Learning about Delirium in a Simulated Clinical Environment: An Interprofessional Learning Intervention for Final Year Medical and Nursing Students

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Ethical approval was granted for this research study by the Monash University Human Research Ethics Committee, Approval number CF08/0127-2008/000061.

DECLARATION

This thesis does not contain any material previously submitted for examination in any other course or accepted for the award of any other degree or diploma in any university and, to the best of my knowledge and belief, does not contain any material previously published or written by another person except when due reference is made in the text.

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Date: March, 2015

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This research study was originally funded from a Faculty of Medicine, Nursing and Health Sciences Teaching and Learning Performance Grant in 2007. The intervention was conducted in Semester 1, 2008 and data collection took place during this time to fulfil the reporting requirements of the grant.

ABSTRACT

This research reports on findings from an interprofessional teaching and learning (IPL) activity delivered to 211 final year medical and nursing students using a simulated patient with delirium in a simulated clinical environment. The aims of the study were to develop, trial and evaluate an interprofessional learning approach and compare this with a uniprofessional learning (UPL) approach. Students' knowledge and perceptions of the learning experience were evaluated for both groups. The objectives of the study were to identify whether an interprofessional approach:

- increased students' knowledge of, and confidence in, managing patients with delirium;
- developed students' appreciation of each other's roles in the management of delirium;
- developed students knowledge of, and confidence in performing interprofessional collaborative practice skills.

An additional objective was to determine whether a modified Readiness for Interprofessional Learning Scale (M-RIPLS) was a valid and reliable instrument to use in the pre-registration setting, in an Australian context.

To address these objectives a Delirium Knowledge Test, an Interprofessional Learning Rating Scale and the M-RIPLS were used. Post-test questionnaires determined the perceptions of the students about the intervention. Individual interviews were used to further explore students' perceptions of the experience. Four Sub-scales emerged from the Factor Analysis of the M-RIPLS instrument: "Teamwork & Collaboration"; "Patient Centredness"; "Roles & Responsibilities"; and, "Professional Freedom". The scale was consistent with other iterations of both the original and modified version of the tool.

Results indicated that the interprofessional education approach used in this cohort:

- Increased students' knowledge of delirium;
- Increased students' ratings of how IPL influences effective interprofessional collaborative practice (ICP);
- Improved nursing and medical students' knowledge and appreciation of each other's roles;
- Developed attitudes of appreciation, trust and respect amongst the students of the two professions; and,
- Increased students' confidence and perceptions of their personal development in interprofessional collaborative competencies, such as the ability to work in teams, to collaborate, to communicate interprofessionally and to work towards making the patient the centre of health care delivery.

This study also revealed that a blended learning approach incorporating the use of simulation was the most effective way to deliver IPL and to develop ICP competencies.

ACKNOWLEDGEMENTS

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To be a professional is to be interprofessional …
(Meads & Barr, 2005)

IPL Delirium Workshop © 2010, Monash University.

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I've probably developed a much better respect and probably will develop a much better relationship with the doctors from now on … (IPL nursing student, 2008)

I think that for the first time, I got to see things from a nursing point of view and how they actually manage a patient. It has actually helped me a lot in terms of understanding how they function and how they work … (IPL medical student, 2008)

CHAPTER 1

Introduction

1.1 Introductory statement

This Chapter introduces the study and provides the background and context to the development of the intervention and subsequent study methods. It provides the key definitions, identifies the problem and the drivers for this research, and provides an overview of the structure of the thesis. The research questions addressed in this study are presented.

1.2 Key definitions

Interprofessional Education (IPE): “Occasions where two or more professions learn with, from and about each other to improve collaboration and the quality of care” (CAIPE, 2002, p.2).

Interprofessional Learning (IPL): “Learning arising from interaction between members (or students) of two or more professions. This may be a product of IPE or happen spontaneously in the workplace or in education sessions” (Freeth, Hammick, Reeves, Koppel, & Barr, 2005, p.xv).

Interprofessional Collaborative Practice (ICP): “Two or more professions working together as a team with a common purpose, commitment and mutual respect” (L-TIPP, 2009, p.iv).

Interprofessionalism: “an approach to team-working which emphasises highly collaborative practice and problem-solving” (Bromage, 2009).

Multiprofessional Learning (MPL): “where members (or students) of two or more professions learn side by side; in other words, parallel rather than interactive learning” (Barr, Koppel, Reeves, Hammick, & Freeth, 2005, p.32).

Multidisciplinary Education (MDE): “education between different branches of the same profession or between academic disciplines” (Barr & Low, 2013, p.4), for example: a physician and a surgeon.

Uniprofessional Learning (UPL): “where members of a single profession learn together” (Freeth et al., 2005, p.xvii).

Transprofessional Learning (TPL): An emerging term not fully explained nor analysed in the literature. “A framework for professionals which allows for the sharing and integration of expertise among team members where members of a single profession learn together” (Bell, Corfield, Davies, & Richardson, 2010, p.143) or, "…teamwork that includes non-professional health workers that might be of even greater importance for health-system performance, especially the teamwork of professionals with basic and ancillary health workers, administrators and managers, policy makers, and leaders of the local community" (Frenk et al., 2010, p.1944).

IPE and IPL are terms often used interchangeably, but IPL will be the term consistently used throughout this thesis other than when the terms are quoted from another source.

1.3 Background, context & statement of the problem

This study investigated an IPL intervention developed for final year medical and nursing students using simulated older patients with delirium in a simulated clinical environment.

This thesis deals with three significant problem areas. The first is the rise in adverse events and medical error in health care. This occurs at a time of rapid workforce change. Over the past five decades a fragmentation of the health care system has been observed, resulting in significant breakdowns of patient safety, with poor collaboration between doctors and nurses implicated as a contributing factor. Further, the World Health Organisation (WHO) has invoked IPL as an effective means to promote teamwork. This culminated in a WHO report published in 2010 that declared there was sufficient evidence to suggest that effective IPL enables effective collaborative practice.

The second problem area is the clinical subject of delirium. Delirium, as the single most common acute neurological disorder affecting adults in general hospitals, is an important topic to consider as the context of the intervention. This is not only because of its clinical significance and high morbidity and mortality rates, but also because effective management of delirium is contingent upon an interprofessional approach necessitating among other things clear communication and an understanding of the respective health care team members' roles.

The third area of significance as a key driver for this study is the lack of IPL in the undergraduate medical and nursing programs at Monash University. Despite the significance of delirium as core curriculum content to both professions, it has been noted in the literature that its management is remarkably poorly taught. Within the medical and nursing curricula at Monash University it has traditionally been taught in a uniprofessional manner, in classroom settings and mostly addressing the development of knowledge.

Consequently, there seemed to be a need to create an IPL learning event for undergraduate medical and nursing students in their final years. Further, there was support from the Faculty for a rigorous evaluation of the proposed IPL, not least because it was seen as a potential way to demonstrate IPLs potential to foster interpersonal, communication and team working skills amongst health professionals. The ability to offer a blended approach to this type of learning was also seen as potentially influential in scaffolding students' learning from theory to practice.

Simulation has likewise emerged as an effective and valid teaching and learning strategy with simulated patients being commonly used in undergraduate and postgraduate medical education for the teaching of communication and clinical skills and for monitoring the performance of doctors for clinical examinations (Wallace, Rao, & Haslam, 2002). The use of simulated environments was therefore considered to be one of the key approaches that could be incorporated into the teaching and learning intervention – the efficacy of which will be investigated and presented in this thesis.

1.4 Aim and scope of study

The research was aimed at teaching two groups of health professional students together on a very important topic – delirium – using an authentic learning environment such as simulation. The study aimed to develop, trial and evaluate an interprofessional learning (IPL) approach. This was compared to a standard uniprofessional (UPL) approach in order to examine students' knowledge and perceptions of the experience.

1.5 Research questions

The research addressed four central questions:

1. Does an interprofessional approach:
    a. Develop medical and nursing students' knowledge of, and confidence in, performing interprofessional collaborative practice skills?
    b. Increase students' knowledge of, and confidence in, managing patients with delirium?
    c. Develop students' appreciation of the roles of doctors and nurses in the management of delirium?
2. Is a blended learning approach an effective way to teaching interprofessional teamwork and collaboration?
3. Is the modified RIPL scale a valid and reliable instrument to use in the Australian pre-registration context?
4. What is the feasibility of implementing a large-scale interprofessional education in the pre-registration years?

The current study therefore sought to expand the growing evidence base that has previously demonstrated the value of IPL in the pre-registration years and to explore the implications that might have for interprofessional collaborative practice (ICP). It also sought to examine the pedagogical approach in order to better understand the nature of learning, particularly for large groups of students.

1.6 Methods

The study incorporated multiple methods to compare the experiences of two groups of learners:

- A discipline specific group consisting of two subgroups each comprised of approximately 50 medical and 50 nursing students.
- An interprofessional group of approximately 100 medical and nursing students together.

Prior to and on completion of the clinical simulation three tests were administered. First, all students completed a 29 item questionnaire - “The Modified Readiness for Interprofessional Learning Scale” (M-RIPLS) to measure their attitudes and perceptions towards IPL. Nineteen items in this questionnaire have previously undergone numerous validation studies (the original RIPLS). Second, a knowledge test was administered to determine students’ knowledge of delirium. Third an Interprofessional Learning Rating Scale was used to measure student’s views on whether IPL was a driver that influenced effective ICP.

Following the pre-test, the profession specific group underwent a 40 minute profession specific ‘lecture’ on delirium followed by a profession specific case based tutorial. The interprofessional group participated in the same activities; however, this was achieved using a fully integrated interprofessional approach.

All students then participated in an interprofessional simulation activity of delirium using a simulated clinical ward setting and simulated patients. Students remained in their groups but were further divided into groups of 12 (4 participants and 8 observers). Follow up interviews further elaborated on the perceptions of the students’ interprofessional practices during this experience.

1.7 Structure of the thesis

In establishing the background drivers and context of the study reported in the thesis and the key terms pertaining to interprofessionalism, Chapter 1 provides an overview of the components of the study and how the structure of the thesis is presented. Chapter 2 elaborates on the process used to identify the plethora of frameworks available to researchers of IPL practices and then presents a justification of the final choices made for this study.

Chapter 3 reviews the array of literature related to IPL and ICP and considers the outcomes from a number of significant international Cochrane and systematic reviews related to this field. This Chapter also explores the evidence base for the use of simulation-based education methodologies with emphasis on the use of simulated patients and concludes with an overview of the literature related to the problem of delirium; particularly from an education perspective.

Chapter 4 introduces the methodology through the educational intervention designed for this study and its links to the system-based framework model developed by Freeth and Reeves

(2004) called the Freeth & Reeves 3-P model. Chapter 4 details the selection and recruitment process, the methodological instruments and data analysis protocols and provides a detailed outline of the manner in which the study was fully conducted.

Given the mixed-method approach used in this research, the results of the study are divided into nine different Chapters (Chapters 5 – 13) all of which provide results related to the sample characteristics, the outcomes of the three major quantitative instruments used in the study including factor analysis to test for validity and reliability of the M-RIPL scale, and the qualitative responses from the surveys and the interview. The qualitative Chapters incorporate indicative transcript extracts for the purpose of exemplifying themes.

Chapter 14 discusses five major outcomes related to the intervention from a synthesised analysis of all data sources. Finally, Chapter 15 addresses the research questions and extends the discussion of the effectiveness of the intervention as a means of developing knowledge and confidence in interprofessional collaborative practice. It presents the limitations of the research and offers a potential new framework for future educational endeavour and research.

1.8 Chapter overview

This Chapter has introduced the study and the necessary background and context of the research. Key definitions, research questions, methods and the overall structure of the thesis have been described. The next Chapter deals with the organising frameworks selected for the research.

CHAPTER 2

Frameworks for IPL & ICP – sifting through the ‘tool box’ of options …

2.1 Introduction

An extensive suite of organising frameworks has been developed by policy makers, education providers, educational researchers and health and social care professionals regarding IPL. These frameworks provide an enclosing structure that supports the theoretical basis, developmental process and ultimate educational and practice outcomes of IPL. These frameworks explain what has now become a complex multi-faceted field. Embedded in these frameworks are various assumptions, concepts, values and practices that shape the way interprofessionalism is viewed and how it could be achieved.

Typical frameworks to emerge are:

- Classification Models
- Educational Frameworks
- Conceptual Frameworks
- Theoretical Frameworks
- Competency Frameworks
- Capability Frameworks

In order to decide the most suitable framework to apply in this study, the following Chapter provides the background and a brief overview of each of the above and closes with a justification for the final selection.

2.2 Classification models

Three diverse models have been put forward in the literature that has the potential to shape this study. The first of these is the Braithwaite “Push/Pull Model”, another is the University of British Columbia (UBC) Model, the third is a reform model put forward by The Global Commission, an independent commission of 20 international academic leaders.

The Braithwaite Model

The Braithwaite Model is an early piece of work commissioned by Australian Capital Territory (ACT) Health and conducted by Australian researchers who devised a model involving four areas the authors believed warranted attention if a systems reform was to be achieved in ICP

(Braithwaite & Travaglia, 2005a). These authors described the need for a ‘push’ and ‘pull’ strategy. The push (upstream) is from both the education system itself and professional bodies pushing out graduates that know about and can demonstrate interprofessionalism. The ‘pull’ is from the health system to the education system, one that demands IPL trained health professionals.

1. Macro – upstream: Tertiary Education Providers (PUSH)
2. Macro – midstream: Professional Education, Regulatory and Registration Bodies (PUSH)
3. Macro – midstream: Health systems streams of care activities (PULL)
4. Micro – downstream: Teams, Units, Wards (PULL) (Braithwaite & Travaglia, 2005a)

The University of British Columbia (UBC) Model

Charles, Bainbridge and Gilbert (2010) from UBC, described a model for conceputualising the various types of interprofessional experiences. Their model is informed by the theories of Valsiner (development concepts) and Mezirow (transformational theory). It involves a three part overlapping process across a continuum of interprofessional experiences where there is firstly ***exposure*** (an introductory stage where there is parallel learning experiences with peers from other professions); ***immersion*** (learning the perspectives and roles of other health professionals through dialogue and collaborative learning interactions); and finally ***mastery*** (advanced level critical thinking skills, self-reflection and a deeper understanding of the contributions of own and others roles).

Whilst Braithwaite’s model helps in understanding some of the drivers to enact IPL, it is difficult to use this as a basis for this study as it relates more to policy approaches rather than a single teaching/learning intervention, as is the case in this study. The UBC model likewise, would only be appropriate if vertically integrating IPL across an entire curriculum including embedding it across different professional courses, year levels, learning activities and assessment processes.

The Global Commission Model

In a landmark article entitled - Education of Health Professionals for the 21st Century - published by The Global Health Commission in The Lancet, future outcomes and recommendations were defined (Frenk et al., 2010). Six instructional reforms were proposed:

1. Adoption of a competency-based curricula
2. *Promotion of interprofessional and transprofessional education*
3. Exploitation of the power of information technology for learning
4. Adaptation locally, but harnessing of resources globally
5. Strengthening of educational resources
6. Promotion of a new professionalism

The authors described this instructional reform as one that encompassed the entire range of learners from admission to graduation, “to generate a diverse student body with a competency-based curriculum that, through the creative use of information technology, prepares students for the realities of teamwork, and to develop flexible career paths that are based on the spirit and duty of a new professionalism” (Frenk et al., 2010, p.1952).

Figure 2.1 depicts a summary of the past and present reforms put forward by the Global Commission where we see a move from a science based curriculum to a problem based and systems based approach.

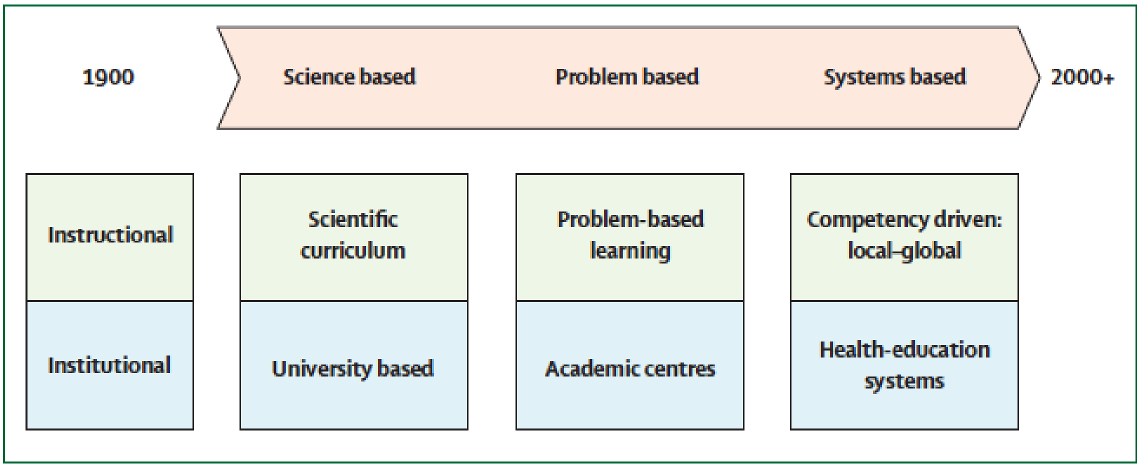


Figure 2.1: Three generations of reform in health professions education (Frenk et al., 2010, p. 1930)

Figure 2.2 contrasts the current dominant model of isolated, ‘siloed’ educational paths with a new and innovative model of interprofessional education. The premise of this new model is the knowledge that in reality teamwork has always been necessary and has been practiced in health care delivery. The more educational experiences that include preparation for this type of work, the better health professionals will be in terms of functioning effectively in teams (Frenk et al., 2010).

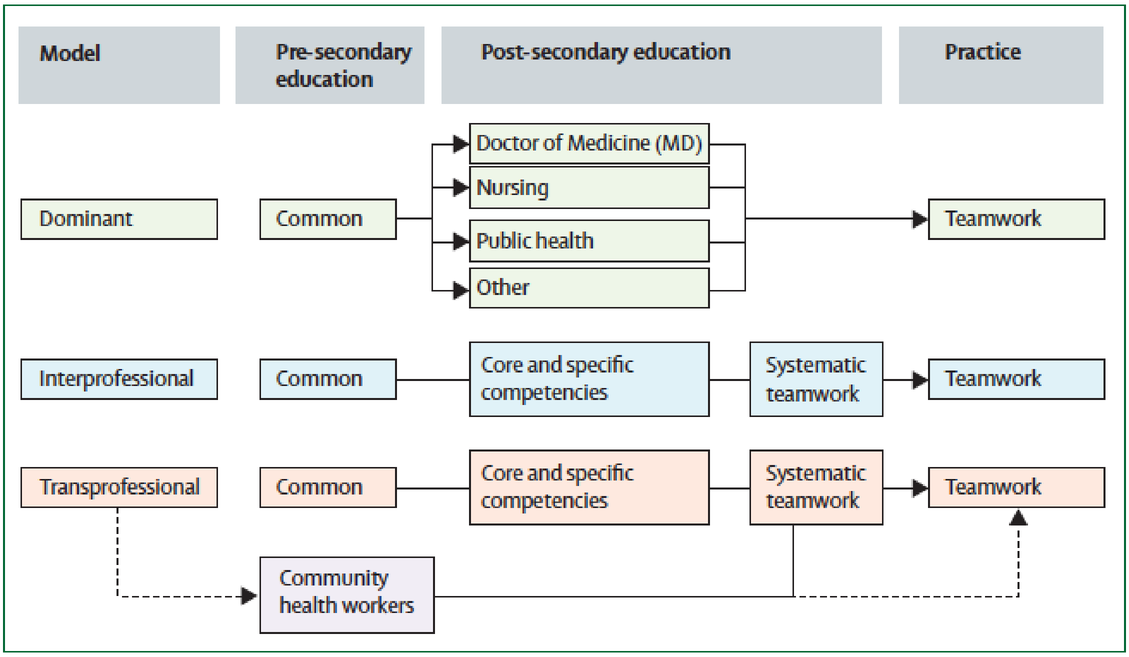


Figure 2.2: A new model of interprofessional education (Frenk et al., 2010, p. 1944)

The Global Commission's new model therefore provides incentive for IPL planners to develop a suite of competencies in relation to IPL. IPL competency frameworks will be presented in Section 2.5 and specific competencies will be discussed in Chapter 3.

2.3 Educational frameworks

Educational frameworks are less common and are mostly found within university-based documentation of interprofessional curricula design. One example of this is the Curriculum Framework for the Integration of IPL into Health and Social Care Curricular of the University of Sydney (G Nisbet et al., 2008). This framework describes the process curriculum planners might use in developing interprofessional curricula that aligns with the aims and expectations of the institution in terms of graduate attributes (including graduate skills and abilities). Three main interprofessional outcomes described in this framework are: interprofessional teamwork, roles of health and social care professionals and interprofessional communication.

Griffith University in Queensland (2011) also has an implementation framework for IPL, with a clear vision and values stated. Once again there is alignment to graduate outcomes. There is reference to a set of educator and curriculum principles with the aim of health professional graduates becoming 'collaborative practice ready'. Ten learning outcomes are described which are more specific in nature than those described by the University of Sydney but similar in relation to teamwork, understanding roles of health and social care professionals and interprofessional communication. These are listed in Table 2.1.

Upon graduation, Griffith-trained health professionals will be able to:
1. Articulate the purpose for effective interprofessional practice in relation to optimisation of the quality, effectiveness and person-centredness of health and social services, in order to assist patients and clients to maximise their health and well-being
2. Work effectively in a team both in the role of team member and of team leader
3. Describe the potential barriers to effective teamwork and strategies through which they may be overcome
4. Describe the roles, responsibilities, practices and expertise of effective members of their own profession
5. Describe the roles, practices and expertise of effective members of other major health professions
6. Recognise and challenge stereotypical views in relation to the roles, practices and expertise of particular health professions in their own thinking and in the communication of others
7. Express their professional opinions competently, confidently and respectfully to colleagues in any health profession
8. Listen to the opinions of other health professionals effectively and respectfully, valuing each contribution in relation to its usefulness for the patient, client or community concerned, rather than on the basis of the professional background of its contributor
9. For individual level care: • Synthesise the input of multiple professional colleagues, together with the beliefs, priorities and wishes of the patient or client and their significant others, to reach consensus on optimal treatment, care and support and how it should be provided While for the community level activity: • Synthesise the input of multiple professional colleagues, together with the values and priorities of the community concerned, to reach consensus on optimal interventions and how they should be implemented
10. Reflet critically and creatively on their own performance in health professional team settings

Table 2.1: Interprofessional graduate learning outcomes for health professional at Griffith University, Queensland (2011, p.6)

The Interprofessional Education for Collaborative Patient-Centred Practice (IECPCP) from Canada provides a comprehensive education and practice framework with two linked central components (see Figure 2.3). One is learner centred. It highlights the learner as central to the interprofessional educational experiences. The second is patient centred and focused on collaborative practice to enhance patient care outcomes. It highlights the patient/client as central to collaborative processes. As Figure 2.3 illustrates, learner outcomes in this framework (D'Amour & Oandasan, 2005; Oandasan & Reeves, 2005b) are described in terms of:

- Knowledge – group functioning, roles and responsibilities;
- Skills/behaviours – communication and reflection; and,
- Attitudes – mutual respect, open to trust, willing to collaborate

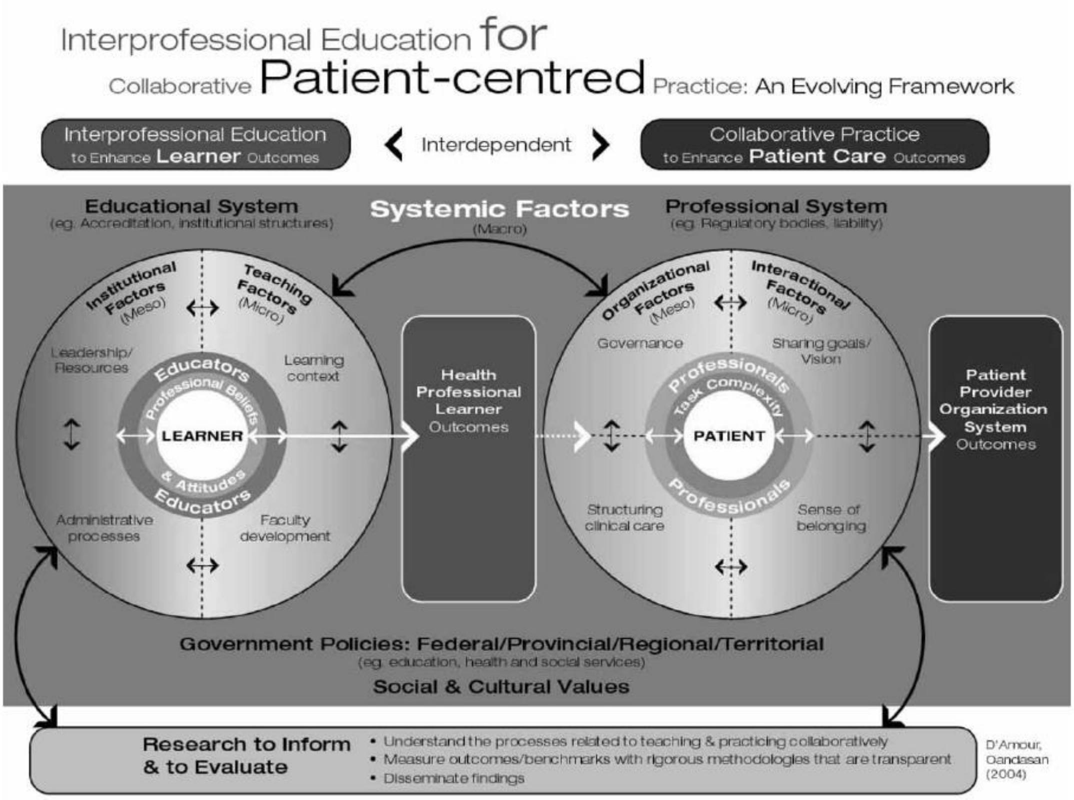


Figure 2.3: The IECPCP framework (D'Amour & Oandasan, 2005, p.11)

2.4 Conceptual and Theoretical frameworks

"Theory for theory sake is futile but practice that is not underpinned by a sound theoretical basis is tantamount to incompetence" (Hean, Craddock, & O'Halloran, 2009, p.11). Numerous authors and researchers have frequently commented on the limited use of theory in the interprofessional field and a frequent criticism has been a lack of systematic, theory driven approaches to the implementation of IPL (Suter et al., 2013). Barr (2013) attributes this phenomenon to the early exponents of IPL who approached it pragmatically for fear that using theory might "intellectualise or obfuscate the self-evident truth that learning together to work together needed no explanation" (p.4). A recent study exploring the extent to which IPL initiatives in the UK were based on sound theoretical frameworks reiterates this point finding a general absence of educational theory underpinning the development of IPL (Craddock, O'Halloran, McPherson, Hean, & Hammick, 2013). A literature review exploring current trends in IPL found that only half of the studies reviewed employed learning theories or conceptual frameworks to guide IPL programs (Abu-Rish et al., 2012).

Clark (2006) argued for theoretical frameworks in order to advance both practice and research in the field of IPL and he described four reasons for doing so:

1. To identify and describe major concepts to guide the development of course program structures and processes
2. To help specify learning objectives and effective methods to achieve them
3. To suggest appropriate roles for learners and teachers in the educational process
4. To aid in measuring program impacts and outcomes (p.579).

Common theories employed have mostly been based on educational and social-psychological perspectives. Given the complexity of interprofessionalism, a more recent push has been to encourage the adoption of systems and organisational types of theories. Table 2.2 shows the multitudes of theories that have been considered in the past in relation to IPL and provides suggestion of ones that have potential to inform the interprofessional field.

Type of theory	Theories currently employed, or with the potential to inform IPL
Organisational theories (Barr, 2013; Suter et al., 2013)	Institutional theory (DiMaggio & Powell, 1983) Organisational learning theory (Argyris & Schön, 1978; Senge, 1990) Punctuated equilibrium theory (Gersick, 1991) Behavioural theory of the firm (Cyert & March, 1963) Contingency theory (Woodward, 1965) Socio-technical theory (Trist & Bamforth, 1951) Stakeholder theory (Freeman, 1984) Integration theory (Lawrence & Lorsch, 1967) Innovation theory (Rogers, 1962) Implementation theory (Montjoy & O'Toole, 1979) Unfreeze-change-refreeze theory (Lewin, 1951)
Systems theories (Barr, 2013; Suter et al., 2013)	Activity theory (Engestrom, Engestrom, & Vahaaho, 1999) Complexity theory (Cooper, Braye, & Geyer, 2004; Fraser & Greenhalgh, 2001) Presage-process-product (Biggs, 1993) General systems theory (Loxley, 1997; Von Bertalanffy, 1971)
Educational theories (Barr, 2013; P. Clark, 2006)	Cooperative/collaborative/social learning theory (Slavin, 1983) Experiential learning theory (P. Clark, 2002; Kolb, 1984) Situated learning theory/Community of practice (Lave & Wenger, 1991) Practice theory (Bourdieu & Passeron, 1990) Reflective practitioner (Schön, 1987)
Social–psychological theories (Barr, 2013; P. Clark, 2006; Hean & Dickinson, 2005)	Contact Hypothesis (Allport, 1979; Carpenter, 1995) Psychodynamic theory (Bion, 1961) Social identity theory (Turner, 1999) Epistemology and ontology of interdisciplinary enquiry (Petrie, 1976) Cognitive & ethical student development (Hofer, 2004; Perry, 1970)

Table 2.2: The ‘tool box’ of theories for IPE. Adapted from (Barr, 2013; P. Clark, 2006; Hean & Dickinson, 2005; Suter et al., 2013)

Hean, Craddock, and Hammick (2012) recognised the challenges associated with selecting a theory referring to it as the ‘zone of confusion’ primarily due to the plethora of options available. They advocated consideration of five domains when making a choice about what theoretical framework to use which were:

1. An agency dimension: For whom would the theory be useful, and how could the theory be applied by each individual?
2. A temporal dimension: When in the IPL experience might the theory be applied usefully?
3. A location dimension: In which learning environment might the theory be useful?

4. Micro versus macro dimensions: Is the learning at the level of the individual student or does it have a wider remit and encompass learning within communities, systems or the organisation as a whole?
5. Utility dimensions: What task might the theory help us to achieve?

As a systems-based theoretical framework of learning (as per Table 2.2), Biggs 3P model is well suited to Hean's five domains and therefore will be explored in more detail in the context of IPL with a view of providing the major framework of this study.

Biggs 3-P model: Presage, Process and Product

The model developed by John Biggs originally focused on classroom teaching and was first published in 1989 as a result of the changing views about teaching and learning in higher education (Biggs, 1989). Biggs presented a model of learning which proposed that the teaching context, student approaches to learning and the outcomes of learning form a system. His model offered an integrated system comprising three main components: Presage; Process; and, Product, hence the "3-P" nomenclature.

Presage factors:	These factors exist prior to learning and relate to the student and to the teaching context.
Process factors:	The approach that learners use to process tasks (Tam, 1999), Biggs refered to this as either a deep or surface approach to learning (Biggs, 1989).
Product factors:	The product phase suggested that study approaches are related to qualitative differences in learning outcomes. In other words, deep approaches produce high quality learning outcomes, while a surface approach results in lower quality outcomes.

The 3-Ps when combined offer insights into the nature of learning and draws attention to the interaction of the student and teaching contexts to produce a deep or surface approach to leaning with the aim of producing quality learning outcomes (Biggs, 1993; Tam, 1999). Kandelbinder (2011) described this as constructive alignment in that when the 3-P system was constructively aligned it could lead to quality learning such as learners learning things that are highly relevant, or taking less time to learn things. What is even more useful about the model is that it lends itself to work-based learning situations (A. Walsh, 2007) – this is appropriate from an ICP perspective. The 3-P model offers a systems-based approach in order to provide a better understanding of how all factors may affect the delivery of a program which in turn may impact on its outcomes (Baker, Egan-Lee, Karen, Silver, & Reeves, 2010).

The 3-P model has undergone many transformations over the past 30 years but the basic tenets have remained the same. In a study on preparing IPL faculty facilitators, use of the 3-P model provided a helpful lens to look at a set of intricate sub-systems including participants, facilitators, program developers and learning outcomes (Baker et al., 2010). The 3-P approach is all encompassing and enables all facets of teaching and learning to be considered, constructively aligned and meticulously planned for. Figure 2.4 provides a diagrammatic depiction of Biggs original 3-P model. It should be noted that Biggs' later work did include multi-directional arrows between presage, process and product (Biggs, 1993).

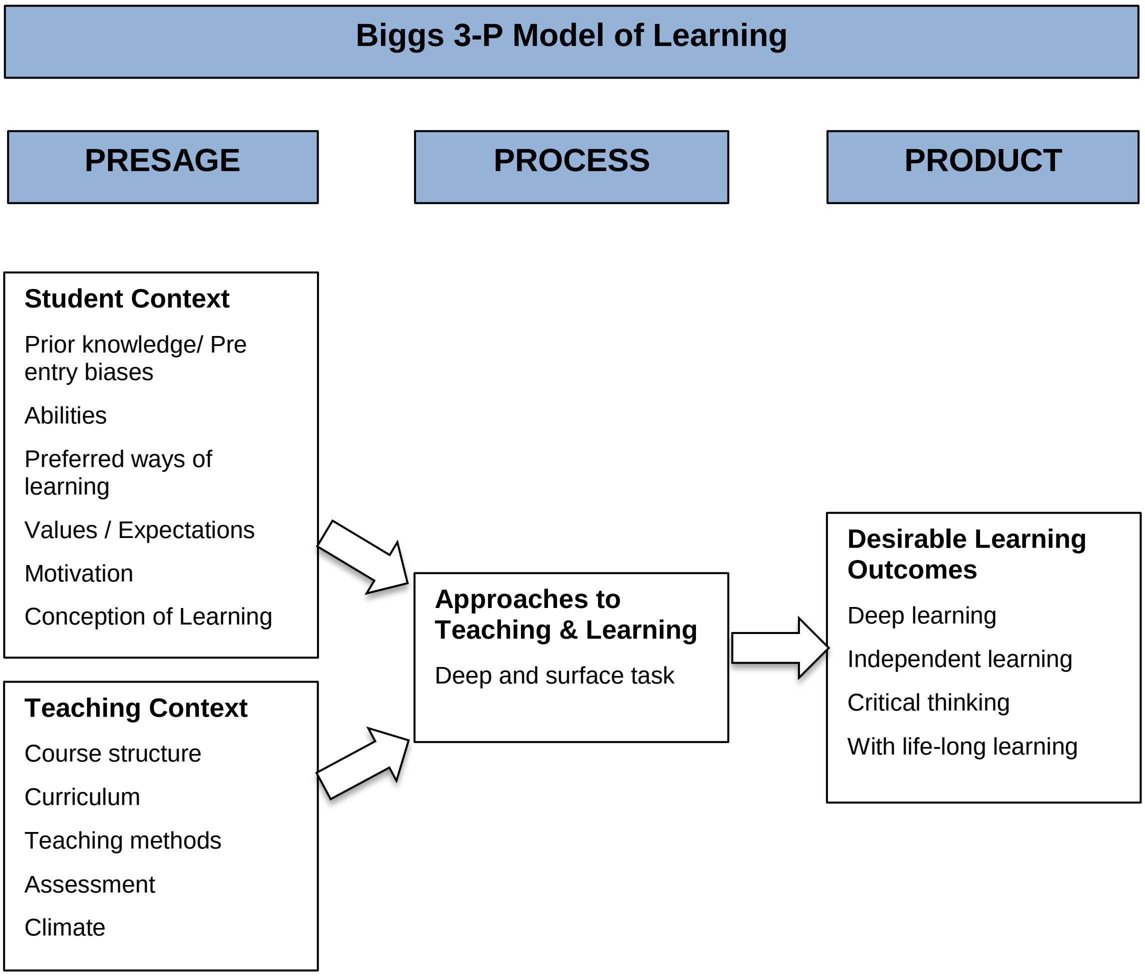


Figure 2.4: Biggs 3-P model of Learning adapted from (Biggs, 1989; Tam, 1999)

Freeth and Reeves (2004) supported the utility of this model stating that it could help planners to frame and illuminate the many complex and diverse influential factors that shape IPL. Their view was that planning for interprofessional collaborative practice was like "untangling the dense web of interacting factors" (p.54). Further, they considered that the presage, process and product factors had too often been overlooked, under-analysed and under-managed in past IPL initiatives. They therefore elaborated on this system, applied it specifically to ICP and presented a range of choices open to the IPL designer; particularly in the process variables section.

The Freeth and Reeves Adaptation of the Biggs 3-P model

Biggs original model included teacher characteristics as a factor of the teaching context. In the Freeth and Reeves model, the teacher characteristics are given greater emphasis to become a separate strand within the presage factors.

In both models there is a natural flow from left to right with presage factors existing prior to the learning experiences. The presage factors influence the creation, conduct and outcomes of these experiences. Process factors describe the teaching and learning approaches leading to the product - the outcome of learning, which in the case of Freeth and Reeves' adaptation are called collaborative competencies (Freeth & Reeves, 2004). Another strong feature of the Freeth and Reeves adaptation is the emphasis on how dynamic this system actually is. Figure 2.5 illustrates how Freeth and Reeves extended and applied Biggs model to the IPL context. (With IPL, the factors are more complex, they interact with each other and there are numerous options to be analysed and considered. Chapter 3 brings these considerations to light in relation to the drivers and challenges of IPE).

The Freeth-Reeves adaptation of Biggs 3-P model is the framework of choice for this study in that it allows all considerations to be included from conceptual development to outcome measures. It also includes all aspects of development, design and evaluation of an IPL intervention. Further, it is not a generic theoretical or work-based learning framework, but is focused on ICP. This choice is supported by a literature review of work-based learning by Tynjala (2013) who found that Biggs' holistic 3-P model provided an excellent analytical tool for understanding the diversity of complex research about work-relevant learning.

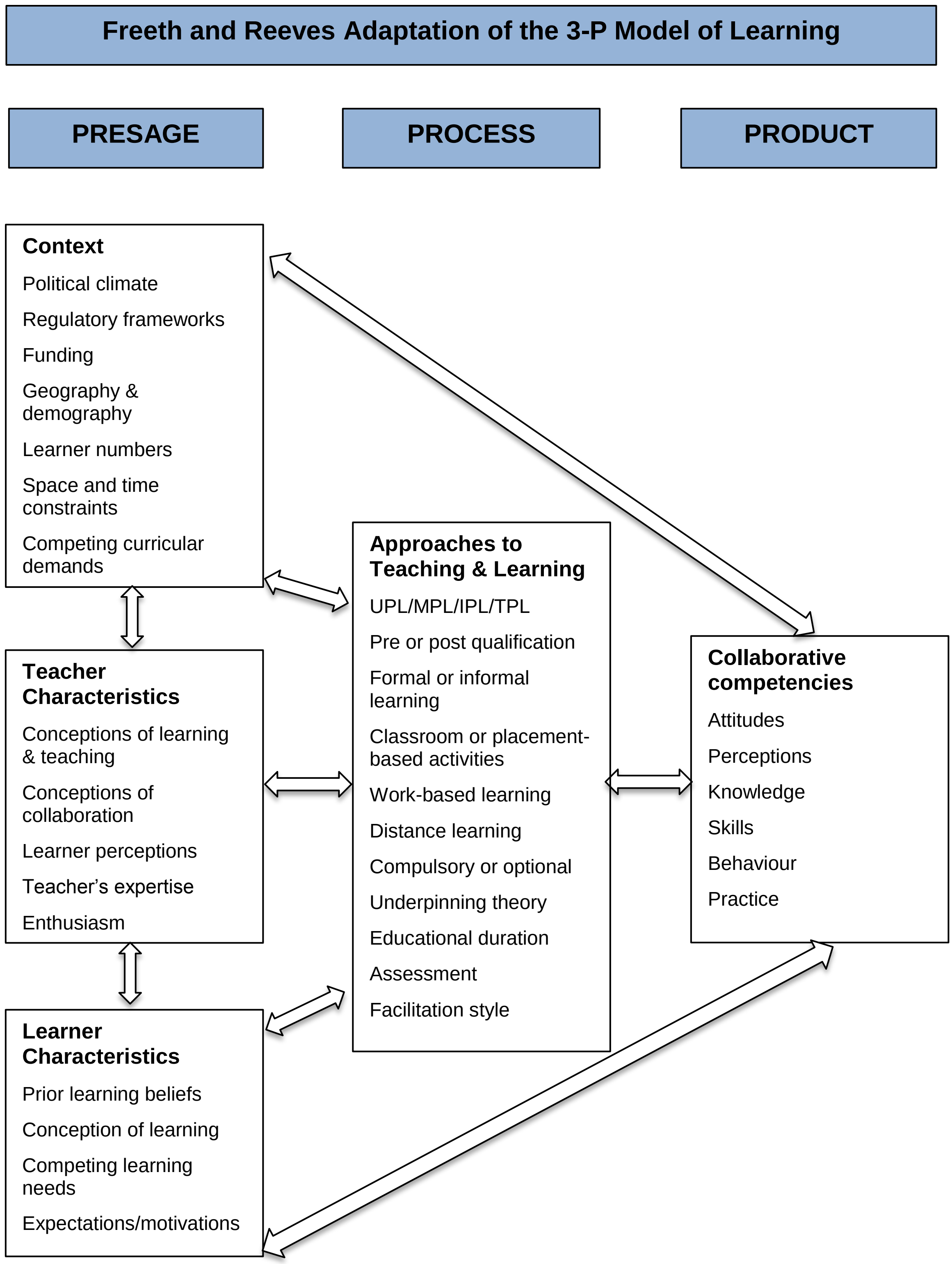


Figure 2.5: Freeth & Reeve's adaptation of the Biggs 3P Model of learning to collaborate Adapted from (Freeth & Reeves, 2004, p.45)

2.5 Capability and competency frameworks

Contemporary health and social care services requires health professionals to possess the necessary skills to practice collaboratively. A number of frameworks have been developed to help describe and classify the standards expected for ICP, and, in turn, to guide education developers in IPL curriculum design. In particular, capability and competency-based frameworks are becoming increasingly popular. Frank (2007) described this as a "competency revolution" in which curricula, standards and assessment are aligned toward frameworks to describe professional abilities. Furthermore, the growing work on competency development parallels the growth of IPL.

Multiple benefits are described in relation to the development of both competency and capability frameworks. As the competency/capability movement has developed, however, a confusing array of terminology and jargon has surfaced. To explain and justify which framework will be used to underpin the outcomes reported in this study it is important to clarify the differences between competency and capability in the context of IPL and ICP.

Capability and capability frameworks in IPL

Capability describes the extent to which individuals can apply, adapt and synthesise new knowledge in different service contexts (Gordon & Walsh, 2005), or it can be considered the sum of expertise and capacity (Brownie, Bahnisch, & Thomas, 2011). In general terms, capabilities are broad learning achievements leading to capability rather than as a specific learning of a particular concept or skill. Capabilities reveal an integrated application of knowledge where the learner/practitioner can adapt and change, develop new behaviours and continue to improve performance. This contrasts with competencies, that do not take complexity into account, but merely considers the performance of tasks (Gordon & Walsh, 2005). Two examples of capability frameworks in the IPL context are outlined below.

1. The Interprofessional Capability Framework

The Interprofessional Capability Framework (ICF) from the United Kingdom was originally developed in 2004 in an effort to conceptualise the 'substance' of interprofessional working. It refers to the ability of health practitioners to work collaboratively and consists of four domains: Collaborative Working; The Reflection; The Cultural Awareness and Ethical Practice; and Organisational Competence (CUILU, 2010; C. L. Walsh, Gordon, Marshall, Wilson, & Hunt, 2005)

2. The Curtin Interprofessional Capability Framework

The Curtin Interprofessional Capability Framework (M. Brewer, 2011; M. L. Brewer & Jones, 2013) is an Australian adaptation of the ICF and is designed to provide a "model for teaching and assessing the capabilities required to be a collaborative practice-ready health professional who can work effectively and efficiently in an interprofessional team to provide safe, high quality service/care to clients, families and communities" (M. Brewer, 2011, p. 3).

Competency and competency frameworks in IPL

Competency describes individuals in terms of their knowledge, skills and behaviours (Gordon & Walsh, 2005). Brownie, Bahnisch, and Thomas (2011) described this as the consistent application of knowledge and skills to the standard required. An Australian report by the National Health Workforce Planning & Research Collaboration, delivered a literature review mapping health workforce competencies, with a view to developing a taxonomy (classification framework) for competency-based standards in health (Brownie, Thomas, & Bahnisch, 2011). This review explored evidence-based options for competency-based health career frameworks in Australia. The authors examined six frameworks as case studies. Four of these frameworks (described below) make reference to collaborative practice, which demonstrates an increased engagement with, and recognition of, the importance of effective interpersonal relations and communication skills, along with an understanding and commitment to ICP.

1. CanMEDS Competency Framework

The CanMEDS Competency Framework (RCPSC, 2014) is a role-based framework that was developed in 2006 by the Royal College of Physicians and Surgeons of Canada. Seven key roles (Domains) are described including the role of *Collaborator.* This framework has significant support from the Australian Medical Council due to its relevance and usability (Brownie, Thomas, et al., 2011).

2. Australian Learning and Teaching Centre (ALTC) Threshold Learning Outcomes Framework

The ALTC Threshold Learning Outcomes Framework (Brownie, Thomas, et al., 2011) is an outcome-based framework for Australian health care disciplines with six defined learning outcomes one of which is to "*work in a team to deliver safe health care"* (p.52)

3. The Canadian National Interprofessional Competency Framework

Published in 2010, the Canadian National Interprofessional Competency Framework (J. Gilbert, 2010) includes six competency domains striving for the goal of interprofessional collaboration:

1. Interprofessional communication
2. Patient/Client/Community-centred care
3. Role clarification
4. Team functioning
5. Interprofessional conflict resolution
6. Collaborative leadership

4. The University of British Columbia Competency Framework for Interprofessional Collaboration

The University of British Columbia Competency Framework for Interprofessional Collaboration (UBC, 2008) outlines the following domains:

1. Interpersonal and communication skills
2. Patient-centred and family focused care
3. Collaborative practice
    a. Collaborative decision making
    b. Roles and responsibilities
    c. Team functioning
    d. Continuous quality

The premise of this framework is that practitioners who can demonstrate their own profession specific competencies plus their interprofessional competencies will have the skills and knowledge deemed necessary to deliver 'optimal, integrated care' (Brownie, Thomas, et al., 2011).

The choice between Competency or Capability in IPL

As can be seen from the above sets of frameworks there are consistent approaches, domains and terminology. Whilst capabilities have their utility in the broader IPL field, in that these provide a more holistic view when compared to competency frameworks, it is the competency approach that has more direct relevance to the outcomes of this study due to its focus on specific learning domains.

For the purposes of this research, a competency, rather than capability framework is considered more useful and measurable as it more directly focuses on development of specific knowledge, skills and behaviours rather than the integration of these into a 'capability'. In addition, The Global Commission's recommendation that this type of approach be adopted adds further weight to this choice, as does the link with the collaborative competencies described in Freeth and Reeves adaptation of Bigg's 3-P Model. Of the competency frameworks, the University of British Columbia (UBC) Competency Framework is the most practical and in keeping with the learner group, aims and objectives articulated in this research, that is, to see if an interprofessional approach develops the knowledge and skills related to the three core competencies. Whilst demonstrated behaviours will not be directly reported, the UBC Competency Framework provides clear criteria to serve as a basis for evaluating the study's product in relation to outcomes.

2.6 Evaluation frameworks

The final type of framework that requires consideration is an evaluation framework. The evaluation framework chosen for this study is based on a version of Kirkpatrick's hierarchy of outcomes modified for IPL that was first described by (Barr, Freeth, M., Koppel, & Reeves, 2000) and later used in a number of systematic reviews of the IPL evaluation literature. Kirkpatrick's original model included four steps of evaluation:

1. Reaction: How well did the learner like the learning process?
2. Learning: What did they learn?
3. Behaviour: What changes in job performance resulted from the learning process?
4. Results: What are the tangible results from the learning process? (Kirkpatrick & Kirkpatrick, 2006)

Barr et al.'s (2000) framework adapts Kirkpatrick's four levels of educational outcomes to fit the IPL setting. Hammick, Freeth, Koppel, Reeves and Barr (2007) later adapted the model as an outcomes framework of evaluation and added two additional classification categories (see Table 2.3 – Levels 2a and 2b). A later adaptation by Payler, Myer and Humphris (2007) added two additional stages to incorporate pre course data collection.

The rationale for selecting this model is also guided by a recommendation proposed following a systematic literature review by Hammick et al. (2007). In that review it was suggested that researchers begin to adopt a common outcomes model, such as Kirkpatrick's, for measuring the products of IPL to enable more robust comparisons between individual studies.

The findings from a comprehensive literature review (Freeth, Hammick, Koppel, Reeves, & Barr, 2002) reported that outcomes from pre-registration (undergraduate) interprofessional evaluations were usually concentrated at Levels 1 and 2a. Consistent with those outcomes, this study focuses on the two pre-stages and three of the six levels of outcomes (Levels 1, 2a and 2b). (It is beyond the scope of this study to identify behavioural and organisational change in the actual clinical practice setting).

Stage	Outcome measures
Literature Review	Pedagogic processes in IPE
Preliminary level	Pre-course data collection
Level 1: Reaction	Learners' views on the learning experience and its interprofessional nature
Level 2a Modification of attitudes / perceptions	Changes in reciprocal attitudes or perceptions between participant groups. Changes in perception or attitude toward the value and /or use of team approaches to caring for a specific client group.
Level 2b: Acquisition of knowledge and skills	Including knowledge and skills linked to interprofessional collaboration
Level 3 Behavioural change	Identifies individuals' transfer of interprofessional learning to their practice setting and changed professional practice
Level 4a: Change in organisational practice	Wider changes in the organisation and delivery of care
Level 4b: Benefits to patients / clients	Improvements in health or well being of patients / clients

Table 2.3: A Modified Kirkpatrick's Classification of Interprofessional Outcomes (Freeth et al., 2002; Hammick et al., 2007; Payler et al., 2007)

2.7 Chapter overview

What is overwhelmingly apparent from the literature is that when it comes to an underpinning or enclosing framework, 'one size does not fit all'. Given the complexity of interprofessionalism this is not surprising. Barr, Koppel, Reeves, Hammick, and Freeth (2005) argued strongly that for such a complex field as IPL, where different groups meet for a variety of purposes, no single theory could suffice. Hall, Weaver, and Grassau (2013) aptly stated that what is needed is a 'toolbox' to build IPL and ICP, made up of "several paradigms that help the planner remain flexible and creative" (p.79). According to Hall et al. (2013) planners need to think like a weaver, selecting threads that will frame and support the program and facilitate the evaluation.

This study therefore draws on a range of frameworks to shape the development and implementation and reported outcomes. To begin with, the study draws from *The Global Commission's* (Frenk et al., 2010) recommendation to follow an interprofessional model of education linked to competency-based approaches.

In general terms, the study follows a *Systems Theory* approach using *Freeth and Reeves adaptation of Biggs 3-P model* of Presage, Process and Product (Freeth & Reeves, 2004).

More specifically:

- the subject matter, setting, and teacher/learner characteristics reflect **Presage** factors;
- the educational design (teaching and learning approach for the intervention) aligns with **Process**; and,
- the outcomes of the study are described as **Product.**

The **Product** is taken a step further to align with the modified *Kirkpatrick's Classification of Interprofessional Outcomes* (Freeth et al., 2002; Hammick et al., 2007; Payler et al., 2007). This incorporates the literature review (Chapter 3), and Pre and Post testing of outcomes addressing Levels 1, 2a and 2b of Kirkpatrick's classification. The **Product** is also evaluated to demonstrate any specific links to the *UBC Competency Framework* (UBC, 2008). Participants' views on the specific teaching and learning approaches also form part of the evaluation that is aligned to **Process**.

Figure 2.6 provides a diagrammatic overview to demonstrate the complex interconnecting frameworks and evaluation processes used in this study.

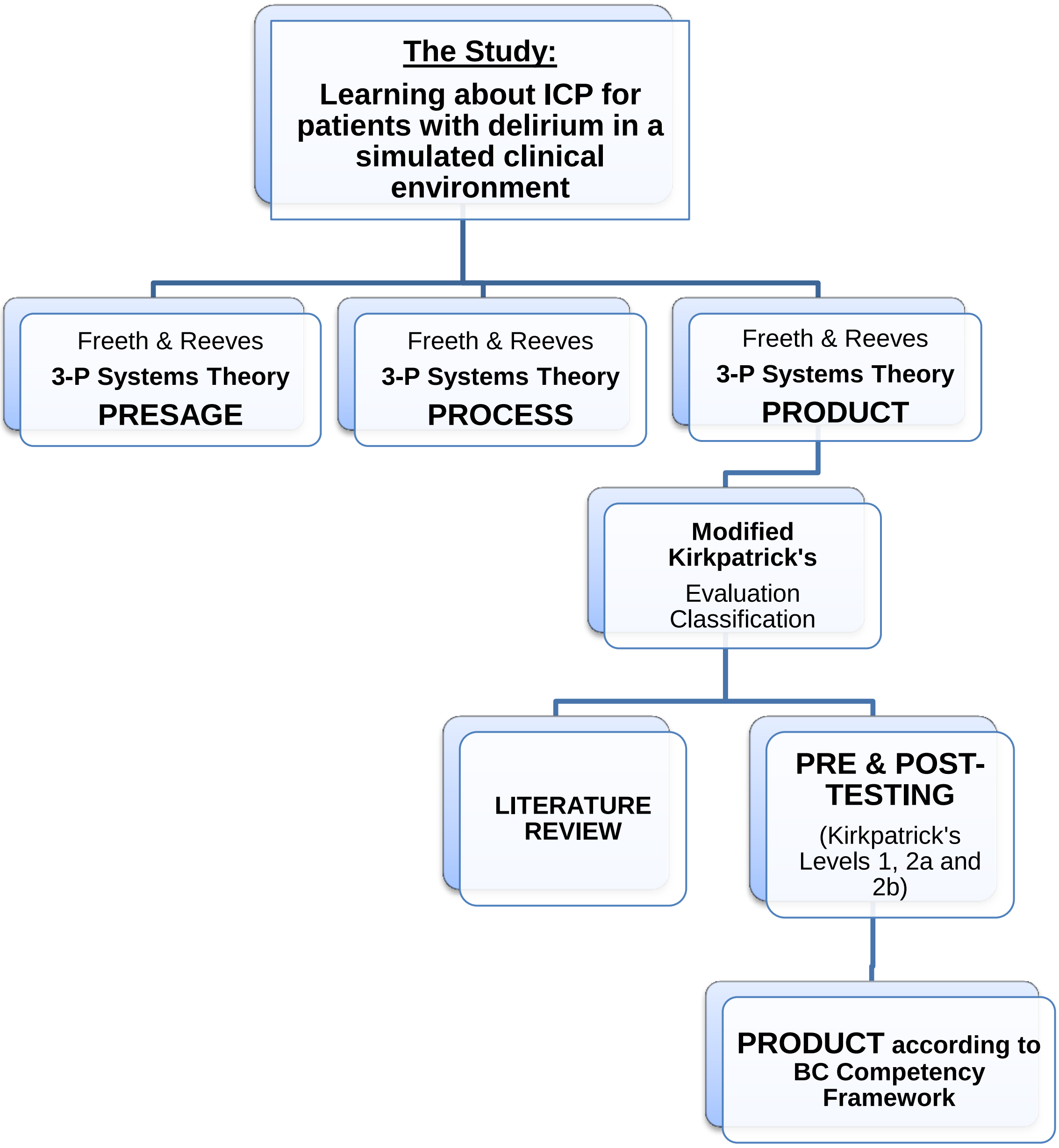


Figure 2.6: All frameworks that underpin the study and support the evaluation

This Chapter has provided an overview of the full range of organising frameworks applied to IPL initiatives and summarises the ones that have been adopted for this research. The following Chapter will provide a review of the literature in relation to interprofessional collaborative practice and interprofessional learning.

CHAPTER 3

Review of relevant literature

3.1 Introduction

This Chapter presents a review of the literature on topics relevant to this research. It will be divided into three sections:

1. Interprofessional Collaborative Practice
2. Interprofessional Education/Interprofessional Learning (using Presage, Process & Product features)
3. The problem of Delirium (the subject context of the study and its significance)

Each of these categories will be further sub-divided into thematic headings. The literature has been searched and reviewed by sourcing:

- Books
- Research and evaluation studies
- Descriptive papers
- Literature reviews (Cochrane Reviews, Systematic Reviews, Literature Reviews and Scoping Reviews)
- Policy and organisational documents (grey literature)
- Websites

3.2 Search Strategies

The field of IPL spans many decades resulting in an abundance of literature and well recognised problems associated with carrying out literature searches. In their work on systematic reviews, Hammick et al. (2007) explain some of the reasons for this, particularly why the IPL literature does not lend itself well to mechanical filters. According to these authors, many IPL studies are widely dispersed; traversing education journals as well as specialist journals for each of the care sectors the IPL addresses. This has resulted in a high variability of how many IPL studies are indexed. There are also problems associated with ambiguous terminology. Given these issues, and combined with the complex scope of this study, a more integrative and iterative literature review has been adopted to enable a critique and synthesis of representative literature relevant to this research and to avoid exclusion of relevant articles or previous literature reviews conducted over two decades. Table 3.1 identifies the databases that were searched to find relevant published literature using the search terms listed in Table 3.2.

Database search

CINHAL	ProQuest Central
ERIC	ProQuest Nursing and Allied Health
Informa Healthcare	PsychINFO
Ingenta Connect	PubMed
MEDLINE	The Cochrane Database (including EPOC)
OvidMEDLINE	Wiley

Table 3.1: Database Selections

The following search terms, key words or phrases were used to explore the breadth of areas relevant to this research. The searches were restricted to papers written in English with no restriction on date range. Boolean searching techniques (where the words, 'and', 'or' and 'not' were used to combine, expand and narrow searches) were applied to some terms. Where relevant references were found, these were obtained.

Biggs 3P model	interprofession OR inter-profession interdiscipline OR inter-discipline	multiprofession OR mutli-profession multidiscipline OR multi-discipline
collaboration	interprofessional	multiprofessional
collaborative practice	interprofessionalism	multiprofessional education
competency	interprofessional education	multiprofessional learning
competency frameworks	interprofessional learning	multiprofessional practice
capability	interprofessional practice	simulation
capability frameworks	interprofessional relations	simulated patients
delirium	interdisciplinary	standardized patients
delirium AND education	interdisciplinary education	standardised patients
delirium AND training	interdisciplinary learning	team or teamwork
education or train or learn or teach or course	interdisciplinary practice	systems theory
education evaluation	Interdisciplinary relations	transprofession OR trans-profession
evaluation methods	IPE OR IPL	transprofesssional education
evaluation research	theoretical/conceptual frameworks	tranprofessional learning

Table 3.2: Search terms

The search was extended checking article reference lists, bibliographies of books and reports for relevant publications. A search of grey literature (such as published and unpublished reports, policy documents, statements, strategies, frameworks and IPL websites) was also conducted with examples listed in Table 3.3.

Australasian Interprofessional Practice & Education Network (AIPPEN)	Institute of Medicine (IOM)
ACT Health	Interprofessional Network of British Columbia
Centre for Advancement of Interprofessional Education, United Kingdom (CAIPE)	Learning & Teaching for Interprofessional Practice (L-TIPP (Aus))
Combined Universities Interprofessional Learning Unit (CIULU)	The Higher Education Academy, Health Sciences and Practice
Curtin University	University of Sydney
Griffith University	University of British Columbia
Health Workforce Australia	World Health Organisation

Table 3.3: Relevant web-based resources

3.3 Interprofessional Collaborative Practice

What is Interprofessional Collaborative Practice?

As defined in Chapter 1, Interprofessional Collaborative Practice (ICP) is “ two or more professions working together as a team with a common purpose, commitment and mutual respect” (L-TIPP, 2009, p.iv). Even though this research is an investigation of IPL, it is collaborative practice that is the ultimate goal with IPL the educational means to achieve this. ICP, therefore, needs further exploration.

Barr, Hammick, Koppel and Reeves (1999) first described this as interprofessional practice, that is, being able to improve care for patients through closer collaboration between the professions and for each profession to respect the integrity of the other in terms of roles and responsibilities. Recent literature has now coined this as ICP, placing more emphasis on its collaborative nature.

Four principles appear to underpin ICP – teamwork, collaboration, patient centred care and professional identity (roles & responsibilities). Using the University of British Columbia (UBC) competency framework for interprofessional collaboration presented in Chapter 2, the following three domains of interprofessional collaboration will be explored in further detail:

1. Interpersonal & Communication Skills
2. Patient-Centred and Family Focused Care

3. Collaborative Practice (UBC, 2008)

Often the above domains are inextricably linked. For example, health professionals who work closely together and communicate frequently can optimise the care for the patient with each member contributing his/her knowledge and skill to augment and support others (Hall & Weaver, 2001). The domains and competencies presented in the framework represent the knowledge, skills and attitudes (professional behaviour) needed for collaborative practice.

What are the Interprofessional Collaborative Practice competencies?

Interpersonal & Communication Skills:

Optimal Interpersonal and Communication Skills are described (UBC, 2008) as the “health professional who consistently communicates sensitively in a responsive and responsible manner, demonstrating the interpersonal skills for interprofessional collaboration” (p.4): Criteria include:

- effectively expresses one’s own knowledge and opinions to others involved in care;
- actively listens to the knowledge and opinions of other team members; and,
- uses information systems and technology to exchange relevant information among all professionals to improve care.

In relation to communication skills, according to Hall (2005) an important component of this is being able to express and support one’s personal views with confidence and assertiveness. Barr et al. (1999) emphasised frequency of communication to optimise patient care highlighting the importance of continuous lines of communication. Oandasan and Reeves (2005a) recognised the need for good communication skills including negotiation skills and Thistlethwaite (2012) argued for an awareness of difference in professionals’ language.

Patient-Centred and Family Focused Care

Through working with others, the health professional is said to be able to “negotiate and provide optimal integrated care by being respectful of, and responsive to, patient and family perspectives, needs and values” (UBC, 2008, p.5). This includes involving patients/families in group decision-making processes and ensuring continuous integration of the patient/families into the team in order to maintain optimal evolving care (UBC, 2008). Oandasan and Reeves (2005a) argued the need to explicitly integrate the opinions of the patient and caregivers into management plans and Thistlethwaite (2012) reinforced the patient’s central role in interprofessional care.

Collaborative Practice

“Collaborative practice establishes and maintains effective working partnerships with other professionals, patients, families, other teams, organisations, and individuals to achieve common goals” (UBC, 2008, p.6). In the framework it is further divided into four sub-sections:

1. Collaborative Decision Making:

"The health professional develops effective and healthy working partnerships with other professionals, whether or not a formalised team exists" (UBC, 2008, p.7). This includes being able to establish interdependent relationships with other health care providers, sharing decision making with others, maintaining professional conduct during interprofessional encounters, resolving conflict with others when disagreements arise and maintaining flexibility and adaptability when working with others (UBC, 2008).

At another level Barr (2002) described this as working with other professions to assess, plan, provide and review care for individual patients. Oandasan and Reeves (2005a) stated that there must be a willingness on the part of health professionals to want to work together. In a study on collaborative practice between registered nurses and general practitioners, Patterson and McMurray (2003) identified five critical attributes related to collaborative decision-making: shared planning, goal setting, decision making, problem-solving and responsibility. Hall (2005) was of the view that there is a need for the health professional team to take responsibility for collaborative decision making, which involves accepting and sharing responsibilities, and participating in group decision making and planning.

2. Roles & Responsibilities:

"The health professional consults, seeks advice and confers with other team members based on a clear understanding of everyone's capabilities, expertise and culture" (UBC, 2008, p.8). To achieve this, the health professional should have sufficient confidence in, and knowledge of one's own profession and the profession of others to work effectively together in order to optimise patient care (UBC, 2008).

In relation to roles and responsibilities Barr et al. (1999) argued two things. First, a need to recognise and observe the constraints of one's role, responsibilities and competence, yet perceive these needs in a wider context. Second, to recognise and respect the roles, responsibilities and competence of other professions in relation to one's own, knowing when, where and how to involve those others through agreed channels. Thistlethwaite (2012) described this as having an awareness of professional boundaries and understanding one's own and others' stereotyping. Oandasan and Reeves (2005a) agreed, stating the need to have trust in relation to self-competence and competence of others. Implicit in this is a knowledge of others roles and a genuine underlying mutual respect about the contributions of others.

3. Team Functioning:

For team functioning, "the health professional uses team-building skills to negotiate, manage conflict, mediate between different interests and facilitate building of partnerships within a formalised team setting" (UBC, 2008, p.9). Five criteria fall into this domain:

- maintains interdependent relationships with interprofessional team members;

- has a critical understanding of interprofessional team structures, effective team functioning and knowledge of group dynamics;
- reflects on team functioning in order to identify dysfunctional processes;
- facilitates interprofessional team meetings; and,
- acts as a representative linking the interprofessional team and outsiders (UBC, 2008).

According to Patterson and McMurray (2003) and Hall (2005) the two critical attributes for team functioning are cooperation and coordination. Cooperation is the acknowledgement and respect of opinions and viewpoints of others while maintaining a willingness to examine and change personal beliefs and perspectives. Coordination is the efficient organisation of group tasks and assignments. This includes understanding the changing nature of health and social care roles and boundaries, dealing with complexity and uncertainty, and tolerating differences, misunderstandings, ambiguities and shortcomings (Barr, 2002; Thistlethwaite, 2012; UBC, 2008).

4. Continuous Quality Improvement:

"The health professional works in an interprofessional team to contribute to continuous improvement of the health care system, particularly in the area of patient safety by mitigating errors, increasing efficiency, and minimizing delays" (UBC, 2008, p.10). In achieving this, the health professional critically evaluates policy and practice in the context of the patient and shares one's own perspective with the interprofessional team. He/she also demonstrates a commitment to a just, non-blaming, non-punitive interprofessional team culture and negotiates and tests interventions within the team to foster a process and systems change (UBC, 2008).

According to Barr (2002), this includes being able to review services, effect change, improve standards, solve problems, and resolve conflict in the provision of care. Further it involves entering into interdependent relationships, teaching and sustaining other professions, and learning from and being sustained by those other professions.

The consensus in the literature is, and according to the above framework, that it appears the competencies for ICP generally fall into three learning domains: interprofessional knowledge; interprofessional skills; and, interprofessional attitudes - all of which are required when undertaking a given task or to achieve a desired goal. It should be noted that some of these competencies span across these categories, particularly patient centred care (Braithwaite & Travaglia, 2005b). A summary of these competencies can be seen in Table 3.4.

Competencies for interprofessional collaborative practice
Interprofessional Knowledge
Awareness of professional role boundaries
Knowledge of other team members expertise, background, knowledge and values
Knowledge of individual roles and processes required to work collaboratively
Interprofessional Skills
Team working skills (negotiation, delegation, time management, assessment of group dynamics)
Communication skills including interpersonal skills and effective social interaction
Conflict resolution skills
Leadership skills
Collaboration skills (cooperative and coordinated)
Skills in providing accurate and timely information to those who need it at the appropriate time
Skills in coordinating and integrating care processes to ensure excellence, continuity and reliability of the care provided
Interprofessional Attitudes
Deals with complexity and uncertainty
Respects, understands and supports the roles of other professionals
Adaptive and flexible
Able and willing to share goals
Tolerant of differences

Table 3.4: Competencies for interprofessional collaborative practice and learning domains
Adapted from (Barr, 2002; Braithwaite & Travaglia, 2005b; R. McNair, Brown, Stone, & Sims, 2001; Mueller, Klingler, Paterson, & Chapman, 2008; Patterson & McMurray, 2003; Pearson & Pandya, 2006,Morison, 2007 #151; Thistlethwaite, 2012; UBC, 2008, p.10; Watts, Lindqvist, Pearce, Drachler, & Richardson, 2007).

3.4 Interprofessional Education and Interprofessional Learning

What is Interprofessional Education and Interprofessional Learning?

If ICP is the desired outcome, then Interprofessional Education (IPE) and Interprofessional Learning (IPL) is the means to achieve this. There have been many attempts at defining IPE. The Centre for Advancement of Interprofessional Education (CAIPE, 2002) provides one of the most widely accepted definitions:

> "… when two or more professions learn with, from and about each other to improve collaboration and quality of care..." (p.2)

IPL is "learning arising from interaction between members (or students) of two or more professions. This may be a product of IPE or happen spontaneously in the workplace or in education sessions" (Freeth et al., 2005, p.xv). For most of this literature review, these two definitions jointly are considered as IPL.

The World Health Organisation (WHO), describe IPL as "the process by which a group of students or workers from the health related occupations with different backgrounds learn together during certain periods of their education, with interaction as the important goal, to collaborate in providing promotive, curative, rehabilitative, and other health related services (WHO, 1988, p.6-7). This differs from multiprofessional learning (MPL), which is defined as "when two or more professions learn side by side for whatever reason" (CAIPE, 2002, p.2). Embedded in the idea of IPL is that there is shared learning which aims to "enhance understanding of others' professional roles and responsibilities, help develop skills needed for effective teamwork and increase knowledge of particular skills and topics" (Parsell & Bligh, 1998, p.89). It should be noted that IPL is primarily focused on understanding and respecting the differences between professions. It is therefore not concerned with substitution or replacement of professional roles (Barr & Waterston, 1996). This is described as transprofessional education (refer to Chapter 1 - definitions).

There are problems associated with terminology in this field. Barr et al. (2005) described this as a "sinking in the semantics" with the field being "bedevilled by competing terms" (p.31). Suffixes and prefixes are therefore important to clarify:

Suffixes: The suffix *Discipline* refers to 'subject', 'discipline' or 'field of study', and *Profession* refers to 'a calling requiring specialised knowledge after academic preparation' (Oandasan & Reeves, 2005a).

Prefixes: The prefix *Multi* refers to 'side by side', *Inter* is 'collaborative', and *Trans* refers to 'role blurring' or 'transprofessional' (Oandasan & Reeves, 2005a).

IPL is consequently different than other forms of learning. Although the focus is still on subject content, there is another multifactorial layer of learning introduced such as learning about professional roles and the interactions that occur. Implicit in IPL is the notion of 'joint active learning'. This adds greater complexity to the learning experiences and outcomes (McKinlay & Pullon, 2007). This also makes it challenging to introduce.

3.5 PRESAGE: Context of Interprofessional Learning

Given the complexity of IPL, the literature will be reviewed with the Freeth and Reeves adaptation of Biggs 3-P model (Presage, Process and Product) as the basis of the discussion. This section considers the important historical context of IPL, the political and policy environment that has shaped its development and the main drivers for the growth of IPL.

Historical background, political climate and drivers for IPL

> If the health groups are brought together during their undergraduate training, and where appropriate are taught by the same teachers, see the same patients and the same facilities, and study together, they will become aware of the capabilities and skills of one another. In this way they should develop into a team of health professionals, replacing the desperate relationships that exists today. The operation of such training programs and facilities will require an organisation and structure which takes the health team concept into account and provides the administrative means of coordinating and ensuring programs and facilities. (Curtis, 1969, p.2) Hereafter known as the Curtis Report.

The history of IPL is a rich one. According to Zwarenstein and Reeves (2000) the modern concern with interactions between doctors and nurses began with an opinion piece in a 1967 psychiatric journal. The authors likened the relationship to a game, a power struggle. The two professions were occupying the same patient care “space”, but they communicated indirectly and manipulatively, with little warmth or mutual support—like a bad marriage. They argued that for this problem to be resolved more radical approaches to collaborative working needed to be explored. The prescient comments from the opening quote along with a series of parallel articles expressed at that time saw the rise of the interprofessional education movement.

The IPE movement, having begun in the early 1960s acquired greater prominence in the late 1970s when the World Health Organisation (WHO), in the Declaration of Alma-Ata-The Vision, sought “urgent action by all governments, development workers and the world community to train and work socially and technically as healthcare teams” (WHO, 1978, p.1). Between 1971 and 1981 there was a flurry of activity on interdisciplinary teamwork with Scandinavia taking the lead and the UK, USA, Canada and Australia all producing a range of initiatives (Oandasan & Reeves, 2005a). Many of these later collapsed (Hall & Weaver, 2001). A further ‘call to arms’ surfaced in 1988 when WHO declared in their Learning Together to Work Together Health Report, that multiprofessional education would improve job satisfaction and encourage a holistic response to patients’ needs (WHO, 1988). CAIPE and the European Network for the Development of MPL was founded at this time to provide a central resource to assist health professional educators to exchange ideas and discuss new initiatives. It was not until inquiries into significant breakdowns of patient safety that the interprofessional education movement finally strengthened its position and became an international imperative.

The Bristol Royal Infirmary Inquiry in the UK was the turning point in the history of IPE and the National Health Service (NHS) in the UK. It examined the tragic deaths of children undergoing heart surgery between 1991 and 1995 and concluded that these children would probably have survived if treated elsewhere. The inquiry found poor organisation, failure of communication, lack of leadership, paternalism and a failure to put patients at the centre of care were all contributors to the deaths of these children (Kennedy, 2001).

> The story of the paediatric cardiac surgery service in Bristol is not an account of bad people. Nor is it an account of people who did not care, nor of people who wilfully harmed patients. It is an account of people who care greatly about human suffering, and were dedicated and well motivated. Sadly, some lacked insight and their behaviour was flawed. Many failed to communicate with each other, and to work together effectively for the interests of their patients. There was a lack of leadership, and of teamwork ... (Kennedy, 2001, pp. 3-10)

One of the recommendations put forth in this report was that more opportunities be provided for different health care professions to share learning and that more emphasis be placed on the non-clinical aspects of care such as communication skills in education programs. The UK was not alone in experiencing breaches in patient safety as a result of failures in teamwork and communication. In 2009 Thompson and Tilden (2009) claimed that 98,000 Americans died every year due to medical errors and 66% of sentinel events in hospitals were caused by communication errors. The Southland District Health Inquiry in New Zealand (HDC, 2001), the King Edward Memorial inquiry in Western Australia (Douglas, Robinson, & Fahy, 2001) and the Bundaberg Hospital (Dr Patel) Royal Commission in Queensland, Australia (Morris, 2005), to name a few, all produced recommendations that included a need for professionals to train and learn together, with a view to improving teamwork and communication and, ultimately, patient care (Braithwaite & Travaglia, 2005b).

One of the earliest, but pivotal, accounts of medical error and patient safety came in 1999 when the Institute of Medicine (IOM) published its “To Err is Human” report in which Kohn, Corrigan and Donaldson (1999) declared that the “decentralized and fragmented nature of the health care system contributed to an epidemic of medical errors” (p.1) with failure of communication and lack of collaboration across disciplines a major contributor. This report was followed by “Crossing the Quality Chasm: A New Health System for the 21st Century” which acknowledged that modern health care had a “growing complexity … with more to know, more to do, more to manage, more to watch, and more people involved than ever before …” (IOM, 2001, p.1). Six aims for improvement and ten rules for redesign were described with cooperation among clinicians a priority. “Clinicians and institutions should actively collaborate and communicate to ensure an appropriate exchange of information and coordination of care …” (IOM, 2001, p.4). In 2003, the IOM provided another report that continued to identify problems with health professionals not adequately prepared to work in interprofessional teams. The report laid the groundwork for implementing the vision of a future health care system focused on integrating patient centred care and being able to work in interprofessional teams, applying principles of quality improvement (Greiner & Knebel, 2003).

> All healthcare professionals should be educated to deliver patient-centred care as members of an interdisciplinary team, emphasising evidenced-based practice, quality improvement approaches, and informatics. (Greiner & Knebel, 2003, p.3)

These events and reports highlighted the tragic consequences of breakdowns in teamwork and communication and steps to mitigate against this. What has transpired over the past 40 years has resulted from a persistent resolve to further the introduction of IPL opportunities at all levels of health care education and practice. This has occurred with varying levels of success. Internationally, including within Australia, there are now government policy documents, professional regulatory bodies and organisations focused on interprofessional education policies and practices.

Scandinavia, and in particular Sweden, have long been acknowledged as the forerunners of IPL curricular innovation. In the early 1970s The University of Linköping devised a plan to pool university resources and base all curricula on common educational principles and content to pave the way for IPL. By 1986 a full-scale undergraduate program commenced, with six health professions involved (Areskog, 2009). Today they are considered the pioneers in student led interprofessional training wards (Ponzer et al., 2004).

Having experienced failures in patient safety, such as in Bristol, the policy push has been robust in the UK, with a renewed emphasis on team-work involving various health professions and a move away from hierarchical models of care (Clifton, Dale, & Bradshaw, 2006). The Health Service for all Talents (2000), The NHS Plan (2000), the Department of Health "Working Together, Learning Together" and the Benchmarking Academic and Practitioner Standards (2001) were publications providing statements, policies and guidelines enhancing the IPL agenda (Glen, 2004). These publications advocated for collaboration and high quality patient care by reducing the fragmentation of services. Other organisations such as The Centre for Advancement of Interprofessional Education (CAIPE) led the way in establishing principles for, and promotion of, IPL. The Combined Universities Interprofessional Learning Unit (CUILU) in the UK, likewise, provided a range of resources supporting collaboration and practice-based IPL. This culminated in a move to include mandatory IPL for all pre-registration training across the UK (Lapkin, Levett-Jones, & Gilligan, 2013).

The drivers for change have also been strong in Canada with the 2002 Romanow Report stating that education and training must prepare health professionals for collaborative practice. Collaboration was seen as necessary to ameliorate a health care system ripe with patient safety issues, health and human resource shortages, and an ageing population with increasing health care needs (Drynan & Murphy, 2010). As a result, the Canadian Patient Safety Institute developed an Interprofessional Patient Safety Competency Framework. In 2003, Canada established the Interprofessional Education for Collaborative, Patient-Centred Practice (IECPCPC) initiative to ensure that health professionals had the knowledge, skills and attitudes to practice together collaboratively (Oandasan & Reeves, 2005b). Today each Canadian university health sciences program offers an IPE subject (Lapkin et al., 2013).

In 2005, the Australian Council for Safety and Quality in Health Care published the National Patient Safety Education Framework. One of the features of this framework was the need for health care workers to ‘communicate effectively’ and to be ‘team players.’ In the same year, ACT Health commissioned a study to identify the value, governance and context of IPE and ICP for an Australian setting. A national conference was convened in 2006 and the Clinical Excellence Commission presented a study to identify issues from eight inquiries into adverse events in Australian health care. Deficient teamwork was a recurring theme from all the inquiries, and health workers were assessed as clinically competent but not necessarily safe to work with one another (J. Stone, 2010; N. Stone, 2007). Despite international developments, by 2007 there was little policy and funding commitment provided for IPE. “Australia was in danger of acquiring a reputation for being in the ‘international backwater’” (N. Stone, 2006). More recently a document released by Learning and Teaching for Interprofessional Practice, Australia (L-TIPP, 2009) recommended the development of health professional curricula that embedded interprofessional learning as a central component, and to graduate students will well-developed interprofessional capabilities. Australia has now ‘heeded the call’ with organisations such as the Australasian Interprofessional Practice and Education Network (AIPPEN) being established to foster the growth of interprofessional learning in Australian health care settings. Whilst not yet fully integrated into Australian pre-registration curricular, Garling’s report from an inquiry into acute care services in NSW Public Hospitals made clear recommendations supporting IPE approaches (Lapkin et al., 2013).

Internationally, the WHO continued to add to the IPE agenda by convening a study group on IPE and Collaborative Practice in 2007. The product of this group was the 2010 Framework for Action on IPE and ICP. This penultimate piece of work describes actions to advance IPE, ICP and the actions to support IPE and collaborative practice at the systems level. It has now become known as the call for action for policy makers, decision makers, educators, health workers, community leaders and global health advocates to take action and move towards embedding IPE and ICP in all aspects of health care service delivery. It provides ideas on how to contextualise existing health systems, how to commit to implementing principles of IPE and ICP and how to champion the benefits of ICP with partners, educators and health workers (WHO, 2010). Figure 3.1 highlights the framework and depicts the current status of ICP around the world. It identifies mechanisms that shape successful collaborative teamwork and outlines a series of actions that policy makers can apply within their own local health system (WHO, 2010). Figure 3.2 identifies how IPE strategies can strengthen health system performance and improve health outcomes. Table 3.5 outlines actions required to advance IPE, ICP and both of these together at the systems level.

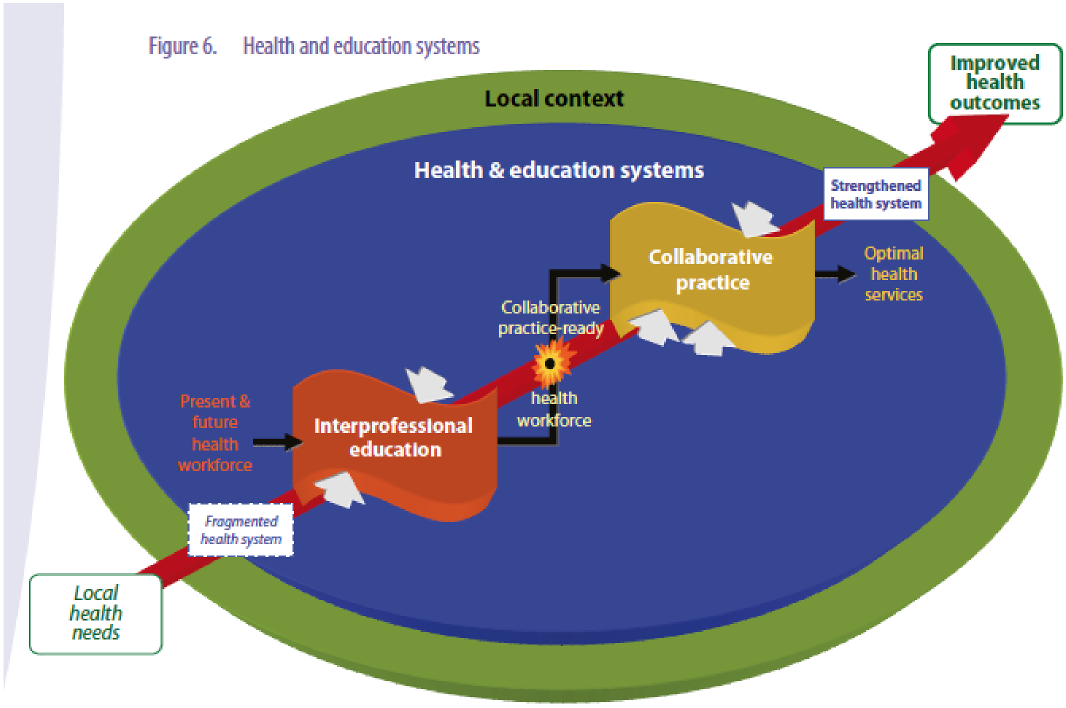


Figure 3.1: Health and Education Systems (WHO, 2010, p.9)

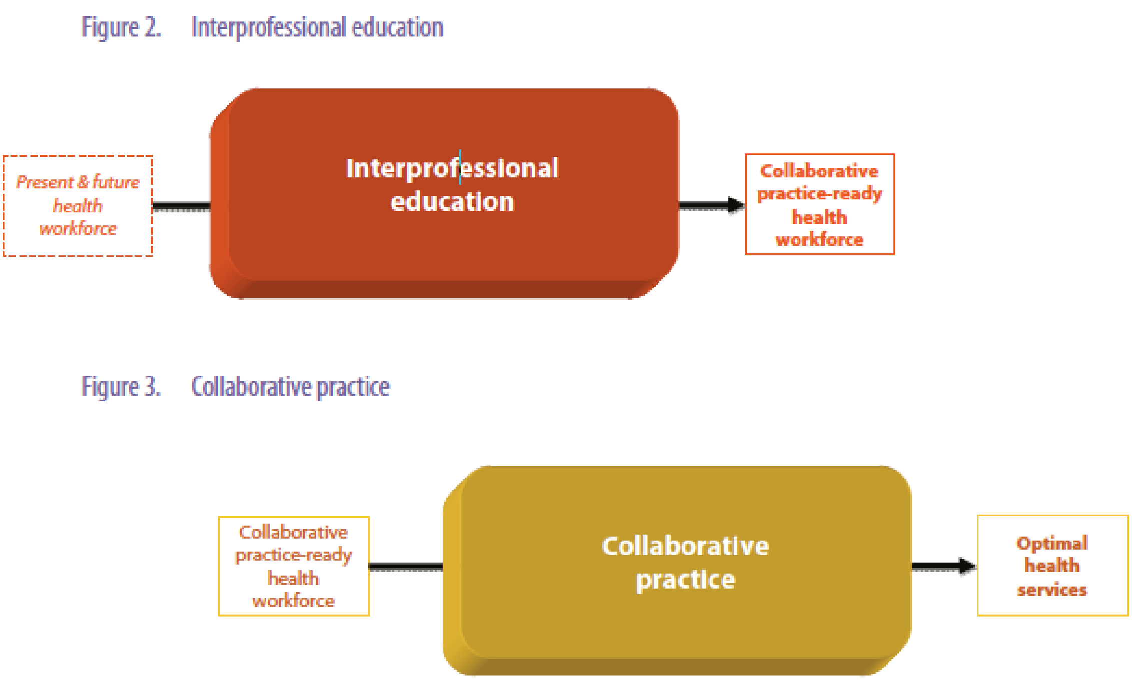


Figure 3.2: IPE and ICPs position in the health system (WHO, 2010, p.9)

Actions to advance IPE	Actions to advance ICP	Actions to advance IPE and ICP at the systems level
Agree to a common vision and purpose for IPE with key stakeholders across all faculties and organizations	Structure processes that promote shared decision-making, regular communication and community involvement	Build workforce capacity at national and local levels
Develop IPE curricula according to principles of good educational practice	Design a built environment that promotes, fosters and extends interprofessional collaborative practice both within and across service agencies	Create accreditation standards for health worker education programmes that include clear evidence of interprofessional education
Provide organizational support and adequate financial and time allocations for: • the development and delivery of IPE • staff training in IPE	Develop personnel policies that recognize and support collaborative practice and offer fair and equitable remuneration models	Create policy and regulatory frameworks that support educators and health workers to promote and practice collaboratively, including new and emerging roles and models of care
Introduce IPE into health worker training programmes: • all pre-qualifying programmes • appropriate post-graduate and continuing professional development programmes • learning for quality service improvement	Develop a delivery model that allows adequate time and space for staff to focus on interprofessional collaboration and delivery of care	Create policy and regulatory frameworks that support educators and health workers to promote and practice collaboratively, including new and emerging roles and models of care
Ensure staff responsible for developing, delivering and evaluating interprofessional education: • are competent in this task, • have expertise consistent with the nature of the planned interprofessional education, • have the support of an interprofessional education champion	Develop governance models that establish teamwork and shared responsibility for health-care service delivery between team members as the normative practice	Create an environment in which to share best practices from workforce planning, financing, funding and remuneration which are supportive of interprofessional education and collaborative practice
Ensure the commitment to interprofessional education by leaders in education institutions and all associated practice and work settings		

Table 3.5: Actions to advance IPE/ICP Adapted from (WHO, 2010, pages 27, 30 and 35)

The evidence supporting the implementation of IPL stretches across more than four decades (N. Stone, 2007). Hall (2005) argues that health care professionals have struggled throughout history to define their boundaries. This has resulted in health professionals working as distinct and somewhat discrete entities with each professional group creating their own cognitive map. In doing so, two professions can potentially look at the same thing and not see the same thing (Hall, 2005). It is important to place the development of the interprofessional education movement in an historical context to determine the key drivers for its development, some barriers along the way, and why is it now considered such an essential component of patient centred healthcare. The historical timelines for the development of IPL are summarised in Table 3.6

Year	Event
1959	**American Psychological Association** write on Interprofessional Relations
1965	Interprofessional article appears in American Psychological Association
1966	American Academy of Optometry write on Interprofessional Relations
1969	University of British Columbia project on Interprofessional Education in the Health Sciences Curtis Report (Canada) Confirmed need for new type of training involving cooperation and coordination
1973	**WHO IPE movement** commences:
1976	Only 36% mental health training programmes in the US had IPL
1978	**WHO Declaration of Alma-Ata**: The vision - "Health for all by the year 2000"
1982	Less than 30% of 105 schools in USA had a component of IP teamwork
1984 - 1995	**Bristol Royal Infirmary Inquiry**: Significant breaches in teamwork and communication
1987	**CAIPE** founded – established principles to guide IPE **European Network for the Development of MPL** constituted
1988	**Learning Together to Work Together Report** Edinburgh Declaration - defined 12 areas of improvement including 'training for teamwork'
1989	White Paper: NHS Community Reforms
1992	CAIPE – national survey of professional groups involved in IPE (mainly nurses / allied health only 7% of physicians involved)
1995	Only 19 published evaluations on IPE
1998	**Pew Commission:** Recreating health professions practice for a new century
1999	IOMs report: **To Err is Human** (Significant review of patient safety): Failure of communication a major contributor to medical error: Recommends interdisciplinary team training programs.
2000	Department of Health: Push for blurred boundaries NHS plan: "**Working together - Learning together**
2001	IOMs report: **Crossing the Quality Chasm**: A New Health System for the 21st Century
2002	**Romanow Report** (Canada): An expectation that health care be provided collaboratively
2003	IOM report: **Health Professions Education: A Bridge to Quality** Canada: IECPCP established
2004	Adverse events study (Canada) Miscommunication and lack of coordination of care
2005	ACT Health Interprofessional Initiative WHO: Five competencies healthcare delivery (patient centred care and partnering). CUILU Provides summary report to develop Practice Based IPL
2006	First Australian National Conference on IPL and IPP Clinical Excellence Commission to identify issues from 8 inquiries into adverse events in health care **Productivity Commission Position** paper: outlining a fragmented health care system WHO World Health Report: **"Working together for health"** WHO Resolution from 59th World Health Assembly advocates "innovative approaches to teaching"
2007	WHO Study Group formed on **IPE and Collaborative Practice**
2008	Health Professional Regulatory Reform Act (Canada): To promote and enhance ICP
2009	L-TIPP (AUS): **Interprofessional Education in Australia: The Way Forward** published
2010	**WHO Framework for Action on IPE and Collaborative Practice**– The most significant published document to guide future curriculum outcomes and policy
2010 - current	A strengthened commitment to IPE and ICP across all levels of education and health care delivery at the international, national and local level

Table 3.6: History of the IPE movement (Barr et al., 1999; Braithwaite & Travaglia, 2005b; Drynan & Murphy, 2010; J. H. Gilbert, 2005; Gordon & Walsh, 2005; Greiner & Knebel, 2003; IOM, 2001; Kennedy, 2001; Kohn et al., 1999; L-TIPP, 2009; Parsell & Bligh, 1998; J. Stone, 2010; N. Stone, 2007; WHO, 1978, 1988, 2010)

The drivers for IPL have emerged from multiple imperatives including rapid workforce changes, interest in the contributions of social problems to health and the rise of the quality movement (Braithwaite & Travaglia, 2005b). Following the original call from the WHO to invoke IPL internationally as an effective means to promote teamwork across many nations throughout the world it has been called for by policy makers, health and social care professionals and educators as a means to improve collaboration and service delivery (Hammick et al., 2007). Hammick et al. (2007) describe the drivers for IPL as both a 'top down' and 'bottom up' approach. The 'top down' method is one that is led by either government policies or an amalgam of government, professional and public drivers resulting from medical error. The influence of IPL champions is significant in terms of how they can translate theory into practice. The 'bottom up' approach is when health professionals either develop discrete programs of IPL locally or transfer their knowledge to others. McNair et al. (2001) also suggests that models of care have changed from a provider-orientated biomedical approach to a consumer-orientated social model of health. The underpinning premise in all the drivers for IPL is that if individuals learn together they will work better together, thus improving the delivery of care. The benefits cannot be ignored.

Benefits of Interprofessional Learning in relation to Interprofessional Collaborative Practice

The reported benefits of IPL & ICP fall into three broad categories; benefits to the patient, benefits to the health care system, and benefits to the health professional (see Table 3.6). From a pre-registration student perspective, there is a view that common curricula will help in the development of a common world-view including common values, language and perspectives, which will transcend into the real world upon graduation (Braithwaite & Travaglia, 2005b). Morison, Boohan, Moutray and Jenkins (2004) observed that students valued teamwork and considered it to be important. The ability to help students from different professions develop a shared learning strategy and to view their professional identity as being collaborative was a major finding of a study by Morison and Jenkins (2007). Reeves et al. (2002) found that IPL had a positive impact on student learning, professional practice and patient care.

The claims about the benefits of IPL suggested in Table 3.7 are based on reported opinions, evaluation outcomes and results of a small number of high quality, more empirically oriented, research studies. Benefits to the patients are more difficult to substantiate in an education context. These are based on only a handful of studies reporting outcomes in clinical practice of IPL but are less conclusive.

Benefits to the patient	Benefits to the health care system	Benefits to the health professional/health professional student
• Enables quality, holistic, safe, patient centred care • Improves clarity of objectives for the patient • Enhances patient-family-community centres goals and values • Enhances patient compliance • Meets patient's functional status needs • Supports the management of complex health care needs • Meets multiple patient needs • Improves health outcomes (decreased hospitalisations, shorter stays, less medical error*) • Increases patient access to choice of provider • Delivers higher rates of patient satisfaction • Reduces patient mortality and morbidity*	• Greater health care efficiency (reduces duplication and hospitalisations) • Ensures Less fragmented care • Facilitates more creative and integrative responses in healthcare (diversity of team) • Common curricula develops a common world view (common values, language and perspectives) • Enables care to be delivered care across health care settings • Increases accountability • Integrates specialist and holistic care • Enables greater focus on preventative care • Less medical error* • Reduces health care costs*	• Reduces the 'silo' effect in education • Less hierarchy, competition and conflict between professions • Modifies negative attitudes and perceptions of others • Remedies failures in trust and communication (provides for continuous communication) • Empowers all health professions • Enhances professional relationships (fosters respect) • Improves working/learning environment • Provides for greater job satisfaction • More positive impact on student learning, professional practice • Increases knowledge of other professions and their contributions/skills • Develops interpersonal and team working skills and collaborative competence

Table 3.7: Benefits of IPL Adapted from (Abu-Rish et al., 2012; Braithwaite & Travaglia, 2005b; Drynan & Murphy, 2010; Hall, 2005; Ker, Mole, & Bradley, 2003; Lorente.M., Hogg, & Ker, 2006; R. McNair, Stone, Sims, & Curtis, 2005; R. P. McNair, 2005; Morison et al., 2004; Mueller et al., 2008; Patterson & McMurray, 2003; Reeves et al., 2002; Reeves et al., 2009; Watts et al., 2007) *less substantiated claims reported in the literature

3.6 PRESAGE: Learner & teacher characteristics, location of interprofessional learning

The literature that refers to the characteristics of learners and teachers, and the location in which IPL takes place, including subject matter choices, will be reviewed as components of Presage factors.

Characteristics of the learner

Who are the learners?

Most reported IPL initiatives involve nurses and doctors, as these are the two largest health professional groups in health and social care. A literature review by Abu-Rish (2012) found that most studies reviewed involved students from two professions and these were mostly medicine and nursing. However, the breadth of health professional disciplines reported in the literature is considerable. Barr et al.'s (2005) systematic review of 107 high quality studies of IPE identified the following statistics in relation to professional participation (Table 3.8).

Profession	Number of studies* (N=107)
Nurses	95 (89%)
Doctors	88 (82%)
Others (e.g. administrators, school teachers)	58 (54%)
Social Workers	39 (36%)
Allied health professionals (unspecified)	32 (30%)
Occupational therapists	22 (21%)
Physiotherapists	18 (17%)
Psychologists	16 (15%)
Pharmacists	13 (12%)
Dentists	5 (5%)
Midwives	6 (6%)

Table 3.8: Professional participation in IPL (Barr et al., 2005). *Actual and percentage figures in this table exceed 107 and 100% respectively as a single evaluation of IPE will contain two or more professions. Therefore multiple recording of numbers was necessary.

The learning preferences of learners and their past experiences of teamwork are also important considerations (Drynan & Murphy, 2010) when designing learning activities. This has the potential to pose barriers for IPL. Learners may need to explore whether their perceived learning needs and outcomes are congruent and whether their learning preferences match (Barr et al., 2005). IPL can also create a degree of dissonance between the desired knowledge or skill and the learner's current state (Barr et al., 2005). The learner therefore needs to be ready and receptive for IPL. Hammick et al's (2007) systematic review of IPE found there was very little information in studies on the age profile, gender and ethnicity of learners that might play a role in shaping interprofessional programmes. Generally they found the majority of participants in IPE were women because most health care professionals are women (Hammick et al., 2007).

Characteristics of the teacher

It has long been recognised that teaching across professional groups is fraught with challenges and involves quite a different set of knowledge, attitudes and skills as well as dedication and time (Hall & Weaver, 2001). Lindqvist and Reeves (2007) suggest this is due to the diversity of students in the IPL context, in that they often vary in age, gender, ethnicity, and in the values that have originally directed them into their profession of choice. Steinert (2005) claims that teachers are traditionally the product of an educational system that is limited to that of their own profession with the majority not trained in an interprofessional environment and many not even working in one. He reports that teachers are often uncomfortable with moving to this approach and do not possess the skills to make the adaptations. According to Anderson (2009), IPL teaching moves teachers out of their comfort zone and away from their area of subject expertise. Oandasan and Reeves (2005a) argues however, the importance of the teaching role in supporting the goals of IPL through role modelling. To be effective, facilitators need to display and role model interprofessional attributes (S. M. Lindqvist & Reeves, 2007; Parsell & Bligh, 1998).

In a systematic review of IPL Hammick et al. (2007) found that the quality of IPL supervision was the most important contribution to student satisfaction and a key determinant to educational processes and outcomes. This is consistent with a study by Kwan (2006) where evidence suggested that skilled, knowledgeable interprofessional facilitators are integral for successful implementation of IPL initiatives.

Oandasan and Reeves (2005a) described six principles important to being an IPL teacher, including the need to be:

- attuned to the dynamics of IPL;
- skilled in optimising learning opportunities;
- valuing of distinctive experience & expertise that participating professions bring;
- able to pay attention to team formation and team maintenance; and,
- able to deal with conflict or sensitivities.

In terms of the motivations for teaching, Remington, Foulk and Williams (2006) contend that IPL requires selection of motivated and skilled facilitators that are trained in non-traditional methods. Lindqvist and Reeves (2007) found the main reason facilitators chose to engage in IPL activities was a commitment to improve interprofessional collaboration and a desire to promote better clinical practice. There is little research however, on how IPL teachers obtain their IPL skills or on strategies needed for preparing, recruiting and retraining faculty on this methodology (Abu-Rish et al., 2012).

In one of the very few papers on teacher training, Steinert (2005) endorsed the view that many teachers lack confidence and are not sufficiently prepared. In preparing teachers, he identified the need to focus on a change of attitude and an increased understanding of the roles and responsibilities of other health care professionals. At the individual level there is a need to address attitudes and beliefs that might impede successful IPL and to provide knowledge about IPL, curriculum and ICP work (Steinert, 2005). According to Lindqvist and Reeves (2007) induction and regular debriefing sessions are key to supporting teachers and fostering a level of interprofessional collegiality.

Staff development to enable competence and confidence in facilitation of IPL is therefore a key consideration in any IPL development. As Hall and Weaver (2001) identifies, the need for more training and motivational incentives for tutors (in particular doctors) is necessary to ensure good facilitator preparation and the successful achievement of learning outcomes.

Interprofessional Learning location

The clinical context for IPL activities varies and the literature includes a range of settings where IPL initiatives have been applied. These can be broadly categorised according to hospital or community-based settings, settings that deal with acute or chronic clinical conditions or specific specialist areas. Barr et al.'s (2005) systematic review of 107 studies found that studies were evenly split between IPL initiatives related to hospital-based care and community-based care (Table 3.9). They also found 60% of the studies were focused on chronic conditions and only 29% were on acute. Most hospital-based IPL related to acute conditions, such as cardiac resuscitation or acute asthma.

Care sector	Number of studies (N=107)
Hospital-based	48 (44.9%)
Community-based	48 (44.9%)
Mixed	8 (7.4%)
Not clear	3 (2.8%)

Table 3.9: Care sector for IPL initiatives (Barr et al., 2005)

Braithwaite and Travaglia's (2005b) literature review provides IPL examples in situations where patients are in need of critical, acute, geriatric, rehabilitation, mental health and/or palliative care. Some of the studies in these settings revealed improved outcomes, shorter stays and reduced medical errors. The reviewers concluded that community placements (service learning) were valuable sources for IPL (Braithwaite & Travaglia, 2005b). Similar contexts were described by Oandasan and Reeves (2005a), such as geriatrics, primary health care, rural medicine, rehabilitative medicine and community settings. The premise underpinning most of these settings is the view that IPL works best where natural teams exist.

3.7 PROCESS: Teaching and learning approaches

Process relates to the approaches used for teaching and learning. According to Freeth and Reeves (2004) this includes the stage where IPL could be introduced, the duration of the learning and the types of learning approaches that are selected.

Interprofessional Learning stage and duration

One of the big debates about IPL is when should it be introduced to learners. There are two schools of thought. Some say it should be introduced early in the pre-registration (undergraduate) years. Tope (1996) argues that IPL would be more effective when students have not become ‘socialised’ into their own professions and developed negative attitudes and stereotypes towards other health and social care professions. Harden (1998) concurs saying there is value in inculcating appropriate professional attitudes at an early stage and in developing a common ‘core’. Parsell and Bligh (1999) express a view that if it were implemented in the early years it would avert entrenched attitudes and negative stereotyping. Barr et al. (2005) also believe there is a need for practitioners to engage in collaborative practice from ‘day one’, often when they are more willing and able to engage (Oandasan & Reeves, 2005a). Starting IPL early in student training before professional doctrines have been built into learning has been found to be important as it helps to capitalise on positive attitudes (Cooper, Spencer-Dawe, & McLean, 2005; Hind et al., 2003; Horsburgh, Lamdin, & Williamson, 2001). Braithwaite and Travaglia’s (2005b) systematic review concluded that for medical students, the earlier the intervention in their professional formation, the more effective the IPL program. The view was that IPL should take place within the first two years of professional training to prevent development of stereotypes about professional groups and to reduce the possibility of perceived threats to personal identity (Braithwaite & Travaglia, 2005b).

Others argue that it should be introduced late in the pre-registration years after learners have had the opportunity to master and become confident in their own professions and develop a basic sense of their future identity (Harden, 1998; R. McNair et al., 2001). Oandasan and Reeves (2005a) state learners must first be secure in their own professional roles before they can function as team members. Barr et al. (2005) present a view that it could be left until the later years when students have begun to ‘find their feet’ in their respective professions. IPL is also commonly introduced in the post-registration years as quality improvement and staff development activities (Oandasan & Reeves, 2005a).

In a large-scale (n=573) longitudinal controlled trial of pre-registration students in Scotland, students commenced their training with strong positive views supporting the principles behind IPL but for some students this weakened with time (McFadyen, Webster, Mclaren, & O'Neill, 2010). Most researchers however, now argue for a continuum of IPL interwoven with UPL and MPL at every stage in pre-registration programs and throughout lifelong continuing interprofessional development (Barr et al., 2005; Clifton et al., 2006; J. Gilbert, 2010). This makes intuitive sense and aligns with the notion of scaffolding interprofessional learning across all years and stages of education. Oandasan and Reeves (2005a) argue however, that these decisions should primarily be based on the goals that are trying to be achieved.

Again Barr et al.’s (2005) important systematic review proves helpful in that it identified the following statistics in relation to the stage of introduction (see Table 3.10). It is anticipated that this data is likely to look different if the same systematic review were to be repeated today as there has been a significant shift in the last ten years of the number of IPL initiatives within pre-registration curricula.

Stage of IPE	Number of studies (N=107)
Post-qualification	85 (79%)
Pre-qualification	20 (19%)
Mixed	2 (2%)

Table 3.10: Most common stage of introduction for IPL (Barr et al., 2005 p.51)

Koppel, Barr, Reeves, Freeth and Hammick's (2001) systematic review identified the following outcomes in relation to the stage, duration and location of IPL. They found evidence to suggest that IPL, as continuing professional development, effects more change to learner behaviour and patient care than in the pre-registration setting. They also found that IPL at the pre-registration stage had a noticeable impact on participants' reaction and learning, and the impact of IPL appeared to have some relationship to its duration. Longer courses were more effective in relation to changing behaviour and the organisation of health care outcomes. Work-based IPL likewise had the strongest impact on learner behaviour and the organisation of health care outcomes and IPL in acute care settings produced more benefit in terms of organisation of health care outcomes than in chronic settings. These authors did however provide a disclaimer to treat these findings with some degree of caution due to:

- it not always being possible to compare 'like with like';
- the strength of the evidence being based on only 99 papers employing either a before and after or post event design; and,
- the potential for reporting bias (an underreporting of neutral of negative outcomes).

In summary they found:

> IPE is more effective at improving patient care if it is of longer duration, delivered in the workplace, particularly in the acute care sector. It also may be more effective if provided as part of early stages of continuing professional development. (Koppel et al., 2001, p.47)

Type of teaching and learning approaches

A number of underpinning principles have been proposed to guide the educational planning process. First of these is planning. All IPL approaches require detailed planning, involvement of all stakeholders and articulation of clear learning objectives linked to curriculum and assessment outcomes (Barr, 2002; R. McNair et al., 2001; Parsell & Bligh, 1998; Thistlethwaite & Moran, 2010).

Balance is also required, "IPE espouses equality and values diversity" (Barr et al., 2005, p.118). Balanced membership between professions`, in terms of number`, size and stability is helpful to achieve the shared goal of improved patient care (Barr, 2002; R. P. McNair, 2005; Oandasan & Reeves, 2005a). Selection of subject matter must also be targeted towards generic content relevant to all participants with a common curriculum across all involved professions (R. McNair et al., 2001), and be situated wherever possible in a clinical setting, rather than an academic de-contextualised classroom (R. McNair et al., 2001; Parsell & Bligh, 1998). Not only should the focus be on patient care but there should also be an explicit focus on learning about, and demonstrating the dynamics of ICP and the non-technical skills of communication, teamwork and conflict resolution (R. McNair et al., 2001; Remington et al., 2006).

The teaching approaches selected should be integrated, interactive and inclusive. As such, IPL should be seen as collaborative not competitive. Theory must be easily transferable to practice (Parsell & Bligh, 1998; Clifton et al, 2006); learner-centred interactive learning activities must be considered; there should be opportunities for informal learning to take place to enable social interaction and there is a need for establishing an inclusive, comfortable learning environment (Barr, 2002; Hammick et al., 2007; Parsell & Bligh, 1998). Whilst not a feature of any published research the use of icebreakers is recommended. In their course guide on how to incorporate interprofessional education into practice education, Drynan and Murphy (2010) recommended the use of icebreakers to establish a comfortable environment, encourage initial interaction and establish a culture of trust and openness.

According to Braithwaite and Travaglia (2005b) a variety of educational approaches work best, with a combination of didactic, clinical instruction (Remington et al., 2006) observation and discussion (Glen, 2004) all being useful approaches. In an exploratory study on student attitudes to their experiences of shared learning, Morison and Jenkins (2007) found that combining classroom and practice-focused learning was the most effective. Multiple IPL formats were used in the studies reviewed by (Abu-Rish et al., 2012) such as small group learning, case-based learning, problem-based learning, large group lectures, reflective exercises, clinical teaching, direct interaction with patients, simulation, community-based projects and e-learning.

In his seminal work on the early developments of IPE, Hugh Barr first described five types of IPE approaches, which are presented in Table 3.11. This was revisited in 2002 and published in the author's later collaborative book entitled Effective IPE, Argument, Assumption & Evidence (2005).

Exchange-based learning	Methods that encourage participants to express views, exchange experience, compare perspectives and expose prejudice *(e.g. debates, case studies)*
Action-based learning	Methods of investigation and co-working such as collaborative enquiry *(e.g. problem-based learning, continuous quality improvement projects, action research)*
Observation-based learning	Psychodynamic observation *(e.g. joint patient visits, shadowing other, usually more experienced students, shadowing clinicians)*
Simulation-based learning	The replication of a real clinical situation to enable relationships between professions to be explored and to receive feedback on performance as participants take different parts in realistic situations *(e.g. role plays, technical skills training with part-task trainers, immersive clinical scenarios with mannequins or simulated patients)*
Practice-based learning	Where a student from one profession is placed with workers from another or when students from different professional disciplines are placed in a real clinical environment *(e.g. interprofessional training wards, interprofessional community placements)*

Table 3.11: Classification of IPL teaching/learning approaches. Adapted from (Barr et al., 2005)

The next section focuses on outcomes reported in studies on three of Barr's classification system - exchange-based, action-based and practice-based approaches. There are very few observation-based studies. Blended approaches incorporating more than one classification are increasingly common as education designers realise the benefits of using a variety of methods. These will be briefly discussed. Simulation-based learning will be elaborated upon in the next section, as this is one of the central methodologies used in this research.

Outcomes from studies using exchange-based approaches

Most exchange-based approaches report findings that increase knowledge about the roles and responsibilities of the other professions. In a study where medical and nursing students exchanged views about how to manage a series of clinical cases, overall attitudes towards the other profession improved and there was an increase in the knowledge of others' roles and duties (Carpenter, 1995). Carpenter concluded that IPL could potentially remove barriers to interprofessional cooperation. A study involving seven professional groups using didactic and small group learning showed similar findings with increases in knowledge of other health care professions and more positive attitudes towards them (Parsell & Bligh, 1998). Pearson and Pandya (2006) evaluated doctors' and nurse practitioners' learning experiences following six half-day shared learning sessions. They found that most participants preferred the interprofessional approach, as it was a way to share expertise and knowledge about clinical areas. A postgraduate study using a case-based approach with doctors, nurses, pharmacists, physiotherapists, respiratory technicians and kinesiologists found that understanding others' viewpoints enhanced interprofessional teamwork and there was a need for communication and collaboration (Verma, Medves, Paterson, & Patteson, 2006). A large-scale longitudinal study using time series design and multiple evaluation methods found significant differences in attitudes of students from different professions and their satisfaction with IPL, however the introduction of IPL during pre-registration years in this cohort did not appear to have a significant longitudinal effect on attitudes towards IPL and interprofessional teamwork (V. R. Curran, Sharpe, Flynn, & Button, 2010).

Outcomes from studies using action-based learning approaches

A quasi-experimental action-based learning study by Lindqvist, Duncan, Shepstone, Watts and Pearce (2005) involved an intervention that ran over nine weeks with a facilitator led intervention group. This group analysed cases and produced a joint report for each case followed by a plenary meeting. The researchers found that students in the intervention group tended to view each profession as more ‘caring’ than did students in the control group. A randomised control group study (three groups) to evaluate the efficacy of an Interprofessional Team Reasoning Framework to facilitate teaching and learning via case studies found that students’ perceptions of team skills were significantly improved (Packard et al., 2012). These students, from five professional groups, jointly worked up a case after first viewing video-recorded examples. Using an analytical framework, students’ performance of their case, (assessed by blinded faculty), was significantly better than the control groups. Another study involving pharmacy, medicine and nursing students, required students to work together to prepare a care management plan on medicines management (Hawkes, Nunney, & Lindqvist, 2013). The researchers found that IPL may help improve patients’ medicines management by encouraging interprofessional collaboration between future nurses, pharmacists and doctors.

Outcomes from studies using practice-based learning

In relation to practice-based settings, a number of studies have been conducted on interprofessional training wards (IPTW) with most taking place in Sweden. A 3-week placement on a short stay municipal care unit for older people in Stockholm resulted in a group of undergraduate nursing, occupational therapy (OT) and social work (SW) students changing their stereotyped views. Despite the experience enhancing students’ understanding of each other’s professions, discrepancies were still noted between the description of their own profession and that of others (Lidskog, Lofmark, & Ahlstom, 2008). A later IPTW placement within a Swedish nursing home found that students were active participants in the care of the designated 12 patients but difficulties were noted in making the training relevant for all student groups (nurses, OTs and SWs). Again, there were discrepancies between expectations and goals (Lidskog, Lofmark, & Ahlstrom, 2009). The authors concluded that the choice of setting was crucial for learning to occur. A meta-analysis of four research studies on IPTW in Sweden revealed that students (nurses, doctors, OTs, and physiotherapists) were positive to the concept of IPL in clinical practice in that it developed an understanding of professional roles. Conclusions drawn included the need to introduce IPL early in the undergraduate years with relevant content and goals. It was also deemed necessary to make the experience mandatory, and that education and support of facilitators was critical to success (Hylin, 2010). A longitudinal study on a student-run clinic on an orthopaedic unit in Linköping found that over the 5 years, the rotation was highly appreciated by the 841 participants (Pelling, Kalen, Hammar, & Wahlstrom, 2011). It strengthened students' insight into their own and others' professional roles and was considered a worthy preparation for future professional work. An exploratory study of 341 medical, nursing and physiotherapy students, likewise delivered findings that showed an increase in the student's knowledge of their own and other professions roles. The outcomes showed that the experience provided opportunities for holistic patient care (Ericson, Masiello, & Bolinder, 2012).

In a UK study on senior medical, nursing, physiotherapy and OT students placed in a rheumatology unit, Reeves et al. (2002) not only found that students valued the experiential learning but it also prepared them for future practice. Patients also enjoyed the ward experience and scored higher on patient satisfaction scores post their hospital stay than a comparative group of patients. An Australian study found similar findings to that of Sweden in that the IPTW had the potential to expand students' understanding of the contributions made by other professionals to effective patient care, although challenges were noted about pre-existing role stereotypes (Nisbet, Hendry, Rolls, & Field, 2008). In another local study conducted in a Melbourne metropolitan Emergency Department, there was little difference in performance indicators between patients managed by student teams as part of an IPL program and a similar group receiving usual care (Meek, Morphet, Hood, Leech, & Sandry, 2013). Patients did however, report high levels of satisfaction with student care. Morison and Jenkins (2007) found that two weeks of classroom teaching followed by 6 weeks of joint clinical placement, enhanced medical and nursing students (n=171) understanding of teamwork and communication. The outcome revealed that combined classroom and clinical placement teaching had sustained benefits.

Outcomes from studies using blended approaches

Using a 2-day shared learning event for doctors and social workers that involved practical exercises in the field, classroom teaching and videotaped case studies, Carpenter and Hewstone (1996) found that overall attitudes toward the other professions improved. Each professional group saw the other as more competent by the end of the program. A combination of e-learning, small group case-based learning (including simulated patient scenarios), face to face small group learning and a panel discussion revealed that face to face case-based learning best supported IPL and highlighted the importance of effective facilitation to enhance student satisfaction (Curran, Sharpe, Forristall, & Flynn, 2008). Another blended approach using problem-based learning, guest speakers, presentation of cases, role-play and facilitated collaborative case-based discussion found that pre-workshop measures were positive predictors of post workshop outcomes (Kenaszchuk, Rykhoff, Collins, McPhail, & van Soeren, 2012). The relationship between workshop attendance and IPL attitudes was positive in seven of the modules.

Using a combination of classroom teaching and clinical placement in relation to HIV/AIDS patients, O'Neill and Wyness (2005) found the experiential components of the learning was more meaningful than the theoretical components with the practice-based collaboration having the most effect. The Leicester Model of IPE in the UK has delivered a comprehensive cycle of learning for over 10 years using teaching approaches such as problem solving and experiential learning in primary health care. Longitudinal evaluations revealed positive learner outcomes that indicated the potential of the model to motivate and prepare future health professionals for teamwork (Anderson & Lennox, 2009).

The research program developed and documented in this thesis aligns with a blended teaching approach with a combination of lecture, exchange-based learning (case study), and simulation-based learning (simulation scenario).

3.8 The role of simulation-based education

As was mentioned in Chapter 2, simulation is defined as a "technique – not a technology – to replace or amplify real experience with guided experiences that evoke or replicate substantial aspects of the real world in a fully interactive manner" (Gaba, 2004, i2). Simulations can include devices, trained persons, lifelike virtual environments, and contrived social situations that mimic problems, events or conditions that arise in professional encounters (Issenberg, McGaghie, Petrusa, Gordon, & Scalese, 2005).

Types of simulation

The types of simulation methods used in healthcare today fall on a continuum from the very simple to the complex. Examples include:

1. **Written case study:** A written story that reflects problem situations from real life or an acted out event from real life using role-play.
2. **Simulated patients**: Everyday people or actors who have been trained to simulate a patient or any aspect of a patient illness (may sometimes be called a standardised patient).
3. **Computer simulations**: Computerised modelling of a real life situation.
4. **Physical simulations:** Physical objects substituted for the real thing. These are often called part-task trainers such as 'Resus Annie' or 'hybrid' simulation where a device is attached to a real person such as an injection pad on the arm of an actor.
5. **Interactive/Immersive simulations that use models:** High fidelity mannequins which respond to actions by a learner.

This section will discuss the evidence base for simulation-based education (SBE) in health professions education and how simulation has been used in interprofessional teaching and learning approaches with particular attention to the use of simulated patients.

The evidence for simulation

SBE has followed a similar historical trajectory as IPL with the same drivers and rationale. The rise of the quality movement, the imperative for patient safety to prevent medical error and the subsequent critical need to train health care teams to communicate and collaborate more effectively has led to the creation of numerous health care simulation training facilities worldwide. In addition to these drivers for change, Gaba (2004), who has long been considered the 'godfather' of health simulation, describes how SBE has also emerged as a result of a long and heavy use of simulation in non-medical industries such as commercial aviation, nuclear power production and the military. He states that what is shared between these industries and health is intrinsic hazard and complexity. From a healthcare perspective this necessitates health professionals being educated and sustained for providing safe clinical care. We also now have the technical capability to be able to recreate medical scenarios in a realistic manner.

According to Kneebone (2006), SBE is considered to be:

- safe;
- learner centred;
- capable of reproducing as closely as possible the conditions of actual practice;
- supportive of the construction of professional identity through participation in communities of practice and learning;
- able to integrate technical skills with non-technical; and,
- a method that exposes learners to various levels of complexity similar to the hazards of real life

Schmidt, Goldhaber-Fiebert, Ho and McDonald (2013) extended these benefits to include the ability to replicate rare, complex or high-stakes scenarios where mistakes are permissible, adjustable levels of challenge is achievable, practise and rehearsal is permitted and corrective feedback is optimised.

In relation to the educational design characteristics for SBE, Jeffries (2005) described a simulation model that followed a very similar pattern to the Freeth and Reeves adaptation of Biggs 3-P model. What is extended with SBE however is the need to ensure *fidelity* (the accuracy of the representation when compared to the real world, (Maran & Glavin, 2003), the ability to adjust the *level of challenge* according to the complexity of the task, the need for *briefing* prior to the simulation, the inclusion of *cues and verbal supports* to learners during the simulation and the *debriefing* process post the simulation which reinforces the positive aspects of the experience and encourages reflective learning. It is often said that the debriefing process is considered key to effective learning as it allows participants to link theory to practice and research, think critically and discuss how to intervene appropriately in complex clinical situations (Jeffries, 2005).

In a critical review of SBE in medical education (SBME), McGaghie, Issenberg, Petrusa and Scalese (2010) described 12 features and best practices as a guide to help educators maximise educational benefits. A summary of these features can be seen in Table 3.12.

Simulation features	**Well established knowledge, 'best practice'**
Feedback	**Essential role in SBME**; Core elements include varieties (formative and summative – mostly formative), sources (trained facilitator, the simulation device and video recording), impact (SBE with potent feedback has the most impact on learning); Individual and team debriefing
Deliberate practice	**Essential role in SBME**; Learner centred; Apparent dose-response relationship
Curriculum integration	**Should be integrated with other learning events** (planned, scheduled, required and conducted in the context of a wider medical curriculum. Focus on educational objectives. SBME complements clinical education does not substitute for patient care in real clinical settings
Outcome measurement	Outcomes that yield **reliable data is essential to SBME**. Feedback to learners, personnel decision, research inferences. Methods: observer ratings, trainee responses
Simulation fidelity	Low to High; Multi-mode (mannequins, task trainers and simulated patients). **Education goals must match simulation tools**
Skill acquisition and maintenance	**Most common learning objective of SBME.** Procedural, Professional, Cognitive and Team skills; Maintenance versus decay; Aptitude and readiness:
Mastery learning	**Rigorous approach to competency-based education** where all learners master educational goals at a high achievement level with little or no outcome variation.
Transfer to practice	**Skills in SBME generalise to real clinical settings**. Highest level of Kirkpatrick hierarchy.
Team training	Communication is the root cause of nearly 70% of errors in clinical practice. SBME allows practice of team-based skills in a consequence-free environment. **Health care team training principles are evidenced-based**
High-stakes testing	The standardisation, fidelity and reproducibility of medical simulation make the technology well suited to formative and summative assessment of clinical competence. **SBME an effective tool for assessing candidates personal qualities and attributes, not just their procedural skills**
Instructor training	**SBME is not easy or intuitive.** Clinical experience is not a proxy for simulation instructor effectiveness. **Instructor and learner need not be from the same health care profession.**

Table 3.12: Medical simulation and best practices**.** Adapted from (McGaghie et al., 2010, p.53)

Zendejas, Brydges, Wang and Cook (2013) conducted another systematic review, which focused exclusively on patient outcomes in SBME. All eligible studies involved procedural tasks and most outcomes reflected procedural success with a small minority of studies reporting other outcomes such as survival and decreased duration of hospitalisation. They concluded that SBME was associated with downstream benefits on patient care. The instructional features that showed improved patient outcomes included more clinical variation and learning strategies, and longer time spent learning. Cant and Cooper (2009) conducted a systematic review of SBE in Nursing Education and found that simulation was a valid teaching/learning strategy with gains in knowledge, critical thinking ability and satisfaction or confidence. In addition, medium and/or high fidelity simulation was seen as an effective teaching and learning method when best-practice guidelines were adhered to.

3.9 The use of simulated patients

Barrows (1993) seminal paper on the use of simulated patients (SPs) for teaching and evaluating clinical skills describes the simulated patient as someone who has been carefully coached to accurately portray a specific patient. According to Barrows (1993) there are numerous advantages of using SPs in that they:

- are available at any time and in any setting;
- are focused on the learning objectives;
- avoid mistreatment of real patients;
- can be used repeatedly;
- provide transition to actual practice on real patients;
- allow for a safe learning environment;
- allow practice for difficult and sensitive conditions;
- can be manipulated for educational purposes;
- can provide feedback to the learner; and,
- can be used for teaching and assessment purposes

SPs are now used widely in medical education. In a literature review of the use of SPs in medical education, Cleland, Abe and Rethans (2009) found that SPs were a valuable resource for teaching and assessing communication and clinical/physical examination skills. These authors found that all SPs effectively play roles, simulate real patients and can give feedback to learners. In another study, using a cohort of medical students and outcome measures of a knowledge test and attitude scales, Eagles, Calder, Nicholl and Walker (2001) compared a videotaped interview of an SP, a live interview with an SP and a real patient interview in the clinical setting of alcohol abuse. The researchers found no difference in end of session knowledge levels or attitudes to patients with alcohol misuse problems. They even found that the use of the live SP was rated as significantly better than either of the two other methods. In another study of SPs, Wuendrich (2012) found that they were not as authentic as real patients but with proper training could reach a high level of authenticity in presenting major psychiatric disorders. In another comparative study of SPs and real patients, Bokken et al. (2010) found that real patients were more authentic but less helpful in practising communication skills and their feedback was less relevant. SPs however were better informed about the purpose of the consultation and provided more specific feedback.

In the research that comprises this thesis, rather than a mannequin-based scenario, a simulated patient has been used to portray the role of a patient experiencing delirium. The clinical context of delirium is well suited to an SP as the fidelity and authenticity of the SP is high and the scenario is able to provoke the right emotional and clinical cues needed to motivate the learner group to communicate with each other and learn how manage the patient problem together.

3.10 Simulation and Interprofessional Learning

A small number of studies in the IPL literature make reference to simulation-based methodologies of teaching and learning. Table 3.13 presents a summary of outcomes from these studies. SBE interventions range from role-play cases, simulated patients, part-task trainers and fully immersive mannequin-based scenarios. It should be noted that many SBE articles investigate teamwork and communication across members of different health professions but the majority of outcomes are not measured in relation to interprofessional competencies.

Authors (Year) & Country	**Title**	**Method**	**Intervention**	**Outcomes**
(Cooke, Chew-Graham, Boggis, & Wakefield, 2003) **UK**	'I never realised that doctors were into feeling too': changing student perceptions through IPE	Before and after study Survey Post focus group Field notes **Cohort:** Undergraduate Medical & Nursing students (n=34)	Two half day session focused on "Breaking bad news" 1. Plenary discussion (communication skills) 2. **Role-play** 3. Practice 'breaking news' with **Simulated Patients**	Teamwork training main educational benefit Students anxious about holistic interprofessional curriculum Health care students may need to collaborate earlier, and for longer periods to enhance professional understanding and relationships
(Ker et al., 2003) **UK**	Early introduction to IPL: a simulated ward environment	Observational research Survey Focus group Formative assessment **Cohort:** Undergraduate Midwifery & Medical Students (n=144)	**Simulated ward** with **Simulated Patients** Students formed small IP teams to manage patients	The development of a controlled, structured and realistic clinical environment provides a useful step in the development of confidence and competence in interprofessional working for clinical practice
(Tucker et al., 2003) **UK**	Learning together: clinical skills for teaching medical and nursing students	Comparative before and after study Survey Confidence ratings for skills **Cohort:** Undergraduate Medical & Nursing students (n=113)	IPL teams practising procedural skills using **Part-task Trainers** over 8 skills stations	Collaborative learning feasible and adds value to the learning experience Positive outcomes in the IPL group with increased confidence levels and understanding of others' professional roles and personal development

Authors (Year) & Country	Title	Method	1. Intervention	Outcomes
(Bradley, Cooper, & Duncan, 2009) **UK**	A mixed-methods study of interprofessional learning of resuscitation skills	Longitudinal study (Before/after and at 3 months) Video observation RIPLS*[1] Focus group interviews **Cohort:** Undergraduate Medical & Nursing students (n=71)	**UPL & IPL groups** One day course **1. Skills sessions** 2. Leadership & teamwork training **3. Simulation scenarios** 4. Assessment scenarios	No significant difference between IPL and UPL groups for leadership, team dynamics or resuscitation tasks Perceived benefits included teamwork, communication and improved understanding of roles and perspectives
(Dacey, Murphy, Anderson, & McCloskey, 2010) **USA**	An interprofessional service-learning course: uniting students across educational levels and promoting patient-centred care	Before and after study RIPLS Geriatric Knowledge Scale (GCS) **Cohort:** Undergraduate Medical, Nursing, Psychology, Pharmacy students (n=10)	**Differences between professions** 1. Lecture **2. Role play** 3. Case study 4. Peer editing **5.** Presentation and discussion	Barriers over scheduling and educational experiences Students gained greater respect for the contributions of others Made them more patient centred Positively influenced the health attitudes and behaviours of older adults
(Hobgood et al., 2010) **USA**	Teamwork training with nursing and medical students: does the method matter? Results of an interinstitutional, interdisciplinary collaboration	RCT Teamwork and attitude instrument Knowledge test Simulated patient evaluation Mayo high performance teamwork scale **Cohort:** Undergraduate Medical & Nursing students (n=438)	**Four groups** 1. Didactic lecture 2. Audience response didactic **3. Role-play** 4. **High performance simulation**	Largest study to date comparing four educational methods of teamwork training. All modalities effective in changing knowledge and attitudes pre and post intervention No educational modality appeared to be superior No educational modality demonstrated a significant change in teamwork skills
(Reese, Jeffries, & Engum, 2010) **USA**	Learning Together: Using simulation to develop nursing and medical student collaboration	Before and after study Simulation design scale Satisfaction & Self confidence scale Collaboration scale Pre and post survey **Cohort** Undergraduate Medical and Nursing students (n=28)	**Groups of 4 IP students** 1. Briefing 2. Immersive mannequin- based **Simulation Scenario** 3. Guided debriefing	Perceptions of the design features of the scenario were positive in all facets of the simulation experience. Feedback and reflection were the most important aspect Ratings of self confidence were high Responses were high on the collaboration scale No differences were observed between nursing and medical students

[1] *RIPLS (Readiness for Interprofessional Learning Scale)

Authors (Year) & Country	Title	Method	Intervention	Outcomes
(Buckley et al., 2012) **UK**	Developing interprofessional simulation in the undergraduate setting: experience with five different professional groups	Before and after study Survey **Cohort** Undergraduate Medical, nursing, physiotherapy and radiography students (n=191)	**Half day sessions of IPL** (3 scenario) 1. Two **Role-played** patient scenarios **2.** One **Mannequin-base scenario**	Routine scenarios following patients journey offer students valuable educational experiences.
(Reisen, Morley, Clendinneng, Ogilvie, & Murray, 2012) **Canada**	Improving interprofessional competence in undergraduate students using a novel blended learning approach	Pre and post 1. IP collaborative competencies attainment survey (ICCAS) 2. IEPS 3. Observation 4. TOSCE (Team Observed Structured Competency Examination) 5. 'We learn' IP Program assessment 6. Course evaluation **Cohort** Postgraduate Nursing, paramedicine, police, child and youth services N=60	**Two day workshop** 3 simulations **1.** Face-to face **Sim 1** **2. Virtual learning** 3. Face-to-face **Sim 2** 4. Online learning dispersed throughout workshop	Improvement in total score of ICCAS and each of 6 individual competencies Significant improvement in total score of IEPS post Significant improvement across 3 simulations in all competency areas for individual and group High ratings on 'we learn' assessment Learners enjoyed interacting in blended environment with positive reports about overall design of workshop.
(Wamsley et al., 2012)) **USA**	The impact of interprofessional standardised patient exercise (ISPE) on attitudes towards working in interprofessional teams	Pre and post comparative study ATHCT Survey Focus groups **Cohort** Undergraduate Dental, medical, nurse practitioner, pharmacy and physiotherapy students	**4 hour intervention using an SP** Chronic illness management in ambulatory setting	ISPE for HP students well received. Students perceived increased knowledge of professional roles, an opportunity to teach others about their role and increased confidence in interacting with other HCPs. Attitudes towards IP teams showed small but sig dif improvements in team value and team efficiency post ISPE

Table 3.13: Overview of studies using SBE and IPE

Despite the same drivers and historical timeline, and the fact that SBE is largely focused on team training, there is very little reference to interprofessionalism in the simulation literature (a clear distinction between each was noticeable in the previous section on the evidence for SBE). Of the literature reviews sourced, most were centred exclusively on SBE in either medicine *or* nursing. What is concerning about this is that it continues to perpetuate a discrete and separate approach which can result in outcomes that are likely to be considered different and distinct for each professional group. One possible explanation to account for the demarcation between areas is that the language and outcomes of IPL have not been easily transferred to the SBE context where references to ‘team training’ is more common. There is frequent reference to ‘the team’ in SBE literature but the professional membership of the team is often not explicit or the focus of attention, nor is there reference to the importance of profession specific roles within the team and how this impacts on relationship and communication. In short, SBE focuses on team competencies and IPL focuses on interprofessional competencies. Rosen et al. (2008) highlight the importance of team performance measurement in SBE and how it is frequently overlooked. However, the authors do not elaborate on the interprofessional configuration of the team itself and how it should be measured. The rigorous study by Hobgood et al. (2010) outlined in Table 3.13 did not produce any changes post the intervention regardless of the education modality but what was interesting in this research was that typical outcomes commonly measured in IPL interventions were not included such as an awareness of professional identity, understanding and appreciation of the roles of self and others and patient-centeredness skills.

Problems also exist in the IPL literature where there are many examples of SBE as one of the teaching approaches used but there is scant attention to best practice features (McGaghie et al., 2010). What is clearly needed in both IPL and SBE is recognition that both strategies attempt to achieve the same goals of teamwork, collaboration, patient-centredness (patient-safety), effective communication and an understanding of the roles of self and others. A future commitment to combine forces, share common language, be inclusive of competency frameworks and examine outcomes across a broad front would further extend and enhance the evidence base for both. This is an area warranting further research.

3.11 Challenges of Interprofessional Learning

The path of introducing IPL into modern health professions education and clinical practice has not been smooth. There have been numerous reservations put forth about its conceptualisation and delivery (Mandy, Milton, & Mandy, 2004). Criticisms of IPL have focused on the need to respect and maintain the specialist intellectual and practice-base of each distinct profession. As Braithwaite and Travaglia (2005b) pointed out, IPL goes against a long tradition of training health professionals in isolation and there could be a perceived threat to professional identity. Hall (2001) discussed the need for role blurring in IPL in order for health professionals to function as an interdisciplinary team, whilst acknowledging that there had been much resistance and confusion associated with redefining roles; a point reiterated by other authors (Finch, 2000; Lorente.M. et al., 2006; Mandy et al., 2004) who also described a lack of clarity around the concept of IPL and the use of multiple and confusing definitions and objectives. Critics of IPL have also seen it as an underhand way of reducing educational costs and edging towards the generic health care worker (Braithwaite & Travaglia, 2005b).

Overall, the challenges and barriers to introducing IPL are multi-factorial and often relate to structural, personal, cultural, professional, organisational and educational obstacles. Lorente et al. (2006) used force field analysis to describe the challenges experienced by two NHS organisations in the UK during the initiation phase of a multi-professional clinical skills project. They found three types of barriers - structural, cultural and educational. These and two additional barriers (professional/organisation and lack of empirical evidence) are summarised below.

Structural barriers

The compartmentalisation of universities, uncoordinated academic schedules and the traditional academic approach (Lorente.M. et al., 2006; Reeves et al., 2002) creates numerous challenges for IPL and is frequently the 'deal breaker' in terms of getting IPL started.

In establishing the Rural Interprofessional Education Project (RIPE) in Victoria, Australia, McNair et al. (2001) described structural challenges as one of the biggest factors to an unsustainable program. Ho et al. (2008) also described how the interface between academia and professions created a real barrier to making IPL work. Thus there can be major challenges associated with logistics, such as:

- separate timetables;
- disproportionate numbers of learners and ensuring parity;
- insufficient learning spaces; classroom size;
- alternate clinical placements;
- availability of teachers;
- arranging meeting times;
- curriculum timing; and,
- matching ratio of students to facilitators.

(Braithwaite & Travaglia, 2005b; Glen, 2004; Hall & Weaver, 2001; McKinlay & Pullon, 2007; R. McNair et al., 2001; Thistlethwaite, 2012)

Cultural barriers

Cultural barriers to collaborate include:

- profession differences in history, values, culture, race, gender, power dynamic, social class and language (Braithwaite & Travaglia, 2005b; Choi & Pak, 2008; J. H. Gilbert, 2005; Remington et al., 2006);
- perceived threat to professional identify; mistrust between professions (Braithwaite & Travaglia, 2005b; McKinlay & Pullon, 2007);
- staff skepticism; unwillingness to experiment with new ways of teaching (Glen, 2004; Ho et al., 2008);
- students' entrenched stereotypical views of other professions (Glen, 2004);
- perception that clinical skills training is being diluted and that sharing of roles is to reduce

costs and edge towards a generic health worker (Braithwaite & Travaglia, 2005b; Lorente.M. et al., 2006); and,

- need to maintain the specialist intellectual and practice-base of each profession (Lorente.M. et al., 2006).

Educational barriers

Bringing health professionals together that have been educated in different systems poses educational challenges. Equality of learners can be an issue such as their level of experience and their numbers (Glen, 2004). In addition, learning is contrasted across professions, assessment approaches are different and clinical experiences occur at different stages. This can also lead to some of the logistical challenges noted previously.

Other educational barriers include:

- differences in academic level of content and demands;
- poor selection of disciplines and team members (Choi & Pak, 2008);
- institutional constraints (Choi & Pak, 2008);
- lack of agreed goals that educators, learners and professionals understand (V. Curran & Orchard, 2007);
- no globally accepted core competencies of ICP (multiple approaches exist in the literature as can be seen in Chapter 2) (J. Gilbert, 2010);
- varying practice demands;
- distinctive assessment approaches of performance (Lorente.M. et al., 2006);
- dealing with faculty mindset barriers (J. H. Gilbert, 2005); and,
- availability to IPE and educational content (Remington et al., 2006).

Professional and organisational barriers

There are also professional regulatory challenges imposed by university legislation, course validation processes, and differences within professional bodies with their accreditation demands. McKinlay and Pullon (2007) make an astute comment about how there is much political will in supporting IPL but implementation is often left to chance. There is still a view that professional organisations focus on representing their own discipline resulting in few drivers pushing the IPL imperative. Gilbert (2005) describes organisational barriers of costs associated with curricular change, different funding models, policy change requirements, governance and management implications, cost of services and cost of research, while Ho et al. (2008) describe a lack of resources and administrative support as being highly problematic.

Lack of empirical evidence

By far the strongest criticisms of IPL have been the lack of consensus on desired outcomes, no firm agreement on the best strategies for implementation and the need to establish a systematic evidence for its effectiveness (Morison et al., 2004). Reeves et al. (2009) was of the view that the poor conceptualisation and overlapping definitions of both IPL and ICP has impeded a robust evidence base. There are still a variety of terms and not one agreed upon competency framework and definition of interprofessionalism. Choi and Pak (2008) also comment on potential conflicts arising when multiple authors and competing intellectual property rights emerge when an interprofessional/interdisciplinary team forms for publication purposes.

In light of what could be viewed as an insurmountable array of challenges (including a perceived lack of evidence), it would be remiss to overlook that which is acknowledged in the literature and take a 'best-practice' view to overcoming some of the barriers. The final section of this literature review will focus on a summary of published literature reviews (some have been included, where relevant, in previous sections).

3.12 Outcomes from reviews of the literature

There has been no shortage of literature reviews about IPL. From its earliest inception there has been a plea for more empirical evidence about learners' attitudes, knowledge and skills, educational design, organisational practice and most importantly patient outcomes. The first published systematic review was in 1999. Since then there have been at least 32 published reviews including 4 Cochrane Systematic Reviews (plus 4 associated publications), 7 Systematic Reviews, 15 Literature Reviews and 2 Scoping Reviews.

Cochrane reviews

Cochrane Reviews are systematic reviews of primary research in human health care and health policy and are internationally recognised as the highest standard in evidence-based health care (Cochrane, 2014). Undertaking a Cochrane Review is considered a scientific investigation in itself with rigorous methods applied and an assembly of original studies having been sorted using strict inclusion criteria usually from randomised controlled trials (RCTs). They are published online in The Cochrane Library and they are usually not applied to educational areas of study. One Cochrane review group however, addresses health interventions outside the strict biomedical, positivist paradigm. This group is called the Effective Practice and Organisation of Care group (EPOC) (Cochrane, 2014). Its scope includes evaluation of interventions designed to improve professional performance, patient care and health outcomes (Zwarenstein et al., 1999). In EPOC two additional study designs are accepted – interrupted time series (ITS) design and controlled before and after studies (CBA). These types of studies are frequently used in educational research.

In 2000, a UK-based team of interprofessional researchers published an EPOC Cochrane Review of IPL focused entirely on IPL interventions and limited to studies that employed RCTs, CBA studies and ITS design. The researchers retrieved 1,042 studies. Of these 89 were reviewed and none were eligible according to the EPOC criteria (Zwarenstein et al., 2000). In

2008 the review was repeated focusing on the effectiveness of IPE. This time 1,801 studies were retrieved, 56 were reviewed and 6 studies were found to be eligible (Reeves et al., 2008). Two of these studies reported mixed outcomes and another two reported that the IPE intervention had no impact on professional practice or patient care. Positive outcomes however, were reported in:

- emergency department culture and patient satisfaction;
- collaborative team behaviours and reduction of clinical error rates for emergency department teams;
- management of care delivered to domestic violence victims; and,
- mental health practitioner competencies related to the delivery of patient care.

A repeat of the original Cochrane review from 2000 and 2008 was undertaken in 2013 yielding 15 eligible studies (Reeves, Perrier, Goldman, Freeth, & Zwarenstein, 2013). Seven of these studies produced positive outcomes adding the following two aspects to the above list:

- diabetes care; and,
- collaborative team behaviour in operating rooms.

Four studies had mixed outcomes and another four had no impact on either professional practice or patient care (Reeves et al., 2013).

In 2009 an additional review was conducted to assess the impact of practice-based interventions designed to change ICP. This review was limited to RCTs with 1128 studies being retrieved, 77 reviewed and 5 found to be eligible (Zwarenstein, Goldman, & Reeves, 2009). The interventions included, interprofessional rounds, interprofessional meetings, and externally facilitated interprofessional audits. Three of the studies had interventions that led to improvements in patient care such as drug use, length of stay and total hospital charges.

Systematic reviews

Given the constraints of the Cochrane Review, a parallel systematic review was performed in 2002 by the same group of researchers that was less constrained but still systematic and rigorous in its approach. This more inclusive review investigated studies that evaluated IPL with a focus on only 'high quality' evaluations based on strengths of design in relation to reported evaluation questions and the quality of the information provided in the published account (Freeth et al., 2002). What follows is a summary of key outcomes from these and other more significant reviews reported in the literature from the UK, USA, Canada and Australia.

The parallel review conducted by (Freeth et al., 2002) was modelled on the adapted Kirkpatrick model of educational evaluations (reported in Chapter 2). Each of the studies reviewed was assessed to be in one of four categories: positive, mixed, neutral and negative with reported outcomes of evaluations concentrated at levels 1 and 2a. Most studies reported positive outcomes mostly at Level 1 through to 4a. Results can be seen in Table 2.9.

Stage	Outcome measures*	Positive	Mixed	Neutral	Negative
Level 1: Reaction	Learners' views on the learning experience and its interprofessional nature	51%			
Level 2a Modification of attitudes / perceptions	Changes in reciprocal attitudes or perceptions between participant groups. Changes in perception or attitude toward the value and /or use of team approaches to caring for a specific client group.	27%		4%	
Level 2b: Acquisition of knowledge and skills	Including knowledge and skills linked to interprofessional collaboration	45%			
Level 3 Behavioural change	Identifies individuals' transfer of interprofessional learning to their practice setting and changed professional practice	23%		2%	
Level 4a: Change in organisational practice	Wider changes in the organisation and delivery of care	40%	6%	2%	
Level 4b: Benefits to patients / clients	Improvements in health or well being of patients / clients	17%	8%	2%	

Table 3.14: A Modified Kirkpatrick's Classification of Interprofessional Outcomes (Freeth et al., 2002; Hammick et al., 2007) *Most studies reported outcomes at more than one level

Changes in **attitude and perception** (Level 2a) included: confidence in teamwork, views on breadth of life experience, academic quality, professional competence of other professionals, roles and functions, satisfaction with team function, clarity of team terminology, mutual responsibility for care, attitudes to team importance, authority, trust, importance of the success of teams, and satisfaction with team accomplishment (Freeth et al., 2002).

Changes in **knowledge and skills** (Level 2b) included: improved knowledge of the nature of interprofessional teamwork, enhanced understanding of the roles and responsibilities of other health care team members, development of teamwork skills such as interprofessional communication (Freeth et al., 2002).

No papers reported wholly negative outcomes.

Braithwaite and Travaglia's (2005b) systematic literature review from Australia revealed that IPL in the postgraduate area was stronger than undergraduate and there was evidence of a positive impact on health care processes and outcomes for patients including, in one instance, a reduction in mortality rates. This review showed that IPL works well when aimed at local teams and that IPL in higher education had the most positive outcomes in relation to learning experiences, changes in attitude and skills acquisition.

Conclusions drawn from Hammick et al.'s (2007) systematic review was that IPL was generally well received by participants and enabled practitioners to learn the knowledge and skills necessary for collaborative working but was less able to positively influence attitudes and perceptions towards others in health service delivery. They also found that in the context of quality improvement activities, IPL was frequently used as a means to enhance the development of practice and an improvement in services.

Another UK systematic review focused on IPL for post-qualifying health professionals in maternity care in the UK (Ireland, Gibb, & West, 2008). It identified 17 eligible studies using reasonably broad eligibility criteria. Evaluations were generally positive but not conclusive enough in relation to interprofessionalism affecting outcomes. An Australian systematic review of the effectiveness of IPL in health professional programs concluded that student's attitudes towards interprofessional collaboration and clinical decision making ability was enhanced with IPL but they were not able to determine whether this was sustained (Lapkin et al., 2013).

Literature reviews

The 15 literature reviews tended to be focused on specific levels of learners or practice areas.

A literature review on IPL in primary health care found the subject matter varied widely and results were overwhelmingly positive with learners' self-reporting changes in behaviour, team working and practice (Clifton et al., 2006). Some studies considered improved patient benefit and clinical outcomes and changes in service delivery (Farooqi & Bhavsar, 2001).

A USA literature review found that IPL was more likely to improve learners' short-term knowledge and attitudes but there was little evidence for long-term improvement or behavioural change. Positive results were seen across 13 studies particularly around knowledge and attitudes. The authors found that programs that incorporated clinical training combined with explicit training on the process for ICP produced the most change in attitude, knowledge and behaviours of clinicians (Remington et al., 2006). Dufrene's (2012) literature review found that most studies focused on perceptions and feelings about IPL with two common themes: understanding of other's roles; and, teamwork & collaboration.

Three common themes emerged from an Australian literature review:

- The need to find common ground between health and higher education
- The importance of enablers and constraints of IPE in current practice
- The urgent need to establish and evidence base to inform future curriculum, practice and policy developments in the Australian context (Nisbet, Lee, Kumar, Thistlethwaite, & Dunston, 2011).

Of the 15 published literature reviews, one of the most noteworthy was one conducted by Abu-Rish et al. (2012). The following trends were observed in reported outcomes from 83 eligible studies:

- Adult learning theory and contact hypothesis was the most common framework
- Majority of IPE activities were in place for 5 years or less
- Most activities were a one-time event (i.e., workshop or simulation training)
- Only 8 studies offered IPL activity on an annual basis
- Most common learning outcomes reported were:
    - students attitudes to IPE;
    - gains in knowledge or IPE competencies or clinical systems;
    - student satisfaction with the IPE course; and,
    - team skills.
- Attitudinal change was rarely assessed longitudinally
- Surveys were the most common evaluation tool, followed by interviews, focus groups, debriefings and knowledge tests
- Majority of studies reported barriers to IPE implementation with scheduling the most frequently reported difficulty followed by matching students of compatible levels, faculty and staff time, insufficient funding and inadequate administrative support
- Key facilitating factors for success were:
    - Administrative support
    - Financial or grant support
    - Staff support
    - Leadership buy in

It can be seen that the outcomes of many of the studies reported over the past 25 years support the value of ICP and the need to graduate students with well-developed interprofessional competencies. It is important that IPL programs are periodically reviewed to determine what can be learned from these initiatives and to take these learnings into new developments. As Thistlethwaite (2012) argued in her key actions for the development of IPE, “we must design and implement a nationally coordinated program of research that is responsive to local conditions and requirements ... and contributes to the development and implementation of a national IPE knowledge management strategy” (p.65).

3.13 The Problem of Delirium

The final section of this review focuses on the clinical problem of delirium and the justification for its selection as the clinical subject matter of this research. Delirium will be explained along with its relevance and significance to doctors and nurses and the educational implications in relation to IPL.

What is delirium?

Derived from the Latin term *delirare,* meaning to become 'crazy' or 'rave', delirium has been documented in the medical literature for more than 2,000 years (Martins & Fernandes, 2012). Delirium has a fairly consistent description in that it is an acute disturbance of global cognitive functioning, characterised by its acute onset and fluctuating course with effected patients experiencing disorganised thinking and inattention (Foreman, Mion, Tyrostad, & Fletcher, 1999; Meagher, 2001a; Miller, 2008; Young & Inouye, 2007). Foreman et al. (1999) describe how patients have an inability to think clearly, care for themselves and often exhibit unsafe behaviours.

Why is it important?

Delirium has been selected as the clinical problem of choice for this research study. There are a number of reasons for this decision. First, delirium is remarkably common, being the single most frequent acute neurological disorder, affecting adults in general hospitals today (Young & Inouye, 2007). According to Brajtman, Higuchi and McPherson (2006) delirium affects approximately 25 – 35% of patients generally, and up to 85% of patients with a terminal illness. Lundstrom et al. (2005) stated that delirium is the most common presenting symptom of old age and constitutes 14 – 42% of admissions for older people into general medicine or acute geriatric services. Delirium is also the most common reason for inpatient psychiatric referrals (Akechi et al., 2010).

Not only is delirium common, it is also associated with poor health outcomes for patients. Patients with delirium have a significantly increased risk of morbidity, (worse physical and cognitive recovery at 6 to 12 months and increased time in institutionalised care), and mortality with a twofold increase in discharge mortality (Meagher, 2001a, 2001b; Tabet et al., 2005; Young & Inouye, 2007). According to Young and Inouye (2007) there is a worse prognosis for patients that have a persistent delirium (about one third of patients). Miller (2008) reports that patient outcomes at one-year post delirium include a higher mortality rate and a lower level of functioning compared with age-matched patients. Foreman et al. (1999) attribute this type of finding to the increased use of physical and pharmacological restraints. This results in an increased risk of falls, pressure ulcer development, infections and protracted length of stay all contributing to delirious patients being six times more likely to die than other patients.

Delirium also causes considerable distress to patients, their families and clinicians and there is an increased health care cost associated with the condition. Young and Inouye (2007) report that delirium is a major burden to healthcare services with an average increase of 8 days per length of stay in hospitals. However, what is even more disturbing is that delirium is frequently missed as a diagnosis by medical and nursing staff (Johnson, 1999; Martins & Fernandes, 2012; Meagher, 2001a). Irving, Detroyer, Foreman and Milisen (2009) contend that many cases go undetected and many precipitating factors are not reduced. According to Meagher (2001a), non-detection rates are in the order of 33-66%. In attempting to understand the barriers to delirium care, Davis and MacLullich (2009) argued that delirium is under-diagnosed and undertreated but the reasons for this are unclear. Akechi et al. (2010) noted that delirium is often not recognised by nurses because of insufficient knowledge and/or minimal emphasis being given to this important condition in medical and nursing schools. Martins and Fernandes (2012) asserted that delirium was under recognised due to its fluctuating course, its overlap with dementia and the scarcity of routine formal cognitive assessments in hospital care. Meagher (2001b) reinforced this view stating that "poor recognition remains the single greatest obstacle to improved clinical and research activity …" (p.435).

Delirium is also temporary and reversible. Early recognition, diagnosis and management are therefore critical.

Educating health professionals about delirium

There are notable gaps in the literature on how doctors and nurses are educated about delirium with very few studies on interprofessional initiatives. Five clinical studies of delirium have identified education outcomes and put forward recommendations related to the teaching of delirium. In a multi-centre study on the knowledge and attitudes towards delirium in 784 trainee general physicians, Davis and MacLullich (2009) found significant gaps in knowledge. Trainees possessed a good knowledge of delirium's prevalence and its association with poor outcomes but lacked knowledge of its diagnosis and treatment. Furthermore, working in geriatric medicine had only a modest effect on the ability of trainees to diagnose delirium. Other recommendations from clinical papers related to the teaching of delirium include the need for the following:

- Expansion of delirium education at all stages of training so that it is proportionate to its clinical impact (Akechi et al., 2010; Davis & MacLullich, 2009)
- Emphasis on teaching doctors and nurses the ability to recognise acuteness of onset, its fluctuating course and attention deficits (Johnson, 1999)
- Avoidance of confusing terminology (Johnson, 1999) (Need consistent use of the term 'Delirium' NOT acute confusion/acute confusional states etc.)
- Emphasis on routine cognitive testing and the use of screening instruments (Meagher, 2001a)
- Attention to identification and management of terminal delirium (Brajtman et al., 2006)
- Need for national guidelines and core curriculum on delirium (Davis & MacLullich, 2009)
- Focus on core level practice gaps not knowledge gaps (Teodorczuk, Mukaetova-Ladinska, Corbett, & Welfare, 2013).

There are very few reported papers on delirium-focused educational interventions. A literature review capturing studies from 1974 to 1997 found 12 published articles with 7 focused on nurses, 1 on physicians, 3 on patients and 1 on postoperative management (Rockwood, 1999). The subject matter of these education initiatives included:

- environmental manipulation;
- communication strategies;
- patient mobilization;
- discouragement of restraints;
- delirium recognition;
- cognitive screening tools; and,
- systematic approach to diagnosis and assessment (Rockwood, 1999).

Most education was didactic, uniprofessional and narrow in its content focus. The reviewer concluded that education interventions aimed at single behaviours were less likely to be successful than comprehensive interventions.

Delirium and Interprofessional Learning

There are two published studies reporting uniprofessional education initiatives about delirium with IPL recommendations. Japanese researchers (Akechi et al., 2010) evaluated a delirium training program for nurses, which included two delirium workshops, a question & answer session and the creation of 'delirium link nurses' whose function was to teach other ward nurses about delirium. The program had a significant effect on 12 of the 15 confidence items and recommendations included the need to use a range of additional strategies including nurses and doctors learning together through group discussions and regular liaison with trained consultant psychiatrists.

A qualitative, exploratory study involving interviews with 9 palliative care nurses discovered that a lack of education was a major source of stress for the interviewed nurses, that teamwork was an important source of support, and that teamwork enhanced the quality of care for delirious patients and their families (Brajtman et al., 2006). Based on the findings the authors recommended that education programs should include all team members using an interprofessional integrated approach with the goal of enhancing collaborative patient-centred care. As a result, the same group of researchers went on to implement and research two new IPL programs. The first was a single cohort before and after study with a palliative care team. The team underwent three interactive teaching sessions over a month using case studies, discussions and short presentations. Post the intervention; the mean scores were higher for an interprofessional delirium knowledge test and higher for the interprofessional team performance scale (Brajtman et al., 2008). A later study, using a quasi-experimental design demonstrated improved end of life delirium care and perceptions of interprofessional competence by the team members. The researchers concluded that bringing team members together to reflect on clinical practice may lead to improved knowledge and interprofessional competence (Brajtman, Wright, Hall, Bush, & Bekele, 2012). Three other significant delirium focused IPL initiatives are summarised in Table 3.15 with two of these producing positive patient related outcomes.

Authors (Year) & Country	**Title**	**Method**	**Intervention**	**Outcomes**
(Lundstrom et al., 2005) **Sweden**	A Multifactorial Intervention Program Reduces the Duration of Delirium, Length of Hospitalisation, and Mortality in Delirious Patients	Prospective intervention study (RCT) **Cohort:** Postgraduate Doctors and Nurses Patient outcome measures Organic Brain Syndrome Scale and Mini-Mental State Examination	1. Two-day lecture –based course focused on assessment, prevention and treatment of delirium 2. Education concerning care-giver-patient interaction focusing on patients with dementia and delirium 3. Re-organisation from a task-allocation care system to a patient allocation care system with individualized care 4. Guidance for nursing staff once a month	Multidisciplinary intervention (including education, guidance, and a change in how care is organised) can reduce the duration of delirium, the hospital mortality, and the length of stay for delirious patients admitted into general internal medicine departments
(Tabet et al., 2005) **UK**	An educational intervention can prevent delirium on acute medical wards	Single blind case controlled study **Cohort:** Postgraduate Doctors and Nurses Patient outcome measures: Point prevalence of delirium and case note reviews	1. One-hour formal presentation 2. Provision of written management guidelines 3. One-on-one follow up sessions & group discussions to emphasise learning, test knowledge and provide feedback	Point prevalence of delirium among older patients significantly reduced for the intervention group Clinical staff recognised significantly more delirium cases where the education package had been delivered
(Teodorczuk et al., 2013) **UK**	Reconceptualising models of delirium education: findings of a Grounded Theory study	**No Intervention** Individual interviews **Cohort:** Postgraduate Nurse, Doctors, Allied Health Professionals, Administrators & Service workers Focus group interviews: **Cohort:** Liaison specialists, Carers, Patients	**Outcomes: Practice gaps:** 1. Ownership of the confused patient 2. Negative attitudes 3. Lack of understanding of how frightened the patient is in hospital 4. Care partnerships 5. Person-centred care 6. Communication 7. Recognition of cognitive impairment 8. Specific clinical needs	**Recommendations** Focus education on core level practice gaps not knowledge gaps Move towards work-based patient, team and practice knowledge could lead to more effective educational strategies to improve delirium care.

Table 3.15: Outcomes from IPE studies on Delirium

It appears that effective management of delirium is contingent upon an interprofessional approach necessitating among other things, clear communication, effective teamwork, an understanding of the respective health care team members' roles and content that addresses practice-related gaps. According to the current evidence, the care situations more commonly known to benefit from interprofessional practice are those with a social stigma (i.e., HIV/AIDS, mental health issues) and conditions of increased complexity and chronicity. As has been mentioned already in this review, innovations centred on aged care, acute care, rehabilitation, mental health and/or palliative care tend to work best. Delirium, being a serious, acute, complex, common, and often misunderstood condition falls into many of these categories. It is clearly warranted as an interprofessional education initiative.

3.14 Chapter overview

This Chapter has provided a review of relevant literature on interprofessional collaborative practice, interprofessional learning, simulated-based education and delirium. It has revealed evidence to demonstrate the value of health professionals learning how to work together to develop their interprofessional competencies. Spanning over 40 years, the WHO and numerous organisations around the world have strived to push the IPL/ICP agenda. WHO's latest call to action in 2010, to embed IPL and ICP in all aspects of health care service delivery, was delivered with a view to reduce the siloed approach and strengthen a fragmented health care system. This review has revealed that there is now a strong evidence base supporting IPL with benefits to the patient, the health care system and the health professional.

It is clear that IPL is complex to design and deliver. The structural, cultural and educational challenges create barriers that need to be overcome with multiple factors to consider. Learner and teacher characteristics, the stage and duration of the teaching, the type of teaching approach to use and the outcomes to measure all need due diligence and planning. Ensuring that key stakeholder input is achieved and sustained is likewise just as important for ongoing sustainability of any educational initiative. This review has revealed that any intervention should be 'fit for purpose' and centred on the goals that need to be achieved. The review has also indicated there are multiple options available for teaching approaches but a blended approach appears to be comprehensive, able to cater to a range of learner preferences and has the potential for longer lasting positive effects. Simulation, as one of these approaches, is likewise an effective and evidence-based method that is engaging, safe, learner centred and provides the opportunity for learners to receive corrective feedback on performance. It also is the teaching method that best replicates real world experiences. Further, simulated patients afford a high level of fidelity and authenticity to the teaching and learning experience.

Despite the significance of delirium as a common, poorly recognised clinical problem, it has a history of being remarkably poorly taught at Monash University (personal communication, Darzins, 2009; Cross, 2009). Prior to 2008, the medical and nursing curricula at Monash University taught this subject in a uniprofessional manner, in large classroom settings and mostly addressing the development of knowledge in the learners. In addition, the medical and nursing undergraduate curriculum at Monash, at that time, was devoid of core interprofessional activities between nursing and medical students.

The imperatives and impetus for IPL and ICP are clearly strong and growing. This research study will add to the expanding evidence base for effective interprofessional learning innovations, particularly in the context of pre-registration learners on an important topic.

This next Chapter outlines all aspects of the study design and educational intervention used in this research project.

CHAPTER 4

Methodology

4.1 Introduction

This Chapter describes all the processes undertaken to conceptualise and develop the education intervention and the research approaches used to measure the outcomes of the education intervention. The Chapter is divided into two parts: Part A: The Education Intervention. This includes the structure and justification of the educational design and its application to the three specific components of Freeth and Reeves Adaptation of Biggs 3-P Model of Learning - PRESAGE, PROCESS and PRODUCT. Part B: The Research Methods: This gives an account of the aims of the research, the research questions investigated, methods used to examine the research questions, sample selection and recruitment, research instruments, data analysis methods and ethical considerations.

Part A: The Education Intervention

a. PRESAGE applied to the intervention

The PRESAGE components, detailed in Chapter 2, suggest that consideration be given to the background context and characteristics of the teacher and learner (Figure 4.1)

Freeth and Reeves Adaptation of the 3-P Model of Learning

PRESAGE

Context
- Political climate
- Regulatory frameworks
- Funding
- Geography & demography
- Learner numbers
- Space and time constraints
- Competing curricular demands

Teacher Characteristics
- Conceptions of learning & teaching
- Conceptions of collaboration
- Learner perceptions
- Teacher's expertise
- Enthusiasm

Learner Characteristics
- Prior Learning Beliefs
- Conceptions of learning
- Competing learning needs
- Expectations and motivations

Figure 4.1: PRESAGE components of Freeth and Reeves' Adaptation of the Biggs 3-P Model of Learning

Each of these three components is now specifically applied to how the education design of the intervention was constructed and implemented.

Context

Table 4.1 presents the Context components of the education intervention according to the Freeth and Reeves 3-P model.

Political climate	At the time of data collection, The Australian Learning and Teaching Council had funded a national consultation process aimed at significantly increasing the capacity of the Australian higher education sector to graduate health professionals who have acquired well developed interprofessional learning (IPL) and interprofessional practice (IPP) capabilities. The political climate was ready for IPL.
Regulatory framework	The Medical and Nursing regulatory frameworks did not affect the delivery of this intervention.
Funding	The education intervention received 'seed' funding from a Teaching and Learning Performance Grant from Monash University Faculty of Medicine, Nursing and Health Sciences.
Learner numbers, geography and demography	The education intervention took place over six individual clinical days with approximately 40 students attending each day. In total there were 211 students with a balance of 123 nursing students and 88 medical students. The duration of the teaching was over a 4-hour period and included provision of breakfast, morning tea and lunch.
Space and time constraints	The education intervention was delivered in the clinical skills laboratories at Monash University's School of Nursing, Peninsula campus. The classroom components of the teaching were delivered in tutorial rooms and one large lecture theatre. The four simulations and debriefings ran concurrently in the clinical skills laboratory that was suitably equipped to mimic a typical general ward setting.
Competing curricula demands	The timetabling was a challenge. For medical students it needed to be delivered during an Aged Care Clinical Rotation and for nursing students it was considered to be one of their clinical placement days in their Mental Health Rotation. Six days were selected where there was no clash with other curriculum activities.
Management support	Both the Head of the School of Nursing and the Coordinator of Aged Care in the medical program were project collaborators and fully supportive of the intervention.
Relationships with Stakeholders	The main stakeholders in this intervention were the course planners, the faculty, the teachers and students. All stakeholders were informed of the activity and supported its implementation.

Table 4.1: Background context of the education intervention

Learner Characteristics

The education intervention was designed for final year medical and nursing students. The following represents considerations of both learner groups in relation to the Freeth and Reeves model and the context of the education.

Prior learning and beliefs: Prior knowledge, skills and attitudes in relation to delirium and collaboration were specific outcome measures of the study.

Conceptions of learning: How the students perceived learning and their learning style was not known prior to the experience nor was it explored in the study.

Competing learning needs: The nursing students were asked to attend this day as one of their standard clinical placement rotation days. Some of the nursing students expressed concern to the course administrator about being taken away from the clinical environment as part of this learning experience. The medical students were scheduled to attend during their Aged Care Rotation. There were no competing learning needs as this was considered part of their routine clinical learning experiences and a core curriculum topic.

Expectations/motivations: The learning activity was compulsory and all students were expected to attend. Students consented to participate in the research components.

Social factors: The importance of social learning was an additional consideration in this study. For this reason, breakfast, coffee/tea and lunch were provided and it gave the students an opportunity to interact and engage with each other in a more relaxed social setting.

Learner demographics: There was no control for the learner's age, gender or ethnicity.

Teacher Characteristics

As this was an interprofessional learning initiative, the education intervention required facilitation by both medical and nursing educators to promote role modeling of interprofessional behaviours and to ensure the integration of perspectives from both professions. Eight tutors were needed on each intervention day (4 medicine, 4 nursing). Overall, there were 16 tutors recruited for the project who facilitated approximately 2 -3 days each. Tutors were selected on the basis of their enthusiasm for IPL and their ability to facilitate small group learning and simulation scenarios. One of the key aspects of their facilitation task was to role model effective interprofessional behaviour. This was consistent with the selection criteria from a study by Lindqvist and Reeves (2007) who found that the main reason facilitators choose to engage in IPL activities was a commitment to improve interprofessional collaboration in order to promote better clinical practice. They also found that in order to be effective, facilitators needed to display attributes of interprofessional collaboration.

b. The PROCESS applied to the intervention:

The approach adopted for the education intervention was multi-faceted but addressed each aspect of PROCESS articulated in the Freeth and Reeves Adaptation of the 3-P Model (Figure 4.2).

Freeth and Reeves Adaptation of the 3-P Model of Learning

PROCESS

Approaches to Teaching and Learning

UPL/MPL/IPL/TPL

Pre or post qualification

Formal or Informal Learning

Classroom or placement-based activities

Work-based learning

Distance Learning

Compulsory or optional

Underpinning theory

Educational duration

Assessment

Facilitation style

Figure 4.2: PROCESS components of Freeth and Reeves Adaptation of the Biggs 3-P Model of Learning

A 4-hour IPL and UPL intervention was designed for pre-registration medical and nursing students in their final year of learning using a five stage sequential process of learning that incorporated both formal and informal elements. The aim of the educational design was to provide interactive, engaging and experiential learning that moved the learner from theory immediately into practice. Four hours was deemed to be long enough to enable learners to engage with a variety of teaching approaches and to logistically be able to accommodate large numbers of students.

Stage 1: Social interaction: Students were provided with breakfast and lunch as a means of 'breaking the ice' and to provide an opportunity for socialisation and informal interaction.

Stage 2: Lecture: Students viewed one of three different pre-recorded videotaped lectures on delirium.

Stage 3: Case study: Students participated in a facilitated small group tutorial case study.

Stage 4: Simulation: Students participated as either a participant or an observer in a 15-minute simulation with a simulated patient portraying the role of a delirious patient.

Stage 5: Debrief: Students participated in a facilitated small group post simulation debriefing where they could confidentially discuss the simulation experience.

The simulation component of the intervention closely replicated ‘real world’ work-based practice.

Five types of IPL approaches - exchange, action, observation, simulation or practice-based were identified by Barr et al. (2006). The education design developed for this intervention incorporated many of these features. The intervention was designed to be exchange, observation and simulation-based and the blueprint involved content delivery, face-to-face interaction, case-based learning and the opportunity to practice in a simulated environment with feedback.

McNair et al. (2001) summarised nine key features of effective interprofessional programs to achieve success. The education intervention incorporates six of these:

1. Clear learning objectives: The learning objectives of each component of the educational design were made explicit to the teaching team and the students.

2. Shared goal of improved patient care: Students were made aware throughout four of the learning sequences that the patient outcome was paramount.

3. Targeted towards generic content relevant to all participants: Delirium, as a common and poorly managed clinical condition that all nurses and doctors will potentially confront in clinical practice, was a focus. It was existing core content for both curricula.

4. Explicit focus on learning about, and demonstrating the dynamics of interprofessional collaboration and teamwork: Knowledge of good interprofessional collaborative practice was the focus of the learning experience with delirium being the vehicle to provide the opportunities to demonstrate IPL behaviours.

5. Occurs after students have developed a basic sense of their future professional identify: Timing the intervention, for pre-registration students was recognised as one of the challenges of this intervention. It was decided that final year students were the ideal group to select as they had already formed their own professional identity and had sufficient clinical exposure and experience to be able to perform in the simulation. It was also consistent with the traditional timing of delivery of content relating to delirium for both medical and nursing students.

6. Situated in a clinical setting rather than academic de-contextualised classroom:

Although the experience component of this study was conducted in a simulated environment, the authenticity of the performance of the simulated patient and the clinical context closely resembled that of actual practice. In an exploratory study on student attitudes to their experiences of shared learning, Morison and Jenkins (2007) found that combining classroom and practice focused learning was the most effective.

Logistics & educational resources:

There were many challenges and barriers to overcome in the development, planning and implementation phases of this intervention.

Team planning challenges:

This education intervention was originally conceived in 2006, and funding was received through a Monash University Learning and Teaching Performance Grant in 2007. At this stage it was important to have an interprofessional planning team. The original team included three doctors (two Geriatricians and an Anaesthetist, who was also a simulation expert), four nurses (one being the researcher) and an education expert. Interestingly, two members of the original project team (nurses) found it difficult to collaborate on the project and found some aspects of the interprofessional team working confronting at an interpersonal level. They withdrew from the project. The Head of the School of Nursing (an expert in mental health nursing) stepped in to provide content expertise. Planning and developing the teaching, learning and research resources took 10 months.

Administrative challenges:

It was decided that the education intervention was to be a compulsory learning experience for all final year students. For this to occur it had to align with subjects in both programs and fit into the scheduling and clinical placement days of each. This necessitated a range of course approvals at an executive committee level for both the School of Nursing and the MBBS program. For nursing it was incorporated into a unit of studies in Mental Health Nursing Practice and for medicine it was planned as one of the required learning modules that students had to complete in final year (Appendix A). Once this was arranged the logistics of implementing the teaching needed to take place. At that time, medical students undertook six core rotations in final year that took them to a variety of hospital settings potentially across Melbourne, Australia and even overseas. Nursing students learnt in 'blocks' with short bursts of 2 – 4 week clinical placements. It took considerable effort in timetabling the groups of students to enable them to attend on the allocated days. The course managers sent emails to the groups of allocated students informing them of the teaching intervention, logistics, and inviting them to participate in the study. A total of five full days were allocated to the teaching intervention in 2008 with multiple sessions occurring across each day. A sample of how this was arranged can be seen in Appendix B. A suitable venue also had to be sourced to enable sufficient small group learning and a simulation and debriefing activity to take place. Each day required an administrator to ensure that students were briefed on the learning activity logistics, allocated to the right groups and moved into the correct locations. Each day also required a balanced mix of nursing and medical students and uniprofessional or interprofessional groups. Even though students were asked to consent to complete the data collection processes, they were still allocated to either group as part of the compulsory learning experience as it was deemed that they were traditionally taught in a uniprofessional way and therefore not negatively impacted by the experience in relation to standard processes. Regardless, all students were given the opportunity to participate in an interprofessional simulation to avoid any perceived issues of conflict and to ensure that the simulation was realistic and achievable.

Other administrative challenges included:

- setting up the clinical area for the simulation including props and clinical equipment;
- ensuring the simulated patient was trained, prepared and in place;
- setting up the video-recording facilities for each group. The video was used to record the simulation and could be replayed in the debrief if required. It was used to help facilitate the teaching points and to provide feedback to learners (video assisted debriefing is an important component of simulation-based education); and,
- provision of catering for each day, which was part of the teaching process.

Recruitment and training of administrators, tutors and simulated patients

One of the biggest challenges was to recruit and train a sufficient number of tutors for all days of the intervention. Four groups ran for each allocated morning or afternoon session with approximately 40 students in each. This required two administrators (to manage catering, logistics and multimedia components), eight tutors and four simulated patients. Medical and nursing tutors were all experienced senior clinicians and/or educators with some even having experience in simulation methodology. The grant assisted payment of some non-university based educators. A small number volunteered their time. Overall it was very challenging to recruit medical tutors, due to their busy work schedules. As a result, a tutor training session could not be held but a comprehensive tutor guide was developed that provided a step-by-step guide to facilitating every stage of the intervention. Tutors were verbally briefed on the learning activities and their role, prior to commencing each session.

Names of actors who portrayed Simulated Patients (SPs) were retrieved from an existing Monash University database. Five simulated patients were recruited to play the role of the delirious patient. They were trained for their role by an expert in simulated patient methodologies to ensure consistency of performance. To assist in the storyboarding of the simulation scenario, senior geriatricians role-played a delirious patient which was video recorded. This was then used to help train the simulated patient. Each simulated patient was provided with a comprehensive script and there were opportunities for rehearsal with feedback.

Development of materials

To assist in the teaching and learning PROCESS of the education intervention, a range of educational resources were developed and where appropriate pilot tested prior to implementation.

- Medical lecture: A videotaped presentation on delirium by a Professor of Geriatric medicine (Appendix C)

- Nursing lecture: A videotaped presentation on delirium by a Professor of Nursing (Appendix D)
- Interprofessional lecture: A videotaped facilitated conversation with the Professor of Geriatric Medicine and the Professor of Nursing (Appendix E)
- Written case study: Content experts created a case study of a patient with delirium to serve as a trigger for discussion in the small group tutorial (Appendix F)
- Simulation scenario: A clinical scenario was scripted and storyboarded for the simulation. This was piloted with a small group of students and clinical educators for content and process validity. The scenario included instructions for the students, facilitators and simulated patient. (Appendices G and H)
- Facilitator guide: A comprehensive facilitator guide was prepared and all facilitators were briefed about their role prior to the intervention (Appendix I)
- Content resources: A range of additional resources was provided to students on the day. This included:
    - Confusion Assessment Method information sheet (Appendix J)
    - ‘Quick Guide to the Management of Delirium’ information sheet (Appendix K)
    - List of interprofessional competencies (Appendix L)

Part B: The Research Methods

a. Introduction

The methodological processes used to measure the outcomes of the education intervention signify the PRODUCT of Freeth and Reeves model (Figure 4.3). The research was aimed at teaching final year medical and nursing students about delirium using a 5-stage sequential blended teaching approach inclusive of learning in a simulated clinical environment. The study also aimed to evaluate an interprofessional learning (IPL) approach, which was compared, to a standard uniprofessional (UPL) approach in order to examine differences in students’ development of knowledge and perceptions of the experience. To address the PRODUCT components of this model, a multi-method approach was seen as more effective in addressing the research questions. This enabled a more complete view of attitudes, perceptions, and knowledge development.

Freeth and Reeves Adaptation of the 3-P Model of Learning

PRODUCT

Collaborative Competencies

Attitudes

Perceptions

Knowledge

Skills

Behaviour

Practice

Figure 4.3: PRODUCT components of Freeth and Reeves Adaptation of the Biggs 3-P Model of Learning.

In relation to Freeth and Reeves' PRODUCT components, this research measured learners' views on the learning experience and its interprofessional nature, changes in reciprocal attitudes or perceptions between participant groups, and changes in perceptions toward the value of team approaches using a range of quantitative and qualitative Pre and Post-tests. Self-reporting of collaborative competencies were also measured before and after the intervention and were aligned to the UBC Competency Framework (UBC, 2008). Attitudes and perceptions of confidence in skill acquisition were measured using questionnaires, and knowledge was measured using Pre and Post knowledge tests and questionnaires. Behaviour and Practice were the only two outcomes not specifically measured in this study.

b. Research questions

The research addressed four central questions:

1. Does an interprofessional approach:

    a. Develop medical and nursing students' knowledge of, and confidence in performing interprofessional collaborative practice skills?

    b. Increase students' knowledge of, and confidence in managing patients with delirium?

    c. Develop students' appreciation of the roles of doctors and nurses in the management of delirium?

2. Is a blended learning approach an effective way to teaching interprofessional teamwork and collaboration?

3. Is the modified Readiness for Interprofessional Learning Scale a valid and reliable

instrument to use in the Australian pre-registration context?

4. What is the feasibility of implementing a large-scale interprofessional education in the pre-registration years?

The study therefore sought to expand the growing evidence base that has previously demonstrated the value of IPL in the pre-registration years and to explore the implications that might have for interprofessional collaborative practice (ICP). It also sought to examine the pedagogical approach in order to better understand the nature of interprofessional learning and how best to overcome the challenges associated with its implementation, particularly for large groups of students. It also sought to further validate a previously published empirical measure of learner readiness for interprofessional learning and to examine its applicability in an Australian context.

c. Sample selection and recruitment

Final year pre-registration students from two professions (medicine and nursing) were selected to participate in this study. The sample was a convenience sample determined by the numbers of students arriving on any given intervention day and volunteering to participate in the study. Data collection took place in Semester 1, 2008. Two hundred and eleven final year medical and nursing students were recruited into the study.

d. Recruitment process

The MBBS Year 5, and Bachelor of Nursing course administrators, who were both independent of the study sent an email to their respective students from the researcher informing them of the following learning and research activities:

- details of the clinical learning experience (date, location, nature of the learning experience); and,
- details of the research study with the explanatory statement attached and a statement that consent will be sought on the day of data collection.

The researcher recruited participants into the study each day. She was a member of staff but was not known to the students and had no direct responsibilities towards their instruction and grading in their courses.

e. Study methods

The study was based on a randomised Pre and Post-test control group design and elaborated through a mixed methods research approach. Mixed methods has become increasingly important for developing deeper insights into research problems. The approach appropriately integrates quantitative and qualitative data into a coherent and conceptual whole (Babbie, 2007; J. Cresswell, 2013; J. W. Cresswell, 2005; Teddlie & Tashakkori, 2009; Thomas, 2003). As such, a mixed methods approach helps to build on the generalisations possible from quantitative data whilst simultaneously offering detailed elaborations derived of deeper specific exploration through qualitative data.

All volunteering students were randomly allocated to either a uniprofessional medical or nusing group (UPL- medicine or nursing) or an interprofessional group (IPL-medical and nursing students combined). There were three groups in total.

- A medicine specific group comprising approximately 50 medical students
- A nursing specific group comprising approximately 50 nursing students.
- An interprofessional group of approximately 100 medical and nursing students together

The next section of this Chapter outlines the data collection methods and research protocol; the types of research instruments used; and the data analysis methods in relation to each of the research instruments.

Data collection methods and research protocol:

Pre and post-tests:

Demographic information about the cohort and whether they had prior experience of IPL was obtained pre the intervention using a questionnaire (Appendix M). An open-ended question was also posed (pre and post) asking students to define interprofessional learning (Appendix M).

Prior to and on completion of the education intervention three tests were administered. First, all students completed a 29 item scale which formed part of the pre and post questionnaires- “The Modified Readiness for Interprofessional Learning Scale” (M-RIPLS; Appendix M). This was to measure their attitudes and perceptions towards IPL. Nineteen items in this questionnaire had previously undergone numerous validation studies (the original RIPLS). Second, an Interprofessional Learning Rating Scale (IPLRS; Appendix M) was included on the pre and post questionnaires, which was used to measure students’ views on whether IPL was a driver that influenced effective ICP. Third, a Delirium Knowledge Test (DKT; Appendix N) was administered to determine students’ knowledge of delirium.

The education intervention:

Following the pre-test, the profession specific group (UPL) underwent a 40 minute profession specific ‘lecture’ on delirium followed by a profession specific case based tutorial. Both the lecture and case study were facilitated by a profession specific tutor (medicine OR nursing). The interprofessional group (IPL) participated in the same activities; however, this was achieved using a fully integrated interprofessional approach including facilitation by both medical AND nursing tutors together.

All students then participated in an interprofessional simulation activity of delirium using a simulated clinical ward setting and simulated patients. During this time, students remained in their groups but were further divided into groups of 12 (4 participants and 8 observers). Following the simulation a facilitated debrief was held with the full group of approximately 12 students. For the UPL groups the debrief was facilitated by a profession specific tutor and for the IPL groups the debrief was facilitated by a medical and nursing tutor together.

Post-test only:

Following the education intervention, students were invited to complete a questionnaire to explore their reactions to the learning experience and their perceptions of the teaching methods used (Appendix O).

Students were also invited to consent to a follow up individual telephone interview (Figure 4.1). Consenting students provided their contact details on the consent form and an independent research assistant telephoned them 2-6 weeks following the instructional day. The follow up telephone interviews further elaborated on the perceptions of the students' interprofessional practices during this experience.

1. Are you a medical or nursing student?
2. What was your colour on the day? Or can you remember the name of your tutor? Or did you debrief with nursing/medical students or separately?
3. What was your most significant learning outcome?
4. What else did you learn?
5. In what way has your experience in the delirium clinical day developed your appreciation of the role of the nurse in the management of delirium?
6. In what way has your experience in the delirium clinical day developed your appreciation of the role of the doctor in the management of delirium?
7. Has the experience increased your confidence in managing a patient with delirium?
8. Did this experience assist you in developing your ability to work in a team?
9. Do you think it has given you more confidence in being able to communicate with nurses/doctors in the future?
10. Was the series of a lecture and case study effective in preparing you for the interprofessional simulation experience either as an observer or a participant?
11. Was the simulation an effective way of developing your interprofessional practices?
12. Would you like to be involved in this type of learning in the future?
13. What was good about it?
14. Is there anything else you would like to say about the learning from this day?

Figure 4.1: Telephone Interview Schedule

In summary, all volunteering students:

(a) Completed a pre-test questionnaire

(b) Completed the pre-test M-RIPLS, IPLRS and DKT

(c) Viewed a videotaped lecture on delirium according to their group allocation (UPL vs. IPL)

(d) Participated in a small group paper based case study on a delirium case. (UPL vs. IPL)

(e) Completed an interprofessional simulation activity regardless of the group allocation

(f) Completed a group debrief (UPL vs. IPL)

(g) Completed the post-test M-RIPLS, IPLRS, and DKT

(h) Completed a post-test questionnaire

(i) A small group of consenting students also participated in follow up telephone interviews.

The configuration of the study design and groups can be seen in Table 4.1. Details of the specific instruments used and how each of these is analysed follows.

<table>
<tr><th colspan="2">Group 1 (Medicine) UPL</th><th colspan="2">Group 2 (Nursing) UPL</th><th colspan="2">Group 3 (Interprofessional) IPL</th></tr>
<tr><td colspan="2">Profession specific education for final year <u>medical</u> students facilitated by a medical educator for the lecture, case study and debrief</td><td colspan="2">Profession specific education for final year <u>nursing</u> students facilitated by a nursing educator for the lecture, case study and debrief</td><td colspan="2">Profession specific education for final year <u>medical and nursing</u> students together facilitated by a medical and a nursing educator for the lecture, case study and debrief</td></tr>
<tr><td colspan="6" align="center">Questionnaire items (Demographics, prior IPL, defining IPL)
M-RIPLS
IPLRS
DKT</td></tr>
<tr><td colspan="2">Group 1 (Medicine) UPL</td><td colspan="2">Group 2 (Nursing) UPL</td><td colspan="2">Group 3 (Interprofessional) IPL</td></tr>
<tr><td>Teaching method</td><td>Cohort</td><td>Teaching method</td><td>Cohort</td><td>Teaching method</td><td>Cohort</td></tr>
<tr><td>Lecture</td><td>Medical</td><td>Lecture</td><td>Nursing</td><td>Lecture</td><td>Med + Nur</td></tr>
<tr><td>Case discussion</td><td>Medical</td><td>Case discussion</td><td>Nursing</td><td>Case discussion</td><td>Med + Nur</td></tr>
<tr><td>Simulation</td><td>Med + Nur*</td><td>Simulation</td><td>Med + Nur*</td><td>Simulation</td><td>Med + Nur</td></tr>
<tr><td>Debriefing</td><td>Medical</td><td>Debriefing</td><td>Nursing</td><td>Debriefing</td><td>Med + Nur</td></tr>
<tr><td colspan="6" align="center">Questionnaire items (Defining IPL, Learning Process and Open-ended questions)
M-RIPLS
IPLRS
DKT</td></tr>
<tr><td colspan="6" align="center">Follow up telephone interviews (volunteer sample)</td></tr>
</table>

Table 4.1: Study Design

*As this was a compulsory learning activity for all students on each day (regardless of volunteering for the research), a decision was made to allow all students to participate in an interprofessional simulation. The justification for this was to:

- ensure all students benefited in some way from an interprofessional experience;
- maintain the authenticity of the simulation (difficult to run the simulation without both professions participating);
- improve the recruitment numbers for simulation volunteers;
- ensure greater generalisability of the outcomes of the study due to larger and more evenly spread sampling; and,
- prevent additional logistical barriers (increased numbers of simulation scenarios, extra tutors and simulated patients).

f. Research Instruments

The seven instruments used to measure specific outcomes of this study are now described.

1. Pre-test questionnaire (characteristics of the sample)

The Pre-test questionnaire sought information about the demographic characteristics of the sample such as age, gender, course of study and prior qualifications. It also ascertained participants' prior experience of IPL.

2. Readiness for interprofessional Learning Scale

The Readiness for Interprofessional Learning Scale (RIPLS) questionnaire was originally developed and validated by Parsell and Bligh in 1999. Its purpose was to examine educational outcomes by exploring learner attitudes, beliefs, knowledge and skills towards IPL activities (Parsell & Bligh, 1999). Participants were asked to rate how strongly they would agree or disagree with the statements regarding shared learning activities on a scale from 1 (Strongly Disagree) to 5 (Strongly Agree). The original RIPLS consisted of 19 items and contained 3 subscales:

- **Teamwork and collaboration** (Items 1-9): This subscale highlights the importance of effective teamwork and collaborative knowledge and skills needed to provide best patient care (King et al., 2012).
- **Professional identity** (Items 10 – 16): This highlights the acquisition of professional identity as students move through their education programs. It relates more to the values and beliefs people hold (King et al., 2012).
- **Roles and responsibilities**: (Items 17-19): This refers to what people actually do and highlights the boundaries between disciplines, particularly hierarchies that may exist in clinical practice (King et al., 2012).

McFadyen et al. (2005) conducted a principal component analysis of the original RIPLS in 2005 and again in 2006 (McFadyen, Webster, & Maclaren, 2006) with a proposed four-subscale model put forward with a positive and negative professional identity sub-scale.

The original RIPLS was tested in Swedish and Japanese contexts (Lauffs et al., 2008; Tamura et al., 2012) with some degree of variability observed. It underwent further validation in the UK where it exhibited psychometric properties consistent with previous uses in different contexts. The latest validation of the original RIPLS was conducted in an Australian context (B. Williams, Brown, & Boyle, 2012) with a four-factor model emerging (and the discarding of 2 individual items) that included:

- Shared learning
- Teamwork and collaboration
- Professional identity
- Roles and responsibilities

Aside from this, the original RIPLS tool underwent development during 2004 – 2005 with a view to strengthen the third factor, roles and responsibilities, and explore new factors such as patient centredness. The result was an extended version of the RIPLS comprising 29 statements called the Modified RIPLS (M-RIPLS; see Table 4.2 below). This is the scale of choice used in this study.

	Please indicate the degree to which you agree or disagree with the statement by ticking the box that best expresses your feeling.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	Learning with other students will help me become a more effective member of a health care team	❑	❑	❑	❑	❑
2.	For small group learning to work, students need to trust and respect each other	❑	❑	❑	❑	❑
3.	Team-working skills are essential for all health care students to learn	❑	❑	❑	❑	❑
4.	Shared learning will help me to understand my own limitations	❑	❑	❑	❑	❑
5.	Patients ultimately benefit if health care professionals work together to solve patient problems	❑	❑	❑	❑	❑
6.	Shared learning with other health care professionals will increase my ability to understand clinical problems	❑	❑	❑	❑	❑
7.	Learning with health care students before qualification would improve relationships after qualification	❑	❑	❑	❑	❑
8.	Communication skills should be learned with other health care students	❑	❑	❑	❑	❑
9.	Shared learning will help me to think positively about other professionals	❑	❑	❑	❑	❑

	Please indicate the degree to which you agree or disagree with the statement by ticking the box that best expresses your feeling.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
10.	Shared learning with other health care students will help me to communicate better with patients and other professionals	❑	❑	❑	❑	❑
11.	I would welcome the opportunity to work on small-group projects with other health care students	❑	❑	❑	❑	❑
12.	Shared learning will help to clarify the nature of patient problems	❑	❑	❑	❑	❑
13.	Shared learning before qualification would help me become a better team worker	❑	❑	❑	❑	❑
14.	I don't want to waste my time learning with other health care students	❑	❑	❑	❑	❑
15.	It is not beneficial for health care students to learn together	❑	❑	❑	❑	❑
16.	Clinical problem-solving skills should only be learned with students from my own discipline	❑	❑	❑	❑	❑
17.	The function of nurses and therapists is mainly to provide support for doctors	❑	❑	❑	❑	❑
18.	There is little overlap between my role and that of other health care professionals	❑	❑	❑	❑	❑
19.	I would feel uncomfortable if another health care student knew more about a topic than I did	❑	❑	❑	❑	❑
20.	I have to acquire much more knowledge and skills than other health care students	❑	❑	❑	❑	❑
21.	I'm not sure what my professional role will be	❑	❑	❑	❑	❑
22.	I use my own judgment a lot in my professional role	❑	❑	❑	❑	❑
23.	Reaching a diagnosis is the main function of my role	❑	❑	❑	❑	❑
24.	My main responsibility as a professional is to treat my patient	❑	❑	❑	❑	❑
25.	I like to understand the patient's side of the problem	❑	❑	❑	❑	❑
26.	Establishing trust with my patients is important to me	❑	❑	❑	❑	❑
27.	I try to communicate compassion to my patients	❑	❑	❑	❑	❑
28.	Thinking about the patient as a person is important in getting treatment right	❑	❑	❑	❑	❑
29.	In my profession you need skills in interacting and cooperating with patients	❑	❑	❑	❑	❑

Table 4.2: The Modified RIPLS (29 Items)

Reid, Bruce, Allstaff and McLernon (2006) validated the M-RIPLS in a postgraduate audience with three factors emerging comprising 23 statements:

- Teamwork and collaboration

- Patient centredness
- Sense of Professional identity

At a similar point in time, the same modified version of RIPLS was also validated in a Middle Eastern undergraduate context with the same factors revealed across 20 statements (El-Zubeir, Rizk, & Al-Khalil, 2006). A summary of the published validations and the breakdown of sub-scales for each can be seen in Table 4.3.

Study	Factor Sub-scale 1	Factor Sub-scale 2	Factor Sub-scale 3	Factor Sub-scale 4
ORIGINAL RIPLS (Parsell & Bligh, 1999) 19 items **UK**	Teamwork & Collaboration (1-9)	Professional Identity (10-16)	Roles & Responsibilities (17-19)	
ORIGINAL RIPLS (McFadyen et al., 2005) 19 items **UK**	Teamwork & Collaboration (1-9)	Professional Identity (Negative) (10-12)	Professional Identity (Positive) (13-16)	Roles & Responsibilities (17-19) **low reliability (α0.32)*
ORIGINAL RIPLS (McFadyen et al., 2006) 19 items **UK**	*Professional Identity (Negative) (10-12) reverse scored* **low reliability for undergraduates*	Teamwork & Collaboration (1-9)	Professional Identity (Positive) (13-16)	Roles & Responsibilities (17-19) **low reliability (α0.43) for undergraduates*
ORIGINAL RIPLS (Lauffs et al., 2008) 19 items **SWEDEN**	Teamwork & Collaboration (1-9)	*Professional Identity (Negative)* *(10-12)* **low reliability*	Professional Identity (Positive) (13-16) *satisfactory reliability	Roles & Responsibilities (17-19)
ORIGINAL RIPLS (King et al., 2012) 19 items **CANADA**	Teamwork & Collaboration (1-9)	Professional Identity (Negative) (10-12)	Professional Identity (Positive) (13-16)	Roles & Responsibilities (17-19)
ORIGINAL RIPLS (Tamura et al., 2012) 19 items **JAPAN**	Teamwork & Collaboration (1-9, 13-16)	IPE opportunities (10-11)	Uniqueness of Profession (12, 17-19)	
ORIGINAL RIPLS (B. Williams et al., 2012) 19 items **AUS**	Shared Learning (4, 6, 7, 9, 13-17)	Teamwork & Collaboration (1-3, 5, 8, 10)	Professional Identity (Positive) (13-16)	Roles & Responsibilities (17-19)
MODIFIED RIPLS (Reid et al., 2006) 29 items (23 included) **UK**	Teamwork & Collaboration (1-13)	Patient-centredness (25-29)	Sense of Professional Identity (16-20)	*6 Items Discarded (14-15 & 21-24)*
MODIFIED RIPLS (El-Zubeir et al., 2006) 29 items (20 included) **UAE**	Teamwork & Collaboration (1,4, 6-13)	Professional Identity (14-18)	Patient-centredness (25-29)	*9 Items Discarded (2,3,5, & 19-24)*

Table 4.3: Factor analysis for RIPLS validations 1999 to current (colour shading indicates closely matching subscales across all validation studies)

No further validation studies could be sourced using the 29-item instrument. Despite this, it was decided that the M-RIPLS scale would be used to maximise the ability to identify any differences between professional groups and learning condition. It also provided another opportunity to validate the larger tool in an Australian pre-registration context.

Permission was sought and was granted to gain access to the scales from an e-resource developed by the Peninsula Medical School in Plymouth, UK (Mattick & Bligh, 2005). This resource was built to provide access to IPE resources, help coordinate research effort and promote communication. It should be noted that the M-RIPLS contained items in a different order to the original RIPLS and the two published articles on the M- RIPLS with some items having slight variations in wording (see Appendix P).

3. Interprofessional Learning Rating Scale

The Interprofessional Learning Rating Scale (a global rating scale) consisted of one question that asked students to rate, on a scale of 1 – 10, with 1 being least important and 10 being most important, the importance of IPL as a driver to influence effective Interprofessional Collaborative Practice (ICP).

4. Post-test questionnaire – teaching and learning process

Using a 5 point Likert scale of 1 (Strongly Disagree) to 5 (Strongly Agree) students were asked about the teaching approaches used in the intervention. This was to determine the extent to which participants agreed on whether the teaching approaches were an effective way to teach about ICP (n=4 items). One item asked whether the intervention had increased their confidence in the collaborative management of a patient with delirium on the same 5-point Likert scale.

5. Pre and Post-test questionnaire – open-ended questions

The pre-test questionnaire asked participants to define IPL. This question was repeated in the post-test questionnaire. This was to see if their knowledge and understanding of IPL developed as a result of the intervention. The questionnaire also asked for participants' views on the most and least valued aspects of the learning experience and how it could be improved for future students.

6. Follow up individual interviews

The individual interview schedule consisted of 14 semi-structured questions designed to encourage participants to elaborate on their perceptions during the learning intervention, particularly to elicit any attitudinal changes and a self-reporting of benefits/constraints. The interviews were conducted by telephone, were audio-recorded and transcribed verbatim by an independent research assistant. The interviews had internal consistency (J. Cresswell, 2013) as the same questions were asked of all participants.

7. Delirium Knowledge Test (DKT)

The DKT was a series of 34 multiple-choice questions (MCQ) designed to test students' knowledge of delirium. Content experts constructed the question set and, following a blueprinting exercise, ensured the test matched the learning objectives of the educational experience.

g. Analysis of results

For each of the instruments the process of analysis is described.

1. Analysis of demographic information:

Frequencies (percentages and numbers) for age, gender, course and prior qualifications were calculated for the whole group and according to course type (profession). Age was also recorded so that two groups formed: one age group category comprised those 25 years or younger; the other group comprised those over 25 years.

2. Analysis of M-RIPLS descriptive statistics:

Descriptive statistics

Frequencies (numbers and percentages) and summary statistics (mean, standard deviation, standard error of the mean, and 2 x standard error of the mean) for each item of the Pre and Post intervention M-RIPLS were calculated according to the whole group, course (medicine and nursing) and learning condition (IPL and UPL).

Exploratory Factor Analysis:

Exploratory Factor Analysis (EFA) was used to reduce the number of variables in the M-RIPLS into a smaller, more manageable number of dimensions or components. EFA was also used to detect the underlying structure in the relationships between the 29 variables. A reliability analysis (measure of internal consistency) was also conducted using Cronbach's alpha α.

From this process a Four Principal Component approach was shown to be legitimate. For each of these four resulting principal factors, a description was assigned using the statements that contributed to them, so that the factors to determine readiness for IPL could be identified. (The complete Factor Analysis process is described in Chapter 5.)

Comparing Groups

For each principal factor found from the factor analysis, an Independent Samples *t*-test was performed to compare <u>between</u> groups from pooled mean scores of pre and post-test results. Comparisons were resolved by course (medicine or nursing), age category (<25 years or > 25 years), gender (male or female), and learning condition (IPL or UPL). Using the same configuration of groups, Paired Samples *t*-test was used to compare <u>within</u> groups to see if there was a significant difference between mean scores Pre and Post the intervention.

All analyses were conducted using the SPSS Statistical Package (Statistical Package for the Social Sciences Version 18.0, SPPS, Inc., Chicago, IL, USA).

3. Interprofessional rating scale

For the IPLRS, frequencies (percentages and numbers), mean, standard deviation, standard error of the mean and 2 x SEM were calculated for each item scored on the pre and post scale and were calculated for the whole group, for each profession (medicine or nursing) and according to gender, age and learning condition (UPL or IPL). Results showed a normal distribution. A Paired Samples *t*-test was used to compare within groups to see if there was a significant difference between mean scores Pre and Post the intervention. Comparisons were resolved by course (medicine or nursing), age category (<25 years or > 25 years), gender (male or female), and learning condition (IPL or UPL). Independent Samples *t*-test was performed to compare between groups from pooled mean scores of pre and post-test results using the same configuration of groups.

4. Post-test questionnaire – teaching and learning process

Summary results of frequencies (percentages and numbers), mean, standard deviation, standard error of the mean and 2 x SEM were calculated for all five post-test items on the questionnaire. All questions were analysed and compared according to course, learning condition, age and gender on the effectiveness of each teaching method. Each question was then analysed individually to compare results between groups using the Independent Samples *t*-test. Comparisons were also measured for responses between each of the four questions (Q.30 – 33), to determine students' preferred learning process. Various differences ('contrasts') between the Mean Scores for the four different Learning Processes were analysed using One-Way ANOVA Contrast Testing.

5. Qualitative data analysis:

The qualitative data underwent thematic analysis. Data were reviewed, line-by-line, and note was made of key words and phrases. The data were then systematically coded using the Qualitative data software package package NVivo (NVivo qualitative data analysis software; QSR International PtY Ltd. Version 9, 2011). The coded data were then reviewed searching for patterns and themes. At completion of this phase, the codes were reviewed again checking for redundancy and were collated into a manageable number of defined themes. The quotes that supported the themes were then identified and inserted into a table. The thematic analysis was then checked for reliability with another qualitative researcher. Disagreements were resolved by adjudication. Frequencies of the themes for what was valued most and least about the learning experience were calculated and comparisons were made according to whole group, profession and learning condition.

Specific items:

The aim of the repeated question on defining IPL was to determine if the intervention developed or changed participants' knowledge about IPL. To analyse that data, CAIPE's definition was used as the 'gold standard' - "to learn with, from and about each other to improve collaboration and quality of care" (CAIPE, 2002, p.2). The post intervention data was reviewed to see if the definition had developed or changed as a result of the experience. Frequencies (numbers and percentages) were then calculated regarding whether the post-test definition stayed the same or included new or changed elements. This was then analysed and compared according to the whole group, profession or the learning condition.

All together there were six open-ended questions included on the questionnaire (2 pre-test and 4 post-test).

The M-RIPLS, IPLRS, DKT and questionnaires were all coded with identifying markers for each participant. The identifying markers were securely stored separately by a general member of staff with the researcher only able to access de-identified coded responses. Any incomplete data sets (those with only one of either a pre or post the intervention questionnaire) were removed from the analysis (n=8).

6. Follow up individual interviews

The interview data underwent the same process of thematic analysis as previously described checking for commonalities of themes similar to those identified from the questionnaire.

7. Delirium Knowledge Test (DKT)

As with the M-RIPLS, the MCQ scores were analysed by a 2-way ANOVA with Paired Samples *t*-test used to compare within groups to see if there was a significant difference between mean scores Pre and Post the intervention. Comparisons were resolved by course (medicine or nursing), age category (<25 years or > 25 years), gender (male or female), and learning condition (IPL or UPL). Independent Samples *t*-test was performed to compare between groups from pooled mean scores of pre and post-test results using the same configuration of groups.

h. Ethics

Ethical approval was sought and granted for the research study (CF08/0127-2008/000061) by the Monash University Human Research Ethics Committee. Participants were provided with an explanatory statement (Appendix Q for medicine and Appendix R for nursing) and consent form (Appendix S). Participants provided consent to the following for research purposes:

- collection of data from the multiple choice Delirium Knowledge Test (pre and post intervention);
- collection of data from the Modified Readiness for Interprofessional Learning Questionnaire (pre and post intervention);

- video-recording of the simulation exercise;
- video recording of the group debrief session;
- audio-recording of the follow up individual telephone interviews; and,
- those students who took part in the follow-up telephone interviews also gave their written consent;

All students signed a confidentiality statement in relation to what was observed and heard during the simulation experience and subsequent debriefing (Appendix T). Given the sensitive nature of observation of performance and video-recording, the researcher and the teaching staff involved in the simulation exercise (i.e., the person who facilitating the simulation training) also signed a written agreement on confidentiality concerning everything that was observed and heard during the data collection process. Some members of the research team were associated with the undergraduate medical and nursing courses (three from Medicine and two from Nursing). They were involved in the education intervention but were not be involved in any recruitment and data analysis activities. Students were informed in the explanatory statement that they may refuse to take part or withdraw from participation in the research without affecting their standing in the course.

4.2 Chapter overview

This Chapter has described the development process and justification for the educational design of the intervention and components of the research methods used in this research including aims and research questions, sample selection and recruitment, research instruments, data analysis methods and ethical considerations. The following Chapters present the results of each of the seven described study methods.

CHAPTER 5

Summary of results and characteristics of the sample

5.1 Introduction

Chapter 5 presents a summary of the quantitative and qualitative results of this study and describes how each will be presented in the thesis. This Chapter also provides an overview of the characteristics of the sample such as the professional grouping, whether the students had prior qualifications, their age, gender, and their prior experience of IPL.

This Chapter begins the process of describing the PRODUCT (outcomes), in particular where these align with the UBC competency framework as potential themes.

The modified Kirkpatrick's Classification of Interprofessional Outcomes (Freeth et al., 2002; Hammick et al., 2007; Payler et al., 2007) also provides structure to the data presentation, discussion and analysis. The first stage of this has already been completed. The literature review in Chapter 3 explained the pedagogical processes and evidence for IPL. The preliminary level pre-course data will be presented in this Chapter. Post-course measures will examine Level 1 (learners' views on the learning experience and its interprofessional nature), Level 2a (modification of learners' attitudes/perceptions) and Level 2b (acquisition of learners' knowledge and perceptions of skill development). Level 2b will be applied in two ways. Firstly, by exploring the acquisition of knowledge and skills about interprofessional collaboration. Secondly, it will examine the acquisition of knowledge and skills about managing patients with delirium, inclusive of its collaborative management.

5.2 Characteristics of the Sample

A total of 211 students were recruited into the study.

Course

The participants were from the two professional groups of medicine and nursing. More nursing students participated in the study than medical students with 58% (n=123) of the 211 students being enrolled in the Bachelor of Nursing (BN) degree and 42% (n=88) enrolled in the Bachelor of Medicine, Bachelor of Science (MBBS) degree (Table 5.1).

Professional Group	N=211	%
Medicine (MBBS)	88	42.0%
Nursing (BN)	123	58.0%

Table 5.1: Demographics by professional group

Other qualifications

Eighty-eight participants (41.7%) identified having other qualifications, with the majority of these being medical students (28.8%, n=61). Of the 61 medical students who described a prior qualification, most had a Bachelor of Medical Science Degree either with, or without, Honours. This degree is usually taken over one year in the middle of the MBBS degree at Monash University. Of the 14 nursing students stating a prior course of study, most were qualified as Division 2 Registered Nurses. At the time of data collection, the Division 2 nurse, or Enrolled Nurse, had usually undertaken an 18-month or 2 year course at a Training and Further Education (TAFE) organisation or other related health training facility to achieve a Diploma in Enrolled Nursing. This enabled registration with the Nursing and Midwifery Board of Australia as a Division 2 nurse. The Bachelor of Nursing leads to a Division 1 Registration. The percentage of nursing students with a prior Division 2 (Enrolled) nursing qualification constituted 11.4% of the total cohort of nursing participants which is slightly higher than the nationally reported average where the percentage of Division 2 nurses enrolled in a BN is said to be 4.8% (Gaynor et al., 2007). This feature could be relevant, as this group will present with varying years of prior experience in the healthcare workforce and also explains some of the variation in age (reported below). Table 5.2 depicts the breakdown of prior qualifications by profession.

Title of course	Medicine (N=88)		Nursing (N=123)	
	n	%	n	%
Diploma of enrolled nursing (RN Div 2)	0	(0.0%)	14	(6.6%)
Bachelor of Medical Science (BMedSci)	61	(28.8%)	1	(0.5%)
Other	13 (6.1%)			

Table 5.2: Prior courses or qualifications

Age

Table 5.3 presents the breakdown of participants according to age and course.

Age Range	Overall (N=211)		Medicine (N=88)		Nursing (N=123)	
	n	%	n	%	n	%
Less than 25 years	147	69.3%	83	94.3%	64	52.5%
26-30 years	22	10.4%	5	5.7%	17	13.9%
31-40 years	18	8.5%	0	0.0%	18	14.8%
41-50 years	20	9.4%	0	0.0%	20	16.4%
Greater than 50 years	3	1.4%	0	0.0%	3	2.4%
Unknown	1	1.0%	0	0.0%	1	0.0%
	211	*100%*	*88*	*100%*	*123*	*100%*

Table 5.3: Participant age range

Age was then recoded so that two groups were formed, one group comprised those 25 years and under and the other group comprised those over 25 years (Table 5.4).

Age Range	Overall (N=211)		Medicine (N=88)		Nursing (N=123)	
	n	%	n	%	n	%
25 years of less	147	69.7%	83	94.3%	64	52.5%
Over 25 years	63	30.3%	5	5.7%	58	47.4%
Unknown	1	0.0%	0	0.0%	1	0.1%

Table 5.4: Aggregated age category

It was found that significantly more nursing students were over 25 years of age (47.4%, n = 58) compared to medical students (5.7%, n = 5), X^2 (1, N = 211) = 42.66, $p < .001$).

Gender

The majority of the 211 participants in this study were female students (n=162, 76.4%) compared to (n=45, 21.3%) male students (Table 5.5) with statistically significantly more females studying nursing than medicine (X^2 (1, N = 207) = 25.69, $p < .001$). Gender proportions in the nursing group alone (90.8% female, 9.2% males) were consistent with other data sources about the nursing workforce with nursing still being a female dominated profession comprising 90% of employed nurses in 2008 (AIHW, 2010). Likewise there was slightly more female than male medical students but this was not statistically significant. This is in keeping with the current norm for medical schools in Australia where intakes are now close to being evenly split between males and females (Joyce, Stoelwinder, McNeil, & Piterman, 2007).

Gender	Overall (N=211)		Medicine (N=88_		Nursing (N=123)	
	n	%	n	%	n	%
Male	45	21.3%	34	38.6%	11	9.2%
Female	162	76.4%	54	61.4%	108	90.8%
Unknown	5	2.3%	0	0.0%	0	0.0%

Table 5.5: Gender according to profession

Prior experiences of IPL

Medical Students

For medical students, nearly a third (30.7%, n=27) indicated prior opportunities to participate in IPL. The comments varied from examples of interprofessional learning, multiprofessional learning (side by side learning), being taught by another health professional and other general types of experiences.

Examples of interprofessional opportunities

- General interaction on the wards with nurses, midwives and allied health professionals in metropolitan, rural and remote settings including an aboriginal community elective
- Shadowing nurses on clinical placements
- Combined skills session with medical and nursing students
- Participation in an IPL pilot program on wound care at the simulation centre
- Participation in the RIPE program (Rural Interprofessional Education Program) – 2 week placement for medicine, nursing and allied health students.

Examples of multiprofessional learning experiences included

- Attendance at grand rounds, ward rounds and multi-disciplinary team meetings with various health professional groups
- Women's health rotation with midwifery students
- Suicide prevention seminar with other health professionals
- Massage classes with physiotherapy students
- On the wards learning needle safety with nurses.

Being taught by another health professional

- Attendance at teaching sessions for nurses on the ward
- Taught by a translator to learn about communication skills in a general practice/psychiatric rotation
- Lectures given by different professional groups e.g., in a geriatric ward taught with a physiotherapy student by a physiotherapist about mobility assessment ("made my limb assessment better").

Other

- Rural health open days
- “I am a personal carer”
- “Yes but a negative experience as it was really tailored to nurses more than doctors”.

Nursing Students

Fewer nursing students (16.3%, n=20), compared to medical students, indicated prior experience of IPL. Examples included:

- Lectures with other health professionals (midwifery, paramedic students and health sciences) (n=8)
- Debrief session during clinical placements (n=2)
- Participating in dementia study days, wound management, diabetes study days (n=2)
- In the community with social workers, counsellors and health care workers for new migrants
- Previous degree (Bachelor of Science) or lectures with Bachelor of Pharmacy students
- In-service education on clinical placement with other professions
- National Rural undergraduate health care conference with all health professional groups
- Participating in a nurse/paramedic training DVD
- Open discussion on palliative care at the hospital
- Geriatric care in-home settings with nurses and medical students
- Participating in a subject that combined medical, nursing and allied health students studying cultural experiences.

5.3 Chapter overview

Overall, there were more nursing students than medical students. The majority of students were female (76.4%) and this was largely attributed to the nursing profession. Younger students (less than 25 years) were more common (69.7%), and approximately half the nursing students were over the age of 25. Altogether, the vast majority of the older students (>25 years) were from nursing (92.1%). A significant proportion of students had a prior qualification, with medical students having an additional Bachelor of Medical Science degree and nursing students having Division 2 registration. Approximately 22.2% of students had, what they perceived to be, some form of prior experience of learning alongside or with other health professional students prior to the education intervention. None of the examples provided were long-term experiences and most related to exposure in clinical placements or short educational events. The next Chapter will present findings from the Modified Readiness for Interprofessional Learning Scale.

CHAPTER 6

Results - The Modified Readiness for Interprofessional Learning Scale

6.1 Introduction

The Modified Readiness for Interprofessional Learning Scale (M-RIPLS) is designed to measure the strength of students' beliefs in the benefits of IPL and their readiness to engage interactively with other students. Statements within this scale are based on the desired, or intended, positive outcomes of shared learning. In this thesis, the M-RIPLS is also used to measure changes in attitude towards IPL as a result of the education intervention with emphasis on whether significant positive changes occur for the students allocated to the IPL group.

The Chapter begins to address an understanding of the cohort's responses to the 29-item M-RIPLS **Pre** and **Post** the intervention. Incomplete data sets (those with only one of either Pre-M-RIPLS or Post-M-RIPLS data sets) were removed from analysis (n=8).

Frequencies (percentages and numbers), and summary statistics (mean, standard deviation, standard error of the mean, and 2 x standard error of the mean), for each item of the Pre and Post M-RIPLS are presented according to the following configurations:

1. Whole group	All students
2. Learning Condition:	All students allocated to the Interprofessional Learning group (IPL)
	All students allocated to the Uniprofessional Learning group (UPL)
3. Course	All Medical students (Med or MBBS)
	All Nursing students (Nur or B.Nursing)

As per Freeth and Reeves adaptation of Biggs 3-P model, the results in this Chapter begins the representation of outcomes ('Product') and characterises those that align with Kirkpatrick's Level 2a, that is, the extent to which participants agree with each item on the scale in relation to attitudes and perceptions towards IPL and their readiness for this.

This Chapter is a precursor to the Factor Analysis, the results of which will be presented in Chapter 7. This will yield more analytical opportunities in relation to the M-RIPLS instrument. Once the Factors have been identified in Chapter 7, the results presented in this Chapter (Chapter 6) will be revisited again and aligned with each newly identified Factor Subscale..

6.2 Results - M-RIPLS data Pre- Intervention

Table 6.1 lists the raw data results of questions 1 – 29 of the M-RIPLS Pre intervention for the Whole Group.

Summary Results of Pre-Questionnaire Questions 1 - 29	Q1. Learning with other students will help me become a more effective member of a health care team	Q2. For small group learning to work, students need to trust and respect each other	Q3. Team-working skills are essential for all health care students to learn	Q4. Shared learning will help me to understand my own limitations	Q5. Patients ultimately benefit if health care professionals work together to solve patient problems	Q6. Shared learning with other health care professionals will increase my ability to understand clinical problems	Q7. Learning with health care students before qualification would improve relationships after qualification	Q8. Communication skills should be learned with other health care students	Q9. Shared learning will help me to think positively about other professionals	Q10. Shared learning with other health care students will help me to communicate better with patients and other professionals	Q11. I would welcome the opportunity to work on small-group projects with other health care students	Q12. Shared learning will help to clarify the nature of patient problems	Q13. Shared learning before qualification would help me become a better team worker	Q14. I don't want to waste my time learning with other health care students	Q15. It is not beneficial for health care students to learn together	Q16. Clinical problem-solving skills should only be learned with students from my own discipline	Q17. The function of nurses and therapists is mainly to provide support for doctors	Q18. There is little overlap between my role and that of other health care professionals	Q19. I would feel uncomfortable if another health care student knew more about a topic than I did	Q20. I have to acquire much more knowledge and skills than other health care students	Q21. I'm not sure what my professional role will be	Q22. I use my own judgment a lot in my professional role	Q23. Reaching a diagnosis is the main function of my role	Q24. My main responsibility as a professional is to treat my patient	Q25. I like to understand the patient's side of the problem	Q26. Establishing trust with my patients is important to me	Q27. I try to communicate compassion to my patients	Q28. Thinking about the patient as a person is important in getting treatment right	Q29. In my profession you need skills in interacting and cooperating with patients
	Frequency (counts)																												
Strong Disagree	1	0	2	3	0	1	0	1	1	1	1	0	0	69	70	54	86	62	58	28	40	1	16	1		0	0	0	0
Disagree	2	1	2	5	0	3	4	4	6	10	7	7	8	95	106	102	81	96	95	83	128	19	104	12	1	0	0	1	0
Neutral	13	12	4	24	3	17	40	38	33	35	50	29	27	26	18	36	28	31	28	51	22	55	45	20	5	4	10	8	3
Agree	113	109	77	116	67	98	97	102	99	97	91	107	113	8	5	9	8	13	18	31	12	112	33	115	117	77	87	75	61
Strong Agree	75	81	119	56	134	84	63	59	64	61	55	60	55	5	5	3	1	2	5	9	1	15	3	54	80	121	106	119	139
Total N	204	203	204	204	204	203	204	204	203	204	204	203	203	203	204	204	204	204	204	202	203	202	201	202	203	202	203	203	203

Table 6.1: M-RIPLS raw data Pre Intervention as Frequencies (counts) for Whole Group.

Figure 6.1 plots the raw data as counts from Table 6.1 for the Whole Group Pre Intervention.

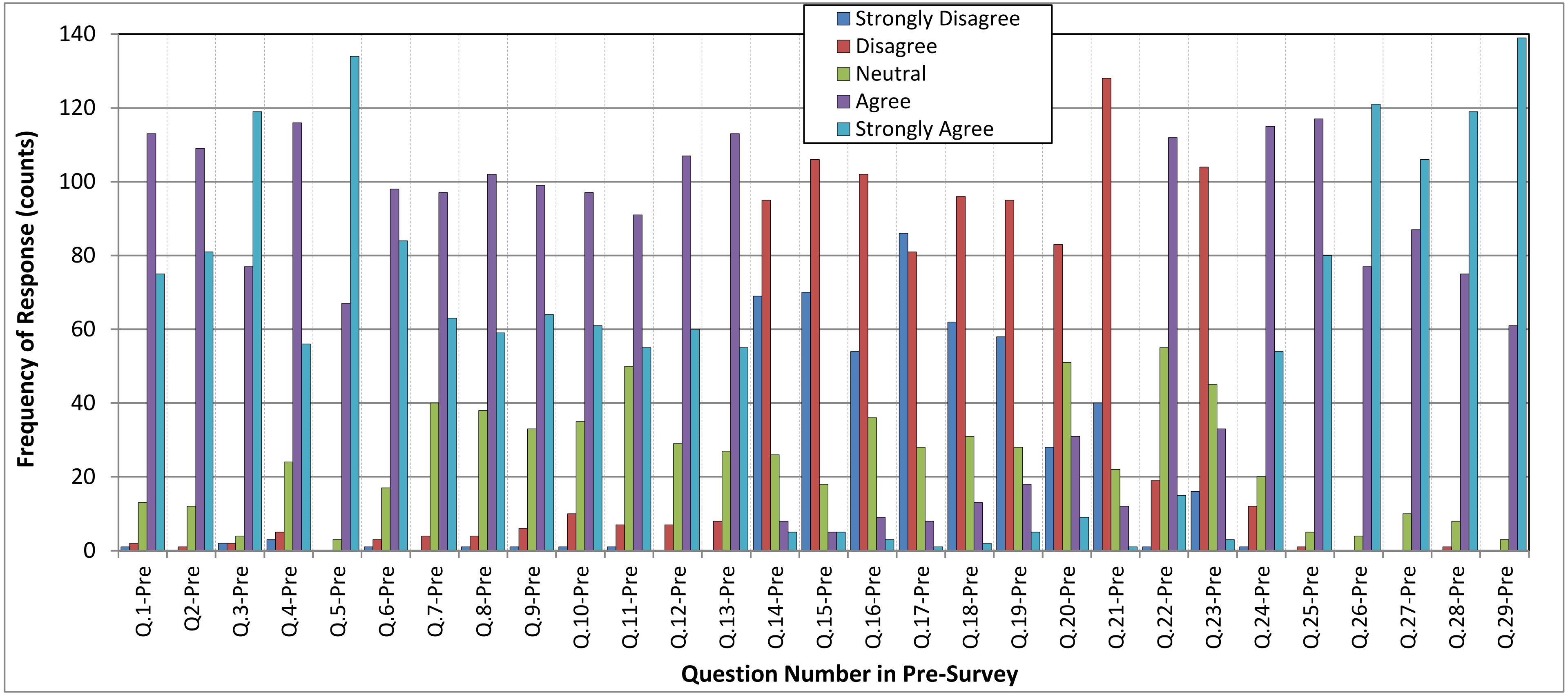


Figure 6.1 Plot of the M-RIPLS raw data listed in Table 6.1 (Pre intervention). The vertical frequency is simply counts.

Table 6.2 presents the raw data results for the Whole Group <u>Pre</u> Intervention as percentages.

Summary Results of Pre-Questionnaire Questions 1 - 29	Q1. Learning with other students will help me become a more effective member of a health care team	Q2. For small group learning to work, students need to trust and respect each other	Q3. Team-working skills are essential for all health care students to learn	Q4. Shared learning will help me to understand my own limitations	Q5. Patients ultimately benefit if health care professionals work together to solve patient problems	Q6. Shared learning with other health care professionals will increase my ability to understand clinical problems	Q7. Learning with health care students before qualification would improve relationships after qualification	Q8. Communication skills should be learned with other health care students	Q9. Shared learning will help me to think positively about other professionals	Q10. Shared learning with other health care students will help me to communicate better with patients and other professionals	Q11. I would welcome the opportunity to work on small-group projects with other health care students	Q12. Shared learning will help to clarify the nature of patient problems	Q13. Shared learning before qualification would help me become a better team worker	Q14. I don't want to waste my time learning with other health care students	Q15. It is not beneficial for health care students to learn together	Q16. Clinical problem-solving skills should only be learned with students from my own discipline	Q17. The function of nurses and therapists is mainly to provide support for doctors	Q18. There is little overlap between my role and that of other health care professionals	Q19. I would feel uncomfortable if another health care student knew more about a topic than I did	Q20. I have to acquire much more knowledge and skills than other health care students	Q21. I'm not sure what my professional role will be	Q22. I use my own judgment a lot in my professional role	Q23. Reaching a diagnosis is the main function of my role	Q24. My main responsibility as a professional is to treat my patient	Q25. I like to understand the patient's side of the problem	Q26. Establishing trust with my patients is important to me	Q27. I try to communicate compassion to my patients	Q28. Thinking about the patient as a person is important in getting treatment right	Q29. In my profession you need skills in interacting and cooperating with patients
	Frequency (Percentage)																												
Strong Disagree	0.5	0.0	1.0	1.5	0.0	0.5	0.0	0.5	0.5	0.5	0.5	0.0	0.0	33.8	34.3	26.5	42.2	30.4	28.4	13.7	19.6	0.5	7.8	0.5	0.0	0.0	0.0	0.0	0.0
Disagree	1.0	0.5	1.0	2.5	0.0	1.5	2.0	2.0	2.9	4.9	3.4	3.4	3.9	46.6	52.0	50.0	39.7	47.1	46.6	40.7	62.7	9.3	51.0	5.9	0.5	0.0	0.0	0.5	0.0
Neutral	6.4	5.9	2.0	11.8	1.5	8.3	19.6	18.6	16.2	17.2	24.5	14.2	13.2	12.7	8.8	17.6	13.7	15.2	13.7	25.0	10.8	27.0	22.1	9.8	2.5	2.0	4.9	3.9	1.5
Agree	55.4	53.4	37.7	56.9	32.8	48.0	47.5	50.0	48.5	47.5	44.6	52.5	55.4	3.9	2.5	4.4	3.9	6.4	8.8	15.2	5.9	54.9	16.2	56.4	57.4	37.7	42.6	36.8	29.9
Strong Agree	36.8	39.7	58.3	27.5	65.7	41.2	30.9	28.9	31.4	29.9	27.0	29.4	27.0	2.5	2.5	1.5	0.5	1.0	2.5	4.4	0.5	7.4	1.5	26.5	39.2	59.3	52.0	58.3	68.1
Total %	100	99.5	100	100	100	99.5	100	100	99.5	100	100	99.5	99.5	99.5	100	100	100	100	100	99.0	99.5	99.0	98.5	99.0	99.5	99.0	99.5	99.5	99.5

Table 6.2: M-RIPLS data as listed in Table 6.1 (<u>Pre</u> Intervention) as Percentages.

Figure 6.2 plots the percentages for the Whole Group Pre intervention.

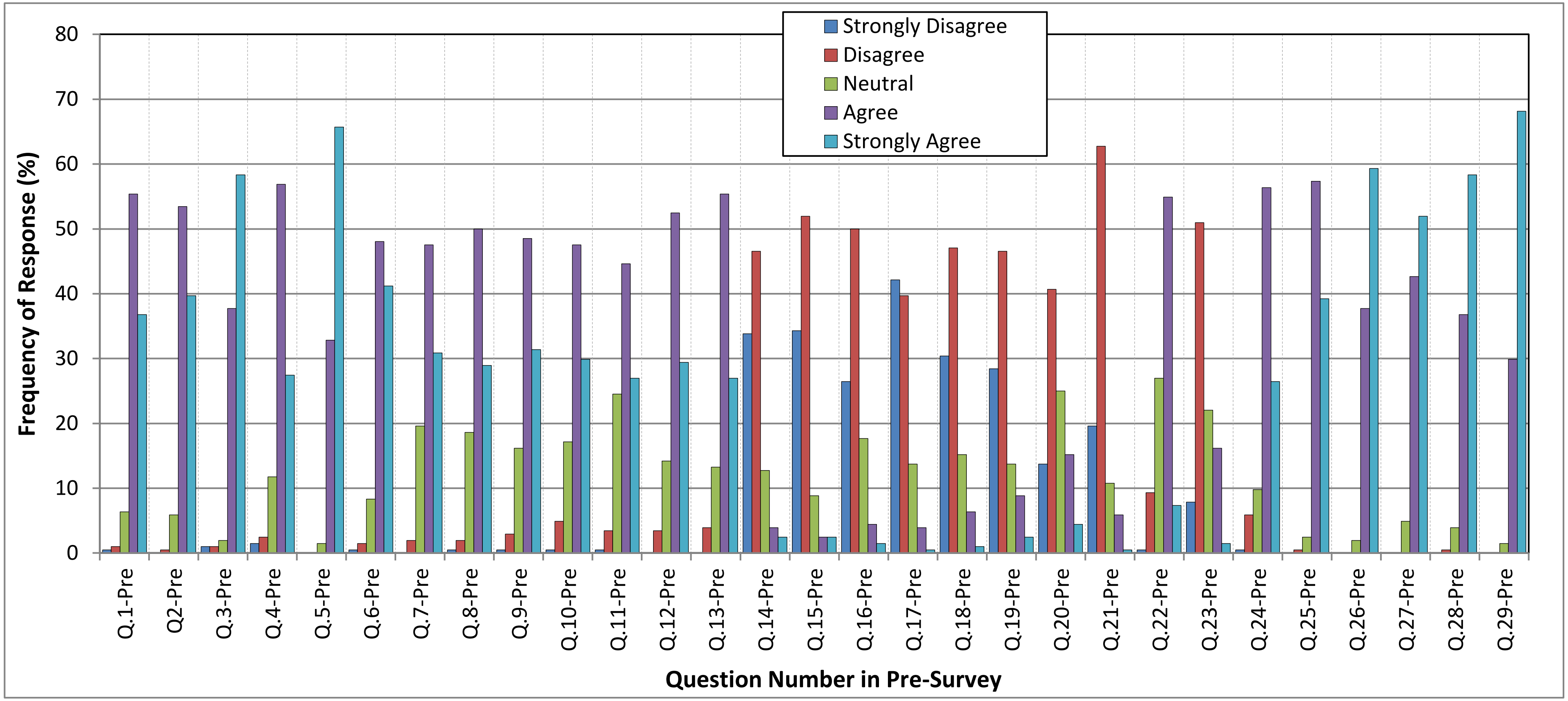


Figure 6.2: Plot of the raw data listed in Table 6.1 (Pre-intervention). The vertical frequency is now as percentages.

Table 6.3 presents the summary statistics for questions 1 – 29 of the M-RIPLS Pre Intervention for the Whole Group.

Summary Results of Pre-Questionnaire Questions 1 - 29	Q1. Learning with other students will help me become a more effective member of a health care team	Q2. For small group learning to work, students need to trust and respect each other	Q3. Team-working skills are essential for all health care students to learn	Q4. Shared learning will help me to understand my own limitations	Q5. Patients ultimately benefit if health care professionals work together to solve patient problems	Q6. Shared learning with other health care professionals will increase my ability to understand clinical problems	Q7. Learning with health care students before qualification would improve relationships after qualification	Q8. Communication skills should be learned with other health care students	Q9. Shared learning will help me to think positively about other professionals	Q10. Shared learning with other health care students will help me to communicate better with patients and other professionals	Q11. I would welcome the opportunity to work on small-group projects with other health care students	Q12. Shared learning will help to clarify the nature of patient problems	Q13. Shared learning before qualification would help me become a better team worker	Q14. I don't want to waste my time learning with other health care students	Q15. It is not beneficial for health care students to learn together	Q16. Clinical problem-solving skills should only be learned with students from my own discipline	Q17. The function of nurses and therapists is mainly to provide support for doctors	Q18. There is little overlap between my role and that of other health care professionals	Q19. I would feel uncomfortable if another health care student knew more about a topic than I did	Q20. I have to acquire much more knowledge and skills than other health care students	Q21. I'm not sure what my professional role will be	Q22. I use my own judgment a lot in my professional role	Q23. Reaching a diagnosis is the main function of my role	Q24. My main responsibility as a professional is to treat my patient	Q25. I like to understand the patient's side of the problem	Q26. Establishing trust with my patients is important to me	Q27. I try to communicate compassion to my patients	Q28. Thinking about the patient as a person is important in getting treatment right	Q29. In my profession you need skills in interacting and cooperating with patients
	Summary Statistics																												
N	204	203	204	204	204	203	204	204	203	204	204	203	203	203	204	204	204	204	204	202	203	202	201	202	203	202	203	203	203
Mean	4.27	4.33	4.51	4.06	4.64	4.29	4.07	4.05	4.08	4.01	3.94	4.08	4.06	1.94	1.87	2.04	1.81	2.00	2.10	2.55	2.04	3.60	2.52	4.03	4.36	4.58	4.47	4.54	4.67
Std Deviation	0.67	0.61	0.68	0.79	0.51	0.72	0.76	0.77	0.80	0.85	0.83	0.76	0.75	0.92	0.86	0.87	0.85	0.90	0.99	1.05	0.77	0.78	0.91	0.81	0.56	0.53	0.59	0.60	0.50
SEM	0.05	0.04	0.05	0.06	0.04	0.05	0.05	0.05	0.06	0.06	0.06	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.05	0.05	0.06	0.06	0.04	0.04	0.04	0.04	0.04
2 x SEM (95% C.I.)	0.09	0.09	0.10	0.11	0.07	0.10	0.11	0.11	0.11	0.12	0.12	0.11	0.11	0.13	0.12	0.12	0.12	0.13	0.14	0.15	0.11	0.11	0.13	0.11	0.08	0.08	0.08	0.08	0.07

Table 6.3: Summary statistics for the 29 item M-RIPLS questions (Pre intervention).

The Mean values and their 95% C.I.s for the Whole Group Pre Intervention are plotted in Figure 6.3

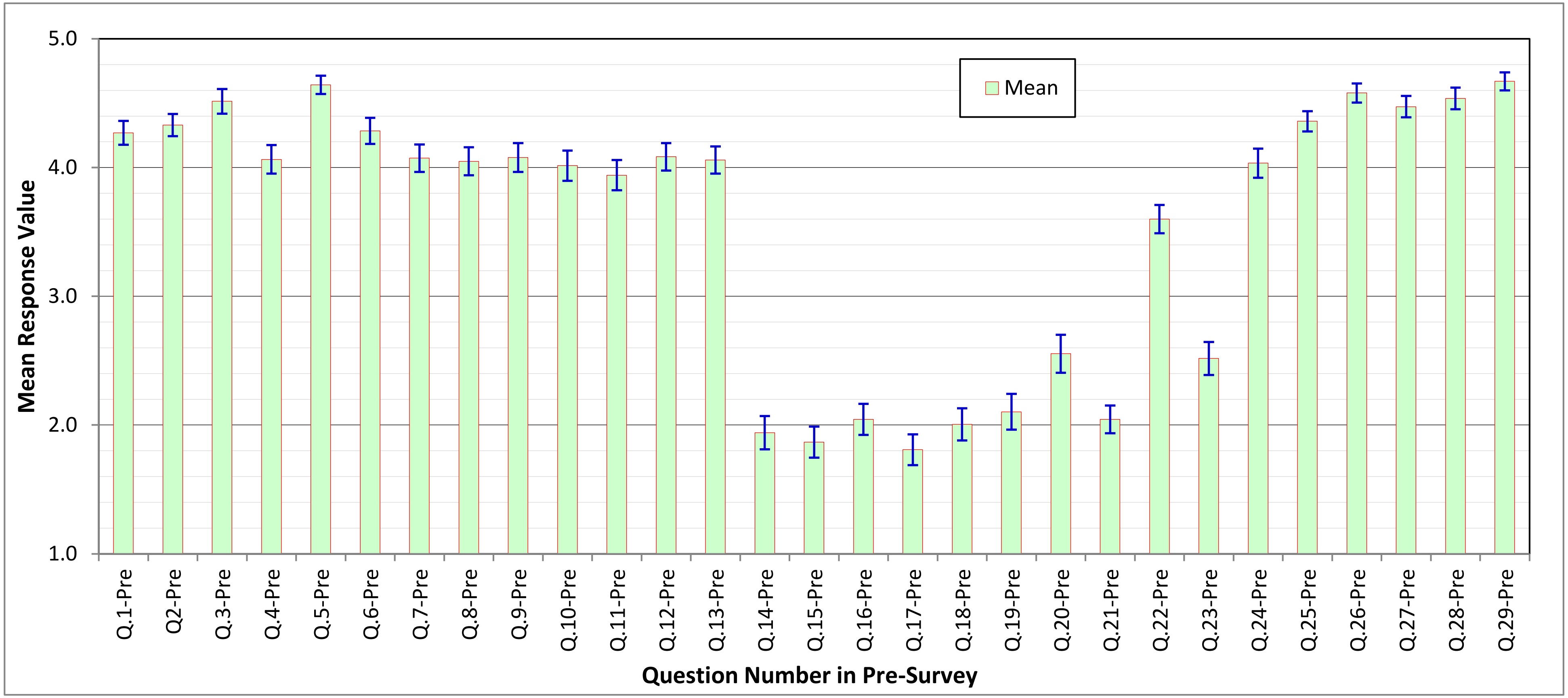


Figure 6.3: Plot of the Mean (Pre-intervention) from Table 6.3 (pale green columns) and 95% C.I. Blue is the uncertainty bars.

6.3 Results - M-RIPLS data Post- Intervention

Table 6.4 lists the raw data results of questions 1 – 29 of the M-RIPLS Post intervention for the Whole Group.

Summary Results of Post-Questionnaire Questions 1 - 29	Q1. Learning with other students will help me become a more effective member of a health care team	Q2. For small group learning to work, students need to trust and respect each other	Q3. Team-working skills are essential for all health care students to learn	Q4. Shared learning will help me to understand my own limitations	Q5. Patients ultimately benefit if health care professionals work together to solve patient problems	Q6. Shared learning with other health care professionals will increase my ability to understand clinical problems	Q7. Learning with health care students before qualification would improve relationships after qualification	Q8. Communication skills should be learned with other health care students	Q9. Shared learning will help me to think positively about other professionals	Q10. Shared learning with other health care students will help me to communicate better with patients and other professionals	Q11. I would welcome the opportunity to work on small-group projects with other health care students	Q12. Shared learning will help to clarify the nature of patient problems	Q13. Shared learning before qualification would help me become a better team worker	Q14. I don't want to waste my time learning with other health care students	Q15. It is not beneficial for health care students to learn together	Q16. Clinical problem-solving skills should only be learned with students from my own discipline	Q17. The function of nurses and therapists is mainly to provide support for doctors	Q18. There is little overlap between my role and that of other health care professionals	Q19. I would feel uncomfortable if another health care student knew more about a topic than I did	Q20. I have to acquire much more knowledge and skills than other health care students	Q21. I'm not sure what my professional role will be	Q22. I use my own judgment a lot in my professional role	Q23. Reaching a diagnosis is the main function of my role	Q24. My main responsibility as a professional is to treat my patient	Q25. I like to understand the patient's side of the problem	Q26. Establishing trust with my patients is important to me	Q27. I try to communicate compassion to my patients	Q28. Thinking about the patient as a person is important in getting treatment right	Q29. In my profession you need skills in interacting and cooperating with patients
	Frequency (counts)																												
Strong Disagree	0	0	0	0	0	0	0	0	0	0	2	3	0	110	107	72	57	52	60	43	43	4	21	2	0	0	1	1	2
Disagree	1	1	1	0	0	1	6	3	3	3	2	20	6	71	72	81	122	115	93	83	125	22	99	20	0	0	0	1	7
Neutral	9	8	3	23	6	16	19	22	22	22	26	93	20	15	16	33	18	24	29	49	32	55	53	21	9	5	10	5	72
Agree	97	88	80	102	70	85	73	89	92	95	87	87	92	6	8	16	7	10	19	24	3	99	29	97	100	82	86	84	122
Strong Agree	97	107	120	79	128	102	106	90	87	84	87	1	85	2	1	2	0	3	2	5	1	23	2	64	95	117	107	113	1
Total N	204	204	204	204	204	204	204	204	204	204	204	204	203	204	204	204	204	204	203	204	204	203	204	204	204	204	204	204	204

Table 6.4: M-RIPLS raw data Post Intervention as Frequencies (counts) for Whole Group

Figure 6.4 plots the raw data as counts from Table 6.4 for the Whole Group Pre Intervention.

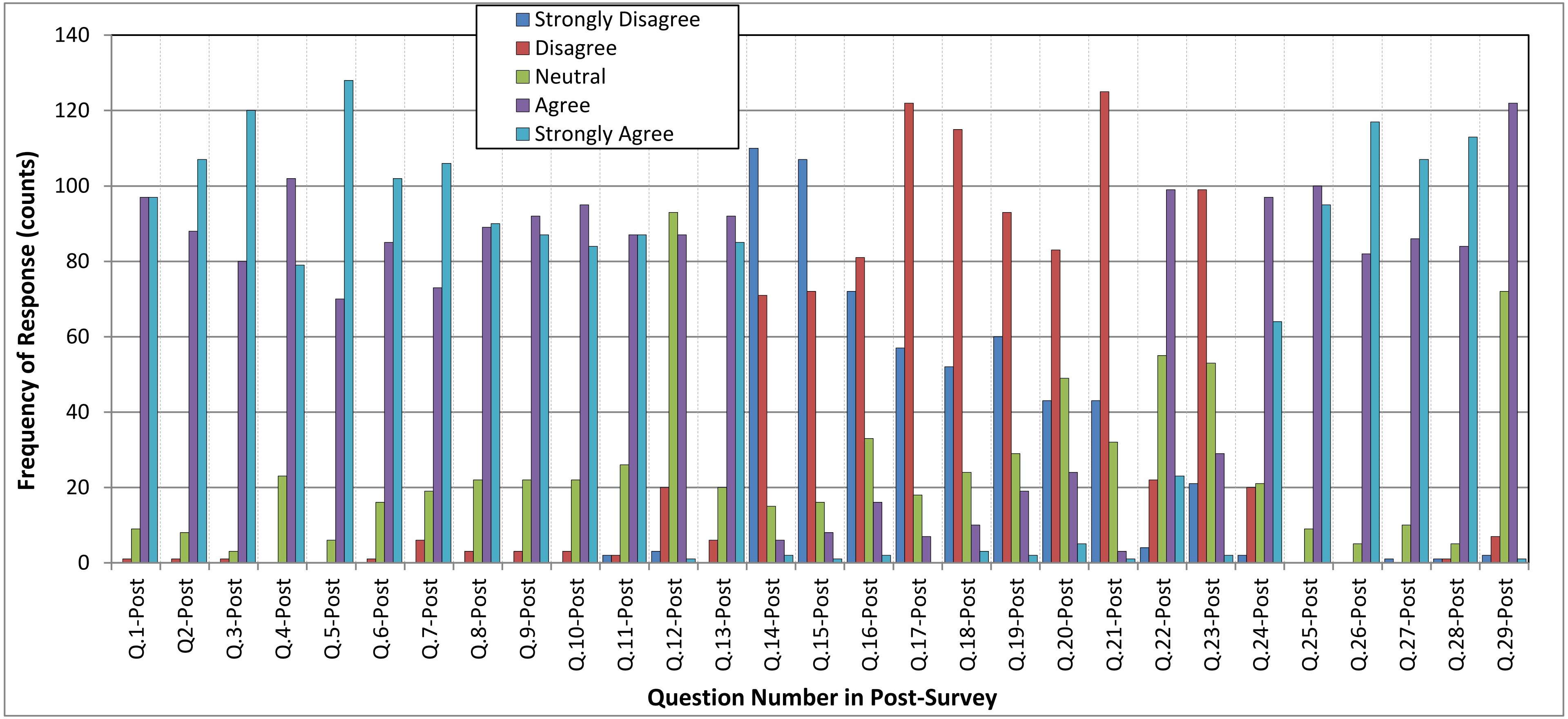


Figure 6.4: Plot of the raw data listed in Table 6.4 (Post Intervention). The vertical frequency is simply counts

Table 6.5 presents the raw data results for the Whole Group Post Intervention as percentages.

Summary Results of Post-Questionnaire Questions 1 - 29	Q1. Learning with other students will help me become a more effective member of a health care team	Q2. For small group learning to work, students need to trust and respect each other	Q3. Team-working skills are essential for all health care students to learn	Q4. Shared learning will help me to understand my own limitations	Q5. Patients ultimately benefit if health care professionals work together to solve patient problems	Q6. Shared learning with other health care professionals will increase my ability to understand clinical problems	Q7. Learning with health care students before qualification would improve relationships after qualification	Q8. Communication skills should be learned with other health care students	Q9. Shared learning will help me to think positively about other professionals	Q10. Shared learning with other health care students will help me to communicate better with patients and other professionals
	Frequency (Percentage)									
Strong Disagree	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Disagree	0.5	0.5	0.5	0.0	0.0	0.5	2.9	1.5	1.5	1.5
Neutral	4.4	3.9	1.5	11.3	2.9	7.8	9.3	10.8	10.8	10.8
Agree	47.5	43.1	39.2	50.0	34.3	41.7	35.8	43.6	45.1	46.6
Strong Agree	47.5	52.5	58.8	38.7	62.7	50.0	52.0	44.1	42.6	41.2
Total %	100	100	100	100	100	100	100	100	100	100

Summary Results of Post-Questionnaire Questions 1 - 29	Q11. I would welcome the opportunity to work on small-group projects with other health care students	Q12. Shared learning will help to clarify the nature of patient problems	Q13. Shared learning before qualification would help me become a better team worker	Q14. I don't want to waste my time learning with other health care students	Q15. It is not beneficial for health care students to learn together	Q16. Clinical problem-solving skills should only be learned with students from my own discipline	Q17. The function of nurses and therapists is mainly to provide support for doctors	Q18. There is little overlap between my role and that of other health care professionals	Q19. I would feel uncomfortable if another health care student knew more about a topic than I did	Q20. I have to acquire much more knowledge and skills than other health care students
	Frequency (Percentage)									
Strong Disagree	1.0	1.5	0.0	53.9	52.5	35.3	27.9	25.5	29.4	21.1
Disagree	1.0	9.8	2.9	34.8	35.3	39.7	59.8	56.4	45.6	40.7
Neutral	12.7	45.6	9.8	7.4	7.8	16.2	8.8	11.8	14.2	24.0
Agree	42.6	42.6	45.1	2.9	3.9	7.8	3.4	4.9	9.3	11.8
Strong Agree	42.6	0.5	41.7	1.0	0.5	1.0	0.0	1.5	1.0	2.5
Total %	100	100	99.5	100	100	100	100	100	99.5	100

Summary Results of Post-Questionnaire Questions 1 - 29	Q21. I'm not sure what my professional role will be	Q22. I use my own judgment a lot in my professional role	Q23. Reaching a diagnosis is the main function of my role	Q24. My main responsibility as a professional is to treat my patient	Q25. I like to understand the patient's side of the problem	Q26. Establishing trust with my patients is important to me	Q27. I try to communicate compassion to my patients	Q28. Thinking about the patient as a person is important in getting treatment right	Q29. In my profession you need skills in interacting and cooperating with patients
	Frequency (Percentage)								
Strong Disagree	21.1	2.0	10.3	1.0	0.0	0.0	0.5	0.5	1.0
Disagree	61.3	10.8	48.5	9.8	0.0	0.0	0.0	0.5	3.4
Neutral	15.7	27.0	26.0	10.3	4.4	2.5	4.9	2.5	35.3
Agree	1.5	48.5	14.2	47.5	49.0	40.2	42.2	41.2	59.8
Strong Agree	0.5	11.3	1.0	31.4	46.6	57.4	52.5	55.4	0.5
Total %	100	99.5	100	100	100	100	100	100	100

Table 6.5: M-RIPLS data as listed in Table 6.4 Post Intervention as Percentages

Figure 6.5 plots the percentages for the Whole Group Post intervention.

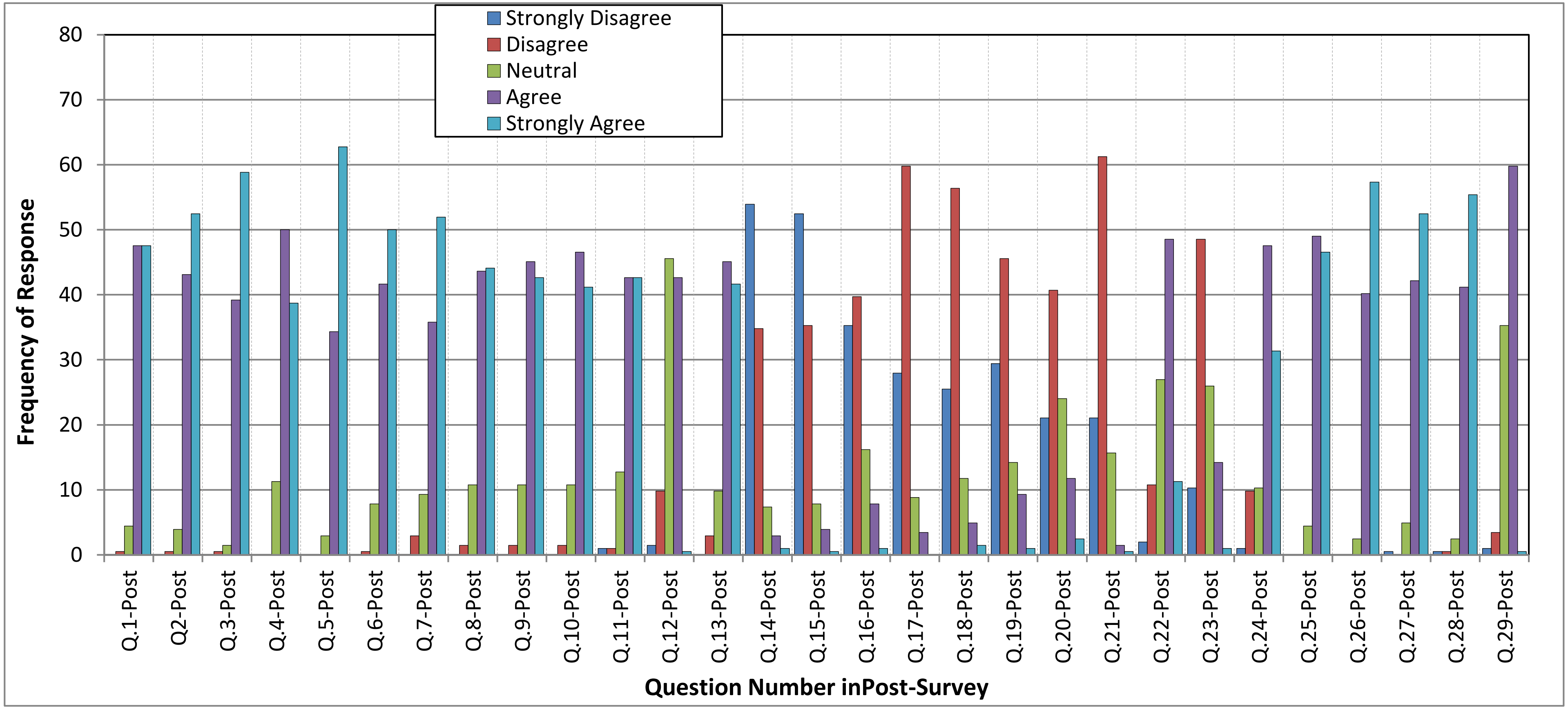


Figure 6.5: Plot of the raw data listed in Table 6. (Post-intervention). The vertical frequency is now as percentages.

Table 6.6 presents the summary statistics for questions 1 – 29 of the M-RIPLS Post Intervention for the Whole Group.

Summary Results of Post-Questionnaire Questions 1 - 29	Q1. Learning with other students will help me become a more effective member of a health care team	Q2. For small group learning to work, students need to trust and respect each other	Q3. Team-working skills are essential for all health care students to learn	Q4. Shared learning will help me to understand my own limitations	Q5. Patients ultimately benefit if health care professionals work together to solve patient problems	Q6. Shared learning with other health care professionals will increase my ability to understand clinical problems	Q7. Learning with health care students before qualification would improve relationships after qualification	Q8. Communication skills should be learned with other health care students	Q9. Shared learning will help me to think positively about other professionals	Q10. Shared learning with other health care students will help me to communicate better with patients and other professionals	Q11. I would welcome the opportunity to work on small-group projects with other health care students	Q12. Shared learning will help to clarify the nature of patient problems	Q13. Shared learning before qualification would help me become a better team worker	Q14. I don't want to waste my time learning with other health care students	Q15. It is not beneficial for health care students to learn together	Q16. Clinical problem-solving skills should only be learned with students from my own discipline	Q17. The function of nurses and therapists is mainly to provide support for doctors	Q18. There is little overlap between my role and that of other health care professionals	Q19. I would feel uncomfortable if another health care student knew more about a topic than I did	Q20. I have to acquire much more knowledge and skills than other health care students	Q21. I'm not sure what my professional role will be	Q22. I use my own judgment a lot in my professional role	Q23. Reaching a diagnosis is the main function of my role	Q24. My main responsibility as a professional is to treat my patient	Q25. I like to understand the patient's side of the problem	Q26. Establishing trust with my patients is important to me	Q27. I try to communicate compassion to my patients	Q28. Thinking about the patient as a person is important in getting treatment right	Q29. In my profession you need skills in interacting and cooperating with patients
	Summary Statistics																												
N	204	204	204	204	204	204	204	204	204	204	204	203	203	204	204	204	204	204	203	204	203	203	204	204	204	204	204	204	203
Mean	4.42	4.48	4.56	4.27	4.60	4.41	4.37	4.30	4.29	4.27	4.25	4.30	4.26	1.62	1.65	2.00	1.88	2.00	2.06	2.34	1.98	3.57	2.47	3.99	4.42	4.55	4.46	4.50	4.54
Std Deviation	0.60	0.60	0.55	0.65	0.55	0.66	0.77	0.72	0.72	0.71	0.79	0.71	0.76	0.82	0.83	0.96	0.70	0.84	0.95	1.02	0.66	0.90	0.90	0.95	0.58	0.55	0.64	0.62	0.66
SEM	0.04	0.04	0.04	0.05	0.04	0.05	0.05	0.05	0.05	0.05	0.06	0.05	0.05	0.06	0.06	0.07	0.05	0.06	0.07	0.07	0.05	0.06	0.06	0.07	0.04	0.04	0.04	0.04	0.05
2 x SEM (95% C.I.)	0.08	0.08	0.08	0.09	0.08	0.09	0.11	0.10	0.10	0.10	0.11	0.10	0.11	0.12	0.12	0.13	0.10	0.12	0.13	0.14	0.09	0.13	0.13	0.13	0.08	0.08	0.09	0.09	0.09

Table 6.6: Summary statistics for the 29 item M-RIPLS questions (Post intervention).

The Mean values and their 95% C.I.s for the Whole Group Post Intervention are plotted in Figure 6.6

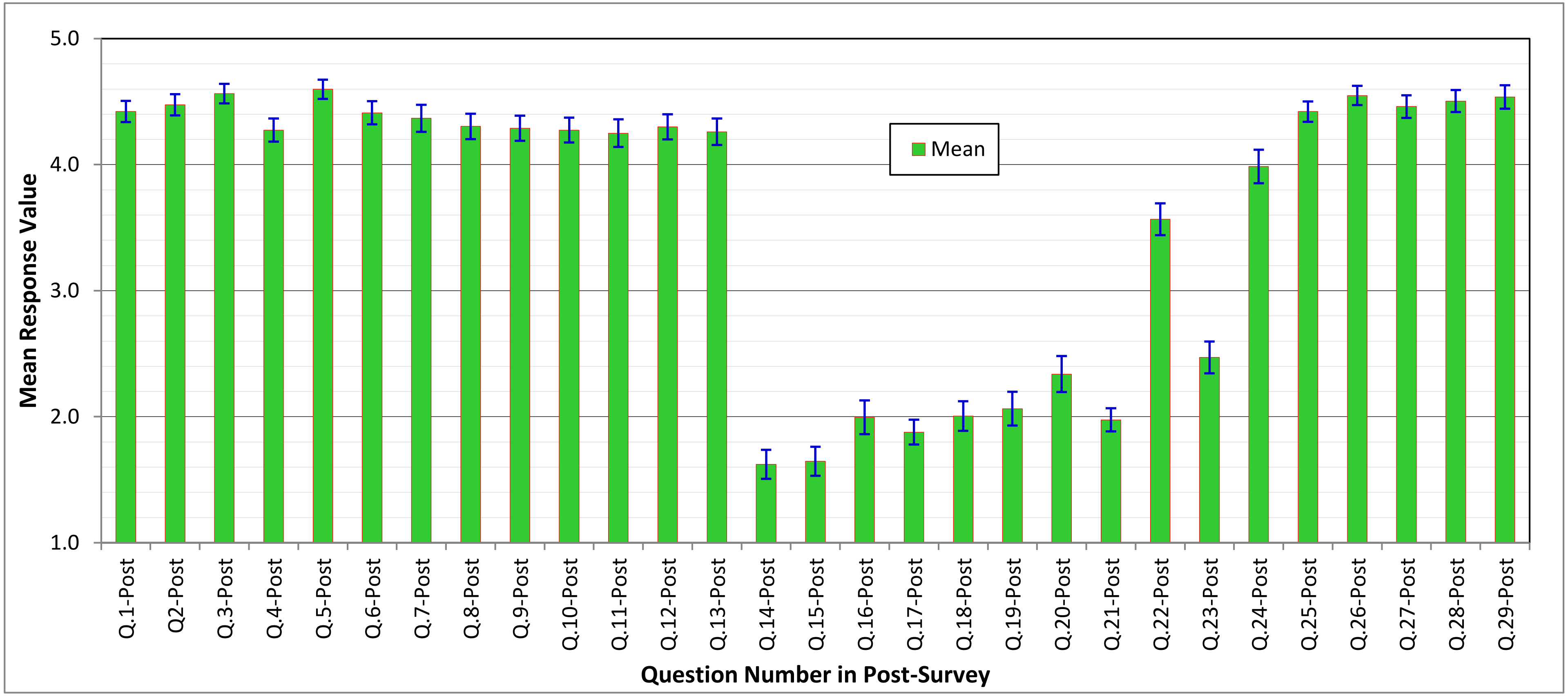


Figure 6.6: Plot of the Mean (Post-intervention) from Table 6.6 (green columns) and 95% C.I. Blue is the uncertainty bars.

6.4 Results - M-RIPLS data Pre and Post- Intervention

Table 6.7 presents the summary statistics for questions 1 – 29 of the M-RIPLS Pre and Post the intervention for the Whole Group.

Whole Group	Q.1	Q.2	Q.3	Q.4	Q.5	Q.6	Q.7	Q.8	Q.9	Q.10	Q.11	Q.12	Q.13	Q.14	Q.15	Q.16	Q.17	Q.18	Q.19	Q.20	Q.21	Q.22	Q.23	Q.24	Q.25	Q.26	Q.27	Q.28	Q.29
	Summary Statistics for Pre-Questionnaire																												
N	204	203	204	204	204	203	204	204	203	204	204	203	203	203	204	204	204	204	204	202	203	202	201	202	203	202	203	203	203
Mean	4.27	4.33	4.51	4.06	4.64	4.29	4.07	4.05	4.08	4.01	3.94	4.08	4.06	1.94	1.87	2.04	1.81	2.00	2.10	2.55	2.04	3.60	2.52	4.03	4.36	4.58	4.47	4.54	4.67
Std Deviation	0.67	0.61	0.68	0.79	0.51	0.72	0.76	0.77	0.80	0.85	0.83	0.76	0.75	0.92	0.86	0.87	0.85	0.90	0.99	1.05	0.77	0.78	0.91	0.81	0.56	0.53	0.59	0.60	0.50
SEM	0.05	0.04	0.05	0.06	0.04	0.05	0.05	0.05	0.06	0.06	0.06	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.05	0.05	0.06	0.06	0.04	0.04	0.04	0.04	0.04
2 x SEM (95% C.I.)	0.09	0.09	0.10	0.11	0.07	0.10	0.11	0.11	0.11	0.12	0.12	0.11	0.11	0.13	0.12	0.12	0.12	0.13	0.14	0.15	0.11	0.11	0.13	0.11	0.08	0.08	0.08	0.08	0.07
	Summary Statistics for Post-Questionnaire																												
N	204	204	204	204	204	204	204	204	204	204	204	203	203	204	204	204	204	204	203	204	203	203	204	204	204	204	204	204	203
Mean	4.42	4.48	4.56	4.27	4.60	4.41	4.37	4.30	4.29	4.27	4.25	4.30	4.26	1.62	1.65	2.00	1.88	2.00	2.06	2.34	1.98	3.57	2.47	3.99	4.42	4.55	4.46	4.50	4.54
Std Deviation	0.60	0.60	0.55	0.65	0.55	0.66	0.77	0.72	0.72	0.71	0.79	0.71	0.76	0.82	0.83	0.96	0.70	0.84	0.95	1.02	0.66	0.90	0.90	0.95	0.58	0.55	0.64	0.62	0.66
SEM	0.04	0.04	0.04	0.05	0.04	0.05	0.05	0.05	0.05	0.05	0.06	0.05	0.05	0.06	0.06	0.07	0.05	0.06	0.07	0.07	0.05	0.06	0.06	0.07	0.04	0.04	0.04	0.04	0.05
2 x SEM (95% C.I.)	0.08	0.08	0.08	0.09	0.08	0.09	0.11	0.10	0.10	0.10	0.11	0.10	0.11	0.12	0.12	0.13	0.10	0.12	0.13	0.14	0.09	0.13	0.13	0.13	0.08	0.08	0.09	0.09	0.09

Table 6.7: Summary statistics for the 29 item M-RIPLS questions (Pre and Post intervention) for the Whole Group.

The Mean values and their 95% C.I.s for the Whole Group Pre and Post Intervention are plotted in Figure 6.7

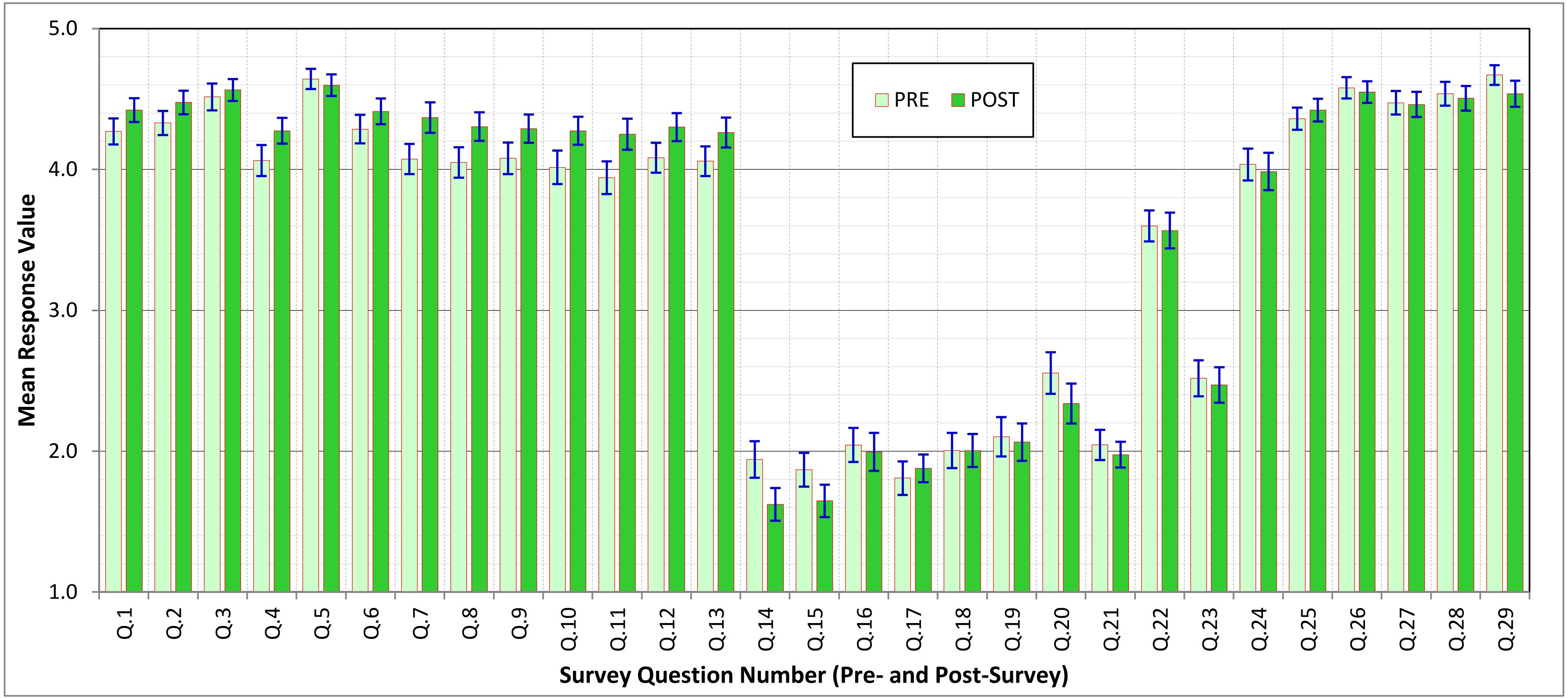


Figure 6.7 Plot of the Whole Group Means (pale green columns for Pre-intervention, green columns for Post intervention) from Table 6.7 and 95% C.I. Blue is the uncertainty bars.

Table 6.8 presents the summary statistics for questions 1 – 29 of the M-RIPLS <u>Pre</u> and <u>Post</u> the intervention for the IPL Group.

IPL Only	Q.1	Q.2	Q.3	Q.4	Q.5	Q.6	Q.7	Q.8	Q.9	Q.10	Q.11	Q.12	Q.13	Q.14	Q.15	Q.16	Q.17	Q.18	Q.19	Q.20	Q.21	Q.22	Q.23	Q.24	Q.25	Q.26	Q.27	Q.28	Q.29
	IPL - Summary Statistics for Pre-Questionnaire																												
N	101	100	101	101	101	101	101	101	101	101	101	100	101	101	101	101	101	101	101	101	101	101	101	101	101	100	101	101	101
Mean	4.19	4.29	4.50	4.05	4.62	4.23	4.03	4.05	4.04	3.98	3.88	4.00	4.01	2.00	1.85	2.09	1.79	2.00	2.13	2.50	2.05	3.52	2.42	3.95	4.34	4.59	4.45	4.53	4.67
Std Deviation	0.63	0.57	0.61	0.68	0.53	0.71	0.77	0.73	0.75	0.80	0.78	0.75	0.70	0.91	0.74	0.87	0.82	0.81	0.98	1.00	0.73	0.77	0.89	0.89	0.57	0.53	0.61	0.61	0.51
SEM	0.06	0.06	0.06	0.07	0.05	0.07	0.08	0.07	0.07	0.08	0.08	0.08	0.07	0.09	0.07	0.09	0.08	0.08	0.10	0.10	0.07	0.08	0.09	0.09	0.06	0.05	0.06	0.06	0.05
2 x SEM (95% C.I.)	0.12	0.11	0.12	0.14	0.10	0.14	0.15	0.14	0.15	0.16	0.15	0.15	0.14	0.18	0.15	0.17	0.16	0.16	0.19	0.20	0.14	0.15	0.18	0.18	0.11	0.11	0.12	0.12	0.10
	IPL - Summary Statistics for Post-Questionnaire																												
N	101	101	101	101	101	101	101	101	101	101	101	100	101	101	101	101	101	101	101	101	101	100	101	101	101	101	101	101	101
Mean	4.42	4.46	4.54	4.23	4.60	4.40	4.40	4.23	4.26	4.25	4.28	4.33	4.28	1.68	1.64	2.02	1.90	1.98	2.02	2.29	1.98	3.61	2.52	3.96	4.42	4.52	4.44	4.47	4.48
Std Deviation	0.55	0.61	0.54	0.63	0.55	0.63	0.71	0.72	0.66	0.67	0.65	0.65	0.68	0.90	0.82	0.92	0.70	0.81	0.91	1.07	0.65	0.87	0.91	1.00	0.59	0.56	0.70	0.70	0.73
SEM	0.05	0.06	0.05	0.06	0.05	0.06	0.07	0.07	0.07	0.07	0.06	0.07	0.07	0.09	0.08	0.09	0.07	0.08	0.09	0.11	0.06	0.09	0.09	0.10	0.06	0.06	0.07	0.07	0.07
2 x SEM (95% C.I.)	0.11	0.12	0.11	0.13	0.11	0.13	0.14	0.14	0.13	0.13	0.13	0.13	0.14	0.18	0.16	0.18	0.14	0.16	0.18	0.21	0.13	0.17	0.18	0.20	0.12	0.11	0.14	0.14	0.15

Table 6.8: Summary statistics for the 29 item M-RIPLS questions – IPL students only (<u>Pre</u> and <u>Post</u> intervention).

The Mean values and their 95% C.I.s for the IPL group are plotted in Figures 6.8.

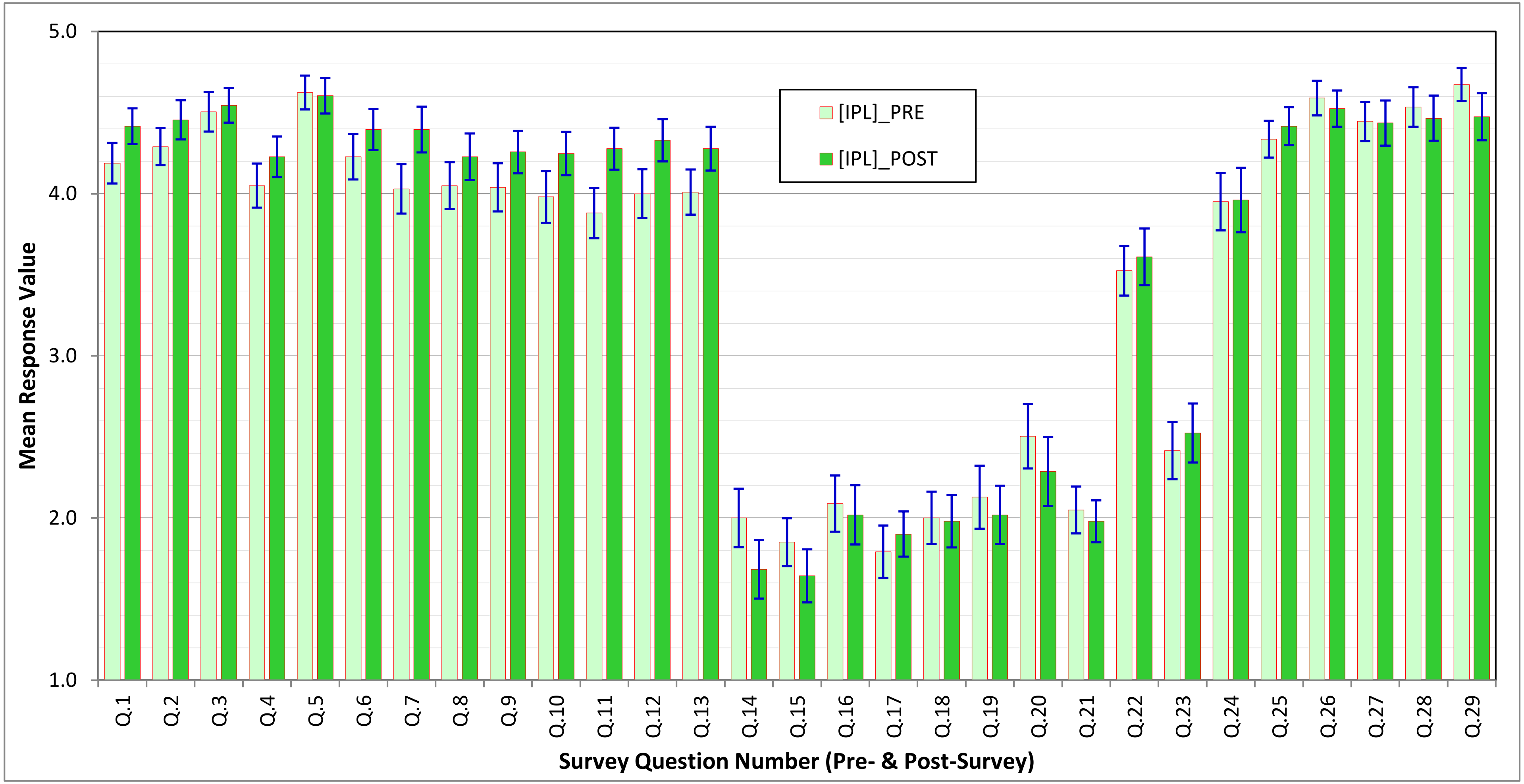


Figure 6.8: Plot of the Means (pale green columns for Pre-intervention, green columns for Post intervention) 95% C.I. from Table 6.8, for IPL students only.

Table 6.9 presents the summary statistics for questions 1 – 29 of the M-RIPLS Pre and Post the intervention for the UPL Group.

UPL Only	Q.1	Q.2	Q.3	Q.4	Q.5	Q.6	Q.7	Q.8	Q.9	Q.10	Q.11	Q.12	Q.13	Q.14	Q.15	Q.16	Q.17	Q.18	Q.19	Q.20	Q.21	Q.22	Q.23	Q.24	Q.25	Q.26	Q.27	Q.28	Q.29
	UPL - Summary Statistics for Pre-Questionnaire																												
N	103	103	103	103	103	102	103	103	102	103	103	103	102	102	103	103	103	103	103	101	102	101	100	101	102	102	102	102	102
Mean	4.35	4.37	4.52	4.08	4.66	4.34	4.12	4.05	4.12	4.05	4.00	4.17	4.11	1.88	1.88	2.00	1.83	2.01	2.08	2.60	2.04	3.67	2.62	4.12	4.38	4.57	4.50	4.54	4.67
Std Deviation	0.70	0.64	0.75	0.88	0.50	0.74	0.76	0.82	0.85	0.89	0.89	0.76	0.79	0.94	0.96	0.86	0.89	0.98	1.02	1.11	0.81	0.79	0.93	0.71	0.55	0.54	0.58	0.59	0.49
SEM	0.07	0.06	0.07	0.09	0.05	0.07	0.07	0.08	0.08	0.09	0.09	0.07	0.08	0.09	0.09	0.09	0.09	0.10	0.10	0.11	0.08	0.08	0.09	0.07	0.05	0.05	0.06	0.06	0.05
2 x SEM (95% C.I.)	0.14	0.13	0.15	0.17	0.10	0.15	0.15	0.16	0.17	0.18	0.17	0.15	0.16	0.19	0.19	0.17	0.18	0.19	0.20	0.22	0.16	0.16	0.19	0.14	0.11	0.11	0.11	0.12	0.10
	UPL - Summary Statistics for Post-Questionnaire																												
N	103	103	103	103	103	103	103	103	103	103	103	103	102	103	103	103	103	103	102	103	102	103	103	103	103	103	103	103	102
Mean	4.43	4.50	4.58	4.32	4.59	4.43	4.34	4.38	4.32	4.30	4.22	4.27	4.25	1.56	1.65	1.97	1.85	2.03	2.11	2.39	1.97	3.52	2.42	4.01	4.43	4.57	4.49	4.54	4.60
Std Deviation	0.60	0.60	0.55	0.65	0.55	0.66	0.77	0.72	0.72	0.71	0.79	0.71	0.76	0.82	0.83	0.96	0.70	0.84	0.95	1.02	0.66	0.90	0.90	0.95	0.58	0.55	0.64	0.62	0.66
SEM	0.06	0.06	0.06	0.07	0.05	0.07	0.08	0.07	0.08	0.07	0.09	0.07	0.08	0.07	0.08	0.10	0.07	0.09	0.10	0.09	0.07	0.09	0.09	0.09	0.06	0.05	0.06	0.05	0.06
2 x SEM (95% C.I.)	0.13	0.12	0.11	0.13	0.11	0.13	0.16	0.14	0.15	0.15	0.18	0.15	0.16	0.15	0.16	0.20	0.14	0.17	0.20	0.19	0.13	0.18	0.17	0.18	0.11	0.11	0.11	0.11	0.12

Table 6.9: Summary statistics for the 29 item M-RIPLS questions – UPL students only (Pre and Post intervention).

The Mean values and their 95% C.I.s for the IPL group are plotted in Figures 6.9.

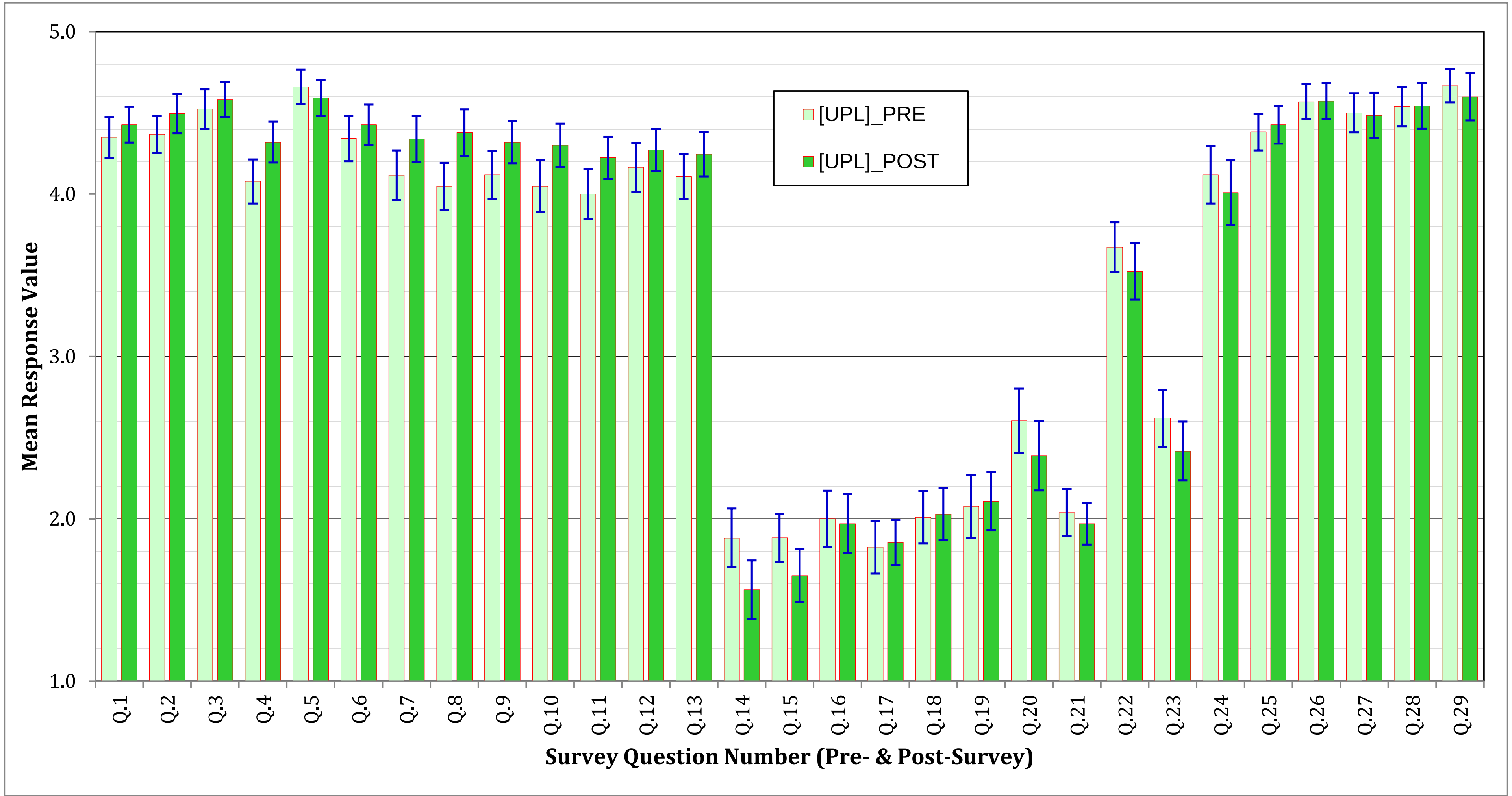


Figure 6.9: Plot of the Means (pale green columns for Pre-intervention, green columns for Post intervention) 95% C.I. from Table 6.9, for UPL students only.

Table 6.10 presents the summary statistics for questions 1 – 29 of the M-RIPLS Pre and Post the intervention for the Nursing Group.

Bachelor of Nursing Only	Q.1	Q.2	Q.3	Q.4	Q.5	Q.6	Q.7	Q.8	Q.9	Q.10	Q.11	Q.12	Q.13	Q.14	Q.15	Q.16	Q.17	Q.18	Q.19	Q.20	Q.21	Q.22	Q.23	Q.24	Q.25	Q.26	Q.27	Q.28	Q.29
	Bachelor of Nursing - Summary Statistics for Pre-Questionnaire																												
N	118	117	118	118	118	117	118	118	117	118	118	118	117	118	118	118	118	118	118	116	117	116	116	116	117	117	117	117	117
Mean	4.25	4.26	4.42	3.93	4.67	4.27	4.06	4.03	3.99	3.93	3.88	4.11	4.03	1.90	1.86	1.98	1.59	1.98	2.03	2.21	1.97	3.64	2.33	3.97	4.40	4.64	4.54	4.62	4.74
Std Deviation	0.69	0.61	0.77	0.85	0.49	0.73	0.74	0.76	0.77	0.86	0.85	0.69	0.67	0.96	0.89	0.88	0.81	0.93	0.96	0.91	0.78	0.83	0.80	0.90	0.54	0.50	0.60	0.55	0.46
SEM	0.06	0.06	0.07	0.08	0.05	0.07	0.07	0.07	0.07	0.08	0.08	0.06	0.06	0.09	0.08	0.08	0.07	0.09	0.09	0.08	0.07	0.08	0.07	0.08	0.05	0.05	0.06	0.05	0.04
2 x SEM (95% C.I.)	0.13	0.11	0.14	0.16	0.09	0.13	0.14	0.14	0.14	0.16	0.16	0.13	0.12	0.18	0.16	0.16	0.15	0.17	0.18	0.17	0.14	0.15	0.15	0.17	0.10	0.09	0.11	0.10	0.09
	Bachelor of Nursing - Summary Statistics for Post-Questionnaire																												
N	118	118	118	118	118	118	118	118	118	118	118	118	118	118	118	118	118	118	118	118	117	117	118	118	118	118	118	118	117
Mean	4.38	4.46	4.54	4.22	4.60	4.45	4.37	4.36	4.31	4.31	4.25	4.31	4.28	1.61	1.63	1.86	1.76	1.95	1.99	2.11	1.87	3.53	2.21	3.98	4.44	4.59	4.54	4.53	4.56
Std Deviation	0.63	0.62	0.56	0.67	0.54	0.65	0.80	0.71	0.73	0.71	0.82	0.69	0.76	0.89	0.89	1.02	0.71	0.89	0.96	0.93	0.66	0.95	0.79	1.02	0.58	0.51	0.56	0.62	0.66
SEM	0.06	0.06	0.05	0.06	0.05	0.06	0.07	0.07	0.07	0.07	0.08	0.06	0.07	0.08	0.08	0.09	0.07	0.08	0.09	0.09	0.06	0.09	0.07	0.09	0.05	0.05	0.05	0.06	0.06
2 x SEM (95% C.I.)	0.12	0.11	0.10	0.12	0.10	0.12	0.15	0.13	0.14	0.13	0.15	0.13	0.14	0.16	0.16	0.19	0.13	0.16	0.18	0.17	0.12	0.18	0.15	0.19	0.11	0.09	0.10	0.11	0.12

Table 6.10: Summary statistics for the 29 item M-RIPLS questions – Nursing students only (Pre and Post intervention).

The Mean values and their 95% C.I.s for the Nursing group are plotted in Figures 6.10.

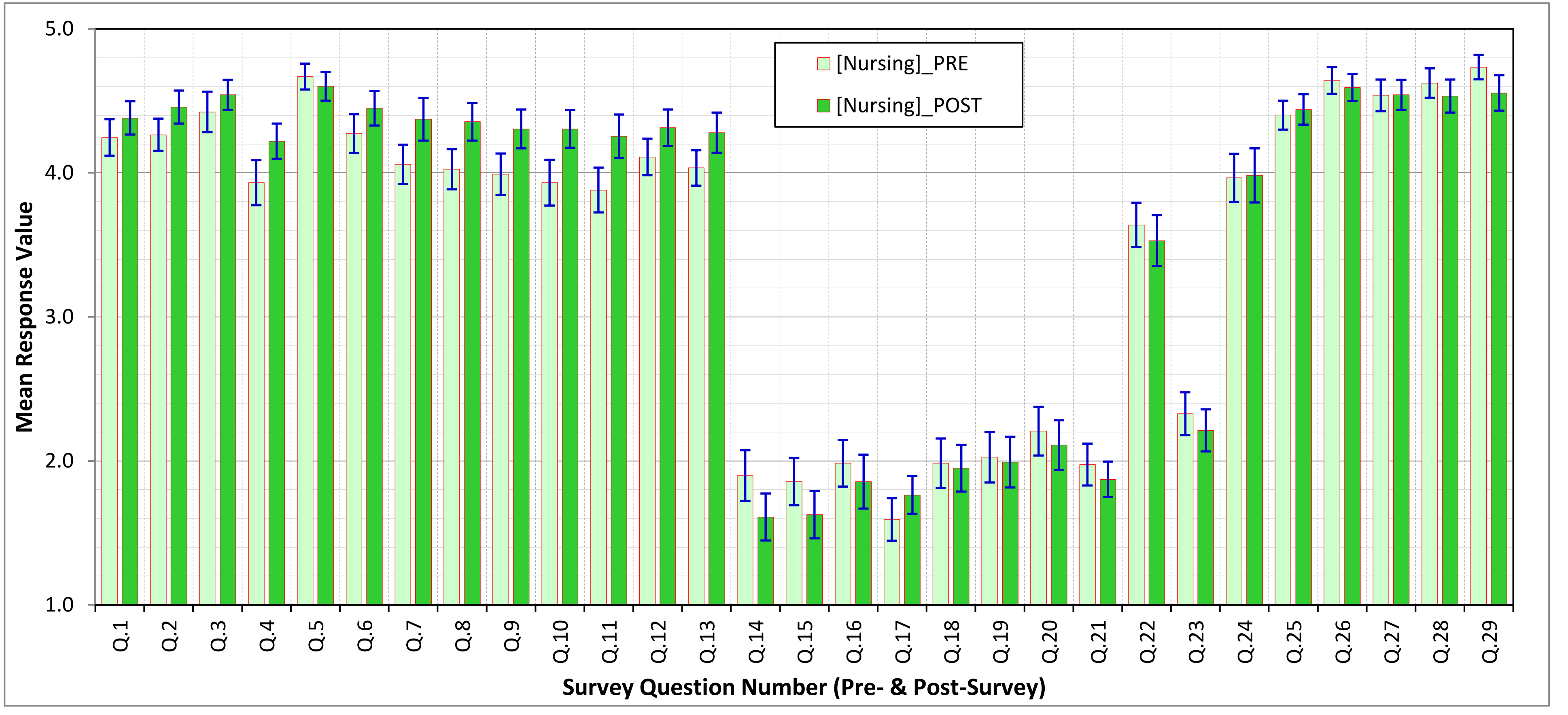


Figure 6.10: Plot of the Means (pale green columns for Pre-intervention, green columns for Post intervention) 95% C.I. from Table 6.10, for Nursing students only.

Table 6.11 presents the summary statistics for questions 1 – 29 of the M-RIPLS Pre and Post the intervention for the MBBS (Medicine) Group.

MBBS Only	Q.1	Q.2	Q.3	Q.4	Q.5	Q.6	Q.7	Q.8	Q.9	Q.10	Q.11	Q.12	Q.13	Q.14	Q.15	Q.16	Q.17	Q.18	Q.19	Q.20	Q.21	Q.22	Q.23	Q.24	Q.25	Q.26	Q.27	Q.28	Q.29
	MBBS - Summary Statistics for Pre-Questionnaire																												
N	86	86	86	86	86	86	86	86	86	86	86	85	86	85	86	86	86	86	86	86	86	86	85	86	86	85	86	86	86
Mean	4.30	4.42	4.64	4.24	4.60	4.30	4.09	4.08	4.20	4.13	4.02	4.05	4.09	2.00	1.88	2.13	2.10	2.03	2.21	3.02	2.14	3.55	2.78	4.13	4.30	4.49	4.38	4.42	4.58
Std Deviation	0.63	0.60	0.53	0.65	0.54	0.72	0.79	0.80	0.82	0.81	0.81	0.84	0.85	0.87	0.82	0.85	0.83	0.85	1.04	1.05	0.74	0.71	0.99	0.65	0.58	0.57	0.58	0.64	0.54
SEM	0.07	0.07	0.06	0.07	0.06	0.08	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.11	0.11	0.08	0.08	0.11	0.07	0.06	0.06	0.06	0.07	0.06
2 x SEM (95% C.I.)	0.14	0.13	0.11	0.14	0.12	0.16	0.17	0.17	0.18	0.17	0.17	0.18	0.18	0.19	0.18	0.18	0.18	0.18	0.22	0.23	0.16	0.15	0.22	0.14	0.12	0.12	0.12	0.14	0.12
	MBBS - Summary Statistics for Post-Questionnaire																												
N	86	86	86	86	86	86	86	86	86	86	86	85	85	86	86	86	86	86	85	86	86	86	86	86	86	86	86	86	86
Mean	4.48	4.50	4.59	4.35	4.59	4.36	4.36	4.23	4.27	4.23	4.24	4.28	4.24	1.64	1.67	2.19	2.03	2.08	2.16	2.65	2.12	3.62	2.83	3.99	4.40	4.49	4.35	4.47	4.51
Std Deviation	0.57	0.57	0.54	0.63	0.56	0.67	0.73	0.73	0.69	0.71	0.75	0.73	0.75	0.73	0.73	0.85	0.66	0.77	0.94	1.05	0.62	0.83	0.91	0.85	0.58	0.59	0.72	0.63	0.66
SEM	0.06	0.06	0.06	0.07	0.06	0.07	0.08	0.08	0.07	0.08	0.08	0.08	0.08	0.08	0.08	0.09	0.07	0.08	0.10	0.11	0.07	0.09	0.10	0.09	0.06	0.06	0.08	0.07	0.07
2 x SEM (95% C.I.)	0.12	0.12	0.12	0.14	0.12	0.14	0.16	0.16	0.15	0.15	0.16	0.16	0.16	0.16	0.16	0.18	0.14	0.17	0.20	0.23	0.13	0.18	0.20	0.18	0.13	0.13	0.15	0.14	0.14

Table 6.11: Summary statistics for the 29 item M-RIPLS questions – Medical students only (Pre and Post intervention).

The Mean values and their 95% C.I.s for the Medicine group are plotted in Figures 6.11.

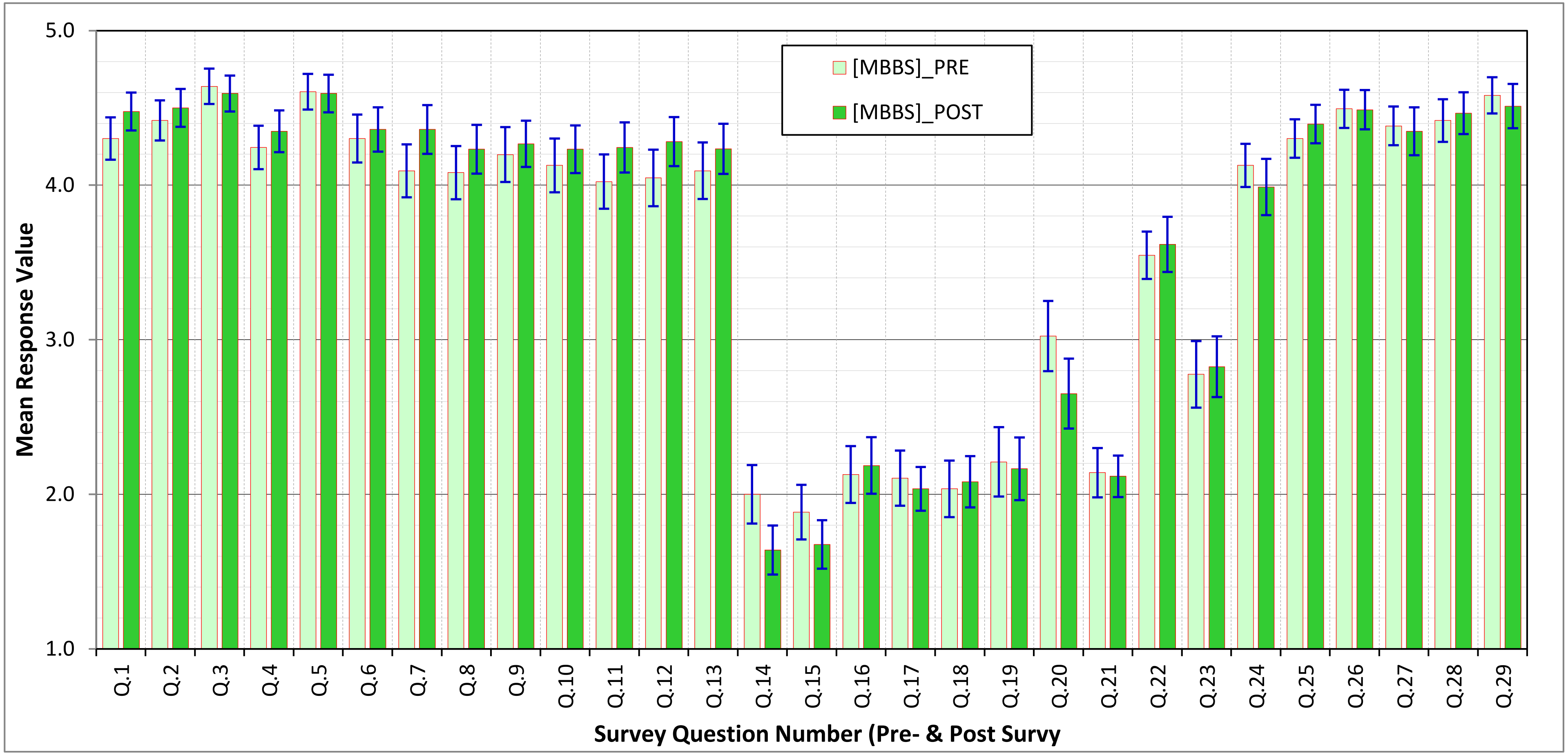


Figure 6.11: Plot of the Means (pale green columns for <u>Pre</u>-intervention, green columns for <u>Post</u> intervention) 95% C.I. from Table 6.9, for Medical students only.

6.5 Chapter overview

This Chapter has provided an opportunity to describe the purpose of the M-RIPLS instrument in the context of this thesis and to present the initial results from applying the scale to all students recruited to the study (**Pre** and **Post** the education intervention). It has also revealed some observable trends in relation to responses for each item according to Learning Condition and Course. The true utility of this data however, is best analysed following the Factor Analysis process for the M-RIPLS instrument which will be detailed in the next Chapter. This will allow for a reduction of the variables from the present, in excess of 50 dimensions, to a smaller number of more manageable dimensions.

Nevertheless, by reviewing the median raw data and the plots of the means, the following trends were noted for both Pre and Post the intervention, regardless of course or learning condition. (It must be stressed that these are observational generalisations only, and are in no way reflective of statistical significance.)

- High rating scores generally observed for Items 1 – 13
- Low rating scores generally observed for items 14 – 20
- Item 22 appeared to be in the medium to high range
- High rating scores generally observed for Items 24 - 29

The summary statistics presented in this Chapter will be reviewed again in Chapter 8 following consideration of the Factor analysis, the process of which is outlined in Chapter 7.

CHAPTER 7

Results – M-RIPLS Factor Analysis

7.1 Introduction and Factor Analysis Process

This Chapter describes the Exploratory Factor Analysis (EFA) process, using Principle Component Analysis (PCA), applied to the 29 items (Q1 to Q29) common to the M-RIPLS from the Pre and Post questionnaire instruments. In this Chapter the Pre and Post data is not viewed separately, but rather pooled together to form a combined dataset of approximately 400 responses to each item from Q1 to Q29.

The areas, Part A to Part H, below, illustrate and summarise the steps of this process in the order they were executed. It should be noted that part of the EFA/PCA process iterative (see Parts D, E and F). Also to note is that there can be more than one outcome to the EFA process (see Parts G and H), as is the case in this Chapter. The two outcomes are explained and a choice is made:

Part A: The basic **descriptive statistics** of the 29 items in the M-RIPLS instrument.

Part B: The **correlation matrix** of the 29 Items in the M-RIPLS instrument. This provides instructions as to which items were likely to be ultimately grouped together in the extracted Principle Components.

Part C: The **KMO and Bartlett's Test** to determine if the set of data, (i.e., the 400+ combined responses to Items Q1 to Q29 of the M-RIPLS_PRE and M-RIPLS_POST questionnaires), was likely to be amenable to Factor Analysis. Once this question was resolved in the positive, the Communalities Table was determined for the Items Q1 to Q29. This provided a measure of how much of the initial variance in the Item (which by default, equaled 1.000), was retained in the Principle Components extracted from the data. Those items for which less than 50% of the initial variance was retained in the extracted Principle Components (PCs) were dropped from the list of items resulting in 25 M-RIPL items. The Principle Components were then extracted from that list.

Part D: Using the remaining 25 M-RIPL items as the final list, Part D presents the following tables/figures:

- 'Total Variance Explained' for the extraction of <u>four</u> Principle Components (PCs);
- 'Scree Plot' for the extraction;
- 'Component Matrix' for four PCs;

- ‘Rotated Component Matrix’ for four (rotated) PCs; and,
- figure illustrating the four ‘PCs in Rotated Space’.

Part E: The **Reliability Analysis**, using Cronbach’s α, of the M-RIPLS Instrument as a whole, and then repeated for certain subsets of the whole, corresponding to the extracted Principle Components.

Part F: **Comparison of the outcomes** of the factor analysis with other validation studies of both the Original and Modified RIPLS.

Part G: Description of the **Factor Subscales.**

Part H: Comparison of **descriptive statistics** from Chapter 6 for each of the new Factor Subscales.

Part A: Summary statistics

Table 7.1 presents the summary statistics of the M-RIPLS items Q1 to Q29. It indicates the total number of items accounted for, missing data, the mean, standard deviation and the standard error of the mean. Even though it is not always essential to examine the summary statistics in the process of conducting an EFA, it is one of the optional outputs of the EFA process and is therefore included for completeness.

Remarks:

It should be noted that Items Q14 and Q15 were scored in the opposite sense to the other items in the questionnaire. Reversing these scores before proceeding with the Factor Analysis was important to make their sense the same as the other items. The reversed items are denoted with as $Q14_{(REV)}$ and $Q15_{(REV)}$, in place of the original items Q14 and Q15.

Part B: Correlation Matrix

Table 7.2 provides the correlation matrix of the M-RIPLS items Q1 to Q29. Since the correlation matrix is always symmetrical about the diagonal, it is conventional to show only the bottom-left half of the matrix. In each cell, the upper number in black is the Pearson correlation coefficient, R, and the lower number in blue italic is the Significance value for Pearson’s R. Where Sig. <0.05, the correlation is said to be significant at the p<0.05 level. In the table cells where two conditions are satisfied simultaneously these are indicated: (a) moderate to high correlation (specifically, where R >0.5), and a high level of statistical significance (specifically, where Sig. <0.05), by using a bold font and green shading and either the single asterisk ‘*’ (for 0.05 > Sig. > 0.01) or the double asterisk ‘**’ (for Sig. < 0.01). Examination of the correlation matrix, like the Descriptive Statistics above in Table 7.1, is optional but recommended in the EFA process and is included for completeness.

	Analysis N	Mean	Std. Deviation	Std. Error of Mean
Q1. Learning with other students will help me become a more effective member of a health care team	390	4.34	.643	0.033
Q2. For small group learning to work, students need to trust and respect each other	390	4.41	.600	0.030
Q3. Team-working skills are essential for all health care students to learn	390	4.54	.627	0.032
Q4. Shared learning will help me to understand my own limitations	390	4.17	.719	0.036
Q5. Patients ultimately benefit if health care professionals work together to solve patient problems	390	4.61	.533	0.027
Q6. Shared learning with other health care professionals will increase my ability to understand clinical problems	390	4.34	.691	0.035
Q7. Learning with health care students before qualification would improve relationships after qualification	390	4.22	.782	0.040
Q8. Communication skills should be learned with other health care students	390	4.18	.753	0.038
Q9. Shared learning will help me to think positively about other professionals	390	4.17	.762	0.039
Q10. Shared learning with other health care students will help me to communicate better with patients and other professionals	390	4.14	.788	0.040
Q11. I would welcome the opportunity to work on small-group projects with other health care students	390	4.10	.821	0.042
Q12. Shared learning will help to clarify the nature of patient problems	390	4.19	.741	0.037
Q13. Shared learning before qualification would help me become a better team worker	390	4.16	.753	0.038
Q14. I don't want to waste my time learning with other health care students	390	1.78	.872	0.044
Q15. It is not beneficial for health care students to learn together	390	1.75	.831	0.042
Q16. Clinical problem-solving skills should only be learned with students from my own discipline	390	2.02	.903	0.046
Q17. The function of nurses and therapists is mainly to provide support for doctors	390	1.84	.767	0.039
Q18. There is little overlap between my role and that of other health care professionals	390	1.99	.856	0.043
Q19. I would feel uncomfortable if another health care student knew more about a topic than I did	390	2.07	.975	0.049
Q20. I have to acquire much more knowledge and skills than other health care students	390	2.43	1.034	0.052
Q21. I'm not sure what my professional role will be	390	2.01	.710	0.036
Q22. I use my own judgment a lot in my professional role	390	3.58	.840	0.043
Q23. Reaching a diagnosis is the main function of my role	390	2.49	.898	0.045
Q24. My main responsibility as a professional is to treat my patient	390	4.01	.881	0.045
Q25. I like to understand the patient's side of the problem	390	4.38	.570	0.029
Q26. Establishing trust with my patients is important to me	390	4.55	.542	0.027
Q27. I try to communicate compassion to my patients	390	4.45	.618	0.031
Q28. Thinking about the patient as a person is important in getting treatment right	390	4.51	.616	0.031
Q29. In my profession you need skills in interacting and cooperating with patients	390	4.59	.596	0.030

Table 7.1: Descriptive Statistics for M-RIPLS Items Q1 to Q29. **Table 7.2 (next page):** The Correlation Matrix for the M-RIPLS Items Q1 to Q29.

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29
Q1	1.000																												
Q2	.509	1.000																											
	.000																												
Q3	.526	.467	1.000																										
	.000	.000																											
Q4	.567	.470	.505	1.000																									
	.000	.000	.000																										
Q5	.430	.463	.460	.290	1.000																								
	.000	.000	.000	.000																									
Q6	.623	.491	.463	.627	.521	1.000																							
	.000	.000	.000	.000	.000																								
Q7	.504	.479	.315	.509	.423	.571	1.000																						
	.000	.000	.000	.000	.000	.000																							
Q8	.586	.458	.548	.593	.369	.589	.629	1.000																					
	.000	.000	.000	.000	.000	.000	.000																						
Q9	.600	.537	.577	.573	.434	.576	.672	.713	1.000																				
	.000	.000	.000	.000	.000	.000	.000	.000																					
Q10	.623	.498	.566	.612	.446	.612	.595	.707	.803	1.000																			
	.000	.000	.000	.000	.000	.000	.000	.000	.000																				
Q11	.596	.425	.485	.545	.286	.454	.464	.630	.601	.665	1.000																		
	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000																			
Q12	.504	.471	.328	.464	.437	.617	.539	.509	.532	.602	.554	1.000																	
	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000																		
Q13	.594	.493	.481	.587	.379	.558	.618	.679	.713	.750	.632	.669	1.000																
	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000																	
Q14	-.449	-.269	-.344	-.355	-.340	-.419	-.361	-.413	-.425	-.438	-.480	-.406	-.483	1.000															
	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000																
Q15	-.402	-.279	-.404	-.373	-.345	-.416	-.369	-.450	-.497	-.453	-.445	-.433	-.526	.771	1.000														
	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000															
Q16	-.225	-.200	-.180	-.199	-.254	-.298	-.378	-.275	-.312	-.303	-.262	-.428	-.316	.523	.531	1.000													
	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000														
Q17	-.100	-.071	.001	.040	-.271	-.100	-.122	-.016	.016	-.003	-.071	-.082	-.060	.262	.241	.318	1.000												
	.022	.076	.495	.209	.000	.022	.007	.377	.376	.477	.075	.049	.116	.000	.000	.000													
Q18	-.134	-.100	-.076	-.049	-.201	-.191	-.159	-.107	-.125	-.137	-.118	-.190	-.120	.264	.276	.342	.472	1.000											
	.003	.022	.061	.160	.000	.000	.001	.015	.006	.003	.008	.000	.008	.000	.000	.000	.000												
Q19	-.168	-.168	-.143	-.096	-.238	-.179	-.108	-.211	-.184	-.189	-.242	-.195	-.207	.347	.391	.292	.291	.303	1.000										
	.000	.000	.002	.026	.000	.000	.015	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000											
Q20	-.018	-.004	.078	.144	-.218	-.076	-.068	-.053	.054	.002	-.047	-.141	-.027	.155	.116	.181	.408	.214	.470	1.000									
	.362	.465	.058	.002	.000	.063	.088	.143	.139	.485	.171	.002	.295	.001	.010	.000	.000	.000	.000										
Q21	-.178	-.204	-.053	.020	-.225	-.057	-.023	-.038	-.087	-.093	-.151	-.143	-.134	.137	.137	.228	.286	.202	.319	.281	1.000								
	.000	.000	.144	.345	.000	.128	.325	.225	.041	.031	.001	.002	.003	.003	.003	.000	.000	.000	.000	.000									
Q22	.083	-.032	.068	.050	.208	.094	.080	.000	.013	-.012	.003	.060	.080	-.104	.022	-.071	-.223	-.106	-.013	-.015	-.058	1.000							
	.049	.262	.087	.158	.000	.029	.054	.499	.400	.404	.476	.116	.054	.018	.329	.078	.000	.016	.400	.384	.121								
Q23	.071	.065	.070	.211	-.077	.067	.048	-.008	.112	.085	-.012	.031	.044	.160	.099	.132	.319	.257	.274	.302	.159	.041	1.000						
	.079	.096	.082	.000	.061	.089	.166	.434	.012	.045	.409	.268	.192	.001	.024	.004	.000	.000	.000	.000	.001	.207							
Q24	.066	.082	.121	.020	.103	.045	-.012	.045	.058	.175	.041	.095	.063	.016	-.008	.026	.031	.089	-.023	.024	-.011	.163	.169	1.000					
	.093	.050	.008	.343	.019	.182	.405	.182	.122	.000	.207	.028	.105	.376	.435	.303	.267	.036	.322	.316	.416	.001	.000						
Q25	.389	.248	.358	.240	.352	.399	.263	.357	.377	.350	.263	.335	.293	-.310	-.307	-.242	-.243	-.268	-.278	-.148	-.188	.136	-.121	.327	1.000				
	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.001	.000	.003	.008	.000					
Q26	.420	.322	.399	.229	.433	.342	.247	.333	.315	.296	.285	.257	.337	-.286	-.292	-.256	-.322	-.197	-.286	-.188	-.221	.182	-.091	.185	.613	1.000			
	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.035	.000	.000				
Q27	.313	.196	.255	.179	.320	.299	.120	.258	.231	.258	.152	.250	.284	-.172	-.222	-.229	-.295	-.234	-.223	-.162	-.243	.173	-.029	.299	.638	.715	1.000		
	.000	.000	.000	.000	.000	.000	.008	.000	.000	.000	.001	.000	.000	.000	.000	.000	.000	.000	.000	.001	.000	.000	.280	.000	.000	.000			
Q28	.365	.215	.207	.157	.327	.264	.227	.269	.260	.273	.228	.301	.294	-.217	-.270	-.347	-.258	-.194	-.264	-.217	-.171	.067	-.131	.178	.472	.589	.593	1.000	
	.000	.000	.000	.001	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.089	.004	.000	.000	.000	.000		
Q29	.342	.272	.264	.128	.461	.263	.232	.264	.298	.265	.198	.292	.303	-.222	-.248	-.259	-.249	-.176	-.311	-.221	-.232	.103	-.091	.188	.515	.637	.562	.592	1.000
	.000	.000	.000	.005	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.019	.034	.000	.000	.000	.000	.000	

Remarks:

Regarding the Correlation Matrix (Table 7.2, above) there are a few remarks worth noting:

- Items Q1 to Q13 were all fairly well correlated with each other. It was therefore expected that this set of items would yield one, or perhaps two, Principle Components in the Exploratory Factor Analysis process.
- Items $Q14_{(REV)}$ and $Q15_{(REV)}$, also appeared to be somewhat well correlated with each other and with items Q1 to Q13.
- Items Q25 to Q29 appeared to comprise another fairly independent group of items, and were likely to form the basis of another Principle Component.
- Items Q16 to Q24 appeared to be not well correlated with each other, nor with the groups already mentioned. It was difficult to anticipate whether any Principle Components were likely to emerge from this group of items.

Part C: KMO, Bartlett's Test, & Communalities Table

KMO and Bartlett's Test:

KMO (Kaiser-Meyer-Olkin) and Bartlett's Test are commonly performed on a measurement instrument (such as a questionnaire like the M-RIPLS) in preparation for an Exploratory Factor Analysis process. They are tests that indicate the suitability of a data set for the detection of underlying structure, such as by using EFA with PCA, in the present case. The first iteration was conducted and yielded the following results as seen in Table 7.3.

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.935
Bartlett's Test of Sphericity	Approx. Chi-Square	6641.6
	Df	406
	Sig.	0.000**

Table 7.3: KMO and Bartlett's test results for M-RIPLS items Q1 to Q29.

Remarks:

The '*KMO Measure of Sampling Adequacy*' is a statistic that indicates the proportion of variance in Items that might be attributable to underlying factors (also known as 'latent variables'). If the KMO value is less than 0.50, the results of the Factor Analysis are probably not very useful. In the present case the KMO measure was 0.935, indicating that ~94% of the variance in the 29-item M-RIPL Questionnaire was attributed to underlying factors. It was therefore likely that the remaining portion of the variance ~6% was largely random noise rather than real information.

'*Bartlett's Test of Sphericity*' tests the 'null hypothesis' that the correlation matrix (see Table 7.2) is an identity matrix, which would indicate that the variables of Q1 to Q29 were all unrelated to each other, and were therefore unsuitable for the detection of underlying structure. The sections of the table with values shaded in green and marked as the Sig. value with a double asterisk '**' indicates statistical significance of p<0.01 for the Bartlett Test. Small values of the 'Significance' statistic of Bartlett's Test (i.e., Sig. <0.05) indicate that the 'null hypothesis' is rejected, and that a Factor Analysis is likely to be useful with the data. In the present case, the value of the significance was p<0.01, indicating that Factor Analysis was very likely to be useful.

So, both KMO and Bartlett's test recommended the likely usefulness of Factor Analysis.

Communalities Table

For each of the 29 items in the M-RIPLS instrument, the Communalities Table provides a measure of how much of the initial variance in the Item (which by default, equals 1.000), will be retained in the Principle Components that are extracted from the data. It is the first stage of the PCA process. Table 7.4 provides the first iteration of the Communalities Table for the M-RIPLS.

Communalities		
	Initial	Extraction
Q1. Learning with other students will help me become a more effective member of a health care team	1.000	.642
Q2. For small group learning to work, students need to trust and respect each other	1.000	.555
Q3. Team-working skills are essential for all health care students to learn	1.000	.553
Q4. Shared learning will help me to understand my own limitations	1.000	.643
Q5. Patients ultimately benefit if health care professionals work together to solve patient problems	1.000	.517
Q6. Shared learning with other health care professionals will increase my ability to understand clinical problems	1.000	.648
Q7. Learning with health care students before qualification would improve relationships after qualification	1.000	.645
Q8. Communication skills should be learned with other health care students	1.000	.714
Q9. Shared learning will help me to think positively about other professionals	1.000	.748
Q10. Shared learning with other health care students will help me to communicate better with patients and other professionals	1.000	.780
Q11. I would welcome the opportunity to work on small-group projects with other health care students	1.000	.635
Q12. Shared learning will help to clarify the nature of patient problems	1.000	.587
Q13. Shared learning before qualification would help me become a better team worker	1.000	.687
Q14$_{(REV)}$. I don't want to waste my time learning with other health care students	1.000	.534
Q15 $_{(REV)}$. It is not beneficial for health care students to learn together	1.000	.582
Q16. Clinical problem-solving skills should only be learned with students from my own discipline	1.000	.415
Q17. The function of nurses and therapists is mainly to provide support for doctors	1.000	.568
Q18. There is little overlap between my role and that of other health care professionals	1.000	.503
Q19. I would feel uncomfortable if another health care student knew more about a topic than I did	1.000	.487
Q20. I have to acquire much more knowledge and skills than other health care students	1.000	.523
Q21. I'm not sure what my professional role will be	1.000	.237
Q22. I use my own judgment a lot in my professional role	1.000	.738
Q23. Reaching a diagnosis is the main function of my role	1.000	.379
Q24. My main responsibility as a professional is to treat my patient	1.000	.276
Q25. I like to understand the patient's side of the problem	1.000	.596
Q26. Establishing trust with my patients is important to me	1.000	.748
Q27. I try to communicate compassion to my patients	1.000	.722
Q28. Thinking about the patient as a person is important in getting treatment right	1.000	.688
Q29. In my profession you need skills in interacting and cooperating with patients	1.000	.660

Table 7.4: Communalities Table for M-RIPLS Items Q1 to Q29.

Remarks:

The Communalities Table indicated that the extracted PCs retained, for example, 64.2% of the variance initially contained in Q1, 55.5% of the variance initially contained in Q2, and so on. The variance of an item included both information and random noise. The PCA extraction process tends to preferentially retain information and so discard random noise. A value of, say, 0.60 in the 'Extraction' column of the Communalities Table indicated that 40% of the initial information had been lost – it was likely to be mainly noise that had been filtered out in the PC extraction process, and therefore not useful information.

However, where the 'Extraction' value in the Communalities Table was <0.5, there was reason for concern that the Principle Components had not retained much of the information originally contained in that item. There were five instances, (highlighted in Table 7.4 in yellow), where the variance retained in the extracted PCs was less than 50%. These were items Q16 (variance retained 48.7%), Q21 (23.7%), Q21 (39.4%), Q23 (37.9%) and Q24 (27.6%).

An iterative process was then undertaken to 'weed' some, or all, of these items out of the remainder of the Factor Analysis process. This was done one at a time. Item Q21 was eliminated first as it had the worst Extraction value, at 23.7%. The Communalities Table was generated again and the next 'worst' item in terms of Extraction Value was eliminated which was Item Q24 and the cycle was repeated until no remaining items with Extraction Values less than 50% were seen. The final version of the Communalities Table can be seen in Table 7.5. What was interesting to note was that although Item Q19 initially had an Extraction value of 48.7%, this value changed during the iterative process, and the item survived into the final version of the Communalities Table with an Extraction of 60.2%. This provided a sound rationale for why the elimination should be done one item at a time.

Communalities		
	Initial	Extraction
Q1. Learning with other students will help me become a more effective member of a health care team	1.000	.635
Q4. Shared learning will help me to understand my own limitations	1.000	.627
Q5. Patients ultimately benefit if health care professionals work together to solve patient problems	1.000	.554
Q6. Shared learning with other health care professionals will increase my ability to understand clinical problems	1.000	.638
Q7. Learning with health care students before qualification would improve relationships after qualification	1.000	.593
Q8. Communication skills should be learned with other health care students	1.000	.692
Q9. Shared learning will help me to think positively about other professionals	1.000	.748
Q10. Shared learning with other health care students will help me to communicate better with patients and other professionals	1.000	.767
Q11. I would welcome the opportunity to work on small-group projects with other health care students	1.000	.603
Q12. Shared learning will help to clarify the nature of patient problems	1.000	.550
Q13. Shared learning before qualification would help me become a better team worker	1.000	.717
Q14. I don't want to waste my time learning with other health care students	1.000	.599
Q15. It is not beneficial for health care students to learn together	1.000	.644
Q17. The function of nurses and therapists is mainly to provide support for doctors	1.000	.586
Q19. I would feel uncomfortable if another health care student knew more about a topic than I did	1.000	.659
Q20. I have to acquire much more knowledge and skills than other health care students	1.000	.592
Q22. I use my own judgment a lot in my professional role	1.000	.695
Q25. I like to understand the patient's side of the problem	1.000	.612
Q26. Establishing trust with my patients is important to me	1.000	.754
Q27. I try to communicate compassion to my patients	1.000	.754
Q28. Thinking about the patient as a person is important in getting treatment right	1.000	.621
Q29. In my profession you need skills in interacting and cooperating with patients	1.000	.640
Extraction Method: Principal Component Analysis.		

Table 7.5: Communalities Table for M-RIPLS items Q1 to Q29, excepting Q16, Q21, Q23 and Q24.

The corresponding KMO and Bartlett's Test was conducted (Table 7.6).

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.938
Bartlett's Test of Sphericity	Approx. Chi-Square	6357.7
	Df	300
	Sig.	0.000**

Table 7.6: KMO and Bartlett's test results for M-RIPLS items Q1 to Q29, excepting Q3, Q18, Q21, Q23 and Q24.

Again, the value of the significance was $p<0.01$, indicating that the result of Bartlett's Test was significant and Factor Analysis was very likely to be useful.

Part D: Extraction of Principle Components

The next step was for the 25 new Components to be extracted in diminishing order of the amount of variance they explained. This can be seen in Table 7.7 in the Total Variance Explained Table (see third column). In this case, the first components were far more important than the later ones extracted. The 25 new components were mutually orthogonal, or non-collinear with each other. Only the first four of these components had an Eigenvalue (roughly equivalent to 'size') greater than unity. This resulted in yielding Four Principle Components by the EFA process. These components as listed in columns 5 – 7, together accounted for 64.6% of the total variance contained in the initial 25 variables.

Columns 8-10 illustrate the next stage in the EFA/PCA. The four Principle Components described in columns 5-7 were rotated in *n* space (using the Varimax rotation) to give four new PCs – the Rotated Principle Components. Together these accounted for the same amount of variance, 64.6%, as column 10 shows. However, they shared that variance more evenly amongst themselves, as column 9 shows. It was ultimately these rotated PCs that was used rather than the non-rotated PCs extracted in the first instance. This process meant that from the 22 items (remaining after the seven exclusions) in the M-RIPLS instrument, 22 new Components were extracted, and that the 22 extracted Components accounted for 100% of the variance contained in the original 22 variables.

It was surmised that the four (rotated) 'Principle Components', PC1 to PC4, accounted for the overwhelming majority of the actual information initially present in the 25 M-RIPL variables (that survived the Extraction process) and little of the random noise. Correspondingly, Components 5-22 accounted for the majority of the random noise and relatively little of the information.

In conclusion, this PC extraction process reduced the dimensionality of the M-RIPL instrument data from 25 to 4, and simultaneously filtered most of the noise from the data, without discarding too much of the information.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	10.540	42.159	42.159	10.540	42.159	42.159	8.495	33.979	33.979
2	2.744	10.978	53.137	2.744	10.978	53.137	3.949	15.797	49.776
3	1.754	7.017	60.154	1.754	7.017	60.154	2.514	10.056	59.832
4	1.104	4.415	64.569	1.104	4.415	64.569	1.184	4.737	64.569
5	.900	3.599	68.168						
6	.798	3.193	71.360						
7	.739	2.955	74.315						
8	.655	2.621	76.936						
9	.551	2.206	79.142						
10	.532	2.126	81.268						
11	.487	1.947	83.216						
12	.463	1.854	85.070						
13	.431	1.726	86.795						
14	.418	1.672	88.467						
15	.396	1.584	90.051						
16	.346	1.383	91.434						
17	.321	1.283	92.717						
18	.317	1.268	93.984						
19	.278	1.110	95.095						
20	.257	1.027	96.121						
21	.226	.906	97.027						
22	.201	.806	97.833						
23	.196	.785	98.618						
24	.182	.728	99.346						
25	.164	.654	100.000						

Extraction Method: Principal Component Analysis.

Table 7.7: The ‘Total Variance Explained’.

Scree Plot:

According to Improved Outcomes Software (IOS, 2014) a Scree Plot is a simple line segment plot that shows the fraction of total variance in the data as explained or represented by each PC. Such a plot when read left-to-right across the position of a point along a line can often show a clear separation in fraction of total variance where the 'most important' components cease and the 'least important' components begin. The point of separation is often called the 'elbow'. In this case the Scree Plot (Figure 7.1) plots the components as the X-axis and the corresponding eigenvalues (from Table 7.9, above) as the Y-axis. As one moves to the right, toward later components, the eigenvalues drop. When the drop ceases and the curve makes an elbow toward a less steep decline, Cattell's Scree Test says to drop all further components after the one starting at the elbow' (Pallant, 2007).

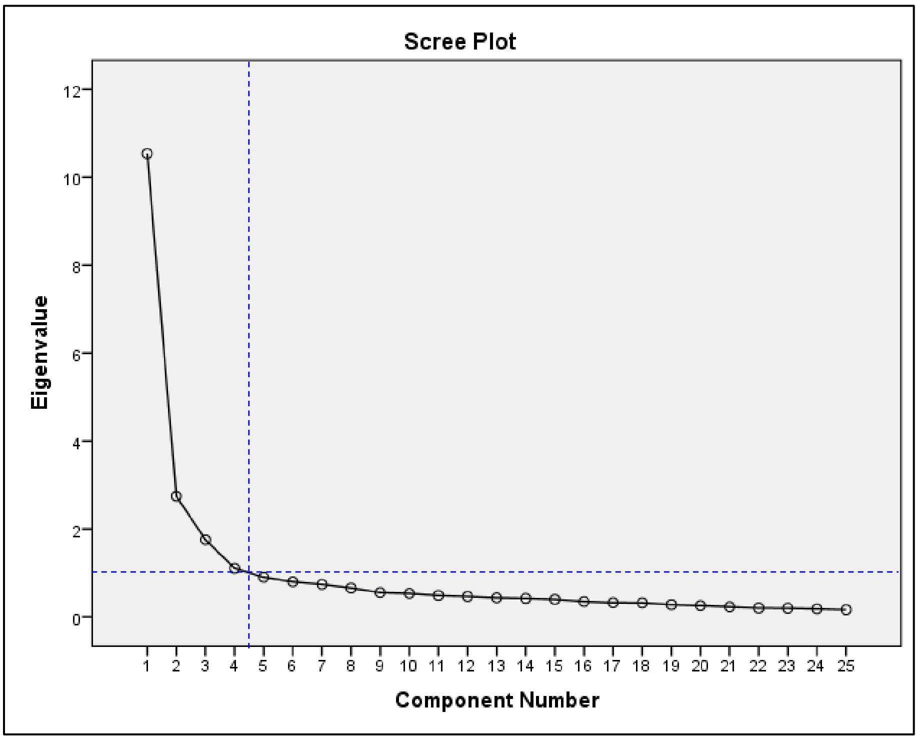


Figure 7.1. Cattell's Scree Plot.

Remarks:

The blue dotted lines on Figure 7.1 shows that by using the 'Eigenvalue >1.000' test it decides the appropriate number of Principle Components (PC) to use. In this case the four PCs could be selected.

Component Matrices:

Table 7.10 presents 'The Component Matrix' table, which shows how the original 25 M-RIPLS items input to the extraction process have been re-expressed as a linear combination of PC1 to PC4. The most important (i.e., only those >0.4) coefficients of the linear combination are shown in columns 2-5. This table refers to the PCs prior to their Varimax rotation in n-space. This is of less importance compared to the 'Rotated Component Matrix', which can be seen in Table 7.11, immediately following.

Table 7.11 presents '<u>The Rotated Component Matrix</u>'. This is essentially the same as Table 7.10, above, except that it refers to the PCs <u>after</u> their Varimax rotation in n-space. From this it can be seen that there are four largely independent PCs (or 'latent variables') that account for the bulk of the M-RIPLS data from this cohort of students. To the immediate right hand side of the Table there is schematic representation of the <u>four</u> Principle Components.

The Four Principle Components were named:

PC1: Teamwork & Collaboration [TWC]

PC2: Patient Centredness [PC]

PC3: Roles & Responsibilities [RR]

PC4: Professional Freedom [PF]

Component Matrix[a]				
	Principle Component			
	1	2	3	4
Q10. Shared learning with other health care students will help me to communicate better with patients and other professionals	.828			
Q9. Shared learning will help me to think positively about other professionals	.822			
Q8. Communication skills should be learned with other health care students	.808			
Q1. Learning with other students will help me become a more effective member of a health care team	.787			
Q6. Shared learning with other health care professionals will increase my ability to understand clinical problems	.785			
Q13. Shared learning before qualification would help me become a better team worker	.783			
Q7. Learning with health care students before qualification would improve relationships after qualification	.759			
Q12. Shared learning will help to clarify the nature of patient problems	.732			
Q11. I would welcome the opportunity to work on small-group projects with other health care students	.727			
Q2. For small group learning to work, students need to trust and respect each other	.726			
Q4. Shared learning will help me to understand my own limitations	.717			
Q3. Team-working skills are essential for all health care students to learn	.708			
Q5. Patients ultimately benefit if health care professionals work together to solve patient problems	.707			
$Q15_{(REV)}$. It is not beneficial for health care students to learn together	.696			
$Q14_{(REV)}$. I don't want to waste my time learning with other health care students	.657			
Q25. I like to understand the patient's side of the problem	.613	-.442		
Q26. Establishing trust with my patients is important to me	.607	-.567		
Q28. Thinking about the patient as a person is important in getting treatment right	.561	-.548		
Q27. I try to communicate compassion to my patients	.486	-.638		
Q29. In my profession you need skills in interacting and cooperating with patients	.516	-.554		
Q20. I have to acquire much more knowledge and skills than other health care students			.613	
Q19. I would feel uncomfortable if another health care student knew more about a topic than I did			.565	
Q17. The function of nurses and therapists is mainly to provide support for doctors	-.439		.441	
Q18. There is little overlap between my role and that of other health care professionals			.430	
Q22. I use my own judgment a lot in my professional role				.861

Extraction Method: Principal Component Analysis.

a. 4 components extracted

Table 7.8: 'The Principle Component Matrix'

	Principle Component				
	1	2	3	4	
Q10. Shared learning with other health care students will help me to communicate better with patients and other professionals	.868				PC1 [TWC]
Q9. Shared learning will help me to think positively about other professionals	.844				
Q8. Communication skills should be learned with other health care students	.820				
Q13. Shared learning before qualification would help me become a better team worker	.814				
Q4. Shared learning will help me to understand my own limitations	.782				
Q7. Learning with health care students before qualification would improve relationships after qualification	.781				
Q11. I would welcome the opportunity to work on small-group projects with other health care students	.778				
Q6. Shared learning with other health care professionals will increase my ability to understand clinical problems	.764				
Q1. Learning with other students will help me become a more effective member of a health care team	.745				
Q12. Shared learning will help to clarify the nature of patient problems	.743				
Q2. For small group learning to work, students need to trust and respect each other	.660				
Q3. Team-working skills are essential for all health care students to learn	.641				
$Q15_{(REV)}$. It is not beneficial for health care students to learn together	.620		.464		
$Q14_{(REV)}$. I don't want to waste my time learning with other health care students	.593		.443		
Q5. Patients ultimately benefit if health care professionals work together to solve patient problems	.544	.420			
Q27. I try to communicate compassion to my patients		.833			PC2 [PC]
Q26. Establishing trust with my patients is important to me		.827			
Q29. In my profession you need skills in interacting and cooperating with patients		.799			
Q28. Thinking about the patient as a person is important in getting treatment right		.796			
Q25. I like to understand the patient's side of the problem		.673			
Q20. I have to acquire much more knowledge and skills than other health care students			-.763		PC3 [RR]
Q19. I would feel uncomfortable if another health care student knew more about a topic than I did			-.736		
Q17. The function of nurses and therapists is mainly to provide support for doctors			-.633		
Q18. There is little overlap between my role and that of other health care professionals			-.555	-.433	
Q22. I use my own judgment a lot in my professional role				.883	PC4 – [PF]

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 5 iterations.

Table 7.9: 'The Rotated Component Matrix' and Four Subscales.

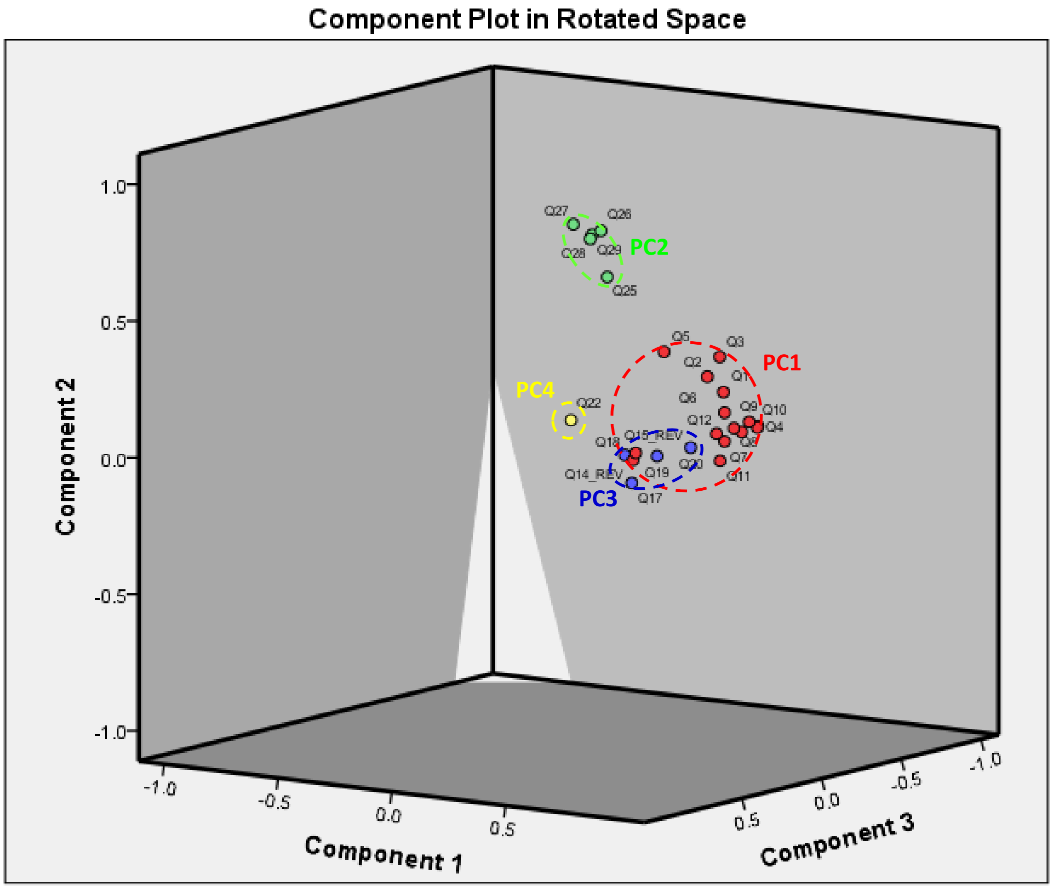


Figure 7.2: Component Plot of PC1, PC2, PC3

Remarks

Figure 7.2 plots the 25 M-RIPLS items that were used as input to the Factor Analysis process in the notional 3-dimensional space defined by PC1, PC2 and PC3. It can be observed that the M-RIPLS items cluster together in the same four independent groups identified in Table 7.11.

Part E: Reliability Analysis using Cronbach's Alpha coefficient

Cronbach's alpha coefficient tests for the internal consistency of a scale and whether it is coherent to the respondents, internally consistent and reliable. Well-established, frequently used instruments would be expected to have Cronbach's $\alpha > 0.70$ (Pallant, 2007). For instruments still undergoing research and development, lower values for Cronbach's α, say 0.60 – $\alpha < 0.70$, may be acceptable. Values for Cronbach's $\alpha < 0.50$ are certainly unacceptable. Table 7.12 identifies the overall Cronbach's α statistic for the 29 Items comprising the M-RIPLS instrument, was an $\alpha = 0.766$ indicating good internal consistency. Cronbach's α was also calculated for the case of removing in turn each Item from the instrument (see Table 7.13). This was done in order to isolate an individual item that may be dragging down the overall Cronbach's α statistic. There were no problematic Items evident in this case as the Overall Cronbach's $\alpha > 0.80$, was not significantly altered by the removal of any single Item.

The following tables present the Cronbach's alpha coefficient for all 29 items, then the extracted 25 Items and then for each of the 4 Factor subscales. For each Factor sub-scale a Cronbach's α has been calculated for the case by removing in turn each Item from the subset. Item 22 as an individual subscale cannot be imposed with a Cronbach's α as it is a single item.

Reliability Statistics

N of Items	Overall Cronbach's Alpha
29	.766

M-RIPLS Item	Cronbach's Alpha if Item Deleted
Q1. Learning with other students will help me become a more effective member of a health care team	.743
Q2. For small group learning to work, students need to trust and respect each other	.747
Q3. Team-working skills are essential for all health care students to learn	.745
Q4. Shared learning will help me to understand my own limitations	.740
Q5. Patients ultimately benefit if health care professionals work together to solve patient problems	.751
Q6. Shared learning with other health care professionals will increase my ability to understand clinical problems	.742
Q7. Learning with health care students before qualification would improve relationships after qualification	.741
Q8. Communication skills should be learned with other health care students	.739
Q9. Shared learning will help me to think positively about other professionals	.737
Q10. Shared learning with other health care students will help me to communicate better with patients and other professionals	.734
Q11. I would welcome the opportunity to work on small-group projects with other health care students	.743
Q12. Shared learning will help to clarify the nature of patient problems	.744
Q13. Shared learning before qualification would help me become a better team worker	.739
Q14. I don't want to waste my time learning with other health care students	.757
Q15. It is not beneficial for health care students to learn together	.755
Q16. Clinical problem-solving skills should only be learned with students from my own discipline	.784
Q17. The function of nurses and therapists is mainly to provide support for doctors	.780
Q18. There is little overlap between my role and that of other health care professionals	.781
Q19. I would feel uncomfortable if another health care student knew more about a topic than I did	.783
Q20. I have to acquire much more knowledge and skills than other health care students	.777
Q21. I'm not sure what my professional role will be	.779
Q22. I use my own judgment a lot in my professional role	.773
Q23. Reaching a diagnosis is the main function of my role	.769
Q24. My main responsibility as a professional is to treat my patient	.764
Q25. I like to understand the patient's side of the problem	.753
Q26. Establishing trust with my patients is important to me	.754
Q27. I try to communicate compassion to my patients	.757
Q28. Thinking about the patient as a person is important in getting treatment right	.755
Q29. In my profession you need skills in interacting and cooperating with patients	.756

Table 7.10: Overall Cronbach's α statistic for the 29 Items comprising the M-RIPLS instrument, α = 0.766.

Reliability Statistics

N of Items	Overall Cronbach's Alpha
25	.871

M-RIPLS Item	Cronbach's Alpha if Item Deleted
Q1. Learning with other students will help me become a more effective member of a health care team	.858
Q2. For small group learning to work, students need to trust and respect each other	.861
Q3. Team-working skills are essential for all health care students to learn	.860
Q4. Shared learning will help me to understand my own limitations	.858
Q5. Patients ultimately benefit if health care professionals work together to solve patient problems	.863
Q6. Shared learning with other health care professionals will increase my ability to understand clinical problems	.858
Q7. Learning with health care students before qualification would improve relationships after qualification	.857
Q8. Communication skills should be learned with other health care students	.856
Q9. Shared learning will help me to think positively about other professionals	.855
Q10. Shared learning with other health care students will help me to communicate better with patients and other professionals	.854
Q11. I would welcome the opportunity to work on small-group projects with other health care students	.858
Q12. Shared learning will help to clarify the nature of patient problems	.859
Q13. Shared learning before qualification would help me become a better team worker	.856
$Q14_{(REV)}$. I don't want to waste my time learning with other health care students	.862
$Q15_{(REV)}$. It is not beneficial for health care students to learn together	.861
Q17. The function of nurses and therapists is mainly to provide support for doctors	.886
Q18. There is little overlap between my role and that of other health care professionals	.887
Q19. I would feel uncomfortable if another health care student knew more about a topic than I did	.890
Q20. I have to acquire much more knowledge and skills than other health care students	.887
Q22. I use my own judgment a lot in my professional role	.879
Q25. I like to understand the patient's side of the problem	.864
Q26. Establishing trust with my patients is important to me	.865
Q27. I try to communicate compassion to my patients	.867
Q28. Thinking about the patient as a person is important in getting treatment right	.865
Q29. In my profession you need skills in interacting and cooperating with patients	.866

Table 7.11: Overall Cronbach's α statistic for the 25 Items used as the basis of the Explanatory Factor Analysis comprising the M-RIPLS instrument, α = 0.871 (excellent).

Reliability Statistics

N of Items	Overall Cronbach's Alpha
15	.950

M-RIPLS Item	Cronbach's Alpha if Item Deleted
Q1. Learning with other students will help me become a more effective member of a health care team	.946
Q2. For small group learning to work, students need to trust and respect each other	.948
Q3. Team-working skills are essential for all health care students to learn	.948
Q4. Shared learning will help me to understand my own limitations	.947
Q5. Patients ultimately benefit if health care professionals work together to solve patient problems	.949
Q6. Shared learning with other health care professionals will increase my ability to understand clinical problems	.946
Q7. Learning with health care students before qualification would improve relationships after qualification	.946
Q8. Communication skills should be learned with other health care students	.945
Q9. Shared learning will help me to think positively about other professionals	.944
Q10. Shared learning with other health care students will help me to communicate better with patients and other professionals	.944
Q11. I would welcome the opportunity to work on small-group projects with other health care students	.947
Q12. Shared learning will help to clarify the nature of patient problems	.947
Q13. Shared learning before qualification would help me become a better team worker	.945
$Q14_{(REV)}$. I don't want to waste my time learning with other health care students	.950
$Q15_{(REV)}$. It is not beneficial for health care students to learn together	.948

Table 7.12: Overall Cronbach's α statistic for the 11 Items subscale which formed the basis of PC1_**[TCW]**.

There were no problematic items evident in this sub-scale as the Overall Cronbach's α > 0.90. This value is not significantly altered by the removal of any single Item.

Reliability Statistics

N of Items	Overall Cronbach's Alpha
5	.723

M-RIPLS Item	Cronbach's Alpha if Item Deleted
Q25. I like to understand the patient's side of the problem	.881
Q26. Establishing trust with my patients is important to me	.854
Q27. I try to communicate compassion to my patients	.861
Q28. Thinking about the patient as a person is important in getting treatment right	.864
Q29. In my profession you need skills in interacting and cooperating with patients	.874

Table 7.13: Overall Cronbach's α statistic for the 5 Items subscale which formed the basis of PC2_**[PC]**.

There were no problematic items evident in this sub-scale as the Overall Cronbach's α > 0.80. This value is not significantly altered by the removal of any single Item.

Reliability Statistics

N of Items	Overall Cronbach's Alpha
4	.701

M-RIPLS Item	Cronbach's Alpha if Item Deleted
Q17. The function of nurses and therapists is mainly to provide support for doctors	.625
Q18. There is little overlap between my role and that of other health care professionals	.630
Q19. I would feel uncomfortable if another health care student knew more about a topic than I did	.615
Q20. I have to acquire much more knowledge and skills than other health care students	.625

Table 7.14: Overall Cronbach's α statistic for the 5 Items subscale which formed the basis of PC3_ **[RR]**.

There were no problematic items evident in this sub-scale as the Overall Cronbach's α > 0.70. This value is not significantly altered by the removal of any single Item.

Part F: Comparison of Principle Component Factors with published literature

Factor analysis has investigated the internal consistency and therefore reliability of the 29-item M-RIPLS. The overall Cronbach's α score of 0.77 has indicated good internal consistency of the modified tool in this context with an excellent Cronbach's α score of 0.87 for the 25 final items. The 25-item M-RIPLS is therefore a useful tool for measuring readiness for interprofessional learning in this Australian pre-registration context.

An analysis of these results was then made with previously reported iterations of both the original and modified RIPLS tool. Some differences were observed. A full comparison between other validation studies of both the 19 and 29 item RIPLS instruments (as per Chapter 4) can be viewed in Table 7.19.

In this thesis there was an α score of 0.95 with 15 items loaded onto the sub-scale titled Teamwork & Collaboration [TWC]. Items 1-13 were consistent with most published reports on the RIPL Scale. In this thesis, Items 14 and 15 also fell within the [TWC] subscale having first been reverse scored prior to factor analysis. Item 16 was discarded but in most other studies (14, 15 & 16) have been an additional Factor and referred to as Professional Identity [PI]. Overall this indicates that Sub-scale 1 [TWC] is a very stable subscale with excellent reliability.

Titled Roles and Responsibilities [RR], Items 17 to 20 have emerged as another Factor subscale in this thesis with good internal consistency and reliability (α of 0.70). Items 17-19 (albeit with low reliability scores) have frequently been described as a separate subscale named [RR] in most validations of the original RIPLS. Parsell and Bligh (1999) have previously reported weak internal consistency of this subscale. This was not the case in this thesis. With Item 20 now being a new addition to the M-RIPLS, this study has revealed that this subscale appears to have sufficient internal consistency. It should be noted that the two later studies of the M-RIPLS identify items in this subscale as Professional Identity [PI].

Item 22 "*I use my own judgment a lot in my professional role*" was the only unique factor from this thesis and was labeled Professional Freedom [PF]. It may need further validation in a range of contexts as there are limitations of only having one Item as a subscale.

Of the remaining statements in the 29-item M-RIPLS, Items 25 – 29, Patient Centredness [PC] was the most consistent across the 3 iterations of the M-RIPLS tool with demonstrably good to high reliability scores in all 3 iterations (α =0.88, 0.86, 0.72). It can therefore be postulated that this is likely to be a very stable subscale and should be assured a place in future iterations of the instrument.

The most problematic items were Items 23 and 24, which demonstrated low reliability scores in all three modified M-RIPLS versions and were discarded in all three previous validation studies. These statements should possibly not be included in future implementations of the tool without further validation.

With the exception of the [TWC], and [PC] Subscales, it is suggested that more work is possibly needed in the labeling of the Factors to produce a more consistent nomenclature. For example, Reid et al. (2006) could have chosen to label the PI factor as RR given the items included and how they have been described in previous work.

Study	Factor Sub-scale 1	Factor Sub-scale 2	Factor Sub-scale 3	Factor Sub-scale 4
ORIGINAL RIPLS (Parsell & Bligh, 1999) 19 items **UK**	Teamwork & Collaboration (1-9)	Professional Identity (10-16)	Roles & Responsibilities (17-19)	
ORIGINAL RIPLS (McFadyen et al., 2005) 19 items **UK**	Teamwork & Collaboration (1-9)	Professional Identity (Negative) (14-16)	Professional Identity (Positive) (10-13)	Roles & Responsibilities (17-19)
ORIGINAL RIPLS (McFadyen et al., 2006) 19 items **UK**	Teamwork & Collaboration (1-9)	*Professional Identity (Negative)* *(14-16)* **low test-retest reliability*	Professional Identity (Positive) (10-13)	Roles & Responsibilities (17-19)
ORIGINAL RIPLS (Lauffs et al., 2008) 19 items **SWEDEN**	Teamwork & Collaboration (1-9)	*Professional Identity (Negative)* *(14-16)* **low reliability*	Professional Identity (Positive) (10-13) *satisfactory reliability	Roles & Responsibilities (17-19)
ORIGINAL RIPLS (King et al., 2012) 19 items **CANADA**	Teamwork & Collaboration (1-9)	Professional Identity (Negative) (14-16)	Professional Identity (Positive) (10-13)	Roles & Responsibilities (17-19)
ORIGINAL RIPLS (Tamura et al., 2012) 19 items **JAPAN**	Teamwork & Collaboration (1-9, 13-16)	IPE opportunities (10-11)	Uniqueness of Profession (12, 17-19)	
ORIGINAL RIPLS (B. Williams et al., 2012) 19 items **AUS**	Shared Learning (2, 4, 7, 9-13,17)	Teamwork & Collaboration (1,3, 5-6, 8)	Professional Identity (Positive) (14-16)	Roles & Responsibilities (18-19)
MODIFIED RIPLS (Reid et al., 2006) 29 items (23 included) **UK**	Teamwork & Collaboration (1-13)	*Professional Identity (16-20)	Patient-centredness (25-29)	*6 Items Discarded* *(14-15 & 21-24)*
MODIFIED (El-Zubeir et al., 2006) 29 items (20 included) **UAE**	Teamwork & Collaboration (1,4, 6-13)	Professional Identity (14-18)	Patient-centredness (25-29)	*9 Items Discarded* *(2,3,5, & 19-24)*
MODIFIED **IPL DELIRIUM STUDY** **29 items (25 included)** **AUS**	**Teamwork & Collaboration** **(1-15)**	**Patient Centredness** **(25-29)**	**Roles & Responsibilities** **(17-20)**	**Professional Freedom** **(22)** *4 Items Discarded* *(16, 21, 23 & 24)*

(*could potentially be labeled RR when examining content of items)

Table 7.15: Delirium M-RIPLS compared to Original (n=7) & M-RIPLS items (n=2) (colour shading indicates closely matching subscales across all validation studies).

Part G: Description of the factors

The four selected factors from the 25-item M-RIPLS will now be explained in more detail.

Factor I: Teamwork and Collaboration [TWC]

Factor I contained 15 items with the highest overall Cronbach's α score of 0.95. This was consistent with the items in Reid's validation study of the M-RIPLS (Reid et al., 2006). It was also similar to the El-Zubeir validation study (El-Zubeir et al., 2006) except for item 5 which these authors discarded.

Statements focused on shared learning had the highest factor loads with, *"shared learning with other health care students will help me to communicate better with patients and other professionals" at* (0.87*), "shared learning will help me think positively about other professionals"* at (0.84)*, "communication skills should be learned with other health care students" (0.82) and "shared learning before qualification would help me become a better team worker"* (0.81) being the highest four. Three items with factor loads that were <0.78 followed this. The lowest factor load of 0.54 was for the item "*patients would ultimately benefit if health care professionals work together to solve patient problems"* (0.54*)*

The items in this subscale represent a strong belief that shared learning is beneficial in relation to building effective team working skills and the need for positive collaborative relationships between health professionals and other health care students. The items imply that health professionals need to acquire team-working skills, be effective communicators and be able to contribute their professional knowledge to an interprofessional team. Inherent in these items is a willingness and need to share knowledge and skills with other health professionals as a way of solving clinical problems in the workplace. The items also indicate the need to cultivate positive relationships between professionals prior to graduation and the value of fostering trust and respect. High scores on the [TWC] subscale reveal positive attitudes towards teamwork and collaboration. An increase in scores post the intervention implies a greater willingness to work together, a developed sense of shared learning and a reduction in professional uniqueness.

Factor II: Patient Centredness [PC]

A total of 5 statements contributed to this group with a total Cronbach's α score of 0.88. These statements were new items compared to the original RIPLS. As has been mentioned, this outcome was consistent with both Reid's and El-Zubeir's versions except for items 23 and 24, which were discarded in both studies. (El-Zubeir 's came out at Factor III not II). The two dominant items were *"I try to communicate compassion to my patients"* (0.83) and "e*stablishing trust with my patients is important to me"* at 0.83. Three of the other items were above 0.67.

According to El-Zubeir et al. (2006) the items in this subscale represent important elements of professionalism that should underpin core requirements of IPL. This subscale focuses on the patient's situation in the delivery of all aspects of care. It emphasises the need for doctors and nurses to have a shared understanding of patient problems, to communicate effectively, show compassion and interact and cooperate with patients in a holistic manner. High scores on the [PC] subscale highlights the value placed in demonstrating empathy, establishing trust, and in thinking about the patient as a person. An increase in scores post the intervention reveals a developed acceptance and capability in being able to keep the patient as a central focus of health care delivery.

Factor III: Roles & Responsibilities [RR]

Four statements contributed to this subscale with a total Cronbach's α score of 0.70. The highest loading was for the statement *"I have to acquire much more knowledge and skills than other health care students"* (-0.76), then *"I would feel uncomfortable if another health care student knew more about a topic than I did"* (-0.74), followed by *"the function of nurses and therapists is mainly to provide support for doctors"* (0.63) and finally the lowest factor loaded item '*there is little overlap between my role and that of other health care professionals* (0.56)

This factor depicts a view that there are boundaries, which delineate roles in professional practice and that particular hierarchies may exist. There is also a suggestion that some professions are subservient to others most notably that the doctor is the 'natural' team leader in patient management depicting a potential barrier to the professions ability to work together. It also suggests that each profession consists of an individual professional culture where specific forms of knowledge, language and beliefs are held and students are socialised into their own professional role. How the health professional views his, or her, own role in the health care team is an aspect explored in this subscale. If medical students score higher on the [RR] subscale, it may indicate that they either have a better personal understanding of their professional role or it may indicate an endorsement of traditional perceptions and paradigms of a 'doctor centric' view of healthcare. If nurses score higher on this subscale it may be that their prior clinical experiences have led them to form some traditional views of the doctor/nurse relationship.

Factor IV: Professional freedom [PF]

Only one statement loaded onto Factor IV and this has been called Professional Freedom – it could also potentially be called Professional Judgment. "*I use my own judgment a lot in my professional role"* (0.88). This statement had the highest individual factor load than any other statement. The premise of this subscale is that judgment is a core role for the health professional and the freedom or discretion to execute this judgment is potentially unique to the individual.

Part H: Summary statistics applied to the Four Factor Subscales

Now that the Factor subscales have been identified it is possible to present summary statistics aligned to each of the four subscales. Table 7.16 presents Mean Pre and Post scores for the 25-item M-RIPLS according to these Four Factors to provide an overall view of the extent to which the students endorsed the relevant items.

Factor Subscale Total items Total possible mean score	**Teamwork and Collaboration** (15 items) **75**	**Patient-Centredness** (5 items) **25.00**	**Roles & Responsibilities** (4 items) **20.00**	**Professional Freedom** (1 item) **5.00**
Whole Group				
Pre	62.75 (8.36)	22.63 (2.28)	8.46 (2.74)	3.60 (0.78)
Post	65.46 (8.35)	22.46 (2.59)	8.27 (2.59)	3.57 (0.90)
IPL Group				
Pre	62.15 (7.80)	22.60 (2.30)	8.43 (2.55)	3.52 (0.77)
Post	65.29 (7.69)	22.32 (2.75)	8.19 (2.66)	3.61 (0.87)
UPL Group				
Pre	63.35 (8.89)	22.66 (2.28)	8.51 (2.94)	3.67 (0.79)
Post	65.63 (8.99)	22.61 (2.44)	8.35 (2.53)	3.52 (0.93)
Nursing Group				
Pre	62.18 (8.20)	22.94 (2.12)	7.79 (2.56)	3.64 (0.83)
Post	65.60 (8.35)	22.65 (2.48)	7.81 (2.69)	3.53 (0.95)
Medicine Group				
Pre	63.52 (8.56)	22.20 (2.44)	9.37 (2.73)	3.55 (0.71)
Post	65.26 (8.40)	22.21 (2.74)	8.91 (2.32)	3.62 (0.82)

Table 7.16: Mean Pre and Post-test scores for M-RIPL Factors according to the Four Factor Subscales. (Numbers in parentheses indicate standard deviations).

For the Whole group, and according to Learning Condition and Course, Table 7.15 shows high scores Pre the education intervention for [TWC], which increased Post the education intervention. [PC] scores were very high Pre the intervention for all groups but decreased slightly Post with the exception of Medicine where the Mean increased slightly. For [RR], the scores were low Pre intervention for the whole group, which decreased Post for all groups except Nursing. [PF] being only 1 item was predominantly middle range.

A more in-depth analysis of the factor subscales, including any statistically significant results for all combinations of groups will take place in Chapter 8.

7.2 Chapter overview

The results presented in this chapter reinforce the value of the Modified version of the RIPL Scale and its validity and reliability in the Australian pre-registration context. The psychometric properties of this tool are comparable to the original RIPLs with the exception of Item 16, which was discarded. The Patient Centredness factor subscale was a valuable addition to the instrument in the modified version used in this cohort where it demonstrated psychometric properties consistent with the only other two validation studies of the modified tool. The subscale Teamwork and Collaboration continues to be a reliable subscale with two additional items being included in this study that have only been reported in one previous study. Concerns over the reliability of the Roles & Responsibilities subscale in prior reports were not substantiated in this study. It appears to be a reliable subscale with the enhancement of an additional item (Item 20). As a single-item Factor, the subscale Professional Freedom probably requires further scrutiny and development in a range of contexts.

High mean scores for Teamwork and Collaboration, and Patient-centredness in this cohort of students prior to, and after the educational experience indicate that these students already had an existing positive view of these factors, which may have been enhanced by the learning experience. Low scores for Roles and Responsibilities pre and post the intervention potentially indicate that stereotypical views of health professional roles may not yet be entrenched in this group of students.

Having now been clearly defined, the four subscales will be examined in Chapter 8 to identify any statistically significant effects of the educational experience and any differences within and between the groups, particularly the impact of the education on the IPL intervention group.

Chapter 8

Results – Analysis of Factor Subscales

8.1 Introduction

This Chapter examines the t-Test analyses of the four Factor Subscales from the 25-item M-RIPLS. It is divided into two parts – Part A: Independent samples t-Test for the four M-RIPL Factors for 'Between Group Differences' and, Part B: Paired samples t-Test of the four M-RIPL factors for 'Within Group Differences', Pre versus Post the intervention.

The aim of this Chapter is to present the quantitative data that measures the strength of the students' views associated with each Factor and whether differences exist between the subgroups of the study cohort. It will suggest if there are individual learner characteristics such as course of study, age, gender or learning condition that may have impacted on these views. Importantly, these results measure whether the intervention resulted in positive changes to students' attitude towards interprofessional learning, their readiness to engage interactively with other students and whether there was a significant difference associated with students allocated to the IPL intervention group.

The Independent Samples t-Test of the 25-item M-RIPLS addresses outcomes (PRODUCT) that relate to Kirkpatrick's Level 1 (learners' views on the learning experience). The Paired Samples t-Test analyses addresses outcomes (PRODUCT) that relate to Kirkpatrick's level 2a. That is, whether there is a change in attitude/perception to the educational experience and IPL's influence for this cohort of students.

In this Chapter, data is presented in Table and Figure form. For all results presented in this Chapter, results that are significant at the $p<0.05$ level are shaded in green and marked with a single asterisk '*'. Results that are significant at the $p<0.01$ level are also shaded in green but marked with a double asterisk '**'.

Part A: Factors PC1 to PC4 Results ‘Between Group’ comparisons

This section of the Chapter presents the results from conducting ‘Independent Samples t-Tests for the four M-RIPL Factors:

TWC$_{PC1}$, **PC**$_{PC2}$, **RR**$_{PC3}$ and **PF**$_{PC4}$.

‘Between Group Differences’ are resolved according to the following categories:

- Learning Condition
- Course
- Gender
- Age Category
- Learning Condition and Course
- Learning Condition and Gender
- Learning Condition and Age Category
- Course and Gender
- Course and Age Category
- Gender and Age

It should be noted that the four Factors yielded by the Factor Analysis in Chapter 7 are presented as **‘Standardised’ Vectors**. This means that each of the four Factors is forced to fit on the same standardised scale. Each Factor has a Mean of exactly 0.000 and a Standard Deviation of exactly 1.000. All Tables and Figures in this Chapter represent these ‘standardised’ variables. Therefore, for the Column plots, a positive column means a value for that variable which is greater than the overall Mean value. A negative value means less than the overall Mean value. Results for the summary statistics for each category have been ‘pooled’ from the Pre and Post Questionnaire results.

a. Comparisons according to Learning Condition

Table 8.1 presents summary statistics of the four M-RIPL Factors, resolved according to Learning Condition (IPL or UPL).

	IPL				UPL			
	N	Mean	Std. Deviation	Std. Error of Mean	N	Mean	Std. Deviation	Std. Error of Mean
TWC$_{PC1}$	197	-.039	.900	.064	196	.040	1.092	.078
PC$_{PC2}$	197	-.024	1.036	.074	196	.024	.965	.069
RR$_{PC3}$	197	.036	.980	.070	196	-.036	1.021	.073
PF$_{PC4}$	197	-.024	1.003	.071	196	.024	.999	.071

Table 8.1: Mean values and other descriptive statistics for the four M-RIPL Factors, PC1 to PC4, resolved according to Learning Condition.

The Mean values and their 95% Confidence Intervals are plotted in Figure 8.1 noting that the PCs are 'standardised', i.e., each one has an overall mean value of exactly 0.000 and a Standard Deviation of exactly 1.000.

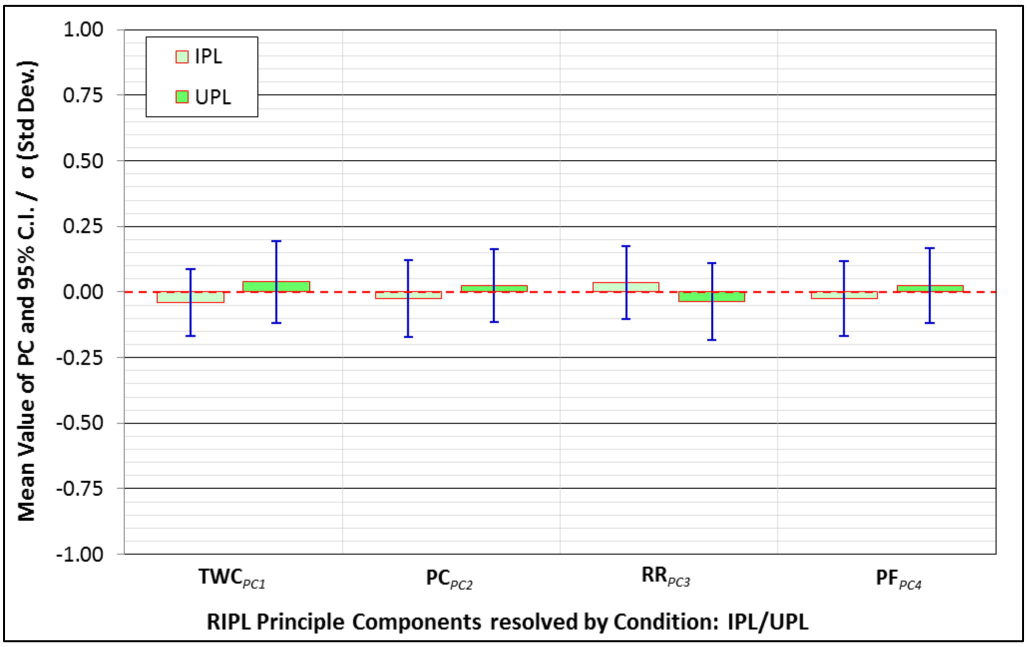


Figure 8.1: Plot of the M-RIPL Factor Mean values, and their 95% C.I., resolved according to Learning Condition.

Table 8.2 reports the results from applying the 'Independent Samples t-Test' to compare the IPL and UPL Learning Condition across all four PCs.

Independent Samples t-Test [Equal variances not assumed]						
		t-test for Equality of Means				
		Mean Difference	Std. Error Difference	t	df	Sig. (2-tailed)
TWC$_{PC1}$	**[IPL] - [UPL]**	-0.079	0.101	-0.783	376.5	0.434
PC$_{PC2}$		-0.049	0.101	-0.481	389.3	0.631
RR$_{PC3}$		0.073	0.101	0.721	390.1	0.471
PF$_{PC4}$		-0.048	0.101	-0.478	391.0	0.633

Table 8.2: Results of Independent Samples t-Tests for differences between Mean values of the M-RIPL Factors resolved according to Learning Condition.

Remarks:

According to Table 8.2 there were no statistically significant difference in Mean scores for the four Factor subscales between IPL and UPL Learning Condition. Being in the IPL group did not appear to have any effect on the outcome of scores for each of the four PCs.

b. Comparisons resolved according to Course

Table 8.3 presents summary statistics of the four M-RIPL Factors, resolved according to Course (Nursing or Medicine).

	Bachelor of Nursing				MBBS			
	N	Mean	Std. Deviation	Std. Error of Mean	N	Mean	Std. Deviation	Std. Error of Mean
TWC_{PC1}	227	-.091	1.002	.066	166	.1238	.9871	.0766
PC_{PC2}	227	.092	.982	.065	166	-.1262	1.0141	.0787
RR_{PC3}	227	.229	.962	.064	166	-.3134	.9682	.0751
PF_{PC4}	227	.010	1.043	.069	166	-.0143	.9411	.0730

Table 8.3: Mean values and other descriptive statistics for the four M-RIPL Factors PC1 to PC4, resolved according to Course.

The Mean values and their 95% Confidence Intervals are plotted in Figure 8.2.

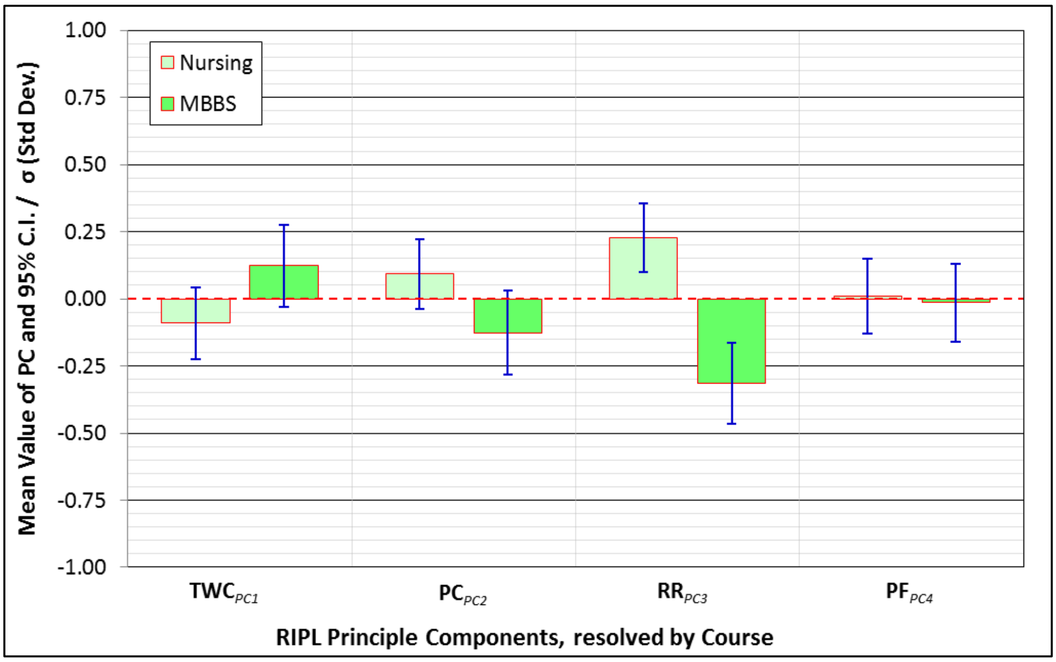


Figure 8.2: Plot of the M-RIPL Factor Mean values, and 95% C.I., resolved according to Course.

Table 8.4 reports the results from applying the ‘Independent Samples t-Test’ to compare for differences between Nursing and Medical students across all four PCs.

Independent Samples t-Test [Equal variances not assumed]		t-test for Equality of Means				
		Mean Difference	Std. Error Difference	t	df	Sig. (2-tailed)
TWC$_{PC1}$	**[Nursing] - [MBBS]**	-0.214	0.101	-2.112	358.6	0.035*
PC$_{PC2}$		0.218	0.102	2.138	348.9	0.033*
RR$_{PC3}$		0.542	0.099	5.502	354.4	0.000**
PF$_{PC4}$		0.025	0.101	0.246	374.1	0.806

Table 8.4: Results of Independent Samples t-Tests for differences between Mean value scores of M-RIPL Factors, resolved according to Course.

Remarks:

According to Table 8.4 the following statistically significant results were observed with three of the four PC subscales:

- The Mean score for Medical students was higher than Nursing students for Factor 1 (**TWC** - $p<0.05$)
- The Mean score for Nursing students was higher than Medical students for Factor 2 (**PC** - $p<0.05$)
- The Mean score for Nursing students was higher than Medical students for Factor 3 (**RR** - $p<0.01$)

c. Comparisons according to Gender

Table 8.5 presents summary statistics of the four M-RIPL Factors, resolved according to Gender (Male or Female).

	Male				Female			
	N	Mean	Std. Deviation	Std. Error of Mean	N	Mean	Std. Deviation	Std. Error of Mean
TWC$_{PC1}$	79	.014	.947	.106	307	-.009	1.022	.058
PC$_{PC2}$	79	-.163	1.209	.136	307	.049	.932	.053
RR$_{PC3}$	79	-.396	1.037	.117	307	.090	.954	.054
PF$_{PC4}$	79	.019	1.059	.119	307	.001	.969	.055

Table 8.5: Mean values and other descriptive statistics for the four M-RIPL Factors PC1 to PC4, resolved according to Gender.

The Mean values and their 95% C.I.s are plotted in Figure 8.3.

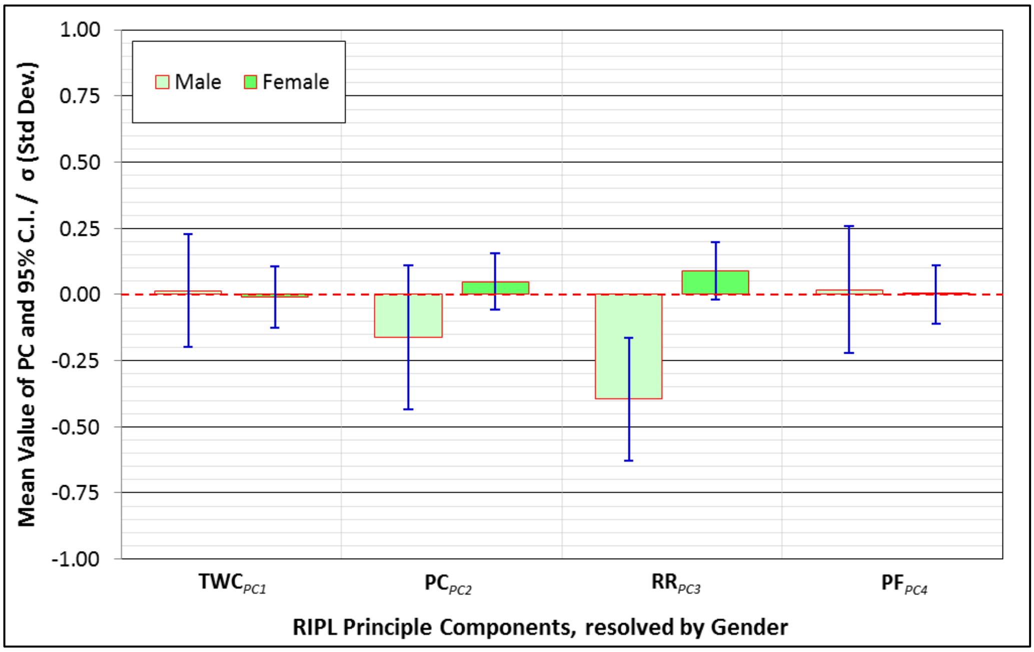


Figure 8.3: Plot of the M-RIPL Factor Mean values, and their 95% C.I., resolved according to Gender.

Table 8.6 reports the results from applying the 'Independent Samples t-Test' to compare the Male and Female students across all four PCs.

Independent Samples t-Test [Equal variances not assumed]						
		t-test for Equality of Means				
		Mean Difference	Std. Error Difference	t	df	Sig. (2-tailed)
TWC$_{PC1}$	**[Male] - [Female]**	0.023	0.121	0.192	128.8	0.848
PC$_{PC2}$		-0.212	0.146	-1.450	103.0	0.150
RR$_{PC3}$		-0.486	0.129	-3.778	114.3	0.000**
PF$_{PC4}$		0.018	0.131	0.133	113.9	0.894

Table 8.6: Results of Independent Samples t-Tests for differences between Mean value scores of M-RIPL Factors, resolved according to Gender.

Remarks:

According to Table 8.6 the Mean score for Female students was significantly higher than Male students on Factor 3 (**RR** - $p<0.01$).

d. Comparisons according to Age Category

Table 8.7 presents summary statistics of the four M-RIPL Factors, resolved according to Age Category (<25 years/>25 years).

	< 25 yr				> 25 yr			
	N	Mean	Std. Deviation	Std. Error of Mean	N	Mean	Std. Deviation	Std. Error of Mean
TWC$_{PC1}$	276	-.059	1.038	.062	115	.138	.900	.084
PC$_{PC2}$	276	-.077	1.015	.061	115	.176	.948	.088
RR$_{PC3}$	276	-.159	1.010	.061	115	.398	.859	.080
PF$_{PC4}$	276	.023	.967	.058	115	-.068	1.075	.100

Table 8.7: Mean values and other descriptive statistics for the four M-RIPL Factors PC1 to PC4, resolved according to Age Category.

The Mean vales and their 95% C.I.s are plotted in Figure 8.4.

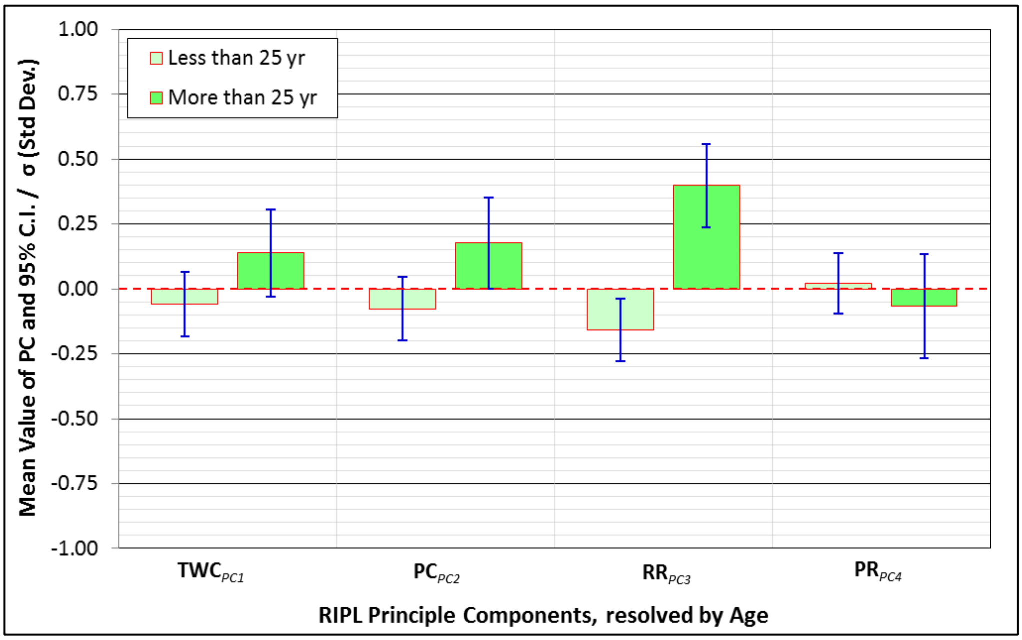


Figure 8.4: Plot of the M-RIPL Factor Mean values, and their 95% C.I., resolved according to Age Category.

Table 8.8 reports the results from applying the 'Independent Samples t-Test' to compare the two Age Categories across all four PCs.

Independent Samples t-Test [Equal variances not assumed]						
		t-test for Equality of Means				
		Mean Difference	Std. Error Difference	t	df	Sig. (2-tailed)
TWC$_{PC1}$	**[< 25 yr] - [> 25 yr]**	-0.198	0.105	-1.888	244.3	0.060
PC$_{PC2}$		-0.253	0.107	-2.358	227.5	0.019*
RR$_{PC3}$		-0.557	0.101	-5.538	248.8	0.000**
PF$_{PC4}$		0.090	0.116	0.780	194.7	0.436

Table 8.8: Results of Independent Samples t-Tests for differences between Mean value scores for M-RIPL Factors according to Age Category.

Remarks:

According to Table 8.8 the following statistically significant results were observed with two of the four sub-scales:

- The Mean score for Older students (>25 years) was higher than Younger students (<25 years) on Factor 2 (**PC** - p<0.01).
- The Mean score for Older students (>25 years) was higher than Younger students (<25 years) on Factor 3 (**RR** - p<0.01).

e. Comparisons between Learning Condition and Course

Table 8.9 presents group summary statistics of the four M-RIPL factors resolved according to Learning Condition and Course.

	[IPL × Nursing]				[UPL × Nursing]				[IPL × MBBS]				[UPL × MBBS]			
	N	Mean	Std Dev.	Std Error Mean	N	Mean	Std. Deviation	Std Error Mean	N	Mean	Std Dev.	Std Error Mean	N	Mean	Std Dev.	Std Error Mean
TWC_{PC1}	112	-.057	.827	.078	115	-.123	1.149	.107	85	-.016	.992	.108	81	.270	.966	.107
PC_{PC2}	112	-.016	1.048	.099	115	.198	.904	.084	85	-.034	1.025	.111	81	-.222	1.000	.111
RR_{PC3}	112	.289	.930	.088	115	.171	.993	.093	85	-.296	.949	.103	81	-.331	.993	.110
PF_{PC4}	112	-.015	1.064	.101	115	.035	1.026	.096	85	-.036	.922	.100	81	.008	.966	.107

Table 8.9: Mean values and other descriptive statistics for the four M-RIPL Factors PC1 to PC4, resolved according to both Learning Condition and Course (The Mean values and their 95% C.I.s are plotted in Figure 8.5)

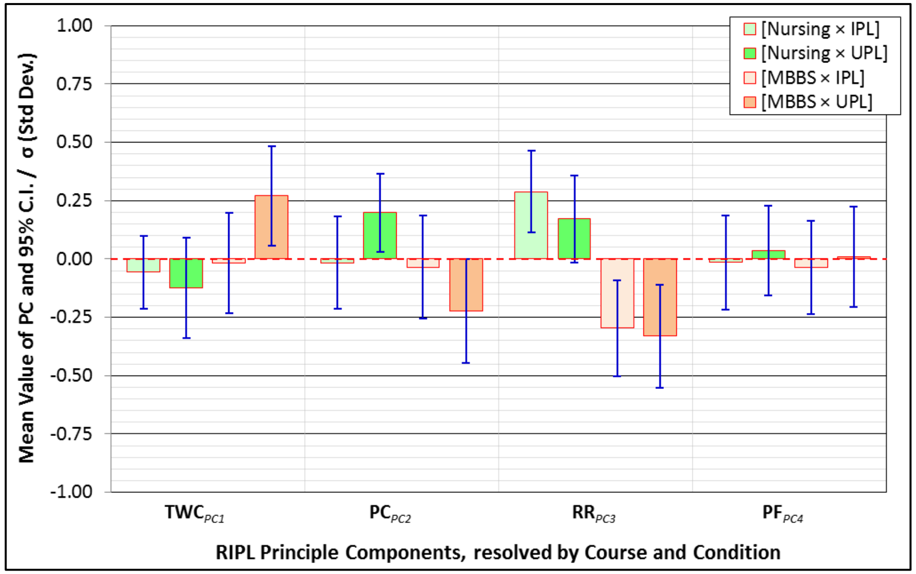


Figure 8.5: Plot of M-RIPL Factor Mean values, and 95% C.I., resolved according to Learning Condition and Course.

Table 8.10 reports the results from applying the 'Independent Samples t-Test' to compare the IPL and UPL Learning Condition and Medical and Nursing students across all four PCs.

Independent Samples t-Test [Equal variances not assumed]		t-test for Equality of Means				
		Mean Difference	Std. Error Difference	t	df	Sig. (2-tailed)
TWC$_{PC1}$	**[Nursing × IPL] - [Nursing × UPL]**	0.066	0.133	0.495	207.3	0.621
PC$_{PC2}$		-0.215	0.130	-1.650	218.5	0.100
RR$_{PC3}$		0.117	0.128	0.920	224.6	0.358
PF$_{PC4}$		-0.051	0.139	-0.365	224.1	0.716
TWC$_{PC1}$	**[MBBS × IPL] - [MBBS × UPL]**	-0.286	0.152	-1.885	163.9	0.061
PC$_{PC2}$		0.188	0.157	1.196	163.9	0.233
RR$_{PC3}$		0.035	0.151	0.232	162.6	0.816
PF$_{PC4}$		-0.044	0.147	-0.300	162.5	0.765
TWC$_{PC1}$	**[Nursing × IPL] - [MBBS × IPL]**	-0.041	0.133	-0.310	161.9	0.757
PC$_{PC2}$		0.018	0.149	0.121	183.0	0.904
RR$_{PC3}$		0.585	0.135	4.322	179.0	0.000*
PF$_{PC4}$		0.021	0.142	0.145	191.5	0.885
TWC$_{PC1}$	**[Nursing × UPL] - [MBBS × UPL]**	-0.393	0.152	-2.594	187.9	0.010*
PC$_{PC2}$		0.421	0.139	3.016	161.2	0.003**
RR$_{PC3}$		0.503	0.144	3.488	172.3	0.001*
PF$_{PC4}$		0.027	0.144	0.189	178.6	0.850

Table 8.10: Results of Independent Samples t-Tests for differences between Mean values of M-RIPL Factors according to Course and Learning Condition.

Remarks:

According to Table 8.10 the following statistically significant results were observed:

- The Mean score for Medical UPL students was higher than Nursing UPL students for Factor 1 (**TWC** - p<0.05].
- The Mean score for Nursing UPL students was higher than Medical UPL students for Factor 2 (**PC** - p<0.01).
- The Mean score for Nursing IPL students was higher than Medical IPL students for Factor 3 (**RR** - p<0.01).
- The Mean score for Nursing UPL students was higher than Medical UPL students for Factor 3 (**RR** - p<0.01).

f. Comparisons between Learning Condition and Gender

Table 8.11 presents group summary statistics of the four M-RIPL Factors, resolved according to Learning Condition and Gender.

	[IPL × Male]				[IPL × Female]				[UPL × Male]				[UPL × Female]			
	N	Mean	Std Dev.	Std Error Mean	N	Mean	Std. Deviation	Std Error Mean	N	Mean	Std Dev.	Std Error Mean	N	Mean	Std Dev.	Std Error Mean
TWC$_{PC1}$	38	-.219	.960	.156	153	-.006	.890	.072	41	.231	.892	.139	154	-.012	1.140	.092
PC$_{PC2}$	38	-.131	1.273	.207	153	.004	.972	.079	41	-.192	1.162	.181	154	.094	.890	.072
RR$_{PC3}$	38	-.478	1.050	.170	153	.135	.897	.073	41	-.320	1.031	.161	154	.046	1.008	.081
PF$_{PC4}$	38	-.082	1.103	.179	153	.009	.946	.077	41	.112	1.020	.159	154	-.007	.994	.080

Table 8.11: Mean values and other descriptive statistics for the four M-RIPL Factors PC1 to PC4, resolved according to both Learning Condition and Gender. (The Mean values and their 95% C.I.s are plotted in Figure 8.6).

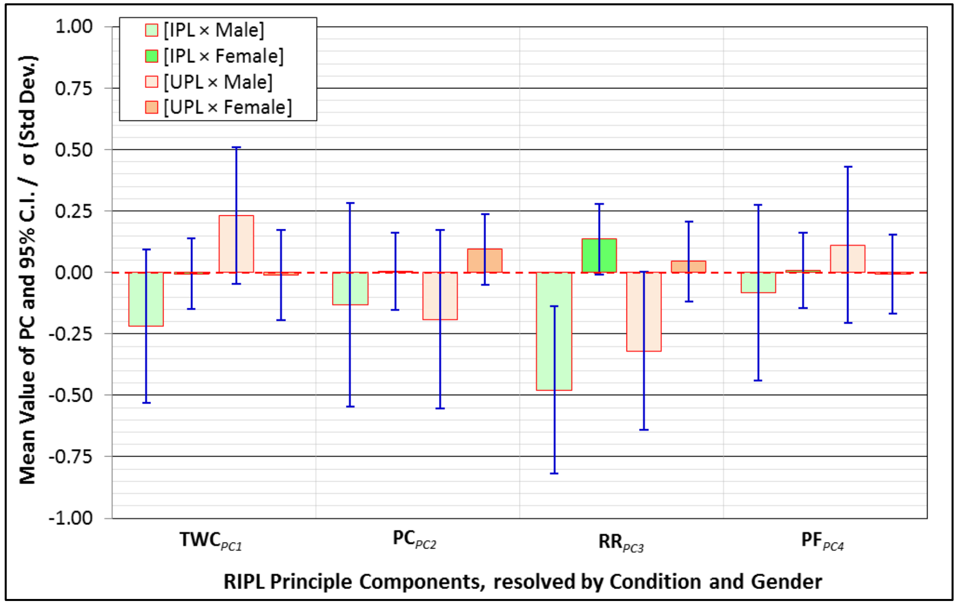


Figure 8.6: Plot of M-RIPL Factor Mean values, and 95% C.I., resolved according to Learning Condition and Gender.

Table 8.12 reports the results from applying the 'Independent Samples t-Test' to compare the IPL and UPL Learning Condition and Male and Female students across all four PCs.

Independent Samples t-Test [Equal variances not assumed]		t-test for Equality of Means				
		Mean Difference	Std. Error Difference	t	df	Sig. (2-tailed)
TWC_{PC1}	**[IPL × Male] – [IPL × Female]**	-0.213	0.172	-1.241	53.9	0.220
PC_{PC2}		-0.135	0.221	-0.611	48.2	0.544
RR_{PC3}		-0.614	0.185	-3.315	51.2	0.002**
PF_{PC4}		-0.092	0.195	-0.470	51.3	0.640
TWC_{PC1}	**[UPL × Male] – [UPL × Female]**	0.242	0.167	1.452	78.5	0.150
PC_{PC2}		-0.286	0.195	-1.466	53.1	0.149
RR_{PC3}		-0.365	0.180	-2.026	61.9	0.047*
PF_{PC4}		0.119	0.178	0.668	61.8	0.507
TWC_{PC1}	**[IPL × Male] – [UPL × Male]**	-0.450	0.209	-2.153	75.3	0.035*
PC_{PC2}		0.060	0.275	0.220	74.9	0.827
RR_{PC3}		-0.159	0.234	-0.677	76.3	0.501
PF_{PC4}		-0.194	0.240	-0.811	75.2	0.420
TWC_{PC1}	**[IPL × Female] – [UPL × Female]**	0.005	0.117	0.046	288.9	0.963
PC_{PC2}		-0.091	0.106	-0.851	302.3	0.395
RR_{PC3}		0.090	0.109	0.823	301.4	0.411
PF_{PC4}		0.016	0.111	0.148	304.4	0.883

Table 8.12: Results of Independent Samples t-Tests for differences between Mean values of M-RIPL Factors according to Learning Condition and Gender.

Remarks:

According to Table 8.12, the following statistically significant results were observed:

- The Mean score for UPL Male students was higher than IPL Male students for Factor 1 (**TWC** - $p<0.05$).
- The Mean score for IPL Female students was higher than IPL Male students for Factor 3 (**RR** - $p<0.01$).
- The Mean score for UPL Female students was higher than UPL Male students for Factor 3 (**RR** - $p<0.01$).

g. Comparison between Learning Condition and Age Category

Table 8.13 presents group summary statistics of the four M-RIPL Factors, resolved according to Learning Condition and Age Category.

	[IPL × < 25 yr]				[IPL × > 25 yr]				[UPL × < 25 yr]				[UPL × > 25 yr]			
	N	Mean	Std Dev.	Std Error Mean	N	Mean	Std. Deviation	Std Error Mean	N	Mean	Std Dev.	Std Error Mean	N	Mean	Std Dev.	Std Error Mean
TWC$_{PC1}$	139	-.105	.964	.082	56	.114	.718	.096	137	-.013	1.110	.095	59	.161	1.050	.137
PC$_{PC2}$	139	-.030	1.021	.087	56	-.028	1.090	.146	137	-.125	1.011	.086	59	.370	.749	.097
RR$_{PC3}$	139	-.144	.986	.084	56	.521	.784	.105	137	-.174	1.036	.089	59	.282	.917	.119
PF$_{PC4}$	139	.015	.944	.080	56	-.150	1.130	.151	137	.030	.993	.085	59	.010	1.023	.133

Table 8.13: Mean values and other descriptive statistics for the four M-RIPL Factors PC1 to PC4, resolved according to both Learning Condition and Age Category. (The Mean values and their 95% C.I.s are plotted in Figure 8.7).

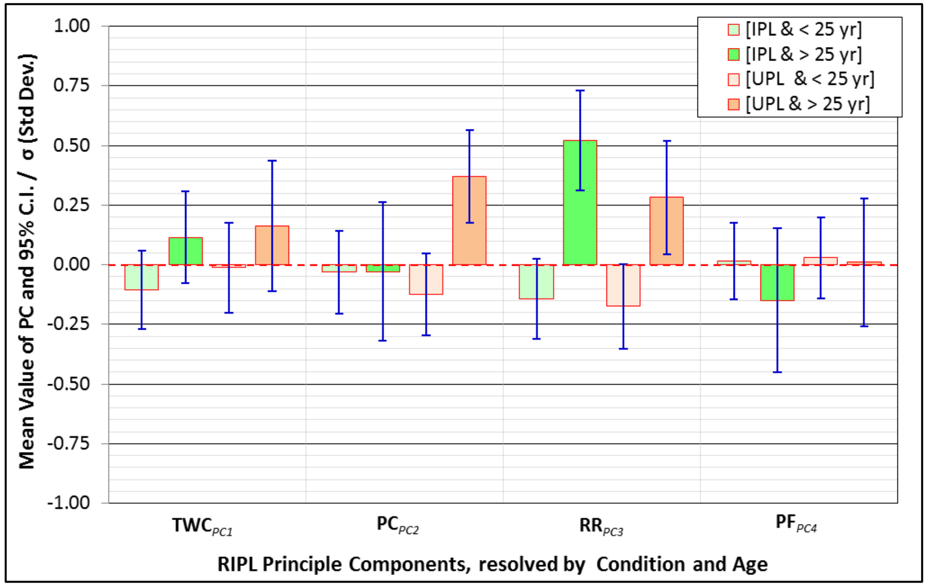


Figure 8.7: Plot of RIPL Factor Mean values, and 95% C.I., data resolved according to Learning Condition and Age Category.

Table 8.14 reports the results from applying the ‘Independent Samples t-Test’ to compare the IPL and UPL Learning Condition and Older and Younger students across all four PCs.

Independent Samples t-Test [Equal variances not assumed]						
		t-test for Equality of Means				
		Mean Difference	Std. Error Difference	t	df	Sig. (2-tailed)
TWC$_{PC1}$	**[IPL × < 25 yr] – [IPL × > 25 yr]**	-.219	.126	-1.736	135.5	0.085
PC$_{PC2}$		-.002	.169	-0.013	96.0	0.989
RR$_{PC3}$		-.665	.134	-4.962	126.9	0.000**
PF$_{PC4}$		.165	.171	0.965	87.5	0.337
TWC$_{PC1}$	**[UPL × < 25 yr] – [UPL × > 25 yr]**	-0.174	0.166	-1.047	115.8	0.297
PC$_{PC2}$		-0.495	0.130	-3.800	146.3	0.000**
RR$_{PC3}$		-0.455	0.149	-3.063	123.5	0.003**
PF$_{PC4}$		0.020	0.158	0.127	107.1	0.899
TWC$_{PC1}$	**[IPL × < 25 yr] – [UPL × < 25 yr]**	-0.092	0.125	-0.734	267.7	0.464
PC$_{PC2}$		0.094	0.122	0.771	274.0	0.442
RR$_{PC3}$		0.030	0.122	0.243	272.9	0.808
PF$_{PC4}$		-0.015	0.117	-0.129	272.8	0.897
TWC$_{PC1}$	**[IPL × > 25 yr] – [UPL × > 25 yr]**	-0.047	0.167	-0.283	102.9	0.778
PC$_{PC2}$		-0.398	0.175	-2.273	96.9	0.025*
RR$_{PC3}$		0.240	0.159	1.509	111.8	0.134
PF$_{PC4}$		-0.160	0.201	-0.794	110.5	0.429

Table 8.14: Results of Independent Samples t-Tests for differences between Mean values of M-RIPL Factors according to Learning Condition and Age Category.

Remarks:

According to Table 8.14, the following statistically significant results were observed:

- The Mean score for Older UPL students (>25 years) was higher than Younger UPL students (<25 years) for Factor 2 (**PC** - p<0.01).
- The Mean score for Older UPL students (> 25 years) was higher than Older IPL students (>25 years) for Factor 2 (**PC** - p<0.01).
- The Mean score for Older IPL students (>25 years) was higher than Younger IPL students (<25 years) for Factor 3 (**RR** - p<0.01).
- The Mean score for Older UPL students (>25 years) was higher than Younger UPL students (<25 years) for Factor 3 (**RR** - p<0.01).

h. Comparisons according to Course and Gender

Table 8.15 presents group summary statistics of the M-RIPL resolved according to Course and Gender.

	[Nursing × Male]				[Nursing Female]				[MBBS × Male]				[MBBS × Female]			
	N	Mean	Std Dev.	Std Error Mean	N	Mean	Std. Deviation	Std Error Mean	N	Mean	Std Dev.	Std Error Mean	N	Mean	Std Dev.	Std Error Mean
TWC_{PC1}	16	-.010	.890	.223	204	-.108	1.021	.072	63	.021	.967	.122	103	.187	.998	.098
PC_{PC2}	16	-.241	1.422	.356	204	.133	.929	.065	63	-.143	1.161	.146	103	-.116	.919	.091
RR_{PC3}	16	.298	.772	.193	204	.214	.958	.067	63	-.572	1.026	.129	103	-.155	.900	.089
PF_{PC4}	16	.206	1.193	.298	204	.004	1.009	.071	63	-.029	1.027	.129	103	-.005	.890	.088

Table 8.15: Mean values and other descriptive statistics for the four M-RIPL Factors PC1 to PC4, resolved according to both Course and Gender.

(The Mean values and their 95% C.I.s are plotted in Figure 8.8).

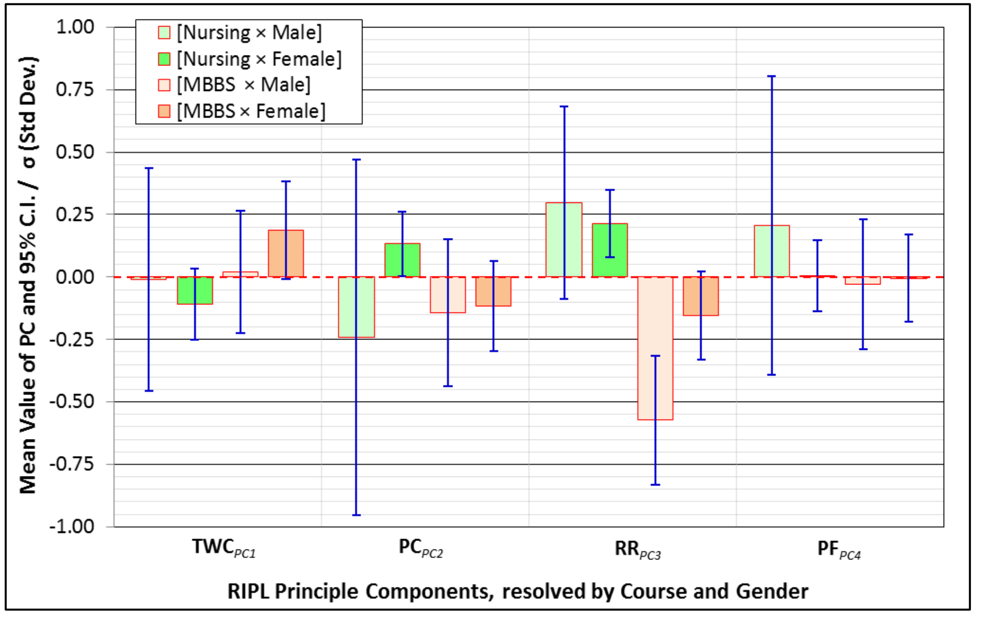


Figure 8.8: Plot of RIPL Factor Mean values, and 95% C.I., resolved according to Course and Gender.

Table 8.16 reports the results from applying the 'Independent Samples t-Test' to compare the Nursing and Medical students and Male and Female students across all four PCs.

Independent Samples t-Test [Equal variances not assumed]		t-test for Equality of Means				
		Mean Difference	Std. Error Difference	t	df	Sig. (2-tailed)
TWC $_{PC1}$	**[Nursing × Male] - [Nursing × Female]**	0.098	0.234	0.419	18.2	0.680
PC $_{PC2}$		-0.374	0.361	-1.035	16.0	0.316
RR $_{PC3}$		0.084	0.204	0.410	18.8	0.687
PF $_{PC4}$		0.201	0.307	0.656	16.7	0.521
TWC $_{PC1}$	**[MBBS × Male] - [MBBS × Female]**	-0.166	0.157	-1.061	134.4	0.290
PC $_{PC2}$		-0.026	0.172	-0.154	108.9	0.878
RR $_{PC3}$		-0.417	0.157	-2.662	118.2	0.009**
PF $_{PC4}$		-0.023	0.156	-0.150	117.1	0.881
TWC $_{PC1}$	**[Nursing × Male] - [MBBS × Male]**	-0.030	0.254	-0.120	24.8	0.906
PC $_{PC2}$		-0.099	0.384	-0.257	20.4	0.800
RR $_{PC3}$		0.870	0.232	3.746	30.0	0.001**
PF $_{PC4}$		0.234	0.325	0.721	21.0	0.479
TWC $_{PC1}$	**[Nursing × Female] - [MBBS × Female]**	-0.294	0.122	-2.421	208.9	0.016*
PC $_{PC2}$		0.249	0.111	2.232	206.9	0.027*
RR $_{PC3}$		0.369	0.111	3.321	216.5	0.001**
PF $_{PC4}$		0.010	0.113	0.088	228.9	0.930

Table 8.16: Results of Independent Samples t-Tests for differences between Mean values of M-RIPL Factors according to Course and Gender.

Remarks:

According to Table 8.16 the following statistically significant results were observed:

- The Mean score for Female Medical students was higher than Female Nursing students for Factor 1 (**TWC** - $p<0.05$)
- The Mean score for Female Nursing students was higher than Female Medical students for Factor 2 (**PC** - $p<0.05$)
- The Mean score for Female Nursing students was higher than Female Medical students for Factor 3 (**RR** - $p<0.01$).
- The Mean score for Female Medical students was higher than Male Medical students for Factor 3 (**RR** - $p<0.01$).
- The Mean value score for Male Nursing students was higher than Male Medical students for Factor 3 (**RR** - $p<0.01$).

i. Comparisons between Course and Age Category

Table 8.17 presents group summary statistics of the M-RIPL resolved according to Course and Age Category.

	[Nursing × < 25 yr]				[Nursing × > 25 yr]				[MBBS × < 25yr]				[MBBS × > 25 yr]			
	N	Mean	Std Dev.	Std Error Mean	N	Mean	Std. Deviation	Std Error Mean	N	Mean	Std Dev.	Std Error Mean	N	Mean	Std Dev.	Std Error Mean
TWC$_{PC1}$	120	-.256	1.080	.099	105	.093	.882	.086	156	.092	.981	.079	10	.612	.998	.315
PC$_{PC2}$	120	.013	.996	.091	105	.174	.969	.095	156	-.147	1.028	.082	10	.196	.731	.231
RR$_{PC3}$	120	.042	1.008	.092	105	.467	.847	.083	156	-.313	.987	.079	10	-.323	.650	.206
PF$_{PC4}$	120	.018	.996	.091	105	-.012	1.097	.107	156	.027	.947	.076	10	-.652	.564	.178

Table 8.17: Mean values and other descriptive statistics for the four M-RIPL Factors PC1 to PC4, resolved according to both Course and Age Category. (The Mean values and their 95% C.I.s are plotted in Figure 8.9).

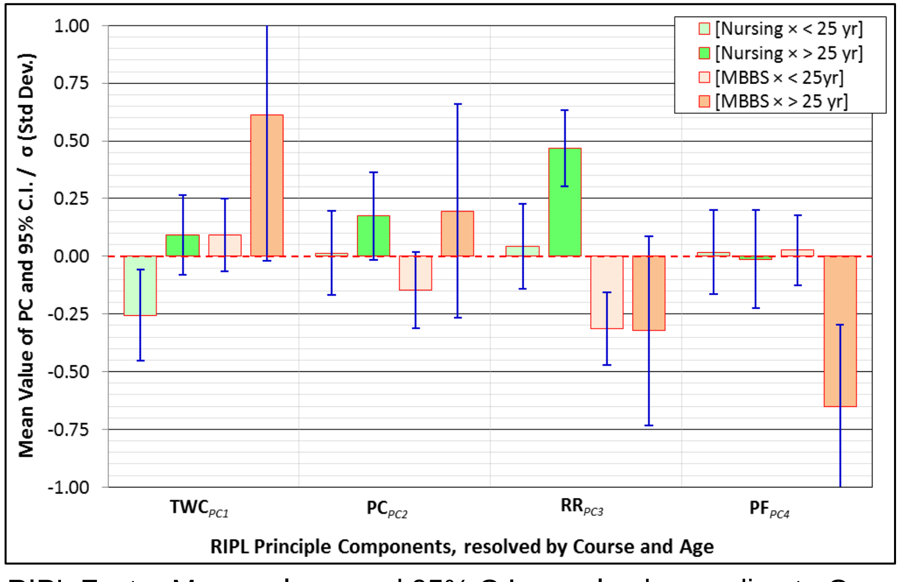


Figure 8.9: Plot of RIPL Factor Mean values, and 95% C.I., resolved according to Course and Age Category.

Table 8.18 reports the results from applying the ‘Independent Samples t-Test’ to compare the Medical and Nursing students and both Age Categories across all four PCs.

Independent Samples t-Test [Equal variances not assumed]		t-test for Equality of Means				
		Mean Difference	Std. Error Difference	t	df	Sig. (2-tailed)
TWC$_{PC1}$	**[Nursing × < 25 yr] - [Nursing × > 25 yr]**	-0.349	0.131	-2.670	222.0	0.008**
PC$_{PC2}$		-0.161	0.131	-1.227	220.5	0.221
RR$_{PC3}$		-0.425	0.124	-3.437	222.7	0.001**
PF$_{PC4}$		0.030	0.140	0.211	211.9	0.833
TWC$_{PC1}$	**[MBBS × < 25 yr] - [MBBS × > 25 yr]**	-0.519	0.325	-1.597	10.1	0.141
PC$_{PC2}$		-0.343	0.245	-1.399	11.4	0.188
RR$_{PC3}$		0.010	0.220	0.047	11.8	0.963
PF$_{PC4}$		0.678	0.194	3.502	12.5	0.004**
TWC$_{PC1}$	**[Nursing × < 25 yr] - [MBBS × < 25 yr]**	-0.349	0.126	-2.765	242.9	0.006**
PC$_{PC2}$		0.160	0.123	1.308	260.0	0.192
RR$_{PC3}$		0.354	0.121	2.922	253.3	0.004**
PF$_{PC4}$		-0.009	0.118	-0.076	249.4	0.939
TWC$_{PC1}$	**[Nursing × > 25 yr] - [MBBS × > 25 yr]**	-0.518	0.327	-1.585	10.4	0.143
PC$_{PC2}$		-0.022	0.250	-0.088	12.2	0.931
RR$_{PC3}$		0.790	0.222	3.566	12.1	0.004**
PF$_{PC4}$		0.640	0.208	3.077	16.5	0.007**

Table 8.18: Results of Independent Samples t-Tests for differences between Mean values of M-RIPL Factors according to Course and Age Category.

Remarks:

According to Table 8.18 the following statistically significant results were observed:

- The Mean score for Older Nursing students (>25 years) was higher than Younger Nursing students (<25 years) for Factor 1 (**TWC** - p<0.01).
- The Mean score for Younger Medical students (<25 years) was higher than Younger Nursing students (<25 years) for Factor 1 (**TWC** - p<0.01).
- The Mean score for Older Nursing students (>25 years) was higher than Younger Nursing students (<25 years) for Factor 3 (**RR** - p<0.01).
- The Mean score for Younger Nursing students (<25 years) was higher than Younger Medical students (<25 years) for Factor 3 (**RR** - p<0.01).
- The Mean score for Older Nursing students (>25 years) was higher than Older Medical students (>25 years) for Factor 3 (**RR** - p<0.01)
- The Mean score for Younger Medical students (<25 years) was higher than Older Medical students (>25 years) for Factor 4 (**PF** - p<0.01).
- The Mean score for Older Nursing students (> 25 years) was higher than Older Medical students (>25 years) for Factor 4 (**PF** - p<0.01).

j. Comparisons according to Gender and Age Category

Table 8.19 presents group summary statistics of the M-RIPL resolved according to Gender and Age Category.

	[< 25 yr × Male]				[< 25 yr × Female]				[> 25 yr × Male]				[> 25 yr × Female]			
	N	Mean	Std Dev.	Std Error Mean	N	Mean	Std. Deviation	Std Error Mean	N	Mean	Std Dev.	Std Error Mean	N	Mean	Std Dev.	Std Error Mean
TWC$_{PC1}$	64	-.030	.918	.115	209	-.065	1.080	.075	15	.206	1.072	.277	98	.110	.876	.089
PC$_{PC2}$	64	-.182	1.173	.147	209	-.024	.952	.066	15	-.082	1.397	.361	98	.205	.870	.088
RR$_{PC3}$	64	-.532	1.034	.129	209	-.060	.961	.066	15	.186	.853	.220	98	.411	.858	.087
PF$_{PC4}$	64	.118	1.070	.134	209	-.014	.936	.065	15	-.405	.925	.239	98	.034	1.041	.105

Table 8.19: Mean values and other descriptive statistics for the four M-RIPL Factors PC1 to PC4, resolved according to both Gender and Age Category. (The Mean values and their 95% C.I.s are plotted in Figure 8.10).

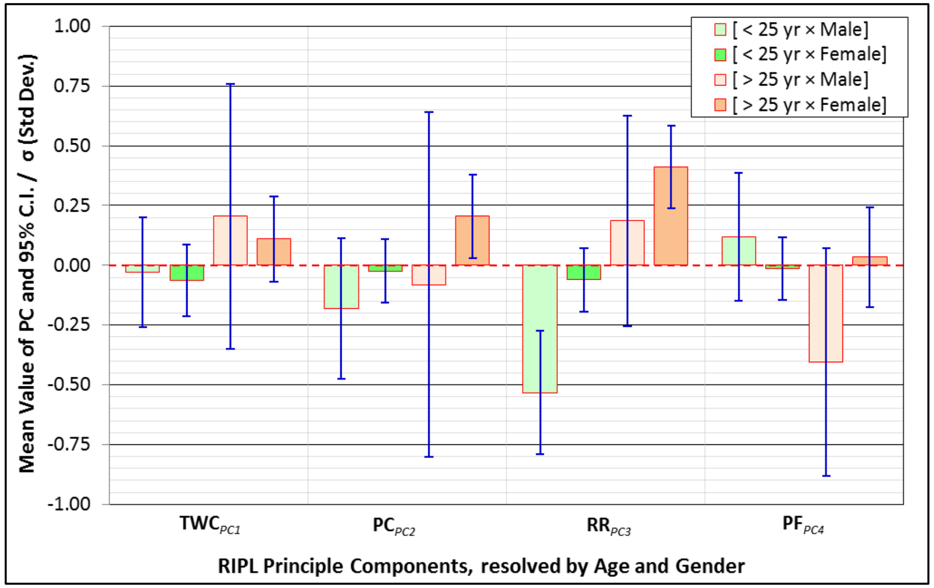


Figure 8.10: Plot of RIPL Factor Mean values, and 95% C.I., resolved according to Gender and Age Category.

Table 8.20 reports the results from applying the 'Independent Samples t-Test' to compare the Gender and Age Category across all four PCs.

Independent Samples t-Test [Equal variances not assumed]		t-test for Equality of Means				
		Mean Difference	Std. Error Difference	t	df	Sig. (2-tailed)
TWC$_{PC1}$	**[< 25 yr × Male] – [< 25 yr × Female]**	0.034	0.137	.250	121.1	0.803
PC$_{PC2}$		-0.158	0.161	-.983	89.9	0.328
RR$_{PC3}$		-0.472	0.145	-3.250	98.6	0.002**
PF$_{PC4}$		0.132	0.149	.888	94.4	0.377
TWC$_{PC1}$	**[> 25 yr × Male] – [> 25 yr × Female]**	0.096	0.291	0.329	17.0	0.746
PC$_{PC2}$		-0.286	0.371	-0.771	15.7	0.452
RR$_{PC3}$		-0.225	0.237	-0.951	18.6	0.354
PF$_{PC4}$		-0.439	0.261	-1.680	19.8	0.109
TWC$_{PC1}$	**[< 25 yr × Male] – [> 25 yr × Male]**	-0.236	0.300	-0.787	19.1	0.441
PC$_{PC2}$		-0.100	0.389	-0.257	18.9	0.800
RR$_{PC3}$		-0.718	0.255	-2.813	24.7	0.009**
PF$_{PC4}$		0.523	0.274	1.910	23.6	0.068
TWC$_{PC1}$	**[< 25 yr × Female] – [> 25 yr ×Female]**	-0.175	0.116	-1.507	230.0	0.133
PC$_{PC2}$		-0.228	0.110	-2.078	206.3	0.039*
RR$_{PC3}$		-0.471	0.109	-4.314	210.7	0.000**
PF$_{PC4}$		-0.048	0.123	-0.385	172.9	0.700

Table 8.20: Results of Independent Samples t-Tests for difference between Mean values of M-RIPL Factors according to Gender and Age Category.

Remarks:

According to Table 8.20, the following statistically significant results were observed:

- The Mean score for Younger Female students (<25 years) was higher than Younger Male students (<25 years) for Factor 3 (**RR** - p<0.01).
- The Mean score for Older Male students (>25 years) was higher than Younger Male students (<25 years) for Factor 3 (**RR** - p<0.01).
- The Mean scores for Older Female students (> 25 years) was higher than Younger Female students (<25 years) for Factor 3 (**RR** - p<0.01).
- The Mean scores for Older Female students (> 25 years) was higher than Younger Female students (<25 years) for Factor 2 (**PC** - p<0.05).

Part B: Factors PC1 to PC4 Results 'Within Group' comparisons

This section of the Chapter presents the results from conducting 'Paired Samples t-Tests for the four M-RIPL Factors **TWC**$_{PC1}$, **PC**$_{PC2}$, **RR**$_{PC3}$ and **PF**$_{PC4}$.

'Within Group Differences', **Pre** versus **Post** the intervention are resolved according to:

- Learning Condition
- Course
- Gender
- Age Category
- Learning Condition and Course
- Learning Condition and Gender
- Learning Condition and Age Category
- Course and Gender
- Course and Age Category
- Gender and Age

The same process as in Part A is applied with the use of Standardised Vectors and reporting of statistical significance.

a. Comparisons according to Learning Condition

Table 8.21 presents summary statistics of the four M-RIPL Factors, resolved according to Learning Condition **Pre** versus **Post** the intervention.

Condition: IPL/UPL		TWC_{PC1}	PC_{PC2}	RR_{PC3}	PF_{PC4}
IPL_PRE	N	98	98	98	98
	Mean	-.257	.117	-.032	-.031
	Std. Deviation	.928	.914	.958	1.036
	Std. Error of Mean	.094	.092	.097	.105
IPL_POST	N	99	99	99	99
	Mean	.176	-.164	.104	-.017
	Std. Deviation	.820	1.130	1.001	.974
	Std. Error of Mean	.082	.114	.101	.098
UPL_PRE	N	96	96	96	96
	Mean	-.099	.085	-.080	.150
	Std. Deviation	1.110	.908	1.158	.932
	Std. Error of Mean	.113	.093	.118	.095
UPL_POST	N	100	100	100	100
	Mean	.173	-.034	.005	-.096
	Std. Deviation	1.064	1.018	.874	1.051
	Std. Error of Mean	.106	.102	.087	.105

Table 8.21: Mean values and other descriptive statistics for the four M-RIPL Factors PC1 to PC4, resolved according to Learning Condition Pre and Post the intervention.

The Mean values and their 95% C.I.s are plotted in Figure 8.11.

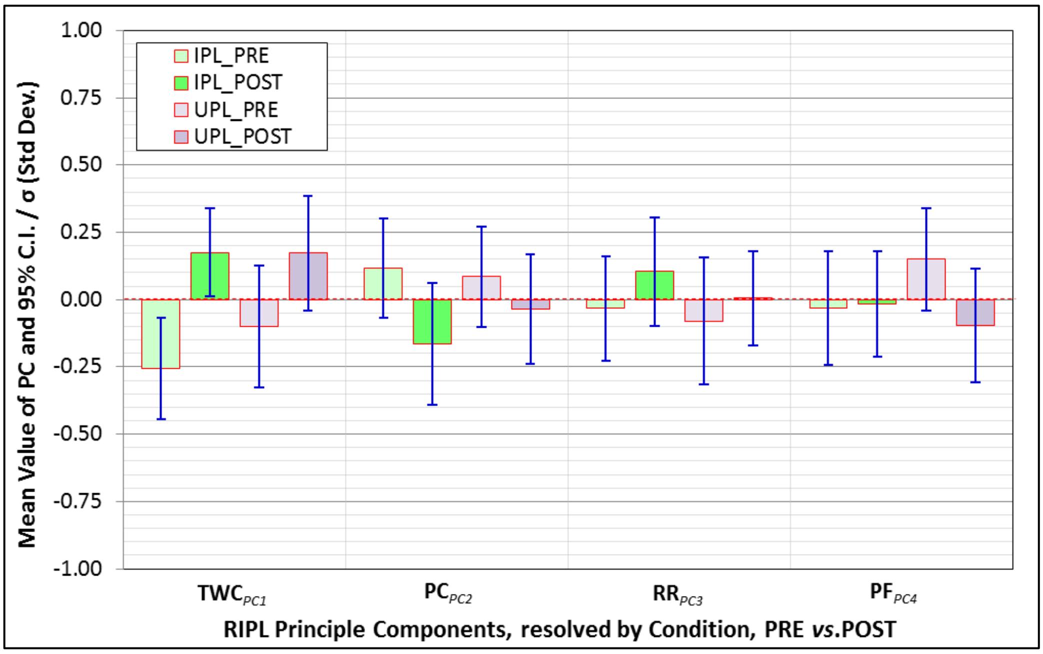


Figure 8.11: Plot of RIPL Factor Mean values, and 95% C.I., resolved according to Learning Condition (Pre vs. Post).

Table 8.22 reports the results from applying the 'Paired Samples t-Test' to compare the IPL and UPL Learning Condition Pre and Post the intervention.

Paired Samples t-Test								
Condition: IPL/UPL			Paired Differences			t	df	Sig. (2-tailed)
			Mean	Std Dev.	Std. Error Mean			
IPL	Pair 1	**TWC**$_{PC1}$_PRE - **TWC**$_{PC1}$_POST	-.442	.607	.062	-7.139	95	.000**
	Pair 2	**PC**$_{PC2}$_PRE - **PC**$_{PC2}$_POST	.296	.971	.099	2.991	95	.004**
	Pair 3	**RR**$_{PC3}$_PRE - **RR**$_{PC3}$_POST	-.134	.635	.065	-2.067	95	.041*
	Pair 4	**PF**$_{PC4}$_PRE - **PF**$_{PC4}$_POST	-.002	.821	.084	-0.022	95	.982
UPL	Pair 1	**TWC**$_{PC1}$_PRE - **TWC**$_{PC1}$_POST	-.297	.900	.093	-3.185	92	.002**
	Pair 2	**PC**$_{PC2}$_PRE - **PC**$_{PC2}$_POST	.074	.716	.074	1.000	92	.320
	Pair 3	**RR**$_{PC3}$_PRE - **RR**$_{PC3}$_POST	-.126	1.063	.110	-1.145	92	.255
	Pair 4	**PF**$_{PC4}$_PRE - **PF**$_{PC4}$_POST	.228	.956	.099	2.299	92	.024*

Table 8.22: Results of Paired Samples t-Tests for Mean values of M-RIPL Factors Pre *vs*. Post the intervention resolved according to Learning Condition.

Remarks:

According to Table 8.22, there were statistically significant differences in mean scores post the intervention for the following Factors:

- Increased Mean scores for IPL students for Factor 1 [**TWC** – $p<0.01$].
- Increased Mean scores for UPL students for Factor 1 [**TWC** – $p<0.01$].
- Decreased Mean scores for IPL students for Factor 2 [**PC** – $p<0.01$).
- Increased Mean scores for IPL students for Factor 3 [**RR** – $p<0.05$].
- Decreased Mean scores for UPL students for Factor 4 [**PF** – $p<0.05$)

b. Comparison according to Course

Table 8.23 presents summary statistics of the four M-RIPL Factors, resolved according to Course **Pre** versus **Post** the intervention.

Course: Nursing/MBBS		TWC_{PC1}	PC_{PC2}	RR_{PC3}	PF_{PC4}
Bachelor of Nursing_PRE	N	111	111	111	111
	Mean	-.342	.218	.238	.103
	Std. Deviation	.998	.894	.953	1.043
	Std. Error of Mean	.095	.085	.090	.099
Bachelor of Nursing_POST	N	116	116	116	116
	Mean	.150	-.028	.221	-.078
	Std. Deviation	.948	1.048	.975	1.040
	Std. Error of Mean	.088	.097	.090	.097
MBBS_PRE	N	83	83	83	83
	Mean	.040	-.055	-.449	-.001
	Std. Deviation	1.020	.911	1.072	.911
	Std. Error of Mean	.112	.100	.118	.100
MBBS_POST	N	83	83	83	83
	Mean	.208	-.198	-.178	-.028
	Std. Deviation	.952	1.109	.837	.976
	Std. Error of Mean	.105	.122	.092	.107

Table 8.23: Mean values and other descriptive statistics for the four M-RIPL Factors PC1 to PC4, resolved according to Course and Pre and Post the intervention.

The Mean values and their 95% C.I.s are plotted in Figure 8.12.

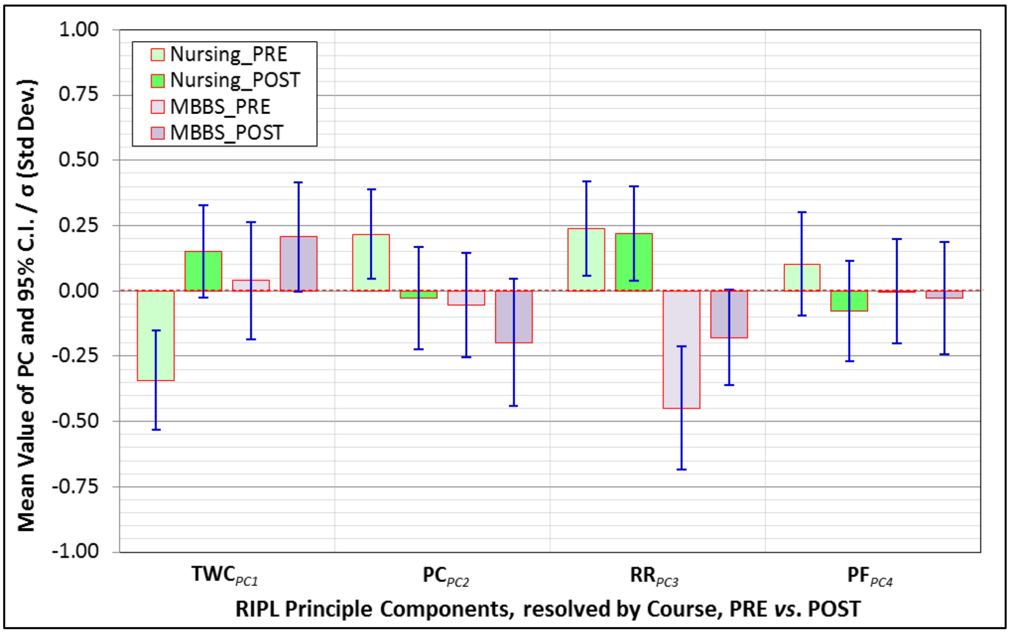


Figure 8.12: Plot of RIPL Factor Mean values, and 95% C.I., resolved according to Course (Pre vs. Post).

Table 8.24 reports the results from applying the 'Paired Samples t-Test' to compare the Nursing and Medical students Pre vs Post the intervention.

Paired Samples t-Test								
Course: Nursing/MBBS			**Paired Differences**			t	df	Sig. (2-tailed)
			Mean	Std Dev.	Std. Error Mean			
Bachelor of Nursing	Pair 1	**TWC**$_{PC1}$_PRE - **TWC**$_{PC1}$_POST	-.486	.830	.080	-6.113	108	.000**
	Pair 2	**PC**$_{PC2}$_PRE - **PC**$_{PC2}$_POST	.240	.868	.083	2.883	108	.005**
	Pair 3	**RR**$_{PC3}$_PRE - **RR**$_{PC3}$_POST	-.012	.718	.069	-.169	108	.866
	Pair 4	**PF**$_{PC4}$_PRE - **PF**$_{PC4}$_POST	.187	.877	.084	2.221	108	.028*
MBBS	Pair 1	**TWC**$_{PC1}$_PRE - **TWC**$_{PC1}$_POST	-.214	.643	.072	-2.978	79	.004**
	Pair 2	**PC**$_{PC2}$_PRE - **PC**$_{PC2}$_POST	.115	.849	.095	1.215	79	.228
	Pair 3	**RR**$_{PC3}$_PRE - **RR**$_{PC3}$_POST	-.292	1.025	.115	-2.545	79	.013*
	Pair 4	**PF**$_{PC4}$_PRE - **PF**$_{PC4}$_POST	.008	.915	.102	.083	79	.934

Table 8.24: Results of Paired Samples t-Tests for Mean values of M-RIPL Factors Pre *vs*. Post the intervention according to Course.

Remarks:

According to Table 8.24, there were statistically significant differences in mean scores post the intervention for the following Factors:

- Increased Mean score for Nursing students for Factor 1 [**TWC** – p<0.01].
- Increased Mean score for Medical students for Factor 1 [**TWC** – p<0.01].
- Decreased Mean score for Nursing students for Factor 2 [**PC** – p<0.01].
- Increased Mean score for Medical students for Factor 3 [**RR** – p<0.05].
- Decreased Mean score for Nursing students for Factor 4 [**PF** – p<0.05].

c. Comparisons according to Gender

Table 8.25 presents summary statistics of the four M-RIPL Factors, resolved according to Gender, **Pre** and **Post** the intervention.

Gender: Male/Female		TWC_{PC1}	PC_{PC2}	RR_{PC3}	PF_{PC4}
Male_PRE	N	39	39	39	39
	Mean	-.100	-.067	-.588	.093
	Std. Deviation	.979	1.048	1.192	.984
	Std. Error of Mean	.157	.168	.191	.158
Male_POST	N	40	40	40	40
	Mean	.126	-.256	-.209	-.053
	Std. Deviation	.912	1.355	.832	1.135
	Std. Error of Mean	.144	.214	.132	.179
Female_PRE	N	152	152	152	152
	Mean	-.208	.144	.068	.070
	Std. Deviation	1.039	.866	.971	.975
	Std. Error of Mean	.084	.070	.079	.079
Female_POST	N	155	155	155	155
	Mean	.186	-.044	.112	-.067
	Std. Deviation	.968	.986	.939	.961
	Std. Error of Mean	.078	.079	.075	.077

Table 8.25: Mean values and other descriptive statistics for the four M-RIPL Factors PC1 to PC4, resolved according to Gender and **Pre** and **Post** the intervention.

The Mean values and their 95% C.I.s are plotted in Figure 8.13.

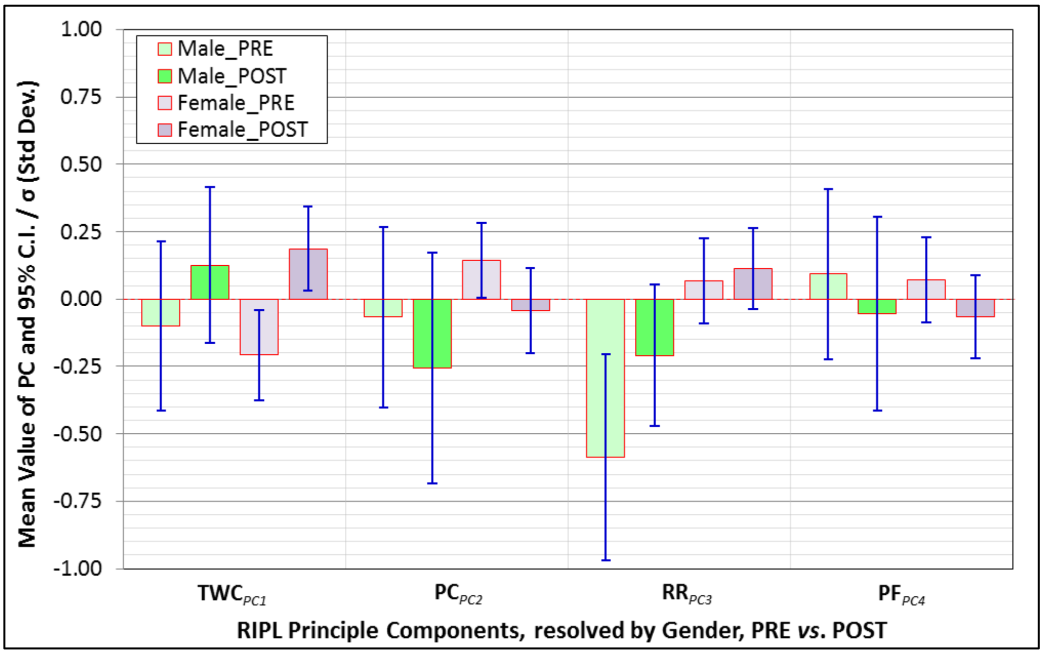


Figure 8.13: Plot of M-RIPL Factor Mean values and 95% C.I., resolved according to Gender (Pre vs Post).

Table 8.26 reports the results from applying the ‘Paired Samples t-Test’ to compare the Gender groups Pre and Post the intervention.

Paired Samples t-Test								
Gender: Male/Female			**Paired Differences**			t	df	Sig. (2-tailed)
			Mean	Std Dev.	Std. Error Mean			
Male	Pair 1	**TWC**$_{PC1}$_PRE - **TWC**$_{PC1}$_POST	-.285	.673	.111	-2.578	36	.014*
	Pair 2	**PC**$_{PC2}$_PRE - **PC**$_{PC2}$_POST	.145	1.124	.185	0.785	36	.438
	Pair 3	**RR**$_{PC3}$_PRE - **RR**$_{PC3}$_POST	-.349	1.111	.183	-1.914	36	.064
	Pair 4	**PF**$_{PC4}$_PRE - **PF**$_{PC4}$_POST	.087	.946	.156	0.558	36	.581
Female	Pair 1	**TWC**$_{PC1}$_PRE - **TWC**$_{PC1}$_POST	-.400	.793	.065	-6.161	148	.000**
	Pair 2	**PC**$_{PC2}$_PRE - **PC**$_{PC2}$_POST	.194	.792	.065	2.986	148	.003**
	Pair 3	**RR**$_{PC3}$_PRE - **RR**$_{PC3}$_POST	-.071	.802	.066	-1.075	148	.284
	Pair 4	**PF**$_{PC4}$_PRE - **PF**$_{PC4}$_POST	.139	.877	.072	1.941	148	.054

Table 8.26: Results of Paired Samples t-Tests for Mean values of M-RIPL Factors Pre *vs*. Post the intervention according to Gender.

Remarks:

According to Table 8.26, there were statistically significant differences in mean scores post the intervention for the following Factors:

- Increased Mean score for Male students for Factor 1 [**TWC** –p<0.05]
- Increased Mean score for Female students for Factor 1 [**TWC** – p<0.01]
- Decreased Mean score for Female students for Factor 2 [**PC** – p<0.01)

d. Comparisons according to Age Category

Table 8.27 presents summary statistics of the four M-RIPL Factors, resolved according to Learning Condition **Pre** and **Post** the intervention.

Age: < 25 yr/>25 yr		TWC_{PC1}	PC_{PC2}	RR_{PC3}	PF_{PC4}
< 25 yr_PRE	N	137	137	137	137
	Mean	-.220	.018	-.203	.085
	Std. Deviation	1.044	.929	1.076	.951
	Std. Error of Mean	.089	.079	.092	.081
< 25 yr_POST	N	139	139	139	139
	Mean	.100	-.171	-.115	-.039
	Std. Deviation	1.011	1.089	.942	.982
	Std. Error of Mean	.086	.092	.080	.083
> 25 yr_PRE	N	56	56	56	56
	Mean	-.088	.290	.326	-.004
	Std. Deviation	.979	.837	.918	1.086
	Std. Error of Mean	.131	.112	.123	.145
> 25 yr_POST	N	59	59	59	59
	Mean	.353	.068	.467	-.128
	Std. Deviation	.766	1.038	.802	1.069
	Std. Error of Mean	.100	.135	.104	.139

Table 8.27: Mean values and other descriptive statistics for the four M-RIPL Factors PC1 to PC4, resolved according to Age Category and **Pre** and **Post** the intervention.

The Mean values and their 95% C.I.s are plotted in Figure 8.14.

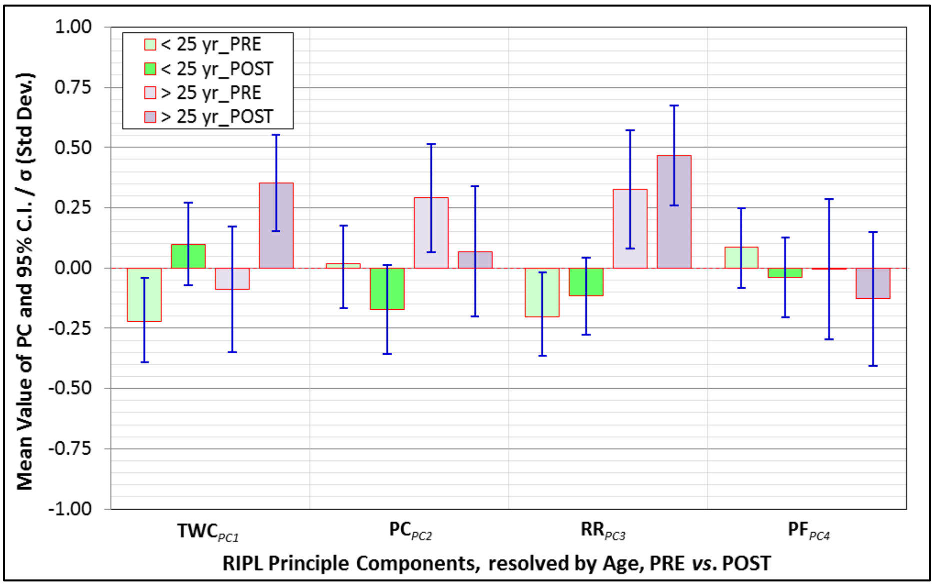


Figure 8.14: Plot of RIPL Factor Mean values, and 95% C.I., resolved according to Age Category (Pre vs Post).

Table 8.28 reports the results from applying the 'Paired Samples t-Test' to compare the Older and Younger students Pre and Post the intervention.

Paired Samples t-Test									
Age: < 25 yr/> 25 yr			Paired Differences			t	df	Sig. (2-tailed)
			Mean	Std Dev.	Std. Error Mean			
Less than 25 yr	Pair 1	**TWC**$_{PC1}$_PRE - **TWC**$_{PC1}$_POST	-.358	.757	.065	-5.479	133	.000**
	Pair 2	**PC**$_{PC2}$_PRE - **PC**$_{PC2}$_POST	.156	.838	.072	2.158	133	.033*
	Pair 3	**RR**$_{PC3}$_PRE - **RR**$_{PC3}$_POST	-.110	.953	.082	-1.332	133	.185
	Pair 4	**PF**$_{PC4}$_PRE - **PF**$_{PC4}$_POST	.132	.876	.076	1.748	133	.083
More than 25 yr	Pair 1	**TWC**$_{PC1}$_PRE - **TWC**$_{PC1}$_POST	-.415	.796	.108	-3.832	53	.000**
	Pair 2	**PC**$_{PC2}$_PRE - **PC**$_{PC2}$_POST	.252	.919	.125	2.011	53	.049*
	Pair 3	**RR**$_{PC3}$_PRE - **RR**$_{PC3}$_POST	-.173	.631	.086	-2.010	53	.050*
	Pair 4	**PF**$_{PC4}$_PRE - **PF**$_{PC4}$_POST	.094	.922	.126	.746	53	.459

Table 8.28 Results of Paired Samples t-Tests for Mean values of M-RIPL Factors Pre *vs*. Post the intervention according to Age Category.

Remarks:

According to Table 8.28, there were statistically significant differences in mean scores post the intervention for the following Factors:

- Increased Mean scores for Younger students (<25 years) for Factor 1 [**TWC** – p<0.01].
- Increased Mean scores for Older students (>25 years) for Factor 1 [**TWC** – p<0.01].
- Decreased Mean scores for Younger students (<25 years) for Factor 2 [**PC** – p<0.05)
- Decreased Mean scores for Older students (>25 years) for Factor 2 [**PC** – p<0.05]
- Increased Mean scores for Older students (> 25 years) for Factor 3 [**RR** – p<0.05)

e. Comparisons according to Learning Condition and Course

Table 8.29 presents summary statistics of the four M-RIPL Factors, resolved according to Learning Condition and Course, **Pre** and **Post** the intervention.

Course and Condition		TWC_{PC1}	PC_{PC2}	RR_{PC3}	PF_{PC4}
[Nursing × IPL]_PRE	N	56	56	56	56
	Mean	-.368	.161	.234	.008
	Std. Deviation	.808	.948	.863	1.127
	Std. Error of Mean	.108	.127	.115	.151
[Nursing × IPL]_POST	N	56	56	56	56
	Mean	.254	-.194	.344	-.038
	Std. Deviation	.729	1.119	.996	1.006
	Std. Error of Mean	.097	.150	.133	.134
[Nursing × UPL]_PRE	N	55	55	55	55
	Mean	-.316	.275	.243	.199
	Std. Deviation	1.168	.840	1.044	.950
	Std. Error of Mean	.157	.113	.141	.128
[Nursing × UPL]_POST	N	60	60	60	60
	Mean	.054	.128	.106	-.115
	Std. Deviation	1.113	.961	.948	1.078
	Std. Error of Mean	.144	.124	.122	.139
[MBBS × IPL]_PRE	N	42	42	42	42
	Mean	-.109	.057	-.387	-.084
	Std. Deviation	1.060	.874	.973	.911
	Std. Error of Mean	.164	.135	.150	.141
[[MBBS × IPL]_POST	N	43	43	43	43
	Mean	.074	-.124	-.208	.011
	Std. Deviation	.925	1.157	.928	.941
	Std. Error of Mean	.141	.176	.141	.144
[MBBS × UPL]_PRE	N	41	41	41	41
	Mean	.191	-.169	-.512	.084
	Std. Deviation	.966	.943	1.173	.914
	Std. Error of Mean	.151	.147	.183	.143
[MBBS × UPL]_PRE	N	40	40	40	40
	Mean	.352	-.277	-.146	-.069
	Std. Deviation	.971	1.063	.737	1.022
	Std. Error of Mean	.154	.168	.117	.162

Table 8.29: Mean values and other descriptive statistics for the four M-RIPL Factors PC1 to PC4, resolved according to both Learning Condition and Course, and Pre and Post the intervention.

The Mean values and their 95% C.I.s for Nursing are plotted in Figure 8.15.

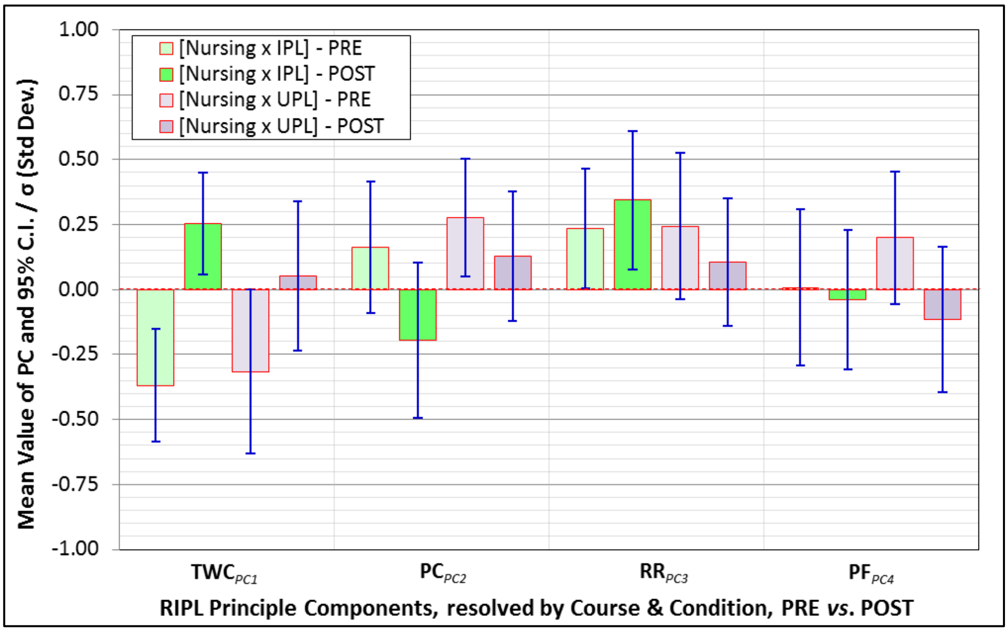


Figure 8.15: Plot of M-RIPL Factor Mean values and 95% C.I., for Nursing resolved according to Learning Condition Pre vs Post).

Table 8.30 reports the results from applying the ‘Paired Samples t-Test’ to compare the Learning Condition with the Nursing group Pre and Post the intervention.

Paired Samples t-Test

Course and Condition			Paired Differences			t	df	Sig. (2-tailed)
			Mean	Std Dev.	Std. Error Mean			
[Nursing × IPL]	Pair 1	**TWC**$_{PC1}$_PRE - **TWC**$_{PC1}$_POST	-.608	.663	.089	-6.795	54	.000**
	Pair 2	**PC**$_{PC2}$_PRE - **PC**$_{PC2}$_POST	.384	.945	.127	3.017	54	.004**
	Pair 3	**RR**$_{PC3}$_PRE - **RR**$_{PC3}$_POST	-.105	.631	.085	-1.230	54	.224
	Pair 4	**PF**$_{PC4}$_PRE - **PF**$_{PC4}$_POST	.092	.792	.107	0.858	54	.395
[Nursing × UPL]	Pair 1	**TWC**$_{PC1}$_PRE - **TWC**$_{PC1}$_POST	-.362	.962	.131	-2.768	53	.008**
	Pair 2	**PC**$_{PC2}$_PRE - **PC**$_{PC2}$_POST	.092	.763	.104	0.890	53	.377
	Pair 3	**RR**$_{PC3}$_PRE - **RR**$_{PC3}$_POST	.083	.791	.108	0.773	53	.443
	Pair 4	**PF**$_{PC4}$_PRE - **PF**$_{PC4}$_POST	.283	.955	.130	2.182	53	.034*

Table 8.30: Results of Paired Samples t-Tests for Mean values of M-RIPL Factors Pre *vs*. Post the intervention for Nursing resolved according to Learning Condition.

Remarks:

According to Table 8.30 there were statistically significant differences in mean scores for Nursing post the intervention for the following Factors:

- Increased Mean score for Nursing IPL students for Factor 1 [**TWC** – p<0.01]
- Increased Mean score for Nursing UPL students for Factor 1 [**TWC** – p<0.01]
- Decreased Mean score for Nursing IPL students for Factor 2 [**PC** – p<0.001]
- Decreased Mean score for UPL nursing students for Factor 4 [**PF** – p<0.05]

The Mean values and their 95% C.I.s are now plotted for Medicine in Figure 8.16.

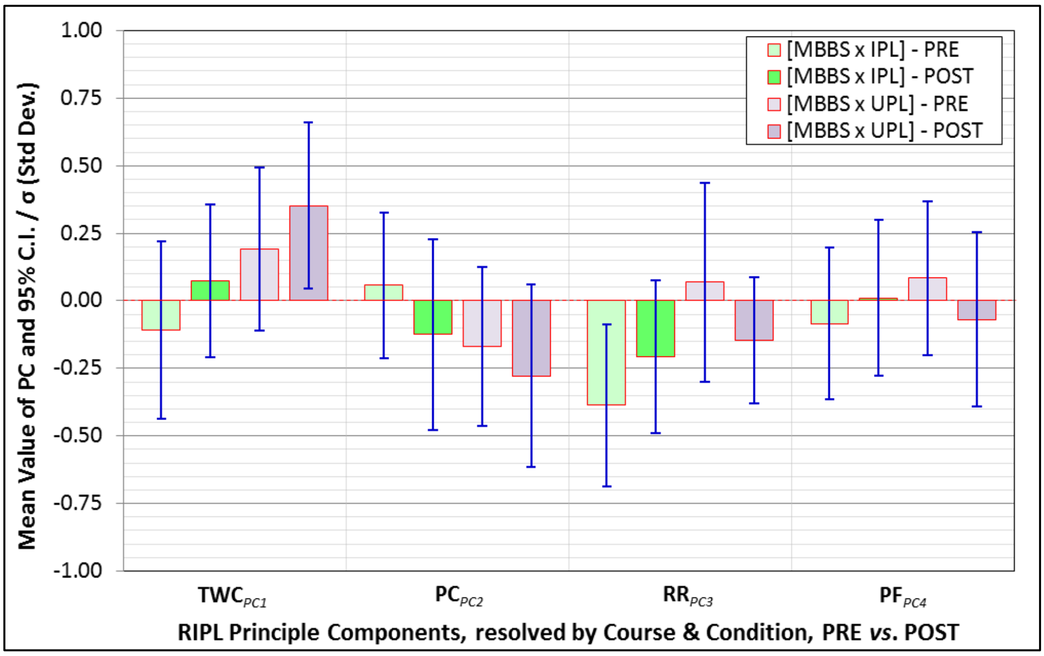


Figure 8.16: Plot of M-RIPL Factor Mean values and 95% C.I., for Medicine resolved according to Learning Condition (Pre vs Post).

Table 8.31 reports the results from applying the 'Paired Samples t-Test' to compare the IPL and UPL Learning Condition with the Medical group Pre and Post the intervention.

Paired Samples t-Test

Course and Condition			Paired Differences			t	df	Sig. (2-tailed)
			Mean	Std Dev.	Std. Error Mean			
[MBBS × IPL]	Pair 1	**TWC**$_{PC1}$_PRE - **TWC**$_{PC1}$_POST	-.221	.441	.069	-3.208	40	.003**
	Pair 2	**PC**$_{PC2}$_PRE - **PC**$_{PC2}$_POST	.178	1.004	.157	1.138	40	.262
	Pair 3	**RR**$_{PC3}$_PRE - **RR**$_{PC3}$_POST	-.173	.645	.101	-1.719	40	.093
	Pair 4	**PF**$_{PC4}$_PRE - **PF**$_{PC4}$_POST	-.127	.853	.133	-0.955	40	.345
[MBBS × UPL]	Pair 1	**TWC**$_{PC1}$_PRE - **TWC**$_{PC1}$_POST	-.207	.808	.129	-1.596	38	.119
	Pair 2	**PC**$_{PC2}$_PRE - **PC**$_{PC2}$_POST	.049	.653	.105	0.468	38	.643
	Pair 3	**RR**$_{PC3}$_PRE - **RR**$_{PC3}$_POST	-.416	1.309	.210	-1.985	38	.054
	Pair 4	**PF**$_{PC4}$_PRE - **PF**$_{PC4}$_POST	.151	.966	.155	.977	38	.335

Table 8.31: Results of Paired Samples t-Tests for Mean values of M-RIPL Factors Pre *vs*. Post the intervention for Medicine resolved according to Learning Condition.

Remarks:

According to Table 8.31, there was a significant increase in the post Mean value score for IPL medical students for Factor 1 [**TWC** – p<0.01]. Learning interprofessionally clearly had a positive impact on Medical students in relation to teamwork and collaborative practice.

f. Comparisons according to Learning Condition and Gender

Table 8.32 presents summary statistics of the four M-RIPL Factors, resolved according to Learning Condition and Gender, **Pre** and **Post** the intervention.

Condition and Gender		TWC_{PC1}	PC_{PC2}	RR_{PC3}	PF_{PC4}
[IPL × Male]_PRE	N	19	19	19	19
	Mean	-.417	.049	-.567	-.132
	Std. Deviation	1.034	1.008	1.087	.962
	Std. Error of Mean	.237	.231	.249	.221
[IPL × Male]_POST	N	19	19	19	19
	Mean	-.020	-.311	-.390	-.032
	Std. Deviation	.860	1.500	1.034	1.254
	Std. Error of Mean	.197	.344	.237	.288
[IPL × Female]_PRE	N	76	76	76	76
	Mean	-.237	.133	.077	.032
	Std. Deviation	.907	.891	.855	1.031
	Std. Error of Mean	.104	.102	.098	.118
[IPL × Female]_POST	N	77	77	77	77
	Mean	.222	-.124	.193	-.013
	Std. Deviation	.817	1.036	.939	.860
	Std. Error of Mean	.093	.118	.107	.098
[UPL × Male]_PRE	N	20	20	20	20
	Mean	.201	-.177	-.608	.306
	Std. Deviation	.842	1.099	1.313	.980
	Std. Error of Mean	.188	.246	.294	.219
[UPL × Male]_POST	N	21	21	21	21
	Mean	.259	-.205	-.045	-.072
	Std. Deviation	.957	1.245	.573	1.046
	Std. Error of Mean	.209	.272	.125	.228
[UPL × Female]_PRE	N	76	76	76	76
	Mean	-.178	.154	.059	.109
	Std. Deviation	1.162	.845	1.080	.921
	Std. Error of Mean	.133	.097	.124	.106
[UPL × > Female]_POST	N	78	78	78	78
	Mean	.151	.036	.032	-.120
	Std. Deviation	1.102	.933	.939	1.054
	Std. Error of Mean	.125	.106	.106	.119

Table 8.32: Mean values and other descriptive statistics for the four M-RIPL Factors PC1 to PC4, resolved according to both Learning Condition and Gender, Pre and Post the intervention.

The Mean values and their 95% C.I.s for the IPL Condition are plotted in Figure 8.17.

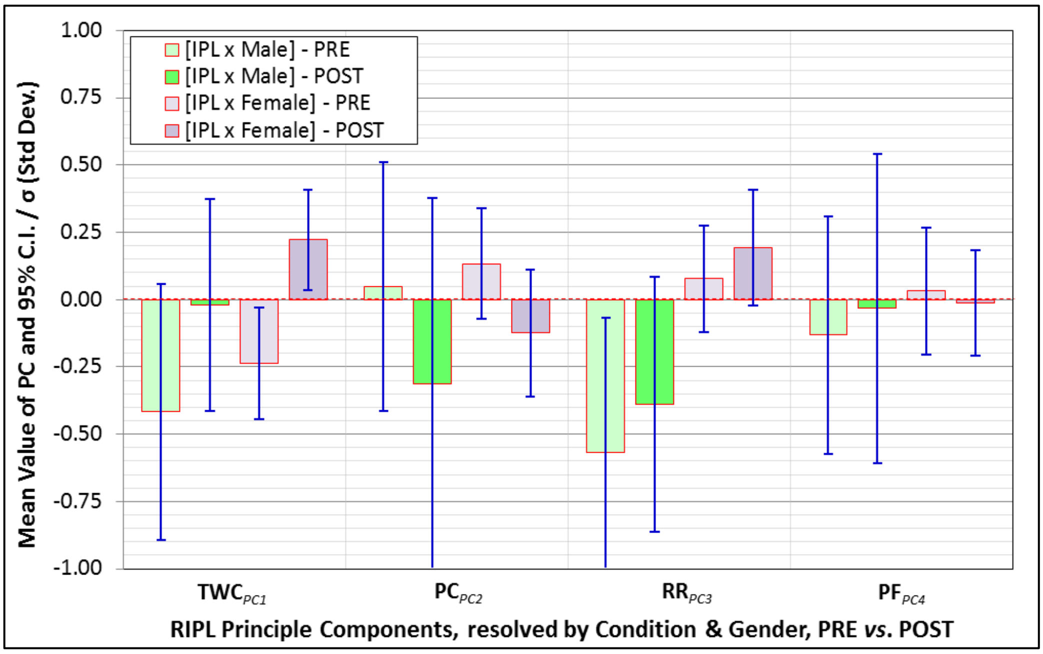


Figure 8.17: Plot of M-RIPL Factor Mean values and 95% C.I., for the IPL group resolved according to Gender (Pre vs Post).

Table 8.33 reports the results from applying the 'Paired Samples t-Test' to compare the IPL and Gender groups Pre and Post the intervention.

Paired Samples t-Test

Learning Condition and Gender			**Paired Differences** Mean	Std Dev.	Std. Error Mean	t	df	Sig. (2-tailed)
[IPL × Male]	Pair 1	**TWC**$_{PC1}$_PRE - **TWC**$_{PC1}$_POST	-.424	.438	.103	-4.103	17	.001**
	Pair 2	**PC**$_{PC2}$_PRE - **PC**$_{PC2}$_POST	.260	1.313	.310	0.839	17	.413
	Pair 3	**RR**$_{PC3}$_PRE - **RR**$_{PC3}$_POST	-.068	.624	.147	-.460	17	.651
	Pair 4	**PF**$_{PC4}$_PRE - **PF**$_{PC4}$_POST	-.224	.997	.235	-0.951	17	.355
[IPL × Female]	Pair 1	**TWC**$_{PC1}$_PRE - **TWC**$_{PC1}$_POST	-.466	.646	.075	-6.248	74	.000**
	Pair 2	**PC**$_{PC2}$_PRE - **PC**$_{PC2}$_POST	.302	.899	.104	2.912	74	.005**
	Pair 3	**RR**$_{PC3}$_PRE - **RR**$_{PC3}$_POST	-.140	.651	.075	-1.864	74	.066
	Pair 4	**PF**$_{PC4}$_PRE - **PF**$_{PC4}$_POST	.091	.751	.087	1.047	74	.299

Table 8.33: Results of Paired Samples t-Tests for Mean values of RIPL Factors Pre *vs*. Post the intervention for the IPL group resolved according to Gender.

Remarks:

According to Table 8.33, there were statistically significant differences in mean scores post the intervention for the following Factors:

- Increased Mean scores for Male IPL students for Factor 1 [**TWC** – p<0.01]
- Increased Mean scores for Female IPL students for Factor 1 [**TWC** – p<0.01]
- Decreased Mean value scores for Female IPL students for Factor 2 [**PC** – p<0.01]

The Mean values and their 95% C.I.s are now plotted for the UPL group in Figure 8.18.

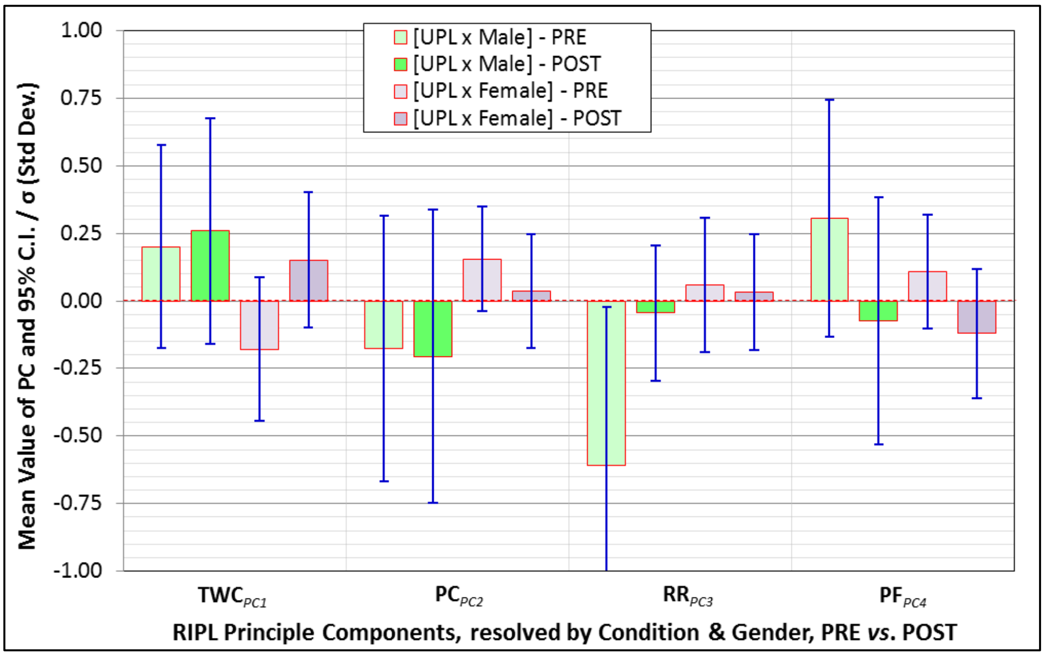


Figure 8.18: Plot of M-RIPL Factor Mean values and 95% C.I., for the UPL group resolved according to Gender (Pre vs Post).

Table 8.34 reports the results from applying the 'Paired Samples t-Test' to compare the UPL and Gender groups Pre and Post the intervention.

Paired Samples t-Test

Learning Condition and Gender			Paired Differences			t	df	Sig. (2-tailed)
			Mean	Std Dev.	Std. Error Mean			
[UPL × Male]	Pair 1	**TWC**$_{PC1}$_PRE - **TWC**$_{PC1}$_POST	.032	.308	.178	0.178	2	.875
	Pair 2	**PC**$_{PC2}$_PRE - **PC**$_{PC2}$_POST	.366	.404	.233	1.568	2	.257
	Pair 3	**RR**$_{PC3}$_PRE - **RR**$_{PC3}$_POST	-.378	.179	.103	-3.660	2	.067
	Pair 4	**PF**$_{PC4}$_PRE - **PF**$_{PC4}$_POST	-.989	.698	.403	-2.454	2	.134
[UPL × Female]	Pair 1	**TWC**$_{PC1}$_PRE - **TWC**$_{PC1}$_POST	-.154	.828	.190	-0.808	18	.429
	Pair 2	**PC**$_{PC2}$_PRE - **PC**$_{PC2}$_POST	.036	.935	.214	0.169	18	.867
	Pair 3	**RR**$_{PC3}$_PRE - **RR**$_{PC3}$_POST	-.616	1.395	.320	-1.926	18	.070
	Pair 4	**PF**$_{PC4}$_PRE - **PF**$_{PC4}$_POST	.381	.815	.187	2.037	18	.057

Table 8.34 Results of Paired Samples t-Tests for Mean values of RIPL Factors Pre *vs*. Post the intervention for UPL students and Gender.

According to Table 8.34 there were no statistically significant findings.

g. Comparisons according to Learning Condition and Age Category

Table 8.35 presents summary statistics of the four M-RIPL Factors, resolved according to Learning Condition and Age Category, **Pre** and **Post** the intervention.

Condition and Age		TWC_{PC1}	PC_{PC2}	RR_{PC3}	PF_{PC4}
[IPL × < 25 yr]_PRE	N	69	69	69	69
	Mean	-.287	.095	-.210	.045
	Std. Deviation	1.009	.908	.952	.965
	Std. Error of Mean	.122	.109	.115	.116
[IPL × < 25 yr]_POST	N	70	70	70	70
	Mean	.075	-.154	-.078	-.014
	Std. Deviation	.889	1.114	1.021	.928
	Std. Error of Mean	.106	.133	.122	.111
[IPL × > 25 yr]_PRE	N	28	28	28	28
	Mean	-.206	.141	.452	-.217
	Std. Deviation	.715	.948	.794	1.208
	Std. Error of Mean	.135	.179	.150	.228
[IPL × > 25 yr]_POST	N	28	28	28	28
	Mean	.434	-.197	.590	-.083
	Std. Deviation	.571	1.209	.782	1.064
	Std. Error of Mean	.108	.228	.148	.201
[UPL × < 25 yr]_PRE	N	68	68	68	68
	Mean	-.152	-.060	-.195	.125
	Std. Deviation	1.081	.949	1.196	.941
	Std. Error of Mean	.131	.115	.145	.114
[UPL × < 25 yr]_POST	N	69	69	69	69
	Mean	.125	-.188	-.153	-.064
	Std. Deviation	1.128	1.072	.859	1.039
	Std. Error of Mean	.136	.129	.103	.125
[UPL × > 25 yr]_PRE	N	28	28	28	28
	Mean	.030	.439	.200	.209
	Std. Deviation	1.188	.694	1.026	.922
	Std. Error of Mean	.224	.131	.194	.174
[UPL × > 25 yr]_POST	N	31	31	31	31
	Mean	.280	.308	.356	-.170
	Std. Deviation	.912	.801	.815	1.089
	Std. Error of Mean	.164	.144	.146	.196

Table 8.35: Mean values and other descriptive statistics for the four M-RIPL Factors PC1 to PC4, resolved according to Learning Condition and Age Category, Pre and Post the intervention.

The Mean values and their 95% C.I.s for the IPL group are plotted in Figure 8.19.

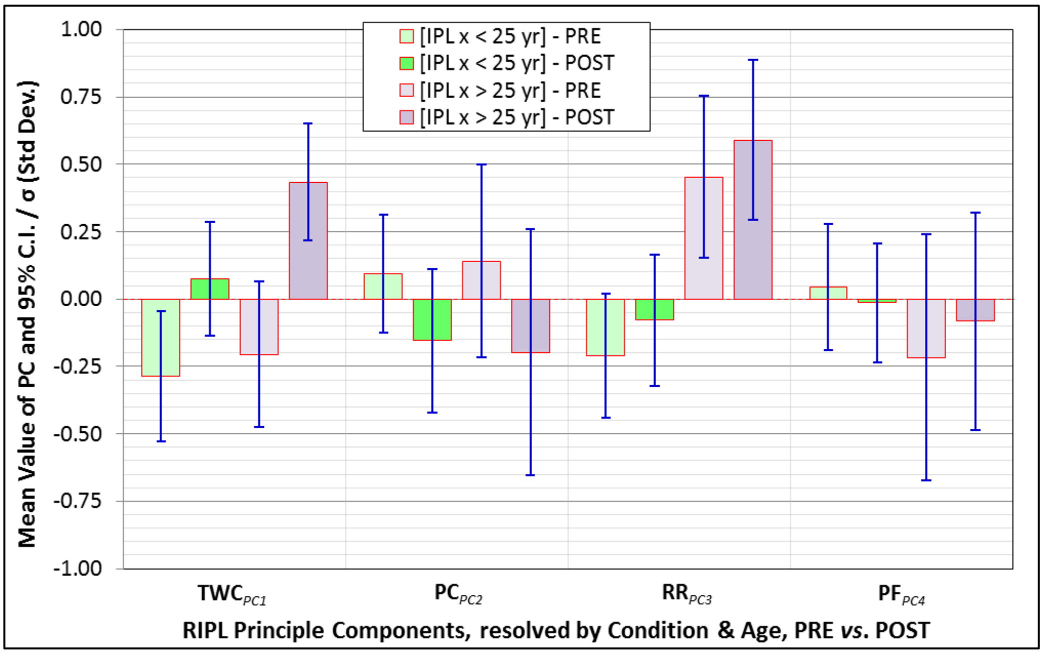


Figure 8.19: Plot of M-RIPL Factor Mean values and 95% C.I., for the IPL group resolved according to Age Category (Pre vs Post).

Table 8.36 reports the results from applying the 'Paired Samples t-Test' to compare the IPL group with Age Category Pre and Post the intervention.

Paired Samples t-Test

Learning Condition and Gender			**Paired Differences**			t	df	Sig. (2-tailed)
			Mean	Std Dev.	Std. Error Mean			
[IPL × < 25 yr]	Pair 1	**TWC**$_{PC1}$_PRE - **TWC**$_{PC1}$_POST	-.387	.571	.069	-5.587	67	.000**
	Pair 2	**PC**$_{PC2}$_PRE - **PC**$_{PC2}$_POST	.249	.889	.108	2.306	67	.024*
	Pair 3	**RR**$_{PC3}$_PRE - **RR**$_{PC3}$_POST	-.129	.631	.076	-1.691	67	.096
	Pair 4	**PF**$_{PC4}$_PRE - **PF**$_{PC4}$_POST	.042	.841	.102	0.414	67	.680
[IPL × > 25 yr]	Pair 1	**TWC**$_{PC1}$_PRE - **TWC**$_{PC1}$_POST	-.612	.668	.129	-4.758	26	.000**
	Pair 2	**PC**$_{PC2}$_PRE - **PC**$_{PC2}$_POST	.397	1.174	.226	1.757	26	.091
	Pair 3	**RR**$_{PC3}$_PRE - **RR**$_{PC3}$_POST	-.129	.662	.127	-1.010	26	.322
	Pair 4	**PF**$_{PC4}$_PRE - **PF**$_{PC4}$_POST	-.048	.720	.139	-.345	26	.733

Table 8.36 Results of Paired Samples t-Tests for Mean values of M-RIPL Factors Pre *vs*. Post the intervention for the IPL group and both Age Categories.

Remarks:

According to Table 8.36 there were statistically significant differences in mean scores post the intervention for the following Factors:

- Increased scores for Younger IPL students (<25 years) for Factor 1 [**TWC** – p<0.01]
- Increased scores for Older IPL students (>25 years) for Factor 1 [**TWC** – p<0.01]
- Decreased scores for Younger IPL students (<25 years) for Factor 2 [**PC** – p<0.01]

The Mean values and their 95% C.I.s for the UPL group are now plotted in Figure 8.20.

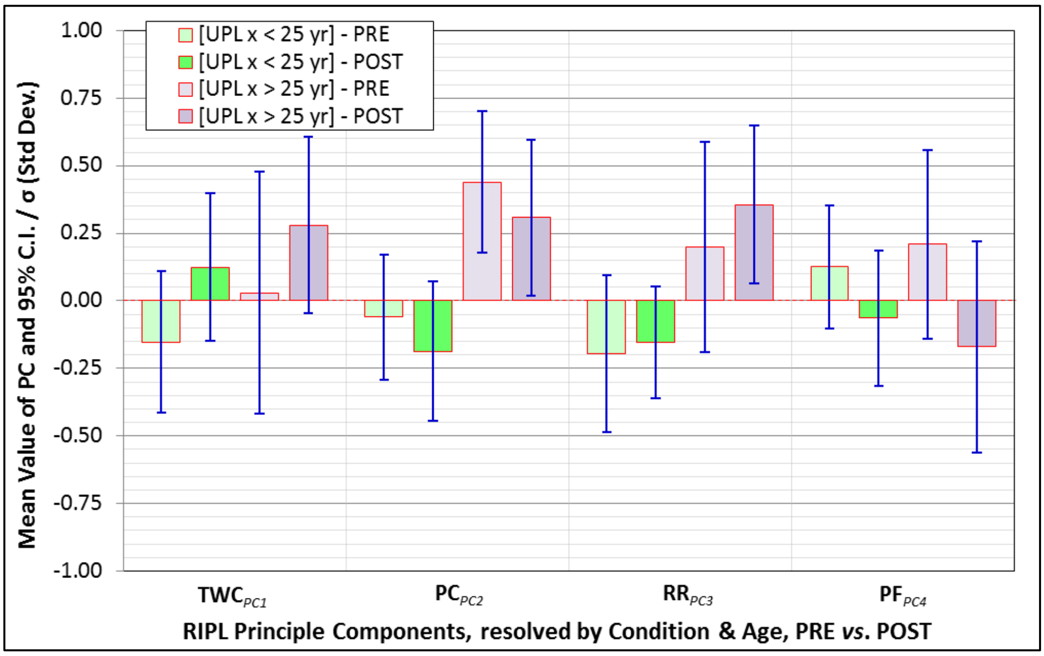


Figure 8.20: Plot of M-RIPL Factor Mean values and 95% C.I., for the UPL group resolved according to Age Category (Pre vs Post).

Table 8.37 reports the results from applying the 'Paired Samples t-Test' to compare the UPL group with Age Category Pre and Post the intervention.

Paired Samples t-Test								
Learning Condition and Age			**Paired Differences**			t	df	Sig. (2-tailed)
			Mean	Std Dev.	Std. Error Mean			
[UPL × < 25 yr]	Pair 1	**TWC**$_{PC1}$_PRE - **TWC**$_{PC1}$_POST	-.329	.914	.113	-2.926	65	.005**
	Pair 2	**PC**$_{PC2}$_PRE - **PC**$_{PC2}$_POST	.061	.777	.096	0.638	65	.525
	Pair 3	**RR**$_{PC3}$_PRE - **RR**$_{PC3}$_POST	-.089	1.203	.148	-.603	65	.549
	Pair 4	**PF**$_{PC4}$_PRE - **PF**$_{PC4}$_POST	.225	.908	.112	2.014	65	.048*
[UPL × > 25 yr]	Pair 1	**TWC**$_{PC1}$_PRE - **TWC**$_{PC1}$_POST	-.218	.874	.168	-1.297	26	.206
	Pair 2	**PC**$_{PC2}$_PRE - **PC**$_{PC2}$_POST	.106	.548	.105	1.007	26	.323
	Pair 3	**RR**$_{PC3}$_PRE - **RR**$_{PC3}$_POST	-.217	.608	.117	-1.852	26	.075
	Pair 4	**PF**$_{PC4}$_PRE - **PF**$_{PC4}$_POST	.235	1.084	.209	1.127	26	.270

Table 8.37 Results of Paired Samples t-Tests for Mean values of M-RIPL Factors Pre *vs.* Post the intervention for the UPL group and both Age Categories.

Remarks:

According to Table 8.37 there were statistically significant differences in mean scores post the intervention for the following groups:

- Increased Mean score for Younger UPL students (<25 years) for Factor 1 [**TWC** – p<0.01]
- Decreased Mean score for Younger UPL students (<25 years) for Factor 4 [**PF** – p<0.05]

h. Comparisons according to Course and Gender

Table 8.38 presents summary statistics of the four M-RIPL Factors, resolved according to Course and Gender, **Pre** and **Post** the intervention.

Course and Gender		TWC_{PC1}	PC_{PC2}	RR_{PC3}	PF_{PC4}
[Nursing × Male]_PRE	N	7	7	7	7
	Mean	-.226	.124	.380	.264
	Std. Deviation	.803	.886	.611	.979
	Std. Error of Mean	.304	.335	.231	.370
[Nursing × Male]_POST	N	9	9	9	9
	Mean	.158	-.525	.234	.160
	Std. Deviation	.964	1.731	.910	1.395
	Std. Error of Mean	.321	.577	.303	.465
[Nursing × Female]_PRE	N	101	101	101	101
	Mean	-.368	.227	.218	.124
	Std. Deviation	1.015	.894	.957	1.028
	Std. Error of Mean	.101	.089	.095	.102
[Nursing × Female]_POST	N	103	103	103	103
	Mean	.148	.040	.210	-.113
	Std. Deviation	.965	.957	.964	.981
	Std. Error of Mean	.095	.094	.095	.097
[MBBS × Male]_PRE	N	32	32	32	32
	Mean	-.073	-.109	-.800	.055
	Std. Deviation	1.023	1.088	1.189	.996
	Std. Error of Mean	.181	.192	.210	.176
[MBBS × Male]_POST	N	31	31	31	31
	Mean	.117	-.178	-.337	-.116
	Std. Deviation	.913	1.249	.776	1.066
	Std. Error of Mean	.164	.224	.139	.191
[MBBS × Female]_PRE	N	51	51	51	51
	Mean	.110	-.021	-.229	-.036
	Std. Deviation	1.021	.789	.938	.861
	Std. Error of Mean	.143	.110	.131	.121
[MBBS × Female]_POST	N	52	52	52	52
	Mean	.262	-.210	-.083	.025
	Std. Deviation	.980	1.029	.864	.924
	Std. Error of Mean	.136	.143	.120	.128

Table 8.38: Mean values and other descriptive statistics for the four M-RIPL Factors PC1 to PC4, resolved according to Course and Gender, and PRE and POST the intervention.

The Mean values and their 95% C.I.s for the Nursing group are plotted in Figure 8.21.

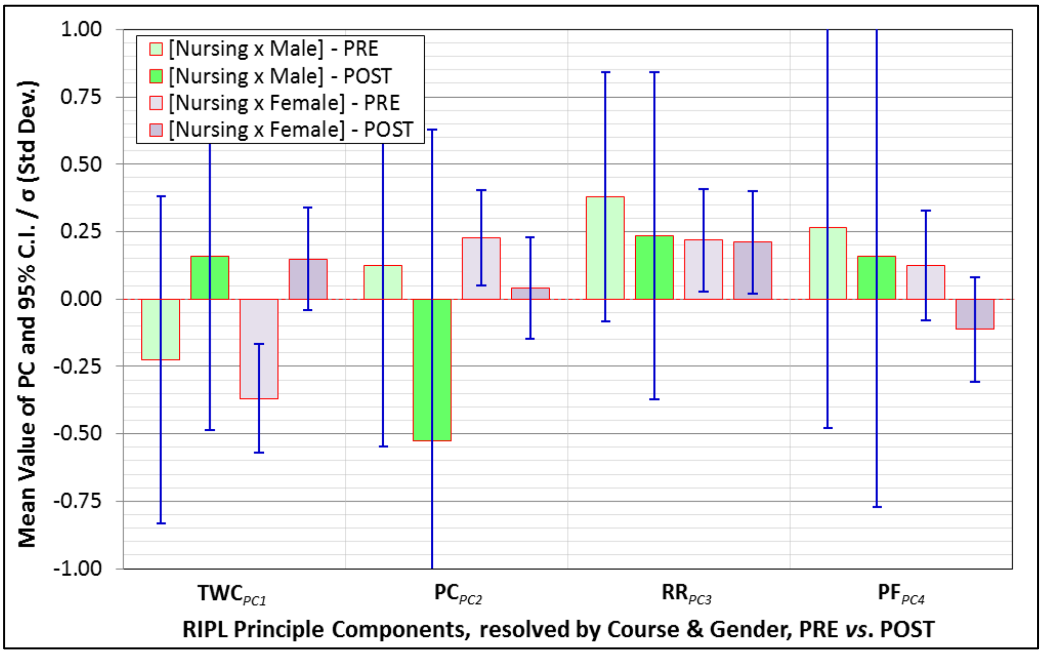


Figure 8.21: Plot of M-RIPL Factor Mean values and 95% C.I., for the Nursing group resolved according to Gender (Pre vs Post).

Table 8.39 reports the results from applying the 'Paired Samples t-Test' to compare the Nursing group with Gender Pre and Post the intervention.

Paired Samples t-Test								
Course and Gender			Paired Differences			t	df	Sig. (2-tailed)
			Mean	Std Dev.	Std. Error Mean			
[Nursing × Male]	Pair 1	**TWC**$_{PC1}$_PRE - **TWC**$_{PC1}$_POST	-.489	.555	.210	-2.330	6	.059
	Pair 2	**PC**$_{PC2}$_PRE - **PC**$_{PC2}$_POST	.866	1.723	.651	1.329	6	.232
	Pair 3	**RR**$_{PC3}$_PRE - **RR**$_{PC3}$_POST	-.099	.634	.240	-.412	6	.695
	Pair 4	**PF**$_{PC4}$_PRE - **PF**$_{PC4}$_POST	-.048	.900	.340	-0.142	6	.891
[Nursing × Female]	Pair 1	**TWC**$_{PC1}$_PRE - **TWC**$_{PC1}$_POST	-.502	.855	.086	-5.840	98	.000**
	Pair 2	**PC**$_{PC2}$_PRE - **PC**$_{PC2}$_POST	.192	.784	.079	2.433	98	.017*
	Pair 3	**RR**$_{PC3}$_PRE - **RR**$_{PC3}$_POST	.006	.733	.074	0.076	98	.939
	Pair 4	**PF**$_{PC4}$_PRE - **PF**$_{PC4}$_POST	.239	.860	.086	2.763	98	.007**

Table 8.39: Results of Paired Samples t-Tests for Mean values of RIPL Factors Pre *vs*. Post the intervention for Nursing and Gender.

Remarks:

According to Table 8.39 there were statistically significant differences in mean scores for the female Nursing group post the intervention for the following Factors:

- Increased Mean value score for Female Nursing students for Factor 1 [**TWC** – $p<0.01$]
- Decreased Mean value score for Female Nursing students for Factor 2 [**PC** – $p<0.05$]
- Decreased Mean value score for Female Nursing students for Factor 4 [**PF** – $p<0.01$]

The Mean values and their 95% C.I.s for the Medical group are plotted in Figure 8.22.

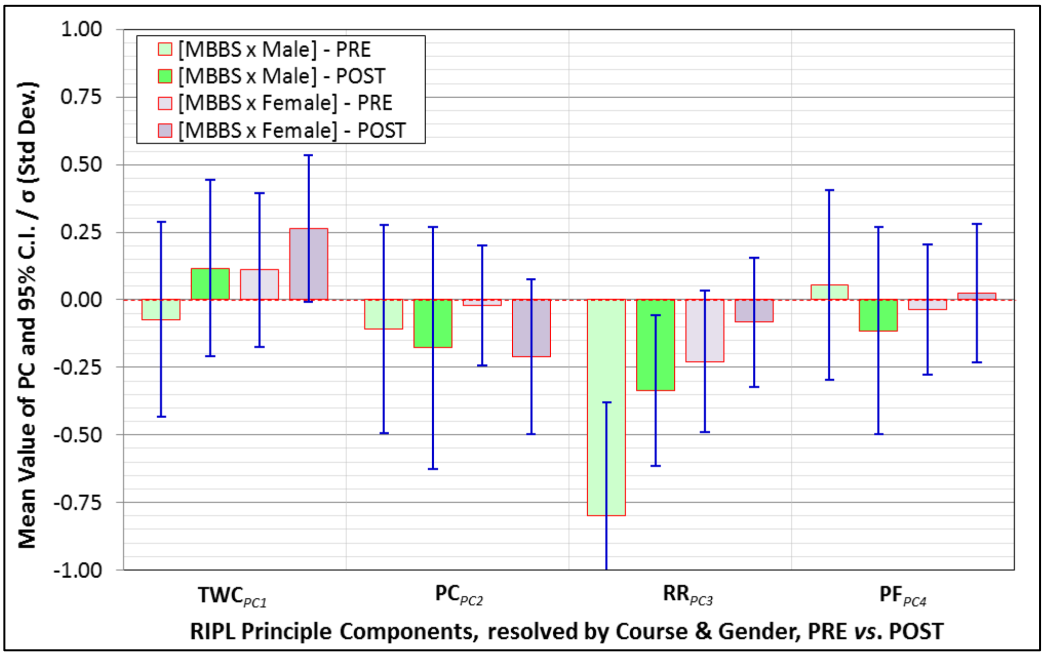


Figure 8.22: Plot of M-RIPL Factor Mean values and 95% C.I., for the Medical group resolved according to Gender (Pre vs Post).

Table 8.40 reports the results from applying the 'Paired Samples t-Test' to compare the Medical group with Gender Pre and Post the intervention.

Paired Samples t-Test

Course and Gender			Paired Differences			t	df	Sig. (2-tailed)
			Mean	Std Dev.	Std. Error Mean			
[MBBS × Male]	Pair 1	**TWC**$_{PC1}$_PRE - **TWC**$_{PC1}$_POST	-.238	.697	.127	-1.867	29	.072
	Pair 2	**PC**$_{PC2}$_PRE - **PC**$_{PC2}$_POST	-.023	.895	.163	-0.141	29	.889
	Pair 3	**RR**$_{PC3}$_PRE - **RR**$_{PC3}$_POST	-.408	1.196	.218	-1.869	29	.072
	Pair 4	**PF**$_{PC4}$_PRE - **PF**$_{PC4}$_POST	.118	.969	.177	0.669	29	.509
[MBBS × Female]	Pair 1	**TWC**$_{PC1}$_PRE - **TWC**$_{PC1}$_POST	-.200	.615	.087	-2.299	49	.026*
	Pair 2	**PC**$_{PC2}$_PRE - **PC**$_{PC2}$_POST	.198	.818	.116	1.715	49	.093
	Pair 3	**RR**$_{PC3}$_PRE - **RR**$_{PC3}$_POST	-.222	.913	.129	-1.717	49	.092
	Pair 4	**PF**$_{PC4}$_PRE - **PF**$_{PC4}$_POST	-.057	.885	.125	-.459	49	.648

Table 8.40: Results of Paired Samples t-Tests for Mean values for M-RIPL Factors Pre *vs*. Post the intervention for Medicine and Gender.

Remarks:

According to Table 8.40 there was a significant increase in the post Mean score for Female Medical students for Factor 1 [**TWC** – $p<0.05$].

i. Comparisons according to Course and Age

Table 8.41 presents summary statistics of the four M-RIPL Factors, resolved according to Course and Age Category, **Pre** and **Post** the intervention.

Course and Age		TWC_{PC1}	PC_{PC2}	RR_{PC3}	PF_{PC4}
[Nursing × < 25 yr]_PRE	N	59	59	59	59
	Mean	-.521	.108	.116	.133
	Std. Deviation	1.020	.920	.976	1.020
	Std. Error of Mean	.133	.120	.127	.133
[Nursing × < 25 yr]_POST	N	61	61	61	61
	Mean	.000	-.078	-.030	-.094
	Std. Deviation	1.083	1.063	1.042	.967
	Std. Error of Mean	.139	.136	.133	.124
[Nursing × > 25 yr]_PRE	N	51	51	51	51
	Mean	-.149	.331	.410	.072
	Std. Deviation	.949	.860	.893	1.088
	Std. Error of Mean	.133	.120	.125	.152
[Nursing × > 25 yr]_POST	N	54	54	54	54
	Mean	.322	.027	.521	-.092
	Std. Deviation	.754	1.048	.806	1.109
	Std. Error of Mean	.103	.143	.110	.151
[MBBS × < 25 yr]_PRE	N	78	78	78	78
	Mean	.008	-.050	-.444	.049
	Std. Deviation	1.009	.935	1.091	.900
	Std. Error of Mean	.114	.106	.124	.102
[MBBS × < 25 yr]_POST	N	78	78	78	78
	Mean	.177	-.244	-.182	.004
	Std. Deviation	.952	1.111	.856	.997
	Std. Error of Mean	.108	.126	.097	.113
[MBBS × > 25 yr]_PRE	N	5	5	5	5
	Mean	.533	-.123	-.527	-.778
	Std. Deviation	1.179	.397	.786	.781
	Std. Error of Mean	.527	.178	.351	.349
[MBBS × > 25 yr]_POST	N	5	5	5	5
	Mean	.690	.516	-.119	-.526
	Std. Deviation	.913	.888	.479	.255
	Std. Error of Mean	.408	.397	.214	.114

Table 8.41 Mean values and other descriptive statistics for the four M-RIPL Factors PC1 to PC4, resolved according to Course and Age Category, Pre and Post the intervention.

The Mean values and their 95% C.I.s for the Nursing group are plotted in Figure 8.23.

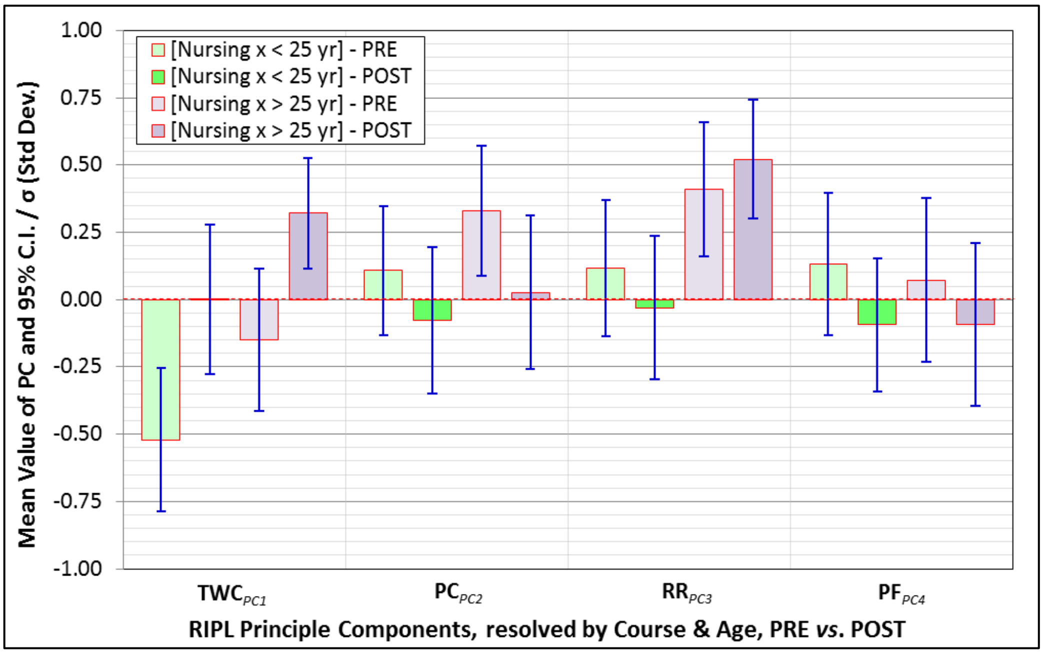


Figure 8.23: Plot of M-RIPL Factor Mean values and 95% C.I., for the Nursing group resolved according to Age Category (Pre vs Post).

Table 8.42 reports the results from applying the 'Paired Samples t-Test' to compare the Nursing group with Age Category Pre and Post the intervention.

Paired Samples t-Test

Course and Age			Paired Differences			t	df	Sig. (2-tailed)
			Mean	Std Dev.	Std. Error Mean			
[Nursing × < 25 yr]	Pair 1	**TWC**$_{PC1}$_PRE - **TWC**$_{PC1}$_POST	-.537	.856	.111	-4.824	58	.000**
	Pair 2	**PC**$_{PC2}$_PRE - **PC**$_{PC2}$_POST	.144	.859	.112	1.290	58	.202
	Pair 3	**RR**$_{PC3}$_PRE - **RR**$_{PC3}$_POST	.112	.771	.100	1.113	58	.270
	Pair 4	**PF**$_{PC4}$_PRE - **PF**$_{PC4}$_POST	.268	.791	.103	2.599	58	.012*
[Nursing × > 25 yr]	Pair 1	**TWC**$_{PC1}$_PRE - **TWC**$_{PC1}$_POST	-.441	.804	.115	-3.840	48	.000**
	Pair 2	**PC**$_{PC2}$_PRE - **PC**$_{PC2}$_POST	.342	.879	.126	2.726	48	.009**
	Pair 3	**RR**$_{PC3}$_PRE - **RR**$_{PC3}$_POST	-.149	.629	.090	-1.653	48	.105
	Pair 4	**PF**$_{PC4}$_PRE - **PF**$_{PC4}$_POST	.129	.941	.134	.958	48	.343

Table 8.42: Results of Paired Samples t-Tests for Mean values Pre *vs*. Post the intervention according to Nursing and Age Category.

Remarks:

According to Table 8.42 there were statistically significant differences in mean scores post the intervention for the following Factors:

- Increased Mean score for Younger Nursing students (<25 years) for Factor 1 [**TWC** – p<0.01]
- Increased Mean score for Older Nursing students (>25 years) for Factor 1 [**TWC** – p<0.01]

- Decreased Mean score for Older Nursing students (> 25years) for Factor 2 [**PC** – p<0.01]
- Decreased Mean score for Younger Nursing students (<25 years) for Factor 4 [**PF** – p<0.05]

The Mean values and their 95% C.I.s for the Medical group are plotted in Figure 8.24.

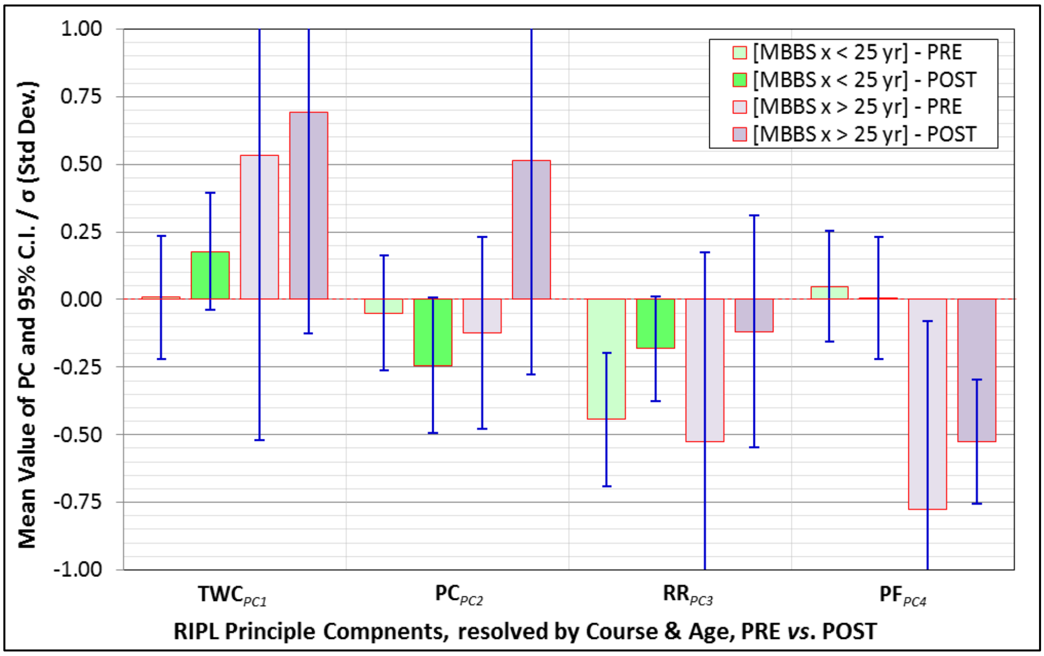


Figure 8.24: Plot of M-RIPL Factor Mean values and 95% C.I., for the Medical group resolved according to Age Category (Pre vs Post).

Table 8.43 reports the results from applying the 'Paired Samples t-Test' to compare the Medical group with Age Category Pre and Post the intervention.

Paired Samples t-Test

Course and Age			Paired Differences			t	df	Sig. (2-tailed)
			Mean	Std Dev.	Std. Error Mean			
[MBBS x < 25 yr]	Pair 1	**TWC**$_{PC1}$_PRE - **TWC**$_{PC1}$_POST	-.218	.641	.074	-2.939	74	.004**
	Pair 2	**PC**$_{PC2}$_PRE - **PC**$_{PC2}$_POST	.166	.827	.095	1.735	74	.087
	Pair 3	**RR**$_{PC3}$_PRE - **RR**$_{PC3}$_POST	-.284	1.047	.121	-2.348	74	.022*
	Pair 4	**PF**$_{PC4}$_PRE - **PF**$_{PC4}$_POST	.026	.929	.107	0.240	74	.811
[MBBS x > 25 yr]	Pair 1	**TWC**$_{PC1}$_PRE - **TWC**$_{PC1}$_POST	-.157	.733	.328	-0.480	4	.656
	Pair 2	**PC**$_{PC2}$_PRE - **PC**$_{PC2}$_POST	-.639	.910	.407	-1.569	4	.192
	Pair 3	**RR**$_{PC3}$_PRE - **RR**$_{PC3}$_POST	-.409	.671	.300	-1.362	4	.245
	Pair 4	**PF**$_{PC4}$_PRE - **PF**$_{PC4}$_POST	-.252	.697	.312	-.808	4	.465

Table 8.43: Results of Paired Samples t-Tests for Mean values of RIPL Factors Pre *vs*. Post the intervention for Medicine and Age Category.

Remarks:

According to Table 8.43 there were statistically significant differences in mean scores post the intervention for the following Factors:

- Increased Mean score for Younger Medical students (<25 years), for Factor 1 [**TWC** – p<0.01].
- Increased Mean score for Younger Medical students (<25 years), for Factor 3 [**RR** – p<0.05].

k. Comparisons according to Gender and Age Category

Table 8.44 presents summary statistics of the four M-RIPL Factors, resolved according to Gender and Age Category, **Pre** and **Post** the intervention.

Age and Gender		**TWC_{PC1}**	**PC_{PC2}**	**RR_{PC3}**	**PF_{PC4}**
[< 25 yr × Male]_PRE	N	32	32	32	32
	Mean	-.113	-.083	-.731	.212
	Std. Deviation	.940	1.109	1.219	1.017
	Std. Error of Mean	.166	.196	.216	.180
[< 25 yr × Male]_POST	N	32	32	32	32
	Mean	.052	-.281	-.334	.024
	Std. Deviation	.903	1.242	.779	1.129
	Std. Error of Mean	.160	.220	.138	.200
[< 25 yr × Female]_PRE	N	104	104	104	104
	Mean	-.249	.061	-.060	.049
	Std. Deviation	1.080	.864	.966	.936
	Std. Error of Mean	.106	.085	.095	.092
[< 25 yr × Female]_POST	N	105	105	105	105
	Mean	.118	-.108	-.060	-.076
	Std. Deviation	1.054	1.030	.960	.937
	Std. Error of Mean	.103	.101	.094	.091
[> 25 yr × Male]_PRE	N	7	7	7	7
	Mean	-.042	.004	.065	-.452
	Std. Deviation	1.226	.770	.848	.606
	Std. Error of Mean	.463	.291	.320	.229
[> 25 yr × Male]_POST	N	8	8	8	8
	Mean	.423	-.157	.292	-.364
	Std. Deviation	.947	1.838	.901	1.180
	Std. Error of Mean	.335	.650	.319	.417
[> 25 yr × Female]_PRE	N	48	48	48	48
	Mean	-.118	.322	.345	.118
	Std. Deviation	.949	.852	.931	1.065
	Std. Error of Mean	.137	.123	.134	.154
[> 25 yr × Female]_POST	N	50	50	50	50
	Mean	.329	.092	.474	-.047
	Std. Deviation	.746	.881	.786	1.021
	Std. Error of Mean	.106	.125	.111	.144

Table 8.44: Mean values and other descriptive statistics for the four M-RIPL Factors PC1 to PC4, resolved according to Age Category and Gender, and PRE and POST the intervention.

The Mean values and their 95% C.I.s for the Younger students are plotted in Figure 8.25.

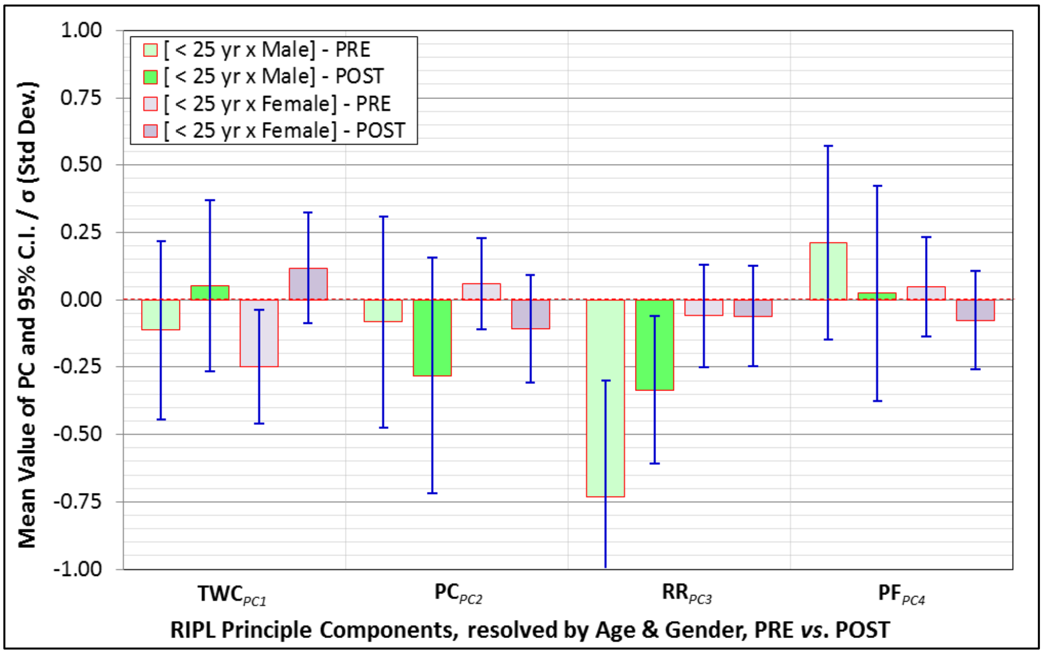


Figure 8.25: Plot of M-RIPL Factor Mean values and 95% C.I., for Younger students resolved according to Age Category (Pre vs Post).

Table 8.45 reports the results from applying the 'Paired Samples t-Test' to compare the Younger students with Gender Pre and Post the intervention.

Paired Samples t-Test

Age and Gender			Paired Differences			t	df	Sig. (2-tailed)
			Mean	Std Dev.	Std. Error Mean			
[< 25 yr × Male]	Pair 1	**TWC**$_{PC1}$_PRE - **TWC**$_{PC1}$_POST	-.249	.686	.125	-1.988	29	.056
	Pair 2	**PC**$_{PC2}$_PRE - **PC**$_{PC2}$_POST	.098	1.027	.188	0.524	29	.604
	Pair 3	**RR**$_{PC3}$_PRE - **RR**$_{PC3}$_POST	-.361	1.189	.217	-1.662	29	.107
	Pair 4	**PF**$_{PC4}$_PRE - **PF**$_{PC4}$_POST	.174	.979	.179	0.975	29	.337
[< 25 yr × Female]	Pair 1	**TWC**$_{PC1}$_PRE - **TWC**$_{PC1}$_POST	-.391	.781	.077	-5.085	102	.000**
	Pair 2	**PC**$_{PC2}$_PRE - **PC**$_{PC2}$_POST	.173	.784	.077	2.236	102	.028*
	Pair 3	**RR**$_{PC3}$_PRE - **RR**$_{PC3}$_POST	-.035	.870	.086	-0.407	102	.685
	Pair 4	**PF**$_{PC4}$_PRE - **PF**$_{PC4}$_POST	.129	.848	.084	1.546	102	.125

Table 8.45: Results of Paired Samples t-Tests for Mean values of RIPL Factors Pre *vs*. Post the intervention for Younger students and Gender.

Remarks:

According to Table 8.45, there were statistically significant differences in mean scores post the intervention for the following Factors:

- Increased Mean scores for Younger Female students (<25 years) for Factor 1 [**TWC** – p<0.01]
- Decreased Mean scores for Younger Female students (<25 years) for Factor 2 [**PC** – p<0.05]

The Mean values and their 95% C.I.s for the Older students are plotted in Figure 8.26.

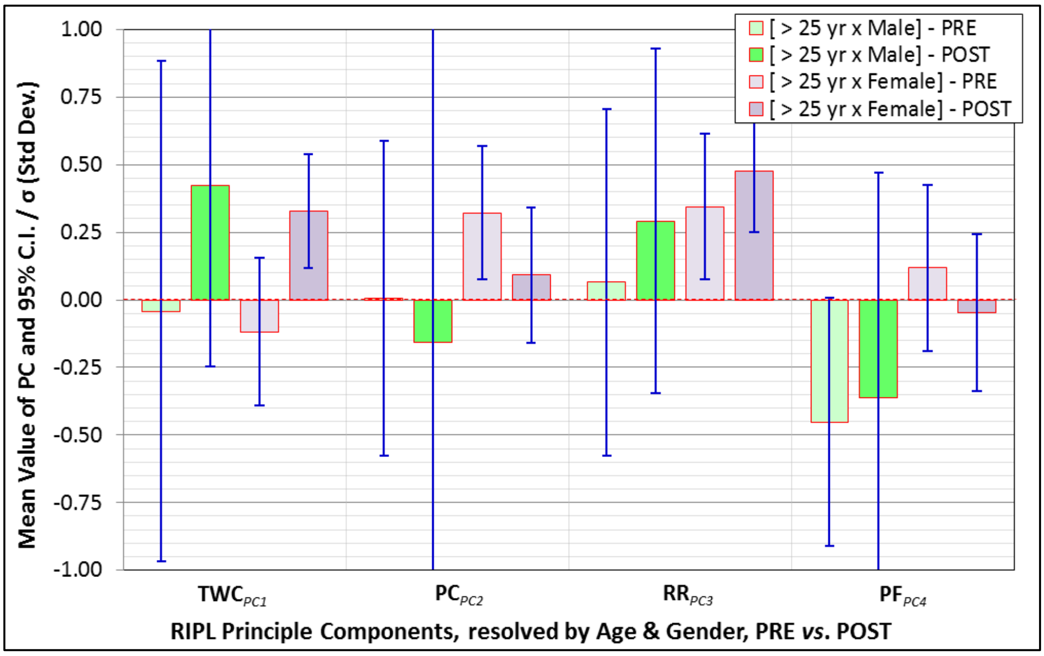


Figure 8.26: Plot of M-RIPL Factor Mean values and 95% C.I., for Older students resolved according to Age Category (Pre vs Post).

Table 8.46 reports the results from applying the 'Paired Samples t-Test' to compare the Older students with Gender Pre and Post the intervention.

Paired Samples t-Test								
Age and Gender			Paired Differences			t	df	Sig. (2-tailed)
			Mean	Std Dev.	Std. Error Mean			
[> 25 yr × Male]	Pair 1	**TWC**$_{PC1}$_PRE - **TWC**$_{PC1}$_POST	-.440	.638	.241	-1.825	6	.118
	Pair 2	**PC**$_{PC2}$_PRE - **PC**$_{PC2}$_POST	.345	1.558	.589	0.586	6	.579
	Pair 3	**RR**$_{PC3}$_PRE - **RR**$_{PC3}$_POST	-.301	.753	.285	-1.058	6	.331
	Pair 4	**PF**$_{PC4}$_PRE - **PF**$_{PC4}$_POST	-.288	.735	.278	-1.038	6	.339
[> 25 yr × Female]	Pair 1	**TWC**$_{PC1}$_PRE - **TWC**$_{PC1}$_POST	-.421	.829	.122	-3.443	45	.001**
	Pair 2	**PC**$_{PC2}$_PRE - **PC**$_{PC2}$_POST	.241	.818	.121	1.999	45	.052
	Pair 3	**RR**$_{PC3}$_PRE - **RR**$_{PC3}$_POST	-.151	.625	.092	-1.638	45	.108
	Pair 4	**PF**$_{PC4}$_PRE - **PF**$_{PC4}$_POST	.163	.947	.140	1.164	45	.251

Table 8.46: Results of Paired Samples t-Tests for Mean values of RIPL Factors PRE *vs*. POST the intervention for Older students and Gender

Remarks:

According to Table 8.46, there was a statistically significant increase in the Mean score for Older Female students (>25 years) for Factor 1 [**TWC** – p<0.01].

8.2 Chapter overview

The t-Test analyses have allowed a more evidence-based examination of each of the identified sub-scales in relation to students' attitudes towards IPL, the impact of the education experience on all students and the outcomes related to the IPL intervention group. It has enabled a quantifiable measure of the strength of students' beliefs in the benefits of IPL towards Teamwork and Collaboration (the knowledge and skills needed), Patient Centredness (the influence of IPL on patient centred care), Roles and Responsibilities (whether students have acquired a strong sense of professional role) and Professional Freedom. In particular this analysis has provided statistical evidence of any positive change as a result of the educational experience and whether learning interprofessionally compared to uniprofessionally had a positive impact for this cohort. The desired outcome would be a statistically significant increase in mean scores across whole group and all sub-groups as a result of the intervention. Of particular value would be a statistically significant increase in scores for the IPL group compared to the UPL group indicating that learning together had resulted in improved views of IPL as a means of influencing ICP.

The Factor Analysis has also allowed an exploration of any influences of learner characteristics on attitudes towards IPL and ICP such as the student's course of study, age, or gender. These findings are now summarised and discussed for each factor of the M-RIPL Factor subscales.

Factor I: Teamwork & Collaboration [TWC]

The items in this subscale represent a belief that shared learning is beneficial to achieving effective teamwork and collaboration and positive collaborative relationships help solve clinical problems in the workplace. In Chapter 7, it was observed that all 15 items falling on this subscale were rated highly, Pre and Post the intervention (taking into account Items 14 and 15 being reverse scored). This revealed that students had a high regard for [TWC] prior to participating in this study, which was sustained at the end of the study. The t-Test analyses have statistically measured this effect.

Analysis of the Pre and Post results for [TWC] indicate a global increase in scores post the intervention, regardless of Learning Condition (IPL/UPL), Course (Medicine/Nursing), Gender (Male/Female) or Age Category (Older/Younger). This outcome was the strongest of all four Factor subscales. The IPL condition did not influence this outcome.

Within a small number of sub-groups there were some exceptions to any statistically significant post intervention increase in mean score:

- Medical UPL students
- Male UPL students
- Older UPL students
- Older medical students (>25 years) (small sample size n=5)
- Younger male students (<25 years)
- Older male students (small sample size n=4)
- Male nursing students (small sample size n=11)

Recognising the small sample size of three of these groups it appears that the UPL condition may have had some influence in making these students less receptive to teamwork and collaborative practice. Nevertheless, scores overall for the whole cohort was remarkably positive.

Comparisons between groups revealed that:

- Medical students scored significantly higher than Nursing students
- Medical UPL students scored significantly higher than Nursing UPL students
- Female Medical students scored significantly higher than Female Nursing students
- Older Nursing students scored significantly higher than Younger Nursing students
- Younger Medical students scored significantly higher than Younger Nursing students

Overall, the results indicate that students in this study highly valued teamwork and collaboration and had a view that shared learning was important in health care delivery. The learning experience strengthened this view for the vast majority of students regardless of grouping. In relation to [TWC], gender, age, and course of study may have an influence in some areas. As an individual group, medical students responded to items in this subscale positively with higher scores compared to nursing students. In addition, being young and female, being an older female nurse and being a younger female medical student may all be contributing factors to a greater openness and readiness to engage with teamwork and collaborative practices.

Factor II: Patient Centredness [PC]

Summary statistics in Chapter 7 revealed that the majority of students endorsed the items falling in the [PC] subscale. Very high scores were recorded prior to, and after the educational experience, indicating that students do concern themselves with patient problems and do have a desire to have a patient focused approach to health care.

In examining significant differences to the mean scores, Post intervention, for [PC] the outcome was opposite of what might be expected with mean scores significantly decreasing for the following groups:

- IPL students
- Nursing students

- Female students (mostly nursing)
- Older students (mostly nursing)
- Younger students
- IPL nursing students
- Female nursing students
- Older nursing students
- Older IPL students
- Younger female students

It appears that the intervention did not have a strong influence on promoting a more patient focused approach for these groups of students. This is an interesting finding. There could be two reasons for this. These students may have already formed a view that patient centred care was implicit, or the learning experience took precedence over everything else. The students may have preferentially put more effort into their own personal involvement in the shared learning activities, or developing team working skills, or working out their own role and that of others, that they focused their attention less on the patient and more on themselves. It may not mean they value [PC] less, it just was not able to be a priority with so many new learning experiences to have and competing priorities. In terms of learner characteristics, being in the IPL group contributed to this difference. For this group of students, it seemed that there was so much effort centred on working with each other about [TWC] and [RR], that [PC] may have ended up being a secondary consideration.

In terms of sub-group differences, nursing students scored significantly higher than medical students, older students scored significantly higher than younger students, nursing UPL students scored significantly higher than medical UPL students, female nursing students scored significantly higher than female medical students, older UPL students scored significantly higher than younger UPL students and older female students scored significantly higher than younger female students. It should be noted that nurses constituted most of the older group and most females were nurses. Even though scores significantly decreased for the older female nurses, their overall scores were higher than most other groups.

Factor III: Roles & Responsibilities [RR]

Summary statistics from Chapter 7 showed low scores for this subscale indicating a rejection of the view that professional practice promotes some health professional roles over others, such as the traditional view that the function of nurses and therapists is to support the doctor. It also indicates a lack of endorsement over there being little overlap between professional roles. By scoring this subscale low it demonstrates that these students had confidence in their own professional roles and were not too threatened if another health professional knew more about a topic than they did. It also rejects the view that some health professionals need to acquire more knowledge and skills than others.

Interestingly, results for [RR] produced the only statistically significant outcome for the IPL group with an increase in scores Post the intervention. For IPL students the education intervention significantly influenced their perceptions of their own professional roles and responsibilities and that of others. This finding is difficult to explain other than the experience may have created greater clarity on their own role and a realisation that team leadership may in fact be profession specific depending on the context. Older students (92% nursing) were the only other sub-category with a significant increase in Post intervention scores for [RR]. Older students also scored higher than younger students indicating that maturity, or more likely, past clinical experiences could have been a factor and may have reinforced stereotypical ideas of professional hierarchy. This is more likely given the older (nursing) students were more likely to have worked as Division 2 nurses potentially having considerable prior experience in clinical work.

Other significant findings related to learner characteristics include:

- nursing students scoring significantly higher than medical students; and,
- female students scoring significantly higher than male students.

Again, nursing students who are predominantly female, are more likely to have had clinical exposure, thereby emphasising the assertion that prior clinical experiences shape views on [RR].

Professional Freedom

There were a small number of statistically significant findings in this individual Factor subscale. Of particular note was a decrease in scores Post the intervention for the UPL group indicating the experience may have diminished their view on the freedom they feel they have to use judgement in their role as a health professional. Decreased scores were also noted for UPL nursing students and younger UPL students. Higher scores were observed for older nursing students compared to younger nursing students and younger medical students compared to older medical students.

The next Chapter presents findings from the IPL rating scale, which will examine students' views on the importance of IPL as a driver to influence effective interprofessional clinical practices.

CHAPTER 9

IPL Rating Scale comparisons

9.1 Introduction

This Chapter presents the results of the IPL Rating Scale (IPLRS). The IPLRS consisted of one question that asked the students to rate, on a scale of 1 to 10, (with 1 being least important and 10 being most important), *the importance of IPL as a driver to influence effective interprofessional clinical practices.* The question was applied both before (Q.32) and after (Q.39) the education intervention. This Chapter is divided into three parts – Part A: The raw results of the IPLRS. Part B: Independent samples t-Test of the IPLRS for 'Between Group Differences' and Part C: Paired samples t-Test of the IPLRS factors for 'Within Group Differences', Pre versus Post the intervention.

The aim of the IPLRS is to firstly measure the strength of student's views about IPLs influence on effective interprofessional collaborative practice, to secondly measure differences across the many sub-groups of the study cohort, particularly to see whether individual learner characteristics impact these views, and lastly, to measure the impact of educational experience in promoting views on IPL as a driver for ICP. Of particular importance is to see if there is a significant difference observed in the IPL intervention group.

The Independent Samples t-Test of the IPLRS addresses outcomes (PRODUCT) that relate to Kirkpatrick's Level 1 (learner's views on the IPL and its influence on interprofessional collaborative practice). The Paired Samples t-Test analyses addresses outcomes (Product) that relate to Kirkpatrick's level 2a. That is, whether there is a change in attitude/perception to the significance of IPL's influence on ICP for this cohort of students.

In this Chapter, data is presented in Table and Figure form. For all results presented in this Chapter, results that are significant at the $p<0.05$ level are shaded in green and marked with a single asterisk '*'. Results that are significant at the $p<0.01$ level are also shaded in green but marked with a double asterisk '**'.

Part A: Raw results of the IPLRS

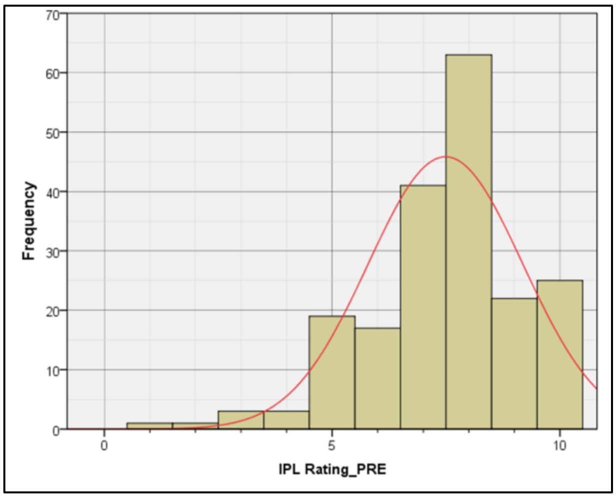
This part of the chapter presents the raw results for the IPLRS as tables and histograms. Table 9.1 presents the raw results of the IPLRS (stated as IPL Rating) in both the Pre and Post surveys.

How would you rate the importance of interprofessional learning as a driver to influence effective interprofessional clinical practices?				
Response Scale	IPL Rating_PRE		IPL Rating_POST	
	Frequency	Percent	Frequency	Percent
Least Important	1	.5	1	.5
2	1	.5	0	0
3	3	1.5	2	1.0
4	3	1.5	1	0.5
5	19	9.3	9	4.4
6	17	8.3	10	4.9
7	41	20.1	26	12.7
8	63	30.9	46	22.5
9	22	10.8	52	25.5
Most Important	25	12.3	45	22.1
No response	9	4.4	12	5.9
Total	204	100.0	204	100.0

Table 9.1: Raw results of the IPL Rating Score in both Pre and Post Questionnaire.

From this it can be seen that the majority of students (74.1%) rated the importance of IPLs influence on ICP as 7 or greater on the IPLRS, Pre the education intervention. This increased slightly post the education intervention to (79.8%).

This data from Table 9.1 is plotted in the following histograms, Figures 9.1 and 9.2.



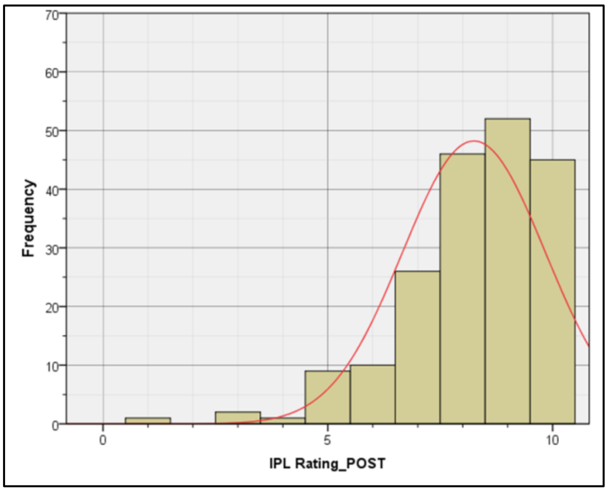


Figure 9.1: Left, histogram of the IPL Rating data from the Pre-Survey. Right, histogram of the IPL Rating data from the Post-Survey. In both cases the vertical (frequency) scale is simply by counts. A 'Normal' distribution curve is fitted to the data.

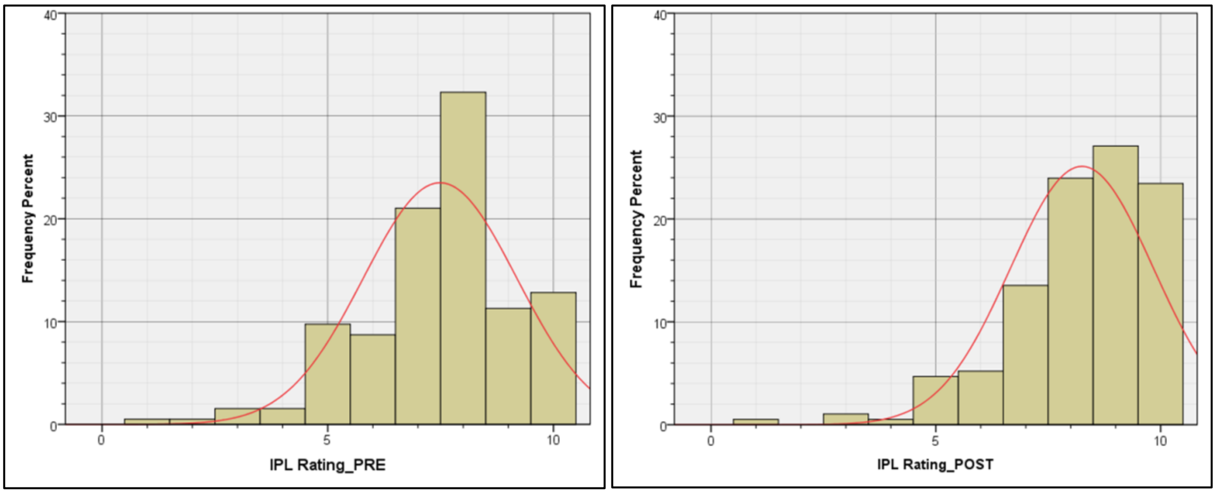


Figure 9.2: Histograms from Figure 9.1 with the vertical (frequency) scale as a percentage.

Part B: IPLRS results 'Between Groups' comparisons

This part of the chapter presents results from the Independent Samples t-Tests for 'Between Group' differences for the IPLRS.

'Between Group' Differences are resolved according to the following categories:

- Learning Condition
- Course
- Gender
- Age Category
- Learning Condition and Course
- Learning Condition and Gender
- Learning Condition and Age Category
- Course and Gender
- Course and Age Category
- Gender and Age

It should be noted that results for the summary statistics for each category have been pooled from the Pre and Post Questionnaire results.

a. Comparison according to Learning Condition

Table 9.2 presents between group summary statistics of the IPLRS resolved according to Learning Condition (IPL/UPL).

Condition: IPL/UPL	N	Mean	Median	Std. Deviation	Std. Error of Mean
IPL	199	7.89	8.00	1.614	.114
UPL	188	7.84	8.00	1.763	.129
All	387	7.87	8.00	1.686	.086

Table 9.2: Summary statistics for IPL-Rating, resolved according to Learning Condition.

The Mean and 95% Confidence Interval (C.I.) data is plotted in Figure 9.3.

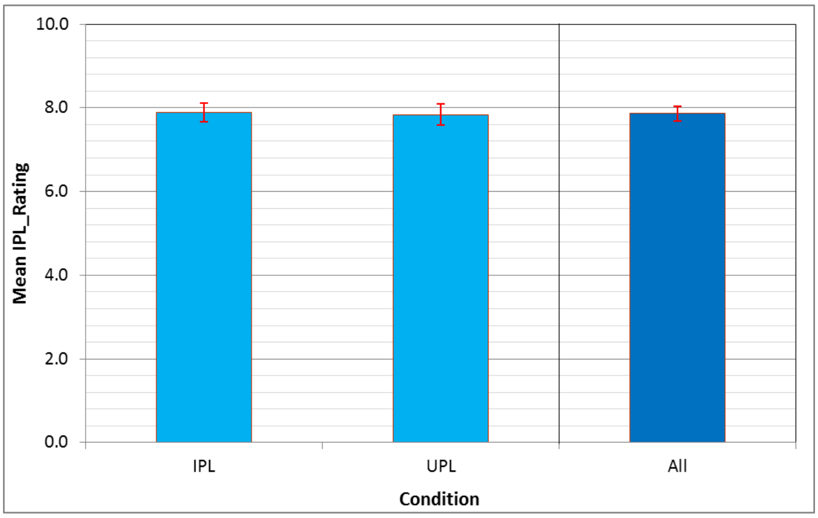


Figure 9.3: Plot of the Mean IPL-Rating values and their 95% C.I., resolved according to Learning Condition.

Table 9.3 reports the results by applying the 'Independent Samples t-Test' to the specified differences between Means, i.e., those pooled Pre and Post pairs of results plotted in Figure 9.3.

Independent Samples t-test [Equal variances not assumed]					
	t-test for Equality of Means				
Comparison	Mean Difference	Std. Error Difference	t	df	Sig. (2-tailed)
[IPL] - [UPL]	.049	.172	.285	377.068	.776

Table 9.3: 'Independent Samples t-Test' to the specified differences between Means resolved according to Learning Condition.

Remarks:

According to Table 9.3, there was no statistically significant difference in pooled rating scores between the IPL and UPL groups.

b. Comparison according to Course

Table 9.4 presents between group summary statistics of the IPLRS resolved according to Course (Nursing/Medicine).

Course	N	Mean	Median	Std. Deviation	Std. Error of Mean
Nursing	222	7.96	8.00	1.707	.115
MBBS	165	7.73	8.00	1.653	.129
All	387	7.87	8.00	1.686	.086

Table 9.4: Summary statistics for IPL-Rating resolved according to Course.

The Mean and 95% C.I. data is plotted in Figure 9.4.

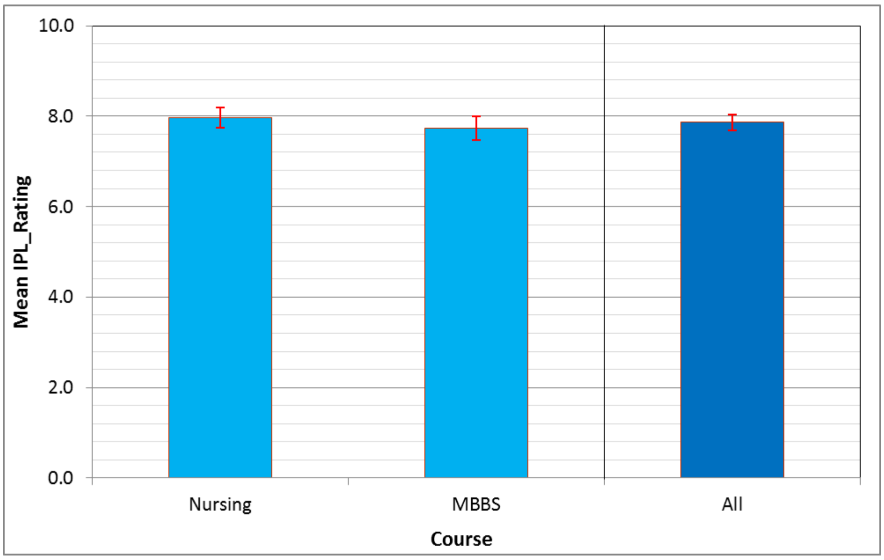


Figure 9.4: Plot of the Mean IPL-Rating values and their 95% C.I., resolved according to Course.

Table 9.5 reports the results from applying the Independent Samples t-Test to the specified differences between Means, i.e., those Pre and Post pairs of results plotted in Figure 9.4.

Independent Samples t-test [Equal variances not assumed]					
	t-test for Equality of Means				
Comparison	Mean Difference	Std. Error Difference	t	df	Sig. (2-tailed)
[Nursing] - [MBBS]	.231	.172	1.339	359.371	.182

Table 9.5: 'Independent Samples t-Test' to the specified differences between Means resolved according to Course.

Remarks:

According to Table 9.5 there was no statistically significant difference in pooled rating scores between the Nursing and Medical students.

c. Comparison according to Gender

Table 9.6 presents between group summary statistics of the IPLRS resolved according to Gender (Male/Female).

Gender	N	Mean	Median	Std. Deviation	Std. Error of Mean
Male	81	7.54	8.00	1.904	.212
Female	298	7.94	8.00	1.618	.094
All	387	7.87	8.00	1.686	.086

Table 9.6: Summary statistics for IPL-Rating, resolved according to Gender.

The Mean and 95% C.I. data is plotted below in Figure 9.5.

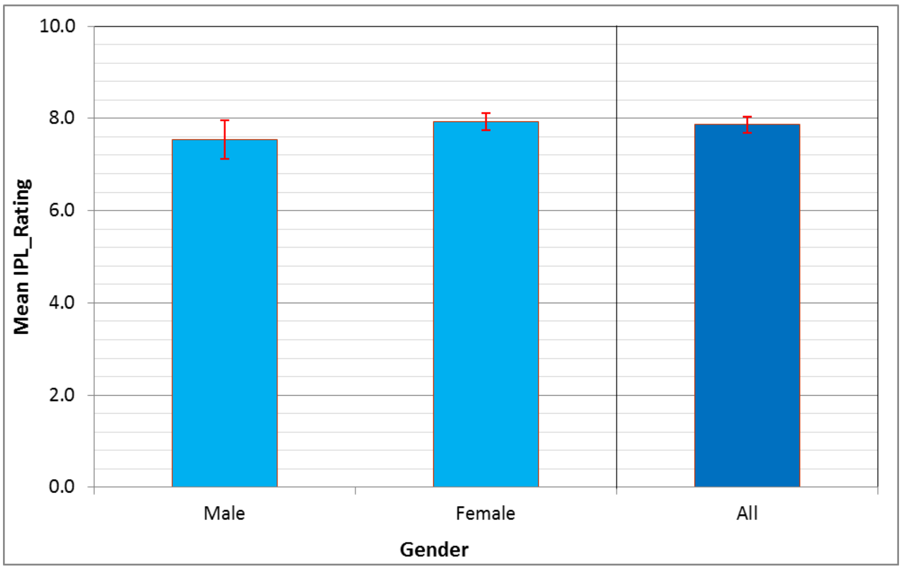


Figure 9.5: Plot of the Mean IPL-Rating values and their 95% C.I., resolved according to Gender.

Table 9.7 reports the results by applying the 'Independent Samples t-Test to the specified differences between Means, i.e., those Pre and Post pairs of results plotted in Figure 9.5.

Independent Samples t-test [Equal variances not assumed]					
	t-test for Equality of Means				
Comparison	Mean Difference	Std. Error Difference	t	df	Sig. (2-tailed)
[Male] - [Female]	-.393	.231	-1.698	113.314	.092

Table 9.7: 'Independent Samples t-Test' to the specified differences between Means resolved according to Gender.

Remarks:

According to Table 9.7 there was no statistically significant difference in the pooled rating score between Male and Female students.

d. Comparison according to Age Category

Table 9.8 presents between group summary statistics of the IPLRS resolved according to Age Category (<25 years/>25 years).

Age category	N	Mean	Median	Std. Deviation	Std. Error of Mean
Less than 25 yr	273	7.71	8.00	1.749	.106
More than 25 yr	112	8.21	8.00	1.467	.139
All	387	7.87	8.00	1.686	.086

Table 9.8: Summary statistics for IPL-Rating, resolved according to Age Category:

The Mean and 95% C.I. data is plotted below in Figure 9.6.

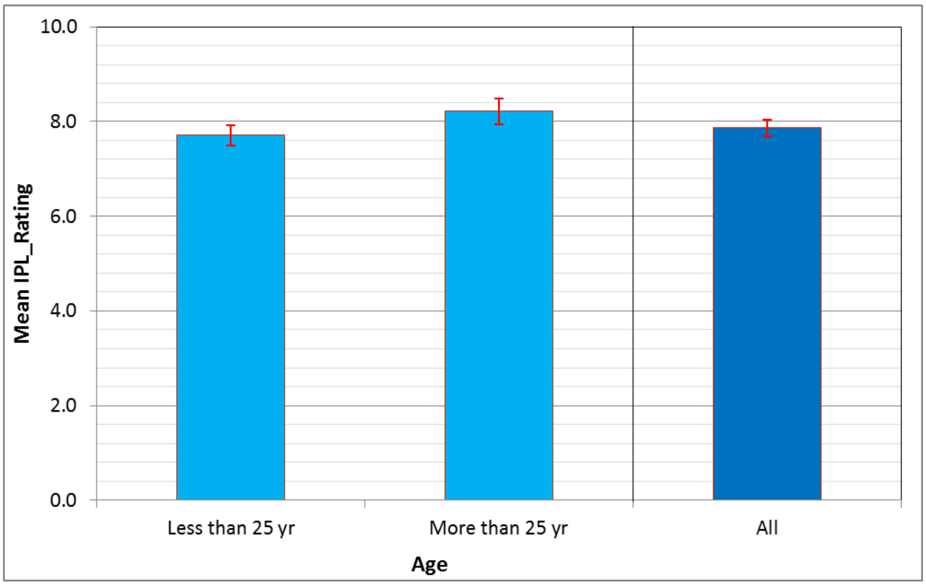


Figure 9.6: Plot of the Mean IPL-Rating values and their 95% C.I., resolved according to Age category.

Table 9.9 reports the results by applying the Independent Samples t-Test to the specified differences between Means, i.e., those Pre and Post pairs of results plotted in Figure 9.6.

Independent Samples t-test [Equal variances not assumed]					
	t-test for Equality of Means				
Comparison	Mean Difference	Std. Error Difference	t	df	Sig. (2-tailed)
[Less than 25 yr] - [More than 25 yr]	-.504	.174	-2.888	244.327	.004**

Table 9.9: 'Independent Samples t-Test' to the specified differences between Means resolved according to Age Category.

Remarks:

According to Table 9.9, older students had a significantly higher IPL rating score than Younger students. The difference in this case is significant at the p<0.01 level.

e. Comparisons according to Learning Condition and Course

Table 9.10 presents between group summary statistics of the IPLRS resolved according to Learning Condition and Course.

Course x Condition	N	Mean	Median	Std. Deviation	Std. Error of Mean
[Nursing x IPL]	112	8.22	8.00	1.499	.142
[Nursing x UPL]	110	7.70	8.00	1.865	.178
[MBBS x IPL]	87	7.46	8.00	1.662	.178
[MBBS x UPL]	78	8.04	8.00	1.599	.181
All	387	7.87	8.00	1.686	.086

Table 9.10: Summary statistics for IPL-Rating, resolved according to both Learning Condition and Course.

The Mean and 95% C.I. data is plotted below in Figure 9.7.

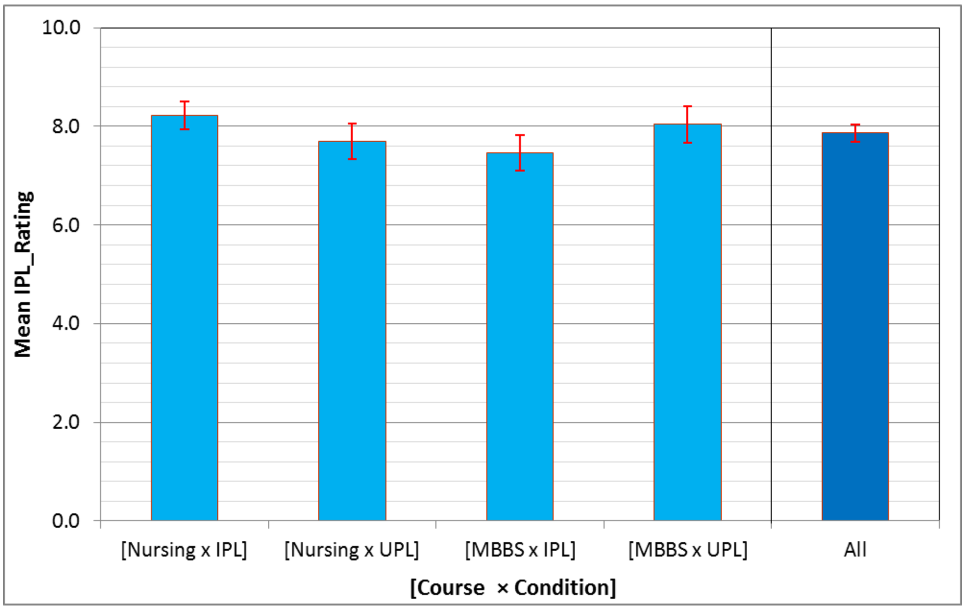


Figure 9.7: Plot of the Mean IPL-Rating values and their 95% C.I., resolved according to Learning Condition and Course.

Table 9.11 reports the results by applying the Independent Samples t-Test to the specified differences between Means, i.e., those Pre and Post pairs of results plotted in Figure 9.7.

Independent Samples t-test [Equal variances not assumed]					
	t-test for Equality of Means				
Comparison	Mean Difference	Std. Error Difference	t	df	Sig. (2-tailed)
[Nursing × IPL] - [Nursing × UPL]	.523	.227	2.302	208.700	.022*
[MBBS × IPL] - [MBBS × UPL]	-.579	.254	-2.278	162.178	.024*
[Nursing × IPL] - [MBBS × IPL]	.763	.228	3.354	174.901	.001**
[Nursing × UPL] - [MBBS × UPL]	-.338	.254	-1.334	179.322	.184

Table 9.11: 'Independent Samples t-Test' to the specified differences between Means resolved according to Learning Condition and Course.

Remarks:

According to Table 9.11 the following statistically significant results were observed:

- Higher rating score for IPL Nursing students compared to UPL Nursing students ($p<0.05$)
- Higher rating score for IPL Nursing students compared to IPL Medical students ($p<0.01$)
- Higher rating score for UPL Medical students compared to IPL Medical students ($p<0.05$)

f. Comparisons according to Learning Condition and Gender

Table 9.12 presents group summary statistics of the IPLRS, resolved according to Learning Condition and Gender.

Condition × Gender	N	Mean	Median	Std. Deviation	Std. Error of Mean
[IPL × Male]	38	7.32	7.50	1.861	.302
[IPL × Female]	155	8.00	8.00	1.516	.122
[UPL × Male]	43	7.74	8.00	1.941	.296
[UPL × Female]	143	7.87	8.00	1.725	.144
All	387	7.87	8.00	1.686	.086

Table 9.12: Summary statistics for IPL-Rating, resolved according to both Learning Condition and Gender.

The Mean and 95% C.I. data is plotted below in Figure 9.8.

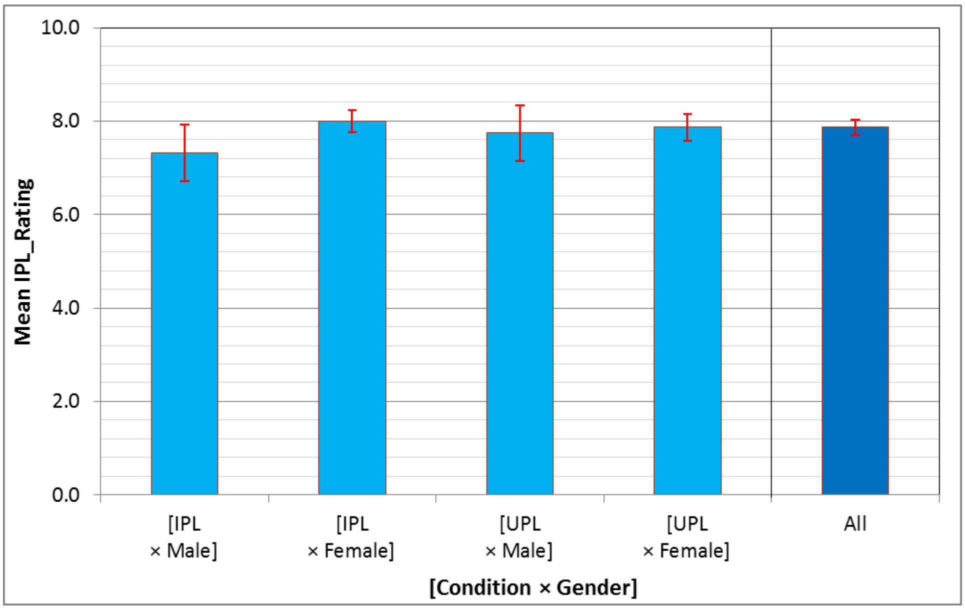


Figure 9.8: Plot of the Mean IPL-Rating values and their 95% C.I., resolved according to Learning Condition and Gender.

Table 9.13 reports the results by applying the Independent Samples t-Test to the specified differences between Means, i.e., those Pre and Post pairs of results plotted in Figure 9.8.

Independent Samples t-test [Equal variances not assumed]					
	t-test for Equality of Means				
Comparison	Mean Difference	Std. Error Difference	t	df	Sig. (2-tailed)
[IPL × Male] - [IPL × Female]	-.684	.326	-2.101	49.698	.041*
[UPL × Male] - [UPL × Female]	-.123	.329	-.373	63.267	.710
[IPL × Male] - [UPL × Male]	-.428	.423	-1.013	78.452	.314
[IPL × Female] - [UPL × Female]	.133	.189	.704	283.681	.482

Table 9.13: 'Independent Samples t-Test' to the specified differences between Means, resolved according to Learning Condition and Gender.

Remarks:

According to Table 9.13, Female IPL students had a significantly higher IPL rating score than Male IPL students. The difference in this case is significant at the $p<0.05$ level.

g. Comparisons according to Learning Condition and Age Category

Table 9.14 presents between group summary statistics of the IPLRS, resolved according to Learning Condition and Age Category.

Learning Condition × Age	N	Mean	Median	Std. Deviation	Std. Error of Mean
[IPL & < 25 yr]	140	7.73	8.00	1.622	.137
[IPL & > 25 yr]	57	8.23	8.00	1.547	.205
[UPL & < 25 yr]	133	7.69	8.00	1.880	.163
[UPL & > 25 yr]	55	8.20	8.00	1.393	.188
All	387	7.87	8.00	1.686	.086

Table 9.14: Summary statistics for IPL-Rating, resolved according to both Learning Condition and Age Category.

The Mean and 95% C.I. data is plotted below in Figure 9.9.

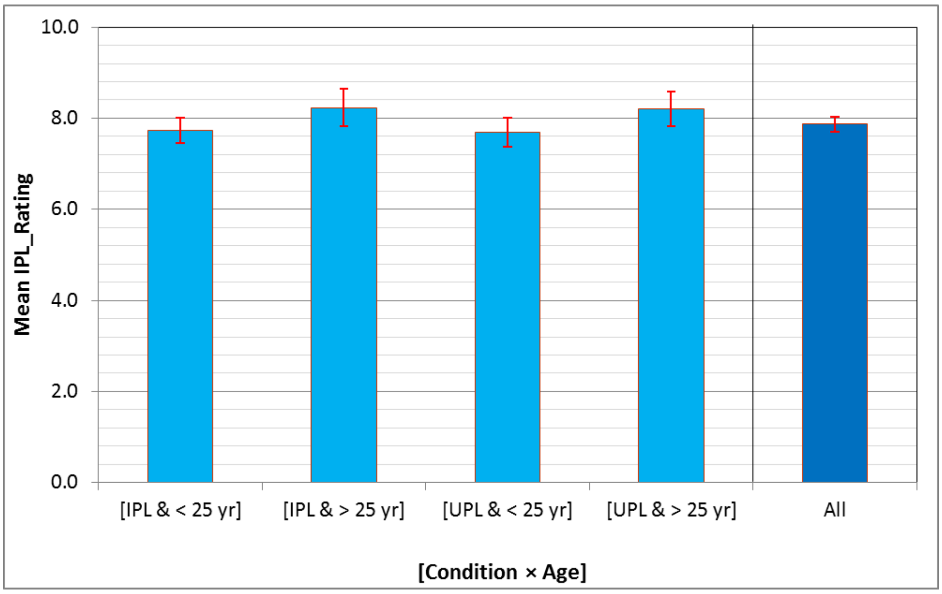


Figure 9.9: Plot of the Mean IPL-Rating values and their 95% C.I., resolved according to both Condition and Age.

Table 9.15 reports the results by applying the Independent Samples t-Test to the specified differences between Means, i.e., those Pre and Post pairs of results plotted in Figure 9.9.

Independent Samples t-test [Equal variances not assumed]					
	t-test for Equality of Means				
Comparison	Mean Difference	Std. Error Difference	t	df	Sig. (2-tailed)
[IPL & < 25 yr] - [IPL & > 25 yr]	-.499	.247	-2.026	108.577	.045*
[UPL & < 25 yr] - [UPL & > 25 yr]	-.508	.249	-2.044	134.683	.043*
[IPL & < 25 yr] - [UPL & < 25 yr]	.037	.213	.173	260.850	.863
[IPL & > 25 yr] - [UPL & > 25 yr]	.028	.278	.101	109.485	.920

Table 9.15: 'Independent Samples t-Test' to the specified differences between Means, resolved according to Learning Condition and Age Category.

Remarks:

According to Table 9.15, the following statistically significant results were observed:

- Higher rating score for Older IPL students compared to Younger IPL students ($p<0.05$).
- Higher rating score for Older UPL students compared to Younger UPL students ($p<0.05$).

h. Comparisons according to Course and Gender

Table 9.16 presents between group summary statistics of the IPLRS, resolved according to Course and Gender.

Course × Gender	N	Mean	Median	Std. Deviation	Std. Error of Mean
[Nursing × Male]	16	7.63	7.50	1.996	.499
[Nursing × Female]	198	7.97	8.00	1.692	.120
[MBBS × Male]	65	7.52	8.00	1.897	.235
[MBBS × Female]	100	7.87	8.00	1.468	.147
All	387	7.87	8.00	1.686	.086

Table 9.16: Summary statistics for IPL-Rating, resolved according to Course and Gender.

The Mean and 95% C.I. data is plotted below in Figure 9.10.

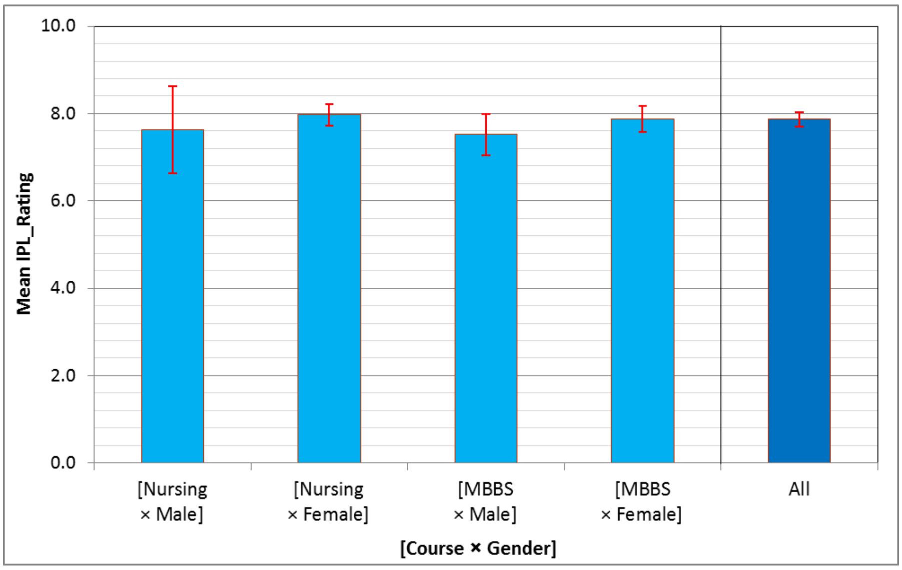


Figure 9.10: Plot of the Mean IPL-Rating values and their 95% C.I., resolved according to both Course and Gender.

Table 9.17 reports the results by applying the Independent Samples t-Test to the specified differences between Means, i.e., those Pre and Post pairs of results plotted in Figure 9.10.

Independent Samples t-test [Equal variances not assumed]					
	t-test for Equality of Means				
Comparison	Mean Difference	Std. Error Difference	t	df	Sig. (2-tailed)
[Nursing × Male] - [Nursing × Female]	-.345	.513	-.672	16.788	.511
[MBBS × Male] - [MBBS × Female]	-.347	.277	-1.251	112.512	.213
[Nursing × Male] - [MBBS × Male]	.102	.552	.185	22.153	.855
[Nursing × Female] - [MBBS × Female]	.100	.190	.525	225.406	.600

Table 9.17: 'Independent Samples t-Test' to the specified differences between Means, resolved according to Course and Gender.

Remarks:

According to Table 9.17, there was no statistically significant difference in the pooled rating score between Course and Gender.

i. Comparisons according to Course and Age Category

Table 9.18 presents between group summary statistics of the IPLRS, resolved according to Course and Age Category.

Course × Age	N	Mean	Median	Std. Deviation	Std. Error of Mean
[Nursing & < 25 yr]	118	7.74	8.00	1.869	.172
[Nursing & > 25 yr]	102	8.20	8.00	1.469	.145
[MBBS & < 25 yr]	155	7.69	8.00	1.658	.133
[MBBS & > 25 yr]	10	8.40	9.00	1.506	.476
All	387	7.87	8.00	1.686	.086

Table 9.18: Summary statistics for IPL-Rating, resolved according to both Course and Age Category.

The Mean and 95% C.I. data is plotted below in Figure 9.11.

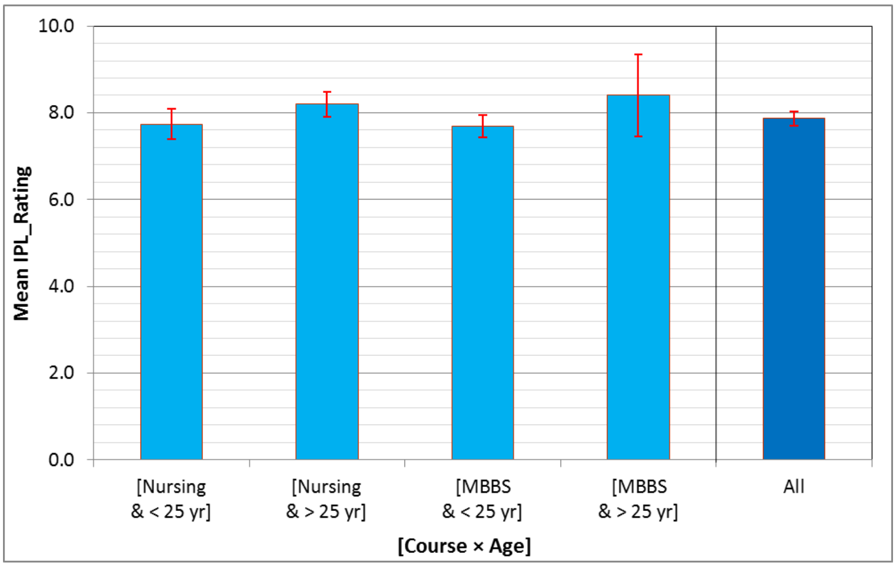


Figure 9.11: Plot of the Mean IPL-Rating values and their 95% C.I., resolved according to both Course and Age.

Table 9.19 reports the results by applying the Independent Samples t-Test to the specified differences between Means, i.e. those Pre and Post pairs of results plotted in Figure 9.11.

Independent Samples t-test [Equal variances not assumed]					
	t-test for Equality of Means				
Comparison	Mean Difference	Std. Error Difference	t	df	Sig. (2-tailed)
[Nursing & < 25 yr] - [Nursing & > 25 yr]	-.459	.225	-2.036	216.124	.043*
MBBS & < 25 yr] - [MBBS & > 25 yr]	-.710	.494	-1.436	10.459	.180
[Nursing & < 25 yr] - [MBBS & < 25 yr]	.047	.218	.216	235.015	.829
[Nursing & > 25 yr] - [MBBS & > 25 yr]	-.204	.498	-.410	10.751	.690

Table 9.19: This table reports the results of applying the 'Independent Samples t-Test' to the specified differences between Means plotted in Figure 9.11.

Remarks:

According to Table 9.19, Older Nursing students had a significantly higher IPL rating score than Younger Nursing students. The difference in this case is significant at the $p<0.05$ level.

j. Comparisons according to Gender and Age Category

Table 9.20 presents between group summary statistics of the IPLRS, resolved according to Gender and Age Category.

Gender × Age	N	Mean	Median	Std. Deviation	Std. Error of Mean
[Male & < 25 yr]	67	7.49	8.00	1.934	.236
[Male & > 25 yr]	14	7.79	8.50	1.805	.482
[Female & < 25 yr]	202	7.79	8.00	1.695	.119
[Female & > 25 yr]	96	8.24	8.00	1.405	.143
All	387	7.87	8.00	1.686	.086

Table 9.20: Summary statistics for IPL-Rating, resolved according to Gender and Age.

The Mean and 95% C.I. data is plotted below in Figure 9.12

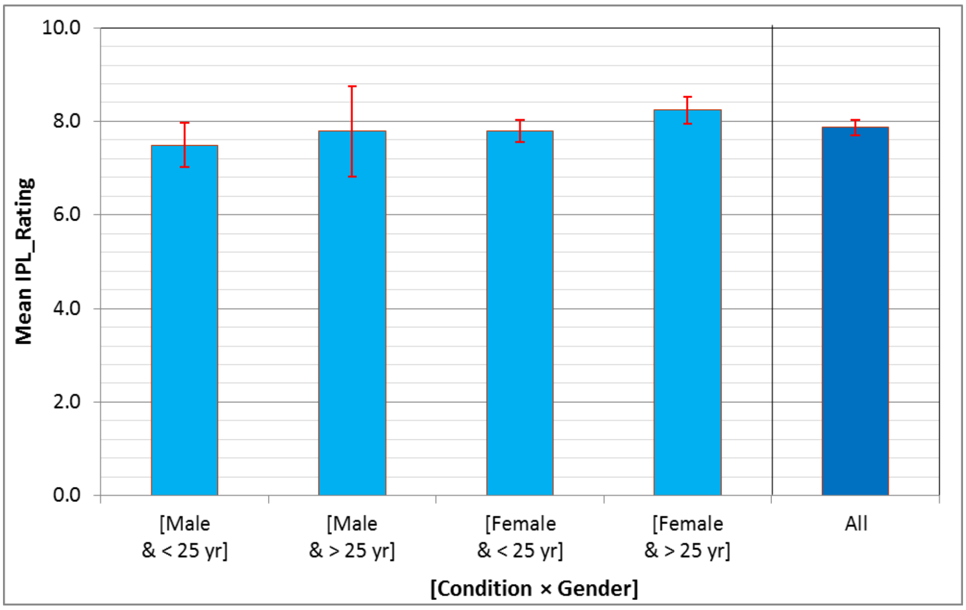


Figure 9.12: Plot of the Mean IPL-Rating values and their 95% C.I., resolved according to both Gender and Age.

Table 9.21 reports the results by applying the Independent Samples t-Test to the specified differences between Means, i.e., those Pre and Post pairs of results plotted in Figure 9.12.

Independent Samples t-test [Equal variances not assumed]					
	t-test for Equality of Means				
Comparison	Mean Difference	Std. Error Difference	t	df	Sig. (2-tailed)
[Male & < 25 yr] - [Male & > 25 yr]	-.293	.537	-.546	19.757	.591
[Female & < 25 yr] - [Female & > 25 yr]	-.448	.186	-2.400	221.718	.017*
[Male & < 25 yr] - [Female & < 25 yr]	-.300	.265	-1.132	101.749	.260
[Male & > 25 yr] - [Female & > 25 yr]	-.454	.503	-.902	15.382	.381

Table 9.21: 'Independent Samples t-Test' to the specified differences between Means, resolved according to Gender and Age Category.

Remarks:

According to Table 9.21, Older Female students had a significantly higher score than Younger female students. The difference is significant at the ($p<0.05$).

Part C: IPLRS results ‘Within Groups’ comparisons

This part of the chapter presents results from the Paired Samples t-Tests for ‘Between Group’ differences for the IPLRS Pre and Post the intervention.

‘Within Group’ Differences are resolved according to the following categories:

- Learning Condition
- Course
- Gender
- Age Category
- Learning Condition and Course
- Learning Condition and Gender
- Learning Condition and Age Category
- Course and Gender
- Course and Age Category
- Gender and Age

a. Comparisons according to Learning Condition

Table 9.22 presents summary statistics of the IPL rating **Pre** and **Post** the intervention, resolved according to Learning Condition (IPL or UPL).

The summary statistics are reported as N (number of respondents in sub-group); Mean (average IPL rating of this sub-group); Std. Deviation (standard deviation of the IPL ratings of this sub-group); Std. Error of Mean (the 1-sigma uncertainty of the Mean); 2 x SEM (twice the Std. Error of the Mean). This provides the value of the 95% Confidence Interval (i.e. 2-sigma) for the Mean value. The last column shows the percent change in Mean response on the Post questionnaire.

Condition: IPL/NIPL		IPL Rating_ PRE	IPL Rating_ POST	% Change in Mean Response
IPL	N	100	99	
	Mean	7.40	8.38	+13.30
	Std. Deviation	1.664	1.405	
	Std. Error of Mean	.166	.141	
	2 × SEM (95% C.I)	.333	.282	
UPL	N	95	93	
	Mean	7.58	8.11	+6.97
	Std. Deviation	1.736	1.760	
	Std. Error of Mean	.178	.182	
	2 × SEM (95% C.I)	.356	.365	
All	N	195	192	
	Mean	7.49	8.25	+10.19
	Std. Deviation	1.697	1.589	
	Std. Error of Mean	.122	.115	
	2 × SEM (95% C.I)	.243	.229	

Table 9.22: Summary statistics for IPL Rating Mean scores resolved according to Learning Condition Pre and Post the intervention.

The Mean values and their 95% Confidence Intervals (C.I.) are plotted in Figure 9.13.

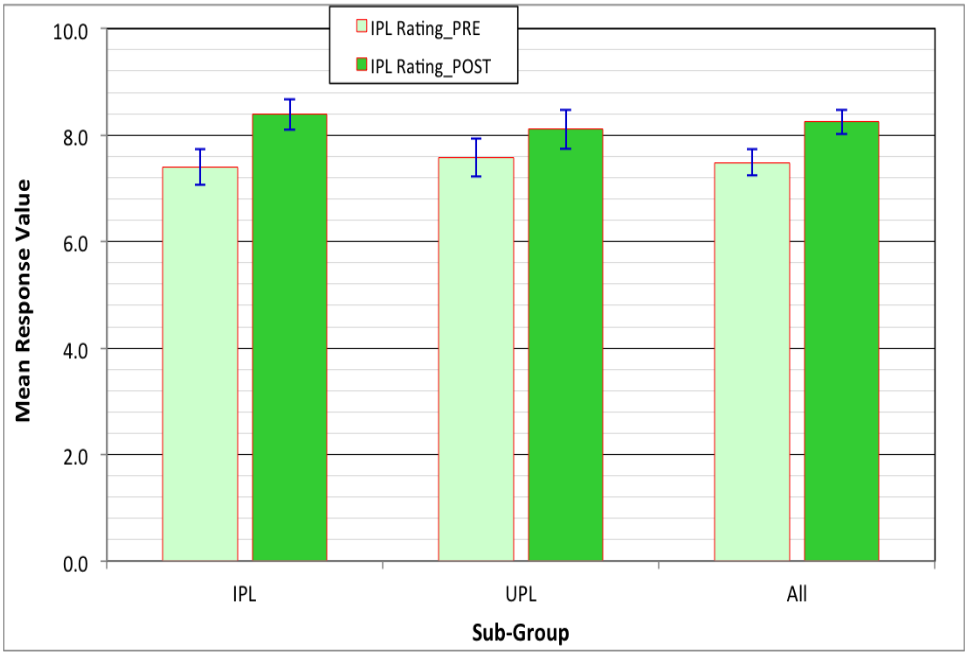


Figure 9.13: Plot of the Mean IPL Rating values, and their 95% C.I., resolved according to Learning Condition (Pre vs Post).

Table 9.23 reports the results from applying the Paired Samples t-Test to the specified differences between Means, to compare IPL with UPL Learning Condition Pre and Post the intervention.

Learning Condition: IPL/UPL		Paired Differences			t	df	Sig. (2-tailed)
		Mean	Std. Dev.	SEM			
IPL	[IPL Rating_PRE – IPL Rating_POST]	-1.010	1.144	.116	-8.740	97	.000**
UPL		-.628	1.189	.128	-4.899	85	.000**
ALL		-.832	1.178	.087	-9.578	183	.000**

Table 9.23: 'Paired Samples t-Test' for differences between Mean values Pre vs. Post the intervention resolved according to Learning Condition.

Remarks:

According to Table 9.23, there were statistically significant increases in IPL-Rating post the intervention for the Whole Group, IPL Group and UPL Group. All three differences were found to be significant at the p <0.01 level.

b. Comparisons according to Course

Table 9.24 presents summary statistics of the IPL rating **Pre** and **Post** the intervention, resolved according to Course (Nursing or Medicine).

Course		IPL Rating_ PRE	IPL Rating_ POST	% Change in Mean Response
Bachelor of Nursing	N	111	111	
	Mean	7.57	8.36	+10.48
	Std. Deviation	1.698	1.628	
	Std. Error of Mean	.161	.155	
	2 × SEM (95% C.I)	.322	.309	
MBBS	N	84	81	
	Mean	7.38	8.10	+9.73
	Std. Deviation	1.700	1.530	
	Std. Error of Mean	.185	.170	
	2 × SEM (95% C.I)	.371	.340	
All	N	195	192	
	Mean	7.49	8.25	+10.19
	Std. Deviation	1.697	1.589	
	Std. Error of Mean	.122	.115	
	2 × SEM (95% C.I)	.243	.229	

Table 9.24: Summary statistics for IPL Rating Mean scores resolved according to Course Pre and Post the intervention.

The Mean values and their 95% Confidence Intervals (C.I.) are plotted in Figure 9.14.

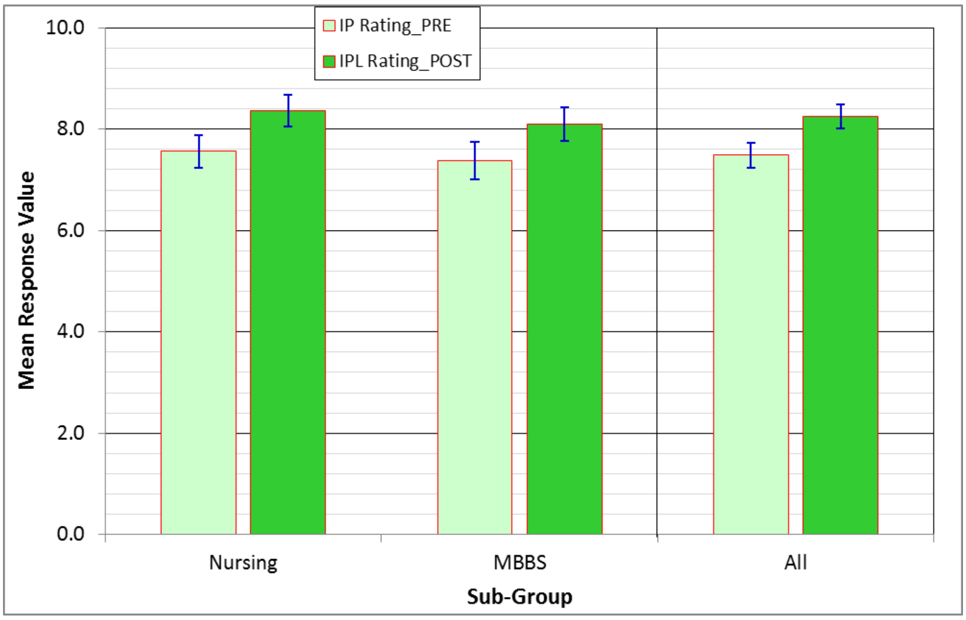


Figure 9.14: Plot of the Mean IPL Rating values, and their 95% C.I., resolved according to Course (Pre vs Post).

Table 9.25 reports the results from applying the Paired Samples t-Test to the specified differences between Means, to compare Medical with Nursing students Pre and Post the intervention.

Course		Paired Differences			t	df	Sig. (2-tailed)
		Mean	Std. Dev.	SEM			
Bachelor of Nursing	**[IPL Rating_PRE – IPL Rating_POST]**	-.895	1.344	.131	-6.826	104	.000**
MBBS		-.747	.912	.103	-7.275	78	.000**
ALL		-.832	1.178	.087	-9.578	183	.000**

Table 9.25: ‘Paired Samples t-Test’ for differences between Mean values Pre vs. Post the intervention resolved according to Course.

Remarks:

According to Table 9.25, there were statistically significant increases in IPL-Rating post the intervention for Medical and Nursing students. The differences were found to be significant at the $p < 0.01$ level.

c. Comparisons according to Gender

Table 9.26 presents summary statistics of the IPL rating **Pre** and **Post** the intervention, resolved according to Gender (Male or Female).

Gender		IPL Rating_ PRE	IPL Rating_ POST	% Change in Mean Response
Male	N	41	40	
	Mean	7.20	7.90	+9.80
	Std. Deviation	1.952	1.809	
	Std. Error of Mean	.305	.286	
	2 × SEM (95% C.I)	.610	.572	
Female	N	150	148	
	Mean	7.54	8.34	+10.58
	Std. Deviation	1.612	1.528	
	Std. Error of Mean	.132	.126	
	2 × SEM (95% C.I)	.263	.251	
All	N	195	192	
	Mean	7.49	8.25	+10.19
	Std. Deviation	1.697	1.589	
	Std. Error of Mean	.122	.115	
	2 × SEM (95% C.I)	.243	.229	

Table 9.26: Summary statistics for IPL Rating Mean scores resolved according to Gender Pre and Post the intervention.

The Mean values and their 95% Confidence Intervals (C.I.) are plotted in Figure 9.15.

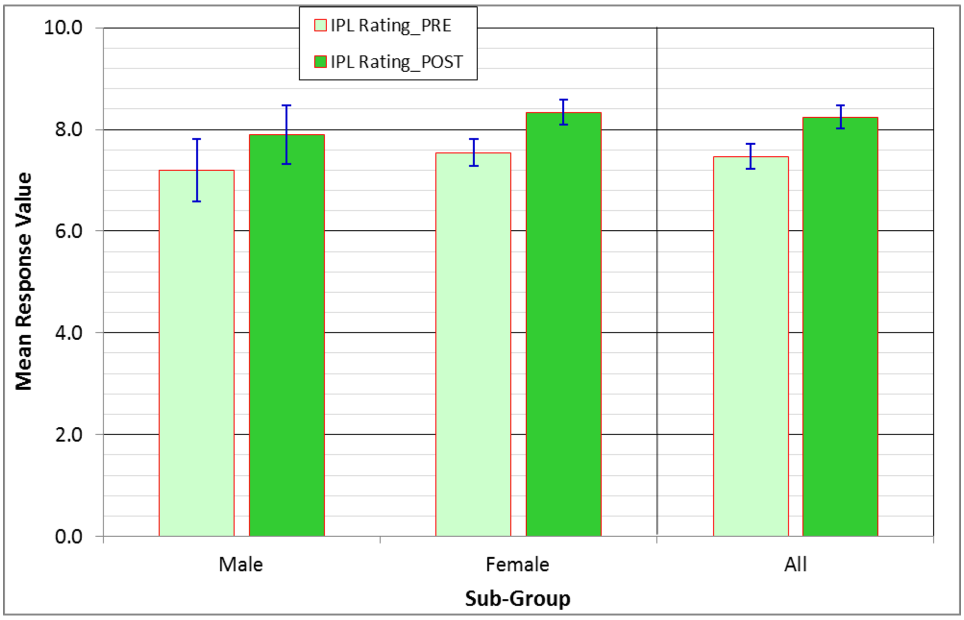


Figure 9.15: Plot of the Mean IPL Rating values, and their 95% C.I., resolved according to Gender (Pre vs Post),

Table 9.27 reports the results from applying the Paired Samples t-Test to the specified differences between Means, to compare Male with Female students Pre and Post the intervention.

Gender		Paired Differences			t	df	Sig. (2-tailed)
		Mean	Std. Dev.	SEM			
Male	**[IPL Rating_PRE – IPL Rating_POST]**	-.821	.997	.160	-5.141	38	.000**
Female		-.858	1.228	.103	-8.297	140	.000**
ALL		-.832	1.178	.087	-9.578	183	.000**

Table 9.27: 'Paired Samples t-Test' for differences between Mean values Pre vs. Post the intervention resolved according to Gender.

Remarks:

According to Table 9.27, there were statistically significant increases in IPL-Rating post the intervention for the Male and Female students. The differences were found to be significant at the p <0.01 level.

d. Comparisons according to Age Category

Table 9.28 presents summary statistics of the IPL rating **Pre** and **Post** the intervention, resolved according to Age Category (<25 years or >25 years).

Age		IPL Rating_ PRE	IPL Rating_ POST	% Change in Mean Response
Less than 25yr	N	138	135	
	Mean	7.30	8.13	+11.46
	Std. Deviation	1.736	1.665	
	Std. Error of Mean	.148	.143	
	2 × SEM (95% C.I)	.296	.287	
More than 25 yr	N	56	56	
	Mean	7.91	8.52	+7.67
	Std. Deviation	1.505	1.375	
	Std. Error of Mean	.201	.184	
	2 × SEM (95% C.I)	.402	.367	
All	N	195	192	
	Mean	7.49	8.25	+10.19
	Std. Deviation	1.697	1.589	
	Std. Error of Mean	.122	.115	
	2 × SEM (95% C.I)	.243	.229	

Table 9.28: Summary statistics for IPL Rating Mean scores resolved according to Age Category Pre and Post the intervention.

The Mean values and their 95% Confidence Intervals (C.I.) are plotted in Figure 9.16.

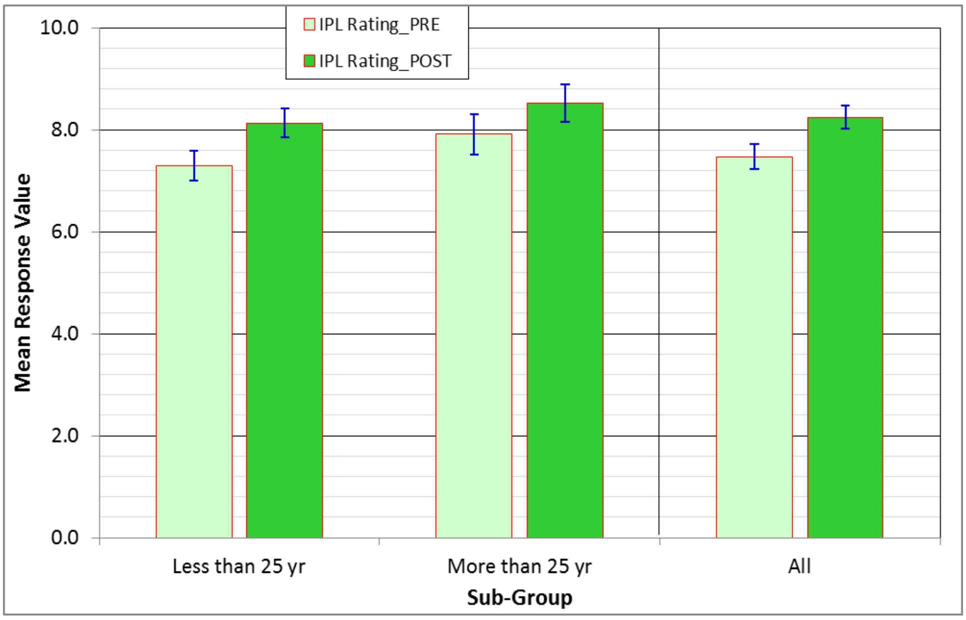


Figure 9.16: Plot of the Mean IPL Rating values, and their 95% C.I., resolved according to Age Category (Pre vs Post).

Table 9.29 reports the results from applying the Paired Samples t-Test to the specified differences between Means, to compare Older with Younger students Pre and Post the intervention.

Age		**Paired Differences**			**t**	**df**	**Sig. (2-tailed)**
		Mean	Std. Dev.	SEM			
Less than 25 yr	**[IPL Rating_PRE – IPL Rating_POST]**	-.840	1.122	.098	-8.566	130	.000**
More than 25 yr		-.846	1.304	.181	-4.678	51	.000**
ALL		-.832	1.178	.087	-9.578	183	.000**

Table 9.29: 'Paired Samples t-Test' for differences between Mean values Pre vs. Post the intervention resolved according to Age Category.

Remarks:

According to Table 9.29, there were statistically significant increases in IPL-Rating post the intervention for both Age Categories. The differences were found to be significant at the p <0.01 level.

e. Comparisons according to Learning Condition and Course

Table 9.30 presents summary statistics of the IPL rating **Pre** and **Post** the intervention, resolved according to Learning Condition and Course.

[IPL/UPL x Course]		IPL Rating_ PRE	IPL Rating_ POST	% Change in Mean Response
[IPL x Nursing]	N	56	56	
	Mean	7.70	8.75	+13.69
	Std. Deviation	1.572	1.225	
	Std. Error of Mean	.210	.164	
	2 × SEM (95% C.I)	.420	.327	
[UPL x Nursing]	N	55	55	
	Mean	7.44	7.96	+7.09
	Std. Deviation	1.823	1.885	
	Std. Error of Mean	.246	.254	
	2 × SEM (95% C.I)	.492	.508	
[IPL x MBBS]	N	44	43	
	Mean	7.02	7.91	+12.59
	Std. Deviation	1.718	1.493	
	Std. Error of Mean	.259	.228	
	2 × SEM (95% C.I)	.518	.455	
[UPL x MBBS]	N	40	38	
	Mean	7.78	8.32	+6.96
	Std. Deviation	1.609	1.561	
	Std. Error of Mean	.254	.253	
	2 × SEM (95% C.I)	.509	.507	
All	N	195	192	
	Mean	7.49	8.25	+10.19
	Std. Deviation	1.697	1.589	
	Std. Error of Mean	.122	.115	
	2 × SEM (95% C.I)	.243	.229	

Table 9.30: Summary statistics for IPL Rating Mean scores resolved according to Learning Condition and Course, Pre and Post the intervention.

The Mean values and their 95% Confidence Intervals (C.I.) are plotted in Figure 9.17.

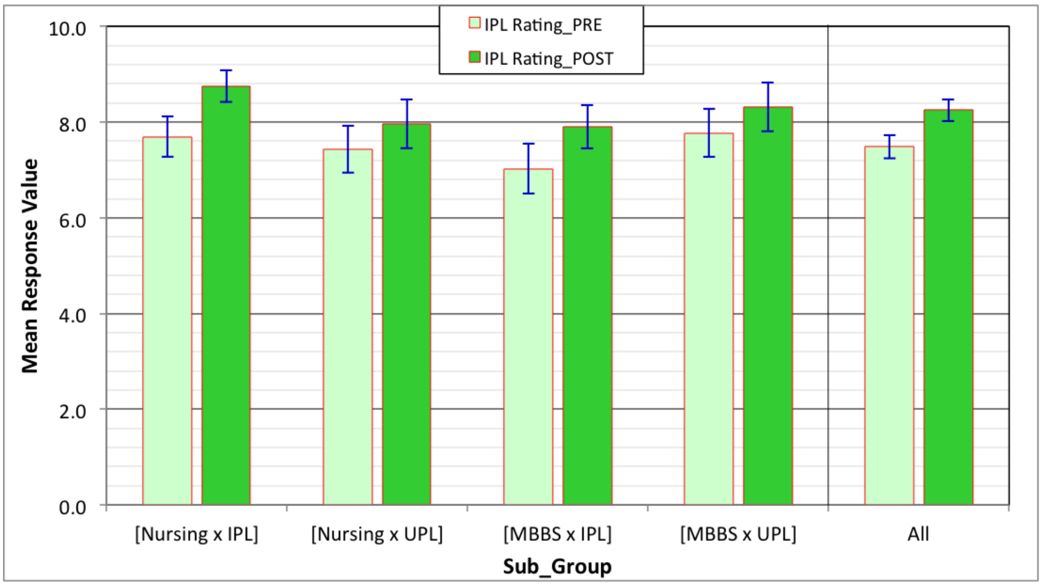


Figure 9.17: Plot of the Mean IPL Rating values, and their 95% C.I., resolved according to Learning Condition and Course (Pre vs. Post).

Table 9.31 reports the results from applying the Paired Samples t-Test to the specified differences between Means, to compare Learning Condition with Course Pre and Post the intervention.

[Course and Condition]		**Paired Differences**			**t**	**df**	**Sig. (2-tailed)**
		Mean	Std. Dev.	SEM			
[Nursing × IPL]	**[IPL Rating_PRE – IPL Rating_POST]**	-1.109	1.315	.177	-6.256	54	.000**
[Nursing × UPL]		-.660	1.349	.191	-3.459	49	.001**
[MBBS × IPL]		-.884	.879	.134	-6.596	42	.000**
[MBBS × UPL]		-.583	.937	.156	-3.734	35	.001**
ALL		-.832	1.178	.087	-9.578	183	.000**

Table 9.31: ‘Paired Samples t-Test’ for differences between Mean values Pre vs. Post the intervention resolved according to Learning Condition and Course.

Remarks:

According to Table 9.31, there were statistically significant increases in IPL-Rating post the intervention for IPL Nursing students, UPL Nursing students, IPL Medical students and UPL medical students. All differences were found to be significant at the $p < 0.01$ level.

f. Comparisons according to Learning Condition and Gender

Table 9.32 presents summary statistics of the IPL rating **Pre** and **Post** the intervention, resolved according to Learning Condition and Gender.

[IPL/UPL-Gender]		IPL Rating_ PRE	IPL Rating_ POST	% Change in Mean Response
[IPL & Male]	N	18	18	
	Mean	6.78	7.78	14.75
	Std. Deviation	1.957	1.734	
	Std. Error of Mean	.461	.409	
	2 SEM	.923	.817	
[IPL & Female]	N	77	78	
	Mean	7.48	8.51	13.80
	Std. Deviation	1.553	1.297	
	Std. Error of Mean	.177	.147	
	2 SEM	.354	.294	
[UPL & Male]	N	21	22	
	Mean	7.48	8.00	7.01
	Std. Deviation	1.990	1.902	
	Std. Error of Mean	.434	.406	
	2 SEM	.869	.811	
[UPL & Female]	N	64	70	
	Mean	7.53	8.14	8.12
	Std. Deviation	1.718	1.739	
	Std. Error of Mean	.215	.208	
	2 SEM	.429	.416	
Total	N	180	188	
	Mean	7.43	8.24	11.00
	Std. Deviation	1.708	1.597	
	Std. Error of Mean	.127	.116	
	2 SEM	.255	.233	

Table 9.32: Summary statistics for IPL Rating Mean scores resolved according to Learning Condition and Gender, Pre and Post the intervention.

The Mean values and their 95% Confidence Intervals (C.I.) are plotted in Figure 9.18.

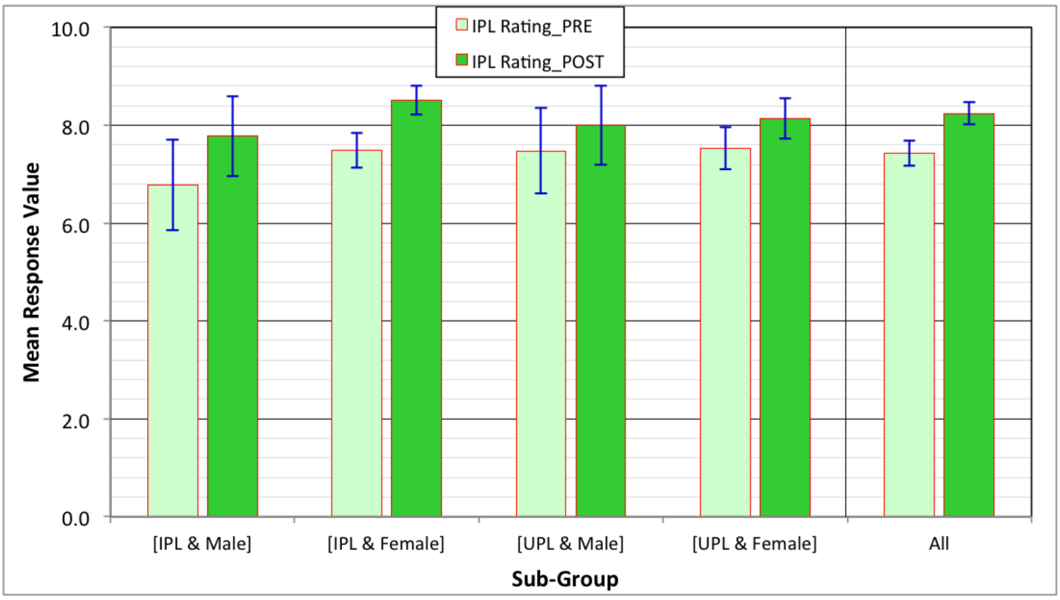


Figure 9.18: Plot of the Mean IPL Rating values, and their 95% C.I., resolved according to Learning Condition and Gender (Pre vs. Post).

Table 9.33 reports the results from applying the Paired Samples t-Test to the specified differences between Means, to compare Learning Condition with Course Pre and Post the intervention.

[Learning Condition and Gender]		Paired Differences			t	df	Sig. (2-tailed)
		Mean	Std. Dev.	SEM			
[IPL x Male]	**[IPL Rating_PRE – IPL Rating_POST]**	-1.000	.970	.229	-4.373	17	.000**
[IPL x Female]		-1.052	1.180	.134	-7.824	76	.000**
[UPL x Male]		-.667	1.017	.222	-3.005	20	.007**
[UPL x Female]		-.625	1.254	.157	-3.989	63	.000**
ALL		-.832	1.178	.087	-9.578	183	.000**

Table 9.33: ‘Paired Samples t-Test’ for differences between Mean values Pre vs. Post the intervention resolved according to Learning Condition and Gender.

Remarks:

According to Table 9.33, there were statistically significant increases in IPL-Rating post the intervention for IPL Male students, IPL Female students, UPL Male students and UPL Female students. All differences were found to be significant at the p <0.01 level.

g. Comparisons according to Learning Condition and Age Category

Table 9.34 presents summary statistics of the IPL rating **Pre** and **Post** the intervention, resolved according to Learning Condition and Age Category.

[Learning Condition and Age Category		IPL Rating_ PRE	IPL Rating_ POST	% Change in Mean Response
[IPL-Less than 25 yrs]	N	69	70	
	Mean	7.23	8.23	13.78
	Std. Deviation	1.637	1.466	
	Std. Error of Mean	.197	.175	
	2 × SEM (95% C.I)	.394	.351	
[IPL-More than 25 yr]	N	28	28	
	Mean	7.68	8.75	13.95
	Std. Deviation	1.701	1.206	
	Std. Error of Mean	.321	.228	
	2 × SEM (95% C.I)	.643	.456	
[UPL-Less than 25 yr]	N	62	65	
	Mean	7.34	8.03	9.43
	Std. Deviation	1.899	1.862	
	Std. Error of Mean	.241	.231	
	2 × SEM (95% C.I)	.482	.462	
[UPL-More than 25 yr]	N	24	28	
	Mean	8.00	8.29	3.57
	Std. Deviation	1.285	1.512	
	Std. Error of Mean	.262	.286	
	2 × SEM (95% C.I)	.525	.571	
All	N	183	191	
	Mean	7.44	8.25	10.88
	Std. Deviation	1.708	1.592	
	Std. Error of Mean	.126	.115	
	2 × SEM (95% C.I)	.253	.230	

Table 9.34: Summary statistics for IPL Rating Mean scores resolved according to Learning Condition and Age Category, Pre and Post the intervention.

The Mean values and their 95% Confidence Intervals (C.I.) are plotted in Figure 9.19.

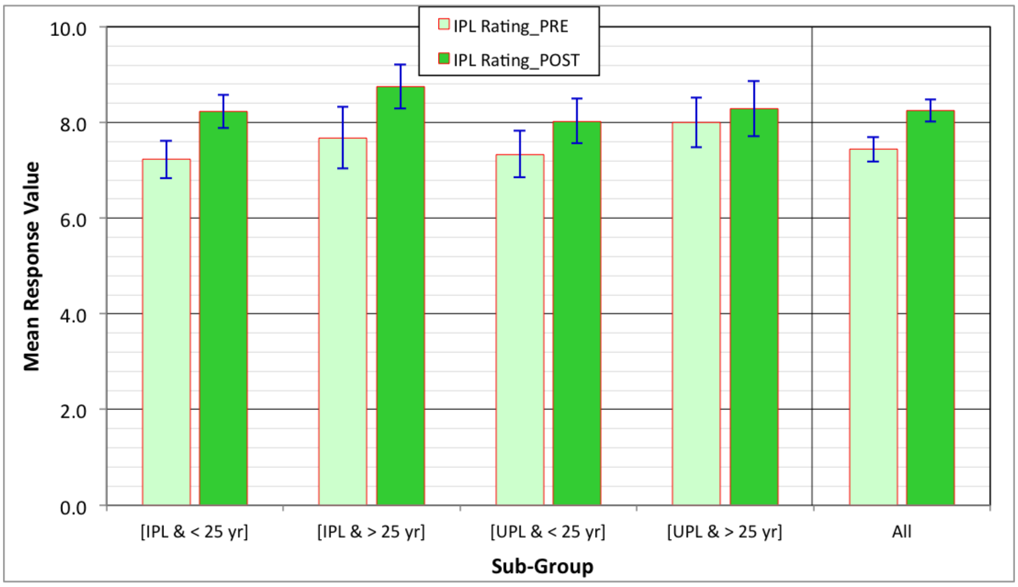


Figure 9.19: Plot of the Mean IPL Rating values, and their 95% C.I., resolved according to Learning Condition and Age Category (Pre vs. Post).

Table 9.35 reports the results from applying the Paired Samples t-Test to the specified differences between Means, to compare Learning Condition with Age Category Pre and Post the intervention.

[Learning Condition and Age]		**Paired Differences**			**t**	**df**	**Sig. (2-tailed)**
		Mean	Std. Dev.	SEM			
[IPL x Less than 25 yr]	**[IPL Rating_PRE – IPL Rating_POST]**	-1.014	1.050	.126	-8.025	68	.000**
[IPL x More than 25 yr]		-1.071	1.331	.252	-4.258	27	.000**
[UPL x Less than 25 yr]		-.645	1.175	.149	-4.324	61	.000**
[UPL x More than 25 yr]		-.583	1.248	.255	-2.290	23	.032*
ALL		-.832	1.178	.087	-9.578	183	.000**

Table 9.35: **‘**Paired Samples t-Test’ for differences between Mean values Pre vs. Post the intervention resolved according to Learning Condition and Course.

Remarks:

According to Table 9.35, there were statistically significant increases in IPL-Rating post the intervention for Younger and Older IPL students; and Younger and Older UPL students. All differences were found to be significant at the $p < 0.01$ level except for Older UPL students which was significant at the $p < 0.05$ level.

h. Comparisons according to Course and Gender

Table 9.36 presents summary statistics of the IPL rating **Pre** and **Post** the intervention, resolved according to Course and Gender.

[Course × Gender[		IPL Rating_ PRE	IPL Rating_ POST	% Change in Mean Response
[Nursing x Male]	N	8	8	
	Mean	7.50	7.75	+3.33
	Std. Deviation	2.070	2.053	
	Std. Error of Mean	.732	.726	
	2 × SEM (95% C.I)	1.464	1.452	
[Nursing x Female]	N	99	99	
	Mean	7.54	8.40	+11.53
	Std. Deviation	1.668	1.609	
	Std. Error of Mean	.168	.162	
	2 × SEM (95% C.I)	.335	.324	
[MBBS x Male]	N	33	32	
	Mean	7.12	7.94	+11.46
	Std. Deviation	1.949	1.777	
	Std. Error of Mean	.339	.314	
	2 × SEM (95% C.I)	.678	.628	
[MBBS x Female]	N	51	49	
	Mean	7.55	8.20	+8.68
	Std. Deviation	1.514	1.354	
	Std. Error of Mean	.212	.193	
	2 × SEM (95% C.I)	.424	.387	
All	N	195	192	
	Mean	7.49	8.25	+10.19
	Std. Deviation	1.697	1.589	
	Std. Error of Mean	.122	.115	
	2 × SEM (95% C.I)	.243	.229	

Table 9.36: Summary statistics for IPL Rating Mean scores resolved according to Course and Gender Pre and Post the intervention.

The Mean values and their 95% Confidence Intervals (C.I.) are plotted in Figure 9.20.

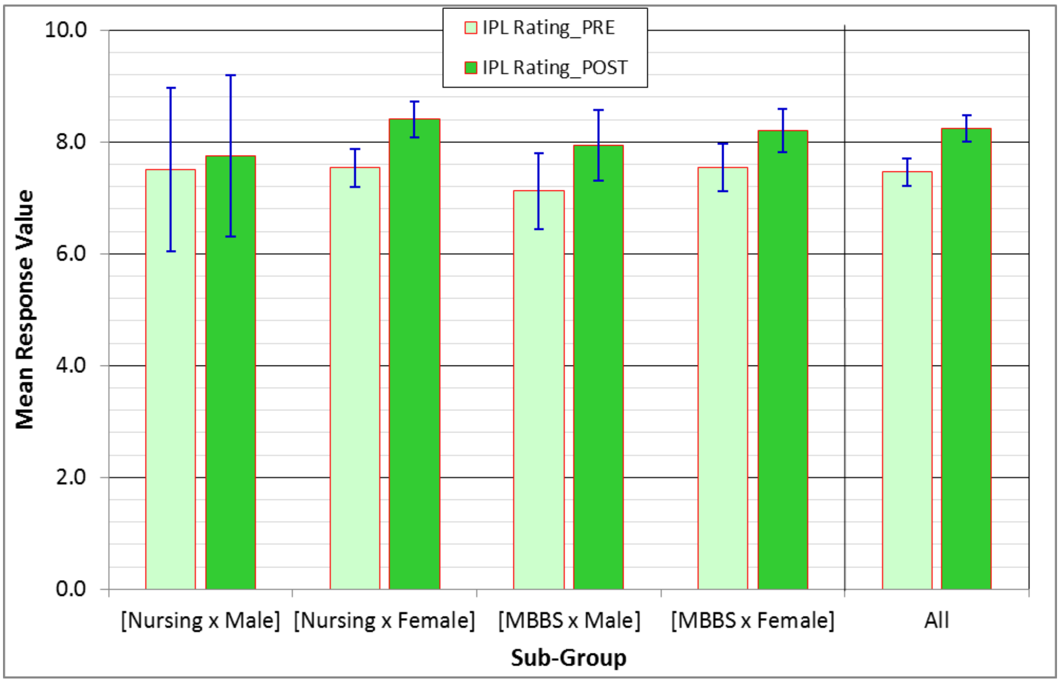


Figure 9.20: Plot of the Mean IPL Rating values, and their 95% C.I., for Pre- and Post-Survey, resolved according to Course and Gender.

Table 9.37 reports the results from applying the Paired Samples t-Test to the specified differences between Means, to compare Course with Age Category Pre and Post the intervention.

Course and Gender		**Paired Differences**			**t**	**df**	**Sig. (2-tailed)**
		Mean	Std. Dev.	SEM			
[Nursing × Male]*	**[IPL Rating_PRE – IPL Rating_POST]**	-.857	1.464	.553	-1.549	6	.172
[Nursing × Female]		-.936	1.350	.139	-6.721	93	.000**
[MBBS × Male]		-.813	.896	.158	-5.131	31	.000**
[MBBS × Female]		-.702	.931	.136	-5.173	46	.000**
ALL		-.832	1.178	.087	-9.578	183	.000**

Table 9.37: 'Paired Samples t-Test' for differences between Mean values Pre vs. Post the intervention resolved according to Course and Age Category.

Remarks:

According to Table 9.37, there were statistically significant increases in IPL-Rating post the intervention for Female Nursing students, Male Medical Students and Female Medical students. All three differences were found to be significant at the p <0.01 level. *Male Nursing students were the only exception to this however the sample size for this group is small (n=11).

i. Comparisons according to Course and Age Category

Table 9.38 present summary statistics of the IPL rating **Pre** and **Post** the intervention, resolved according to Course and Age Category.

[Course × Age]		IPL Rating_ PRE	IPL Rating_ POST	% Change in Mean Response
[Nursing & < 25 yr]	N	59	59	
	Mean	7.24	8.24	+13.82
	Std. Deviation	1.804	1.813	
	Std. Error of Mean	.235	.236	
	2 × SEM (95% C.I)	.470	.472	
[Nursing & > 25 yr]	N	51	51	
	Mean	7.90	8.49	+7.44
	Std. Deviation	1.487	1.405	
	Std. Error of Mean	.208	.197	
	2 × SEM (95% C.I)	.416	.394	
[MBBS & < 25 yr]	N	79	76	
	Mean	7.34	8.05	+9.68
	Std. Deviation	1.694	1.548	
	Std. Error of Mean	.191	.178	
	2 × SEM (95% C.I)	.381	.355	
[MBBS & > 25 yr]	N	5	5	
	Mean	8.00	8.80	+10.00
	Std. Deviation	1.871	1.095	
	Std. Error of Mean	.837	.490	
	2 × SEM (95% C.I)	1.673	.980	
All	N	195	192	
	Mean	7.49	8.25	+10.19
	Std. Deviation	1.697	1.589	
	Std. Error of Mean	.122	.115	
	2 × SEM (95% C.I)	.243	.229	

Table 9.38: Summary statistics for IPL Rating Mean scores resolved according to Course and Age Category Pre and Post the intervention.

The Mean values and their 95% Confidence Intervals (C.I.) are plotted in Figure 9.21.

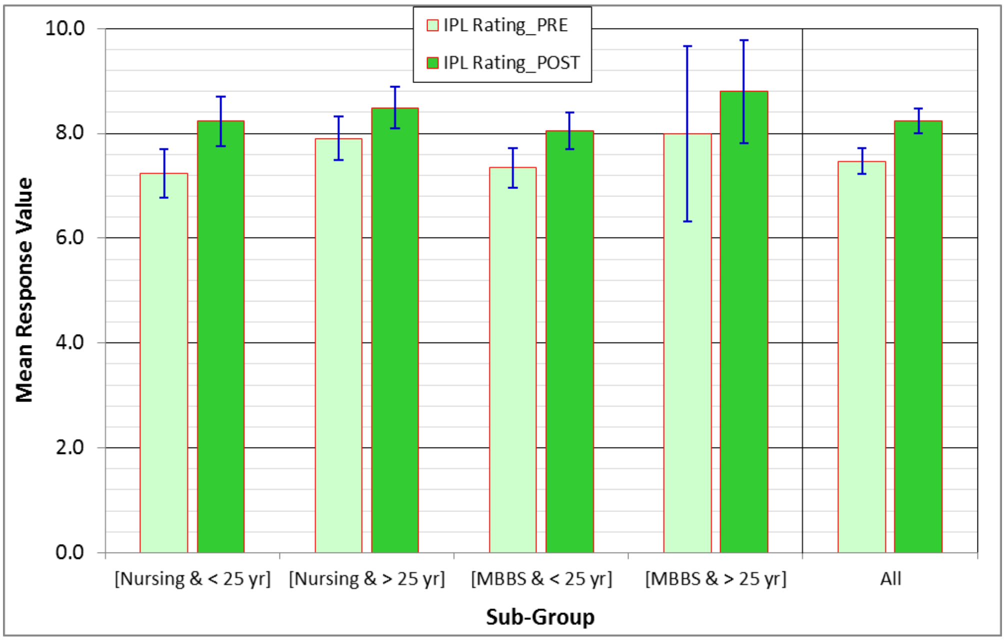


Figure 9.21: Plot of the Mean IPL Rating values, and their 95% C.I., resolved according to Course and Age Category (Pre vs Post).

Table 9.39 reports the results from applying the Paired Samples t-Test to the specified differences between Means, to compare Course with Age Category Pre and Post the intervention.

Course and Age		**Paired Differences**			**t**	**df**	**Sig. (2-tailed)**
		Mean	Std. Dev.	SEM			
[Nursing & < 25 yr]	**[IPL Rating_PRE – IPL Rating_POST]**	-.965	1.336	.177	-5.453	56	.000**
[Nursing & > 25 yr]		-.851	1.351	.197	-4.319	46	.000**
[MBBS & < 25 yr]		-.743	.922	.107	-6.931	73	.000**
[MBBS & > 25 yr]		-.800	.837	.374	-2.138	4	.099
ALL		-.832	1.178	.087	-9.578	183	.000**

Table 9.39: 'Paired Samples t-Test' for differences between Mean values Pre vs. Post the intervention resolved according to Course and Age Category.

Remarks:

According to Table 9.39, there were statistically significant increases in IPL-Rating post the intervention for the Younger Nursing students, Older Nursing students and Younger Medical students. All three differences were found to be significant at the $p < 0.01$ level. The only exception to this was the Older Medical students who were a very small sample size (n=5).

j. Comparisons according to Gender and Age Category

Table 9.40 present summary statistics of the IPL rating **Pre** and **Post** the intervention, resolved according to Gender and Age Category.

[Gender × Age]		IPL Rating_ PRE	IPL Rating_ POST	% Change in Mean Response
[Male & < 25 yr]	N	33	33	
	Mean	7.12	7.88	10.64
	Std. Deviation	1.996	1.850	
	Std. Error of Mean	.347	.322	
	2 × SEM (95% C.I)	.695	.644	
[Female & < 25 yr]	N	96	100	
	Mean	7.34	8.23	12.07
	Std. Deviation	1.691	1.613	
	Std. Error of Mean	.173	.161	
	2 × SEM (95% C.I)	.345	.323	
[Male & > 25 yr]	N	6	7	
	Mean	7.33	8.00	9.09
	Std. Deviation	2.066	1.732	
	Std. Error of Mean	.843	.655	
	2 × SEM (95% C.I)	1.687	1.309	
[Female & > 25 yr]	N	45	48	
	Mean	7.84	8.56	9.15
	Std. Deviation	1.429	1.319	
	Std. Error of Mean	.213	.190	
	2 × SEM (95% C.I)	.426	.381	
All	N	180	188	
	Mean	7.43	8.24	11.00
	Std. Deviation	1.708	1.597	
	Std. Error of Mean	.127	.116	
	2 × SEM (95% C.I)	.255	.233	

Table 9.40: Summary statistics for IPL Rating Mean scores resolved according to Gender and Age Category Pre and Post the intervention.

The Mean values and their 95% Confidence Intervals (C.I.) are plotted in Figure 9.22

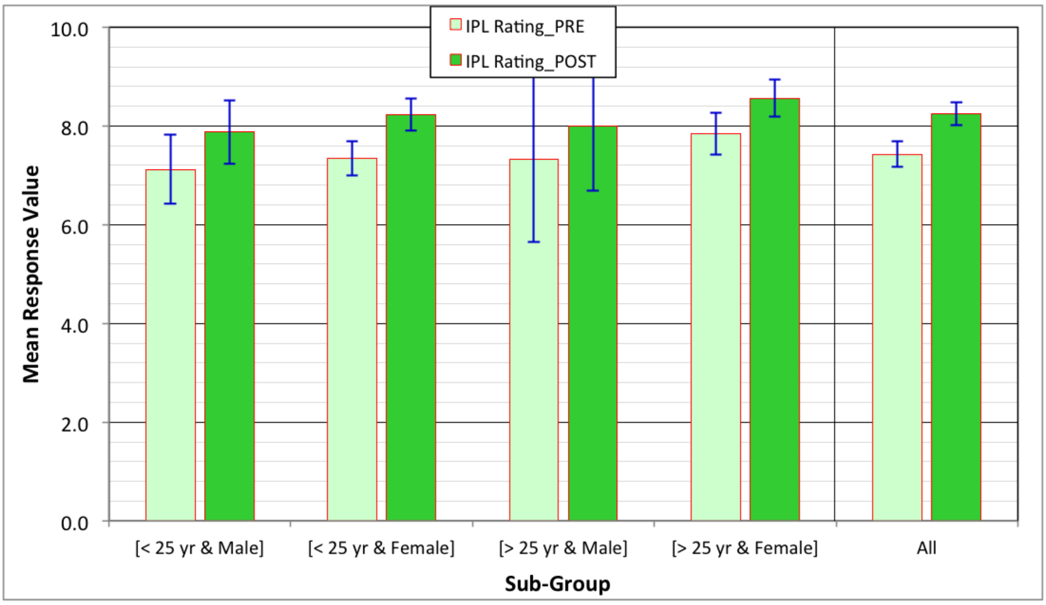


Figure 9.22: Plot of the Mean IPL Rating values, and their 95% C.I., resolved according to Gender and Age Category (Pre vs Post).

Table 9.41 reports the results from applying the Paired Samples t-Test to the specified differences between Means, to compare Gender with Age Category Pre and Post the intervention.

Course and Age		**Paired Differences**			**t**	**df**	**Sig. (2-tailed)**
		Mean	Std. Dev.	SEM			
[Male & < 25 yr]	**[IPL Rating_PRE – IPL Rating_POST]**	-.758	.867	.151	-5.019	32	.000**
[Female & < 25 yr]		-.875	1.207	.123	-7.100	95	.000**
[Male & > 25 yr]		-1.167	1.602	.654	-1.784	5	.135
[Female & > 25 yr]		-.822	1.284	.191	-4.295	44	.000**
ALL		-.832	1.178	.087	-9.578	183	.000**

Table 9.41: 'Paired Samples t-Test' for differences between Mean values Pre vs. Post the intervention resolved according to Course and Age Category.

Remarks:

According to Table 9.41, there were statistically significant increases in IPL-Rating post the intervention for the Younger Male and Female students, Older Female students. All three differences were found to be significant at the p <0.01 level. There were no significant changes for the Older Male students who were a very small sample size (n=4).

9.2 Chapter overview

This Chapter examined students' views about how they rated IPL as a driver to influence effective interprofessional clinical practices. An important outcome of the results in this Chapter was the statistically significant change in attitude, Post the intervention. This was observed with all student groups regardless of Learning Condition, Course, Gender or Age Category.

Within sub-groups, there were three exceptions to this, Older Male students, Older Medical students and Male Nursing students. It should be noted however, that scores were still increased in these two groups post the intervention, they were just not statistically significant. The individual sample sizes for these groups were also very small. In terms of the intervention alone, there was no statistically significant difference between the IPL and UPL group.

The next most important outcome of this Chapter were the statistically significant increases in IPL Rating scores when comparisons were calculated from aggregated means of Pre and Post scores between the following groups:

- IPL nurses compared to UPL nurses
- UPL doctors compared to IPL doctors
- IPL nurses compared to IPL doctors
- Older students compared to younger students (mainly nursing)
- Older nurses compared to younger nurses

- Older IPL students compared to younger IPL students
- Older UPL students compared to younger UPL students
- Female IPL students compared to male IPL students
- Older female students compared to younger female students

From this it could be extrapolated that age (and possibly maturity) may be a strong influence on how IPL is valued and perceptions of its influence on ICP. Potentially gender also has an effect with females (particularly older females) scoring higher scores post the experience. Given that most of the older group were nurses, and approximately 50% of the whole cohort were in fact female nurses, it is this group that appears to represent the strongest views in favour of IPL. The UPL medical students were also a unique group in that they appeared to be more receptive to IPL than their IPL student counterparts indicating that the characteristics and attributes of those medical students randomized into the UPL group might have had a greater influence than the intervention alone. The intervention appeared to have a strong influence with the nursing cohort with IPL nurses scoring higher than UPL nurses and IPL doctors. It appears therefore that the most receptive people to this view of IPL and ICP are older female nursing students who were engaged in a complete IPL experience.

The immediate following chapter (Chapter 10) focuses on the students' perceptions of the Learning process (Lecture, Case-study and Simulation) used for the education intervention.

CHAPTER 10

Results - Evaluation of Learning Process

10.1 Introduction

This Chapter focuses on evaluating the Learning Process used in this research. Data from this Chapter aligns with Kirkpatrick's Level 1 analysis, that is, eliciting learners' views on the learning experience and the process used to deliver the teaching. To achieve this, a series of four questions (Q.30 – Q.33) were used to explore students' views on the Learning Process by identifying the effectiveness of individual teaching components such as the lecture, case study and simulation and how this compared to a blended teaching approach (all three combined). Participants were then asked a single question (Q.34) on whether they agreed if the intervention increased their confidence in the collaborative management of delirium (see Table 10.1). Results in this Chapter are presented in two Parts. Part A: Results within each question (raw data, summary statistics and comparisons across all groups using Independent Samples t-Test), and Part B: Comparisons between the questions to compare preferences for each of the teaching processes (summary statistics and comparisons between groups using One-way ANOVA contrast tests).

Q.30	The lecture on delirium by itself would be an effective way of teaching me about interprofessional practices
Q.31	The case study on delirium by itself would be an effective way of teaching me about interprofessional practices
Q.32	The simulation on delirium by itself would be an effective way of teaching me about interprofessional practices
Q.33	The combination of lecture, case study and simulation would be the most effective way of teaching me about interprofessional practices
Q.34	Today's learning experience has increased my confidence in the collaborative management of a patient with delirium

Table 10.1: Questions on learning process and confidence reporting.

In this Chapter, data is presented in Table and Figure form. All results presented in this Chapter, that are significant at the $p<0.05$ level are shaded in green and marked with a single asterisk '*'. Results that are significant at the $p<0.01$ level are also shaded in green but marked with a double asterisk '**'.

Part A: Summary results for Q.30 – Q.34 individually

In Part A, summary results are presented for all questions, then each of the questions are analysed individually by making comparisons generally and then comparisons according to

Learning Condition, Course, Gender and Age Category. Each question is analysed individually to compare results between groups, and then further measured for statistical significance. This is achieved by using the Independent Samples T-test, to see if the differences between the pair of Mean values are statistically significant at the $p<0.05$ or $p<0.01$ level.

Note: Only results that yielded a significant difference ($p<0.05$) between a pair of means are included.

a. Summary results:

The summary statistics for Q.30 – 34 include the raw response frequency data, which are presented as tables and figures reporting mean, standard deviation and standard error of the mean for each question.

Table 10.2 presents the raw response frequency data for each of the five questions related to Learning Process.

	N	Mean	Std. Deviation	Std. Error of Mean
Q.30 - The lecture on delirium by itself would be an effective way of teaching me about interprofessional practices	204	3.04	1.221	.085
Q.31- The case study on delirium by itself would be an effective way of teaching me about interprofessional practices	204	3.04	1.188	.083
Q.32 - The simulation on delirium by itself would be an effective way of teaching me about interprofessional practices	204	3.32	1.220	.085
Q.33 - The combination of lecture, case study and simulation would be the most effective way of teaching me about interprofessional practices	204	4.42	.817	.057
Q.34 - Today's learning experience has increased my confidence in the collaborative management of a patient with delirium	204	4.34	.799	.056

Table 10.2: Summary statistics for the responses to Q.30 – 34 on learning process POST the intervention.

From Table 10.2 it can be seen that, on average, students rated the combination of lecture, case study and simulation highly (4.42) on the 5-point Likert scale, indicating that overall this was their most preferred way of teaching about interprofessional clinical practice. The Mean value for increased confidence in the collaborative management of delirium was likewise high with a Mean value of 4.34. This indicates a high level of support for the learning experience in being able to build confidence and develop collaborative management skills.

The Mean and 95% Confidence Interval (C.I.) data from Table 10.2 is plotted in Figure 10.1.

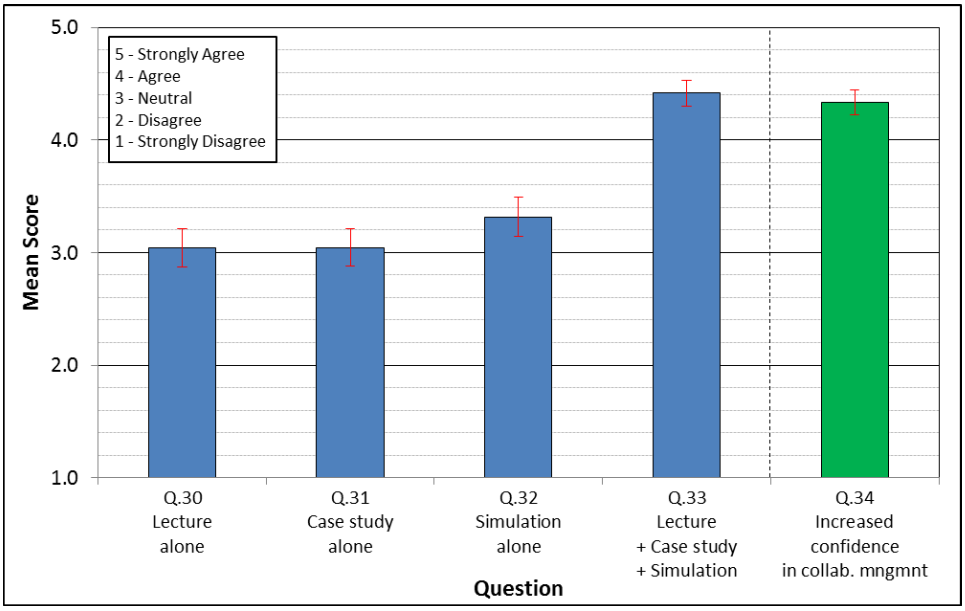


Figure 10.1: Plot of the Mean values of the responses to Q.30-POST to Q.34-POST derived of Table 10.2. The uncertainty bars represent the 95% Confidence Interval, calculated as 95% C.I. = ± 2 × Std Error of Mean.

What follows next is an analysis of each question individually.

b. Analysis of Q.30

"The lecture on delirium by itself would be an effective way of teaching me about interprofessional practice"

Raw data

Table 10.3 presents the frequency data for question 30.

Q30. The lecture on delirium by itself would be an effective way of teaching me about interprofessional practice.	Frequency	Percent
Strongly Disagree	19	9.3
Disagree	64	31.4
Neutral	36	17.6
Agree	59	28.9
Strongly Agree	26	12.7
Total	**204**	**100.0**

Table 10.3: Frequency of responses to Q.30-POST, on a five point Likert-scale.

From Table 10.3 it can be seen that less than half of the students (41.6%, n=85) endorsed, (agreed/strongly agreed), that the lecture by itself would be an effective way of teaching them about interprofessional practice.

Figure 10.2 plots the frequency data for Q. 30.

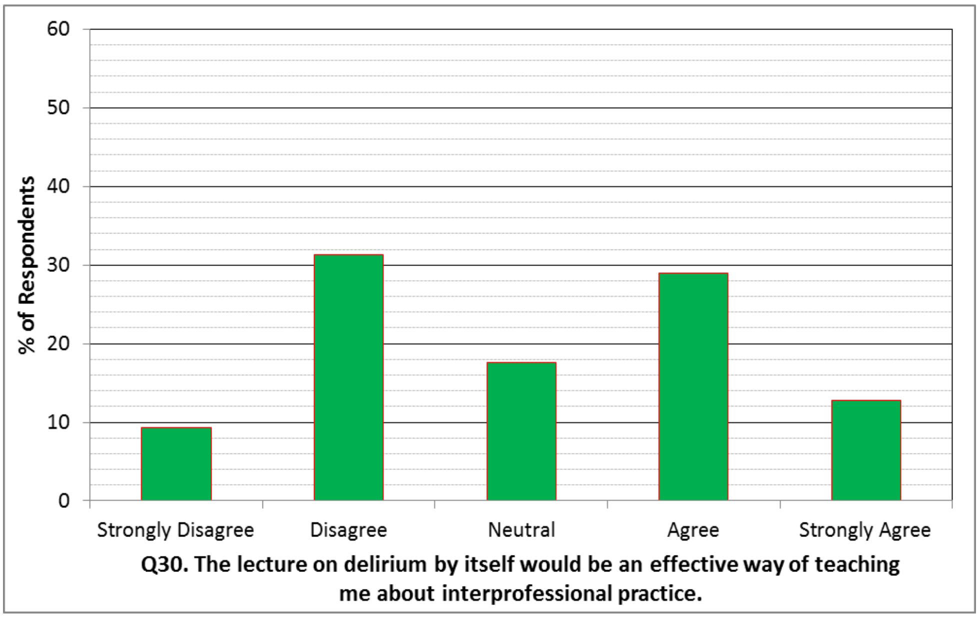


Figure 10.2: Plot of raw response data to Q.30-POST, in terms of % of Respondents.

Comparisons resolved according to All Groups

Table 10.4 provides a comparison of Mean value scores for Q.30 resolved according to Learning Condition, Course, Age Category and Gender.

Q30. The lecture on delirium by itself would be an effective way of teaching me about interprofessional practice.		**N**	**Mean**	**Std. Dev.**	**Std. Error Mean**
Condition:	IPL	101	2.93	1.210	.120
	UPL	103	3.16	1.227	.121
Course:	B.Nursing	118	3.22	1.234	.114
	MBBS	86	2.80	1.166	.126
Age Category:	< 25 yr	142	3.00	1.197	.100
	>25 yr	61	3.11	1.266	.162
Gender:	Male	42	2.90	1.265	.195
	Female	158	3.07	1.211	.096
All		204	3.04	1.221	.085

Table 10.4: Mean response values to Q.30-POST according to Learning condition, Course, Age category and Gender.

The Mean value and 95% C.I. data from Table 10.4 is plotted in Figure 10.3.

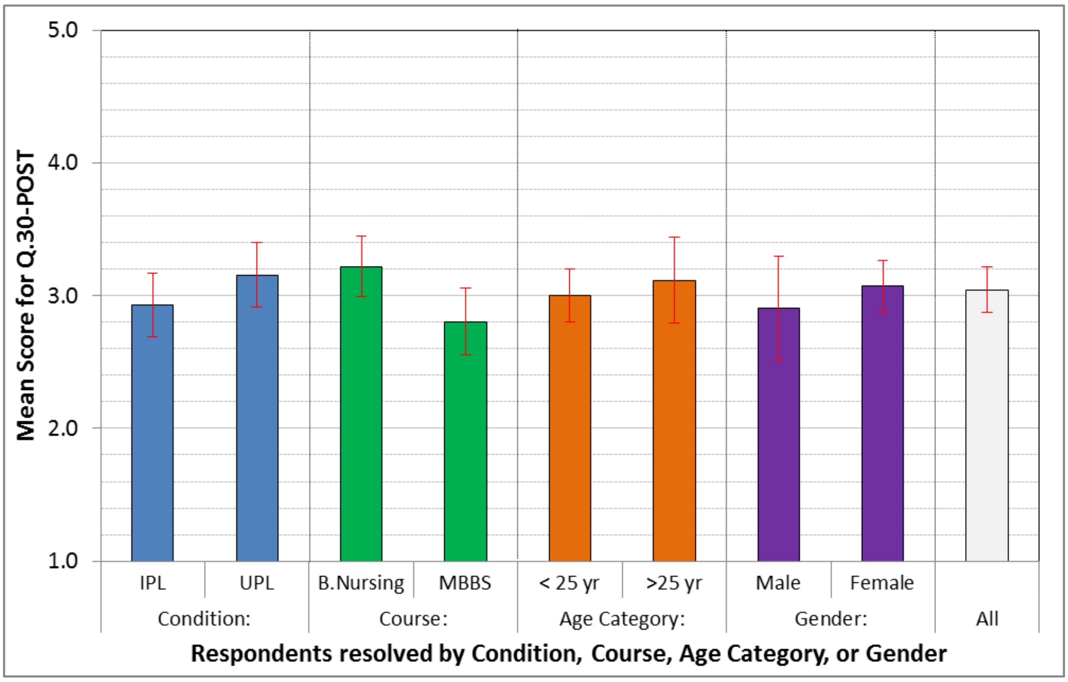


Figure 10.3: Plot of the Mean response values for Q.30 (Post) for all groups.

Table 10.5 presents the results of comparisons between groups for Q.30 after applying the 'Independent Samples T-test'.

Independent Samples Test (Equal variances not assumed)					
Q30. The lecture on delirium by itself would be an effective way of teaching me about interprofessional practice.	**t-test for Equality of Means**				
	Mean Difference	Std. Error Difference	t	df	Sig. (2-tailed)
Condition:	-.225	.171	-1.316	201.992	.190
Course:	.418	.170	2.466	188.941	.015*
Age:	-.115	.191	-.602	108.124	.549
Gender:	-.165	.218	-.757	62.437	.452

Table 10.5: 'Independent Samples T-test' to the pairs of Mean values between groups plotted in Figure 10.3.

Remarks

On average, the lecture process was seen as a significantly more effective process by Nursing students compared to Medical students ($p < 0.05$ level).

Comparisons resolved according to Learning Condition and Course (Q.30)

Table 10.6 presents the results of comparisons between groups for Q.30 resolved according to both Learning Condition and Course.

Condition: IPL/UPL		N	Mean	Std. Deviation	Std. Error of Mean
IPL	B.Nursing	57	2.98	1.261	.167
	MBBS	44	2.86	1.153	.174
UPL	B.Nursing	61	3.44	1.177	.151
	MBBS	42	2.74	1.191	.184
All		204	3.04	1.221	.085

Table 10.6: Mean response values to Q.30-POST resolved according to both Learning Condition and Course.

The Mean value and 95% C.I. data from Table 10.6 is plotted in Figure 10.4.

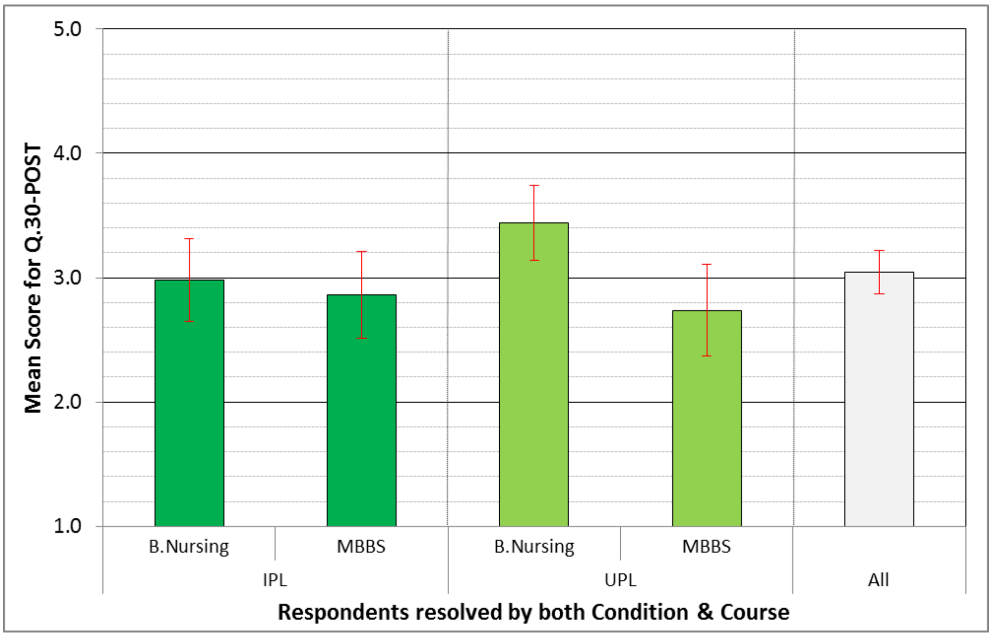


Figure 10.4: Plot of the Mean response for Q. 30 resolved according to Learning Condition and Course.

Table 10.7 presents the results of comparisons between Learning condition and Course for Q.30 after applying the 'Independent Samples T-test'.

Independent Samples Test (Equal variances not assumed)					
Q30. The lecture on delirium by itself would be an effective way of teaching me about interprofessional practice.	**t-test for Equality of Means**				
	Mean Difference	Std. Error Difference	t	df	Sig. (2-tailed)
IPL: [B.Nursing] - [MBBS]	.119	.241	.493	96.117	.623
UPL: [B.Nursing] - [MBBS]	.705	.238	2.965	87.604	.004**

Table 10.7: 'Independent Samples T-test' to compare Mean values between Learning Condition and Course.

Remarks

On average, the lecture was seen as a more effective process by the UPL nursing students compared to the UPL medical students, to a statistically significant degree at the $p < 0.01$ level.

c. Analysis of Q.31

"The case study on delirium by itself would be an effective way of teaching me about interprofessional practice"

Raw data

Table 10.8 presents the frequency data for question 31.

Q31. The case study on delirium by itself would be an effective way of teaching me about interprofessional practice.	**Frequency**	**Percent**
Strongly Disagree	18	8.8
Disagree	63	30.9
Neutral	37	18.1
Agree	64	31.4
Strongly Agree	22	10.8
Total	204	100.0

Table 10.8: Frequency of responses to Q.31-POST, on a five point Likert-scale.

From Table 10 8 it can be seen that less than half of the students (42.2%, n=86) agreed/strongly agreed that the case study by itself would be an effective way of teaching them about interprofessional practice.

Figure 10.5 plots the frequency data for Q.31

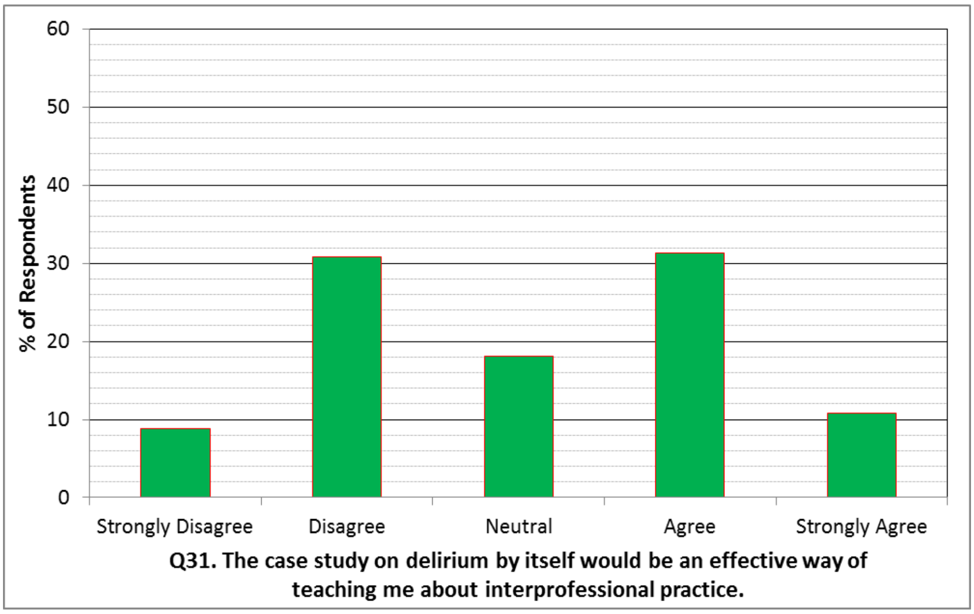


Figure 10.5: Plot of raw response data to Q.31-POST, in terms of % of Respondents.

Comparisons resolved according to all groups

Table 10.9 provides a comparison of Mean Value scores for Q.31 resolved according to Learning Condition, Course, Age Category and Gender.

Q31. The case study on delirium by itself would be an effective way of teaching me about interprofessional practice.		**N**	**Mean**	**Std. Dev.**	**Std. Error Mean**
Condition:	IPL	101	3.05	1.186	.118
	UPL	103	3.04	1.196	.118
Course:	B.Nursing	118	3.16	1.219	.112
	MBBS	86	2.88	1.132	.122
Age Category:	< 25 yr	142	3.01	1.158	.097
	> 25 yr	61	3.10	1.248	.160
Gender:	Male	42	3.10	1.246	.192
	Female	158	3.01	1.173	.093
All		203	3.03	1.183	.083

Table 10.9: Mean response values to Q.31-POST resolved according to the Learning Condition, Course, Age category and Gender.

The Mean value and 95% C.I. data from Table 10.9 is plotted in Figure 10.6.

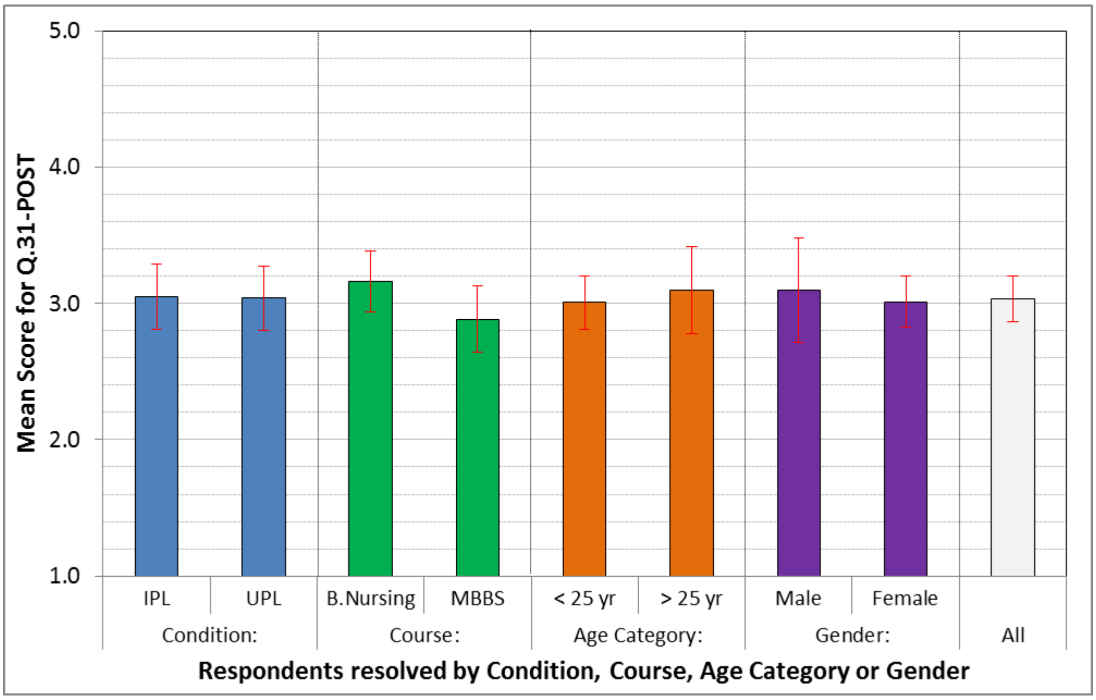


Figure 10.6: Plot of the Mean response values for Q.31 (Post)

Table 10.10 presents the results of comparisons between groups for Q.31 after applying the 'Independent Samples T-test'.

Independent Samples Test (Equal variances not assumed)					
Q31. The case study on delirium by itself would be an effective way of teaching me about interprofessional practice.	**t-test for Equality of Means**				
	Mean Difference	Std. Error Difference	t	df	Sig. (2-tailed)
Condition:	.011	.167	.064	201.972	.949
Course:	.277	.166	1.673	190.578	.096
Age:	-.091	.187	-.488	106.396	.626
Gender:	.083	.214	.386	61.706	.700

Table 10.10: 'Independent Samples T-test' to the pairs of Mean values between groups plotted in Figure 10.6.

Remarks

In no case are the pairs of Mean values separated by a difference, which is significant at the $p<0.05$ level.

Comparisons resolved according to Learning Condition and Course (Q.31)

Table 10.11 presents the results of comparisons between groups for Q.31 resolved according to both Learning Condition and Course.

Condition: IPL/NIPL		N	Mean	Std. Deviation	Std. Error of Mean
IPL	B.Nursing	57	3.04	1.281	.170
	MBBS	44	3.07	1.065	.161
UPL	B.Nursing	61	3.28	1.157	.148
	MBBS	42	2.69	1.179	.182
All		204	3.04	1.188	.083

Table 10.11: Mean response values to Q.31-POST resolved according to both Learning Condition and Course.

The Mean value and 95% C.I. data from Table 10.11 is plotted in Figure 10.7.

Figure 10.7: Plot of the Mean response values for Q.31 resolved according to Learning Condition and Course.

Table 10.12 presents the results of comparisons between Learning condition and Course for Q.31 after applying the 'Independent Samples T-test'.

Independent Samples Test (Equal variances not assumed)					
Q31. The case study on delirium by itself would be an effective way of teaching me about interprofessional practice.	t-test for Equality of Means				
	Mean Difference	Std. Error Difference	t	df	Sig. (2-tailed)
IPL: [B.Nursing] - [MBBS]	-.033	.234	-.142	98.419	.888
UPL: [B.Nursing] - [MBBS]	.588	.235	2.508	87.187	.014*

Table 10.12: 'Independent Samples T-test' to compare Mean values resolved according to Learning Condition and Course.

Remarks

On average, the case study was seen as a more effective process by UPL nursing students compared to UPL medical students, to a statistically significant degree at the $p < 0.05$ level.

d. Analysis of Q.32

"The simulation on delirium by itself would be an effective way of teaching me about interprofessional practice"

Raw data

Table 10.13 presents the frequency data for Q. 32.

Q32. The simulation on delirium by itself would be an effective way of teaching me about interprofessional practice.	**Frequency**	**Percent**
Strongly Disagree	13	6.4
Disagree	55	27.0
Neutral	25	12.3
Agree	76	37.3
Strongly Agree	35	17.2
Total	204	100.0

Table 10.13: Frequency of responses to Q.32-POST, on a five point Likert-scale.

From Table 10.13 it can be seen that approximately half of the students (54.5%, n=111) agreed/strongly agreed that the simulation would be an effective way of teaching them about interprofessional practice.

Figure 10.8 plots the frequency data for question 32.

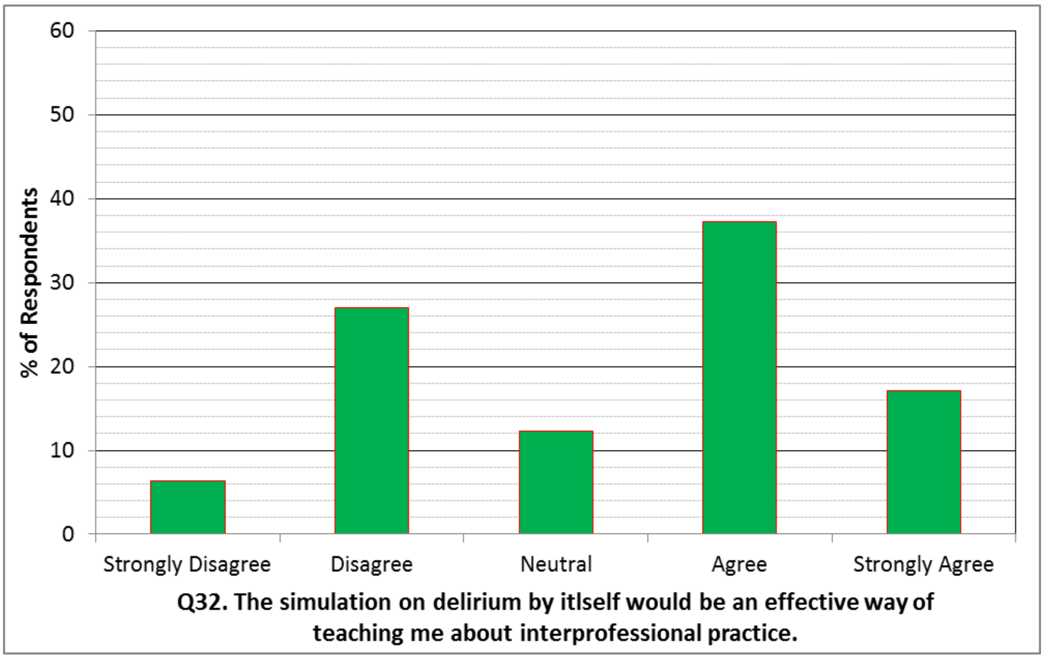


Figure 10.8: Plot of raw response data to Q.32-POST, in terms of % of Respondents.

Comparisons resolved according to all groups

Table 10.14 provides a comparison of Mean value scores for Q.32 resolved according to Learning Condition, Course, Age Category and Gender.

Q32. The simulation on delirium by itself would be an effective way of teaching me about interprofessional practice.		**N**	**Mean**	**Std. Dev.**	**Std. Error Mean**
Condition:	IPL	101	3.39	1.225	.122
	UPL	103	3.25	1.218	.120
Course:	B.Nursing	118	3.31	1.244	.115
	MBBS	86	3.34	1.194	.129
Age Category:	< 25 yr	142	3.32	1.217	.102
	>25 yr	61	3.31	1.246	.159
Gender:	Male	42	3.64	1.186	.183
	Female	158	3.23	1.226	.097
All		204	3.32	1.220	.085

Table 10.14: Mean response values to Q.32-POST resolved according to Learning Condition, Course, Age Category and Gender.

The Mean response value and 95% C.I. data from Table 10.14 is plotted in Figure 10.9

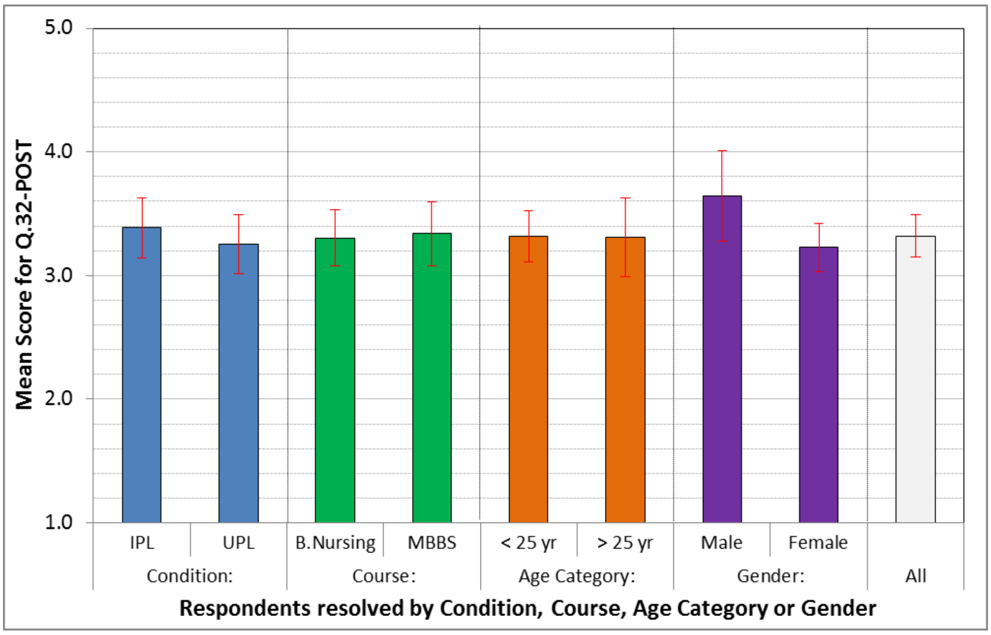


Figure 10.9: Plot of the Mean response values for Q. 32 (Post) for all groups.

Table 10.15 presents the results of comparisons between groups for Q.32 after applying the 'Independent Samples T-test'.

Independent Samples Test (Equal variances not assumed)					
Q32. The simulation on delirium by itself would be an effective way of teaching me about interprofessional practice.	**t-test for Equality of Means**				
	Mean Difference	Std. Error Difference	t	df	Sig. (2-tailed)
Condition:	.134	.171	.782	201.877	.435
Course:	-.032	.172	-.186	187.427	.852
Age:	.005	.189	.029	111.315	.977
Gender:	.415	.207	2.002	66.198	.049*

Table 10.15: 'Independent Samples T-test' to the pairs of Mean values between groups plotted in Figure 10.9.

Remarks

On average, the simulation was seen as a more effective process by male students compared to female students, to a statistically significant degree at the p <0.05 level.

e. Analysis of Q.33

"The combination of lecture, case study and simulation would be the most effective way of teaching me about interprofessional practice"

Raw data

Table 10.16 presents the frequency data for Q.33.

Q33. The combination of lecture, case study and simulation would be the most effective way of teaching me about interprofessional practice.	**Frequency**	**Percent**
Strongly Disagree	3	1.5
Disagree	6	2.9
Neutral	7	3.4
Agree	75	36.8
Strongly Agree	113	55.4
Total	204	100.0

Table 10.16: Frequency of responses to Q.33-POST, on a five point Likert-scale.

From Table 10.16 it be seen that the vast majority of students (88.7%, n=188) agreed/strongly agreed that the combination of lecture, case study and simulation was the most effective way of teaching them about interprofessional practice.

Figure 10.10 plots the frequency data for Q.33.

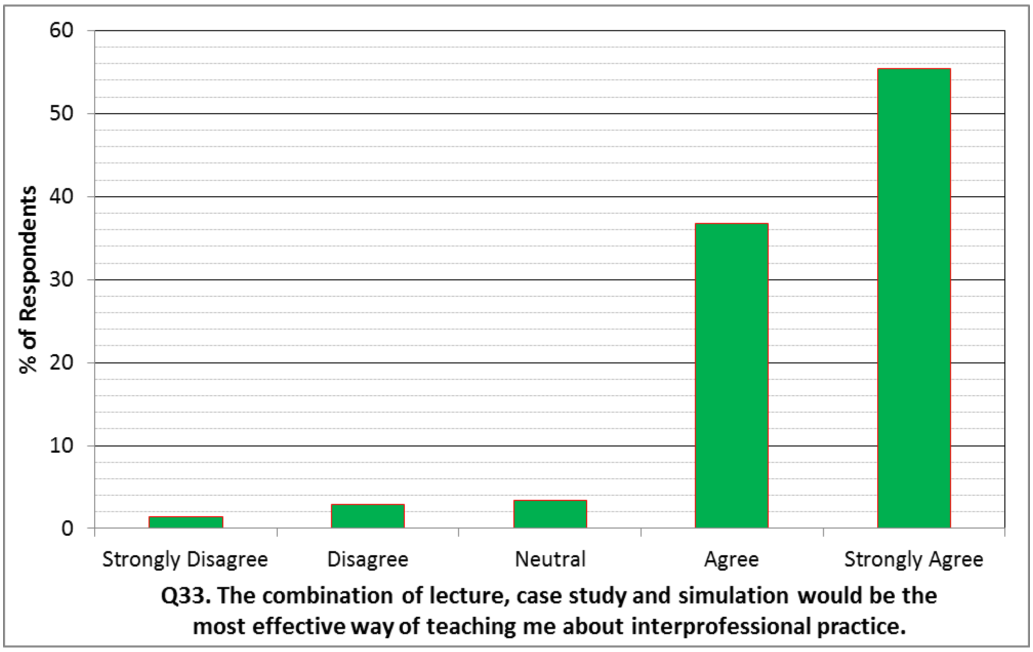


Figure 10.10: Plot of raw response data to Q.33-POST, in terms of % of Respondents.

Comparisons within groups

Table 10.17 provides a comparison of Mean value scores for Q.33 resolved according to Learning Condition, Course, Age Category and Gender.

Q33. The combination of lecture, case study and simulation would be the most effective way of teaching me about interprofessional practice.		**N**	**Mean**	**Std. Dev.**	**Std. Error Mean**
Condition:	IPL	101	4.51	.626	.062
	UPL	103	4.32	.962	.095
Course:	B.Nursing	118	4.40	.878	.081
	MBBS	86	4.44	.729	.079
Age Category:	< 25 yr	142	4.35	.877	.074
	>25 yr	61	4.57	.644	.083
Gender:	Male	42	4.29	.891	.138
	Female	158	4.46	.803	.064
All		204	4.42	.817	.057

Table 10.17: Mean response values to Q.33-POST resolved according to: Condition, then Course, Age Category and Gender.

The Mean response value and 95% C.I. data is plotted in Figure 10.11.

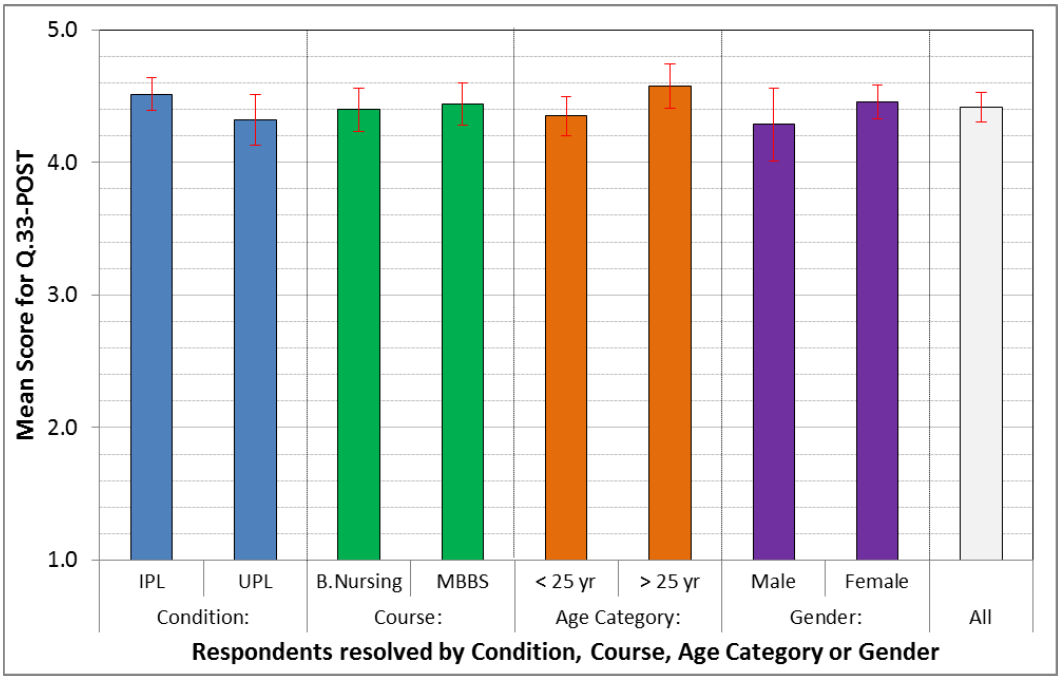


Figure 10.11: Plot of the Mean response values for Q.33 (Post) for all groups.

Table 10.18 presents the results of comparisons between groups for Q.33 after applying the ‘Independent samples T-test’.

Independent Samples Test (Equal variances not assumed)					
Q33. The combination of lecture, case study and simulation would be the most effective way of teaching me about interprofessional practice.	t-test for Equality of Means				
	Mean Difference	Std. Error Difference	T	df	Sig. (2-tailed)
Condition:	.194	.113	1.714	175.730	.088
Course:	-.044	.113	-.386	198.529	.700
Age:	-.222	.111	-2.005	152.364	.047*
Gender:	-.170	.152	-1.121	59.864	.267

Table 10.18: 'Independent Samples T-test' to the pairs of Mean values between groups plotted in Figure 10.11.

Remarks

On average, the combination of lecture, case study and simulation was seen as a more effective process by older students compared to younger students, to a statistically significant degree at the p <0.05 level.

Comparisons resolved according to Course and Gender (Q.33)

Table 10.19 presents the results of comparisons between groups for Q.33 resolved according to both Course and Gender.

Course		**N**	**Mean**	**Std. Deviation**	**Std. Error of Mean**
B.Nursing	Male	9	4.56	.527	.176
	Female	105	4.39	.915	.089
MBBS	Male	33	4.21	.960	.167
	Female	53	4.58	.497	.068
All		200	4.42	.823	.058

Table 10.19: Mean response values to Q.33-POST resolved according to both Course and Gender.

Figure 10.12 plots these results.

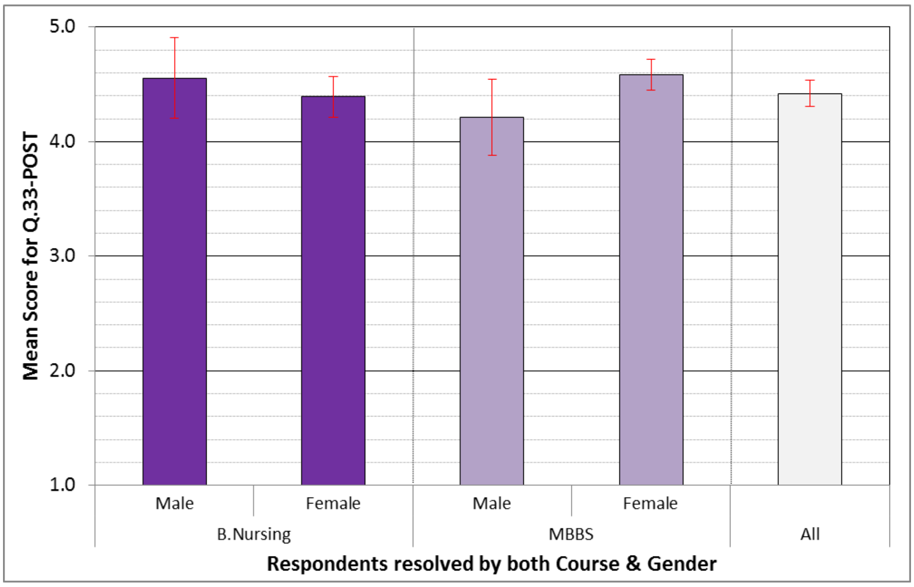


Figure 10.12: Plot of the Mean response values for Q.33 resolved according to Course and Gender.

Table 10.20 presents the results of comparisons between Course and Gender for Q.33 after applying the 'Independent samples T-test'.

Independent Samples Test (Equal variances not assumed)					
Q33. The combination of lecture, case study and simulation would be the most effective way of teaching me about interprofessional practice.	**t-test for Equality of Means**				
	Mean Difference	Std. Error Difference	t	df	Sig. (2-tailed)
B.Nursing: [Male] - [Female]	.165	.197	.838	12.598	.418
MBBS: [Male] - [Female]	-.373	.181	-2.064	42.848	.045*

Table 10.20: 'Independent Samples T-test' to the pairs of Mean values between Course and Gender.

Remarks

On average, the combination of lecture, case study and simulation was seen as a more effective process by Female Medical students compared to Male Medical students, to a statistically significant degree at the $p < 0.05$ level.

f. Analysis of Q.34

"Today's learning experience has increased my confidence in the collaborative management of a patient with delirium"

Raw data

Table 10.21 presents the frequency data for Q.34.

Q34. Today's learning experience has increased my confidence in the collaborative management of a patient with delirium.	**Frequency**	**Percent**
Strongly Disagree	3	1.5
Disagree	2	1.0
Neutral	18	8.8
Agree	81	39.7
Strongly Agree	100	49.0
Total	204	100.0

Table 10.21: Frequency of responses to Q.34-POST, on a five point Likert-scale.

From Table 10.21 it can be seen that the vast majority of students (88.7%) agreed/strongly agreed that the learning experience had increased their confidence in the collaborative management of a delirious patient.

The Mean value response and 95% C.I. data from Table 10.21 is plotted in Figure 10.13.

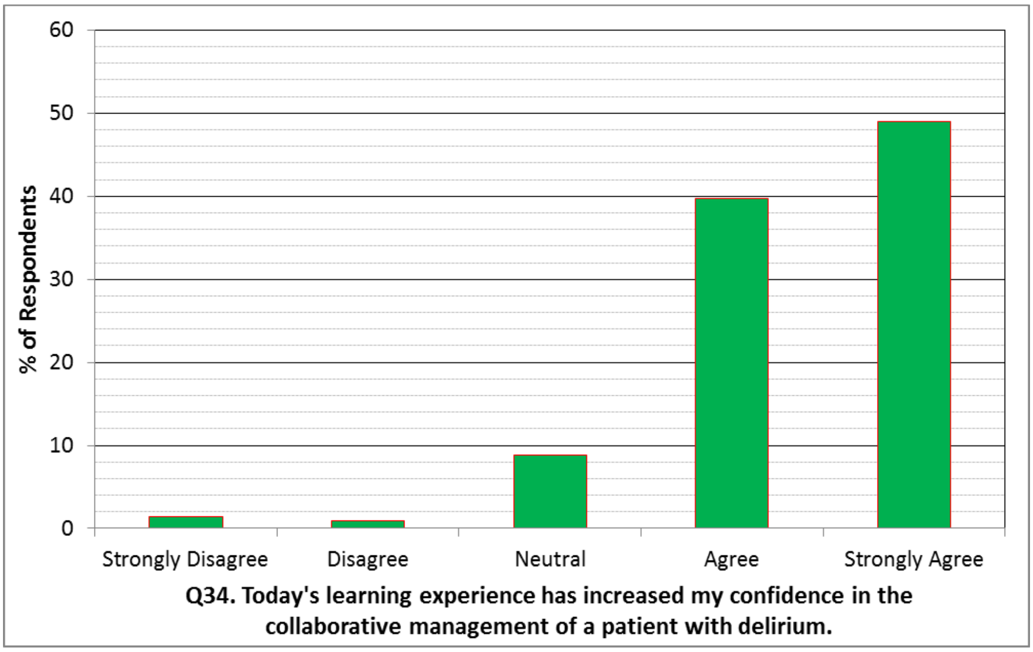


Figure 10.13: Plot of raw response data to Q.34-POST, in terms of % of Respondents.

j. Comparisons resolved according to All Groups

Table 10.22 provides a comparison of Mean value scores for Q.34 resolved according to Learning Condition, Course, Age Category and Gender.

Q34. Today's learning experience has increased my confidence in the collaborative management of a patient with delirium.		**N**	**Mean**	**Std. Dev.**	**Std. Error Mean**
Condition:	IPL	101	4.42	.621	.062
	UPL	103	4.26	.939	.093
Course:	B.Nursing	118	4.36	.802	.074
	MBBS	86	4.30	.798	.086
Age Category:	< 25 yr	142	4.27	.866	.073
	>25 yr	61	4.51	.595	.076
Gender:	Male	42	4.14	.899	.139
	Female	158	4.39	.772	.061
All		204	4.34	.799	.056

Table 10.22: Mean response values to Q.34-POST resolved according to: Learning Condition, then Course, Age Category and Gender.

The Mean value response and 95% C.I. data from Table 10.22 is plotted in Figure 10.14.

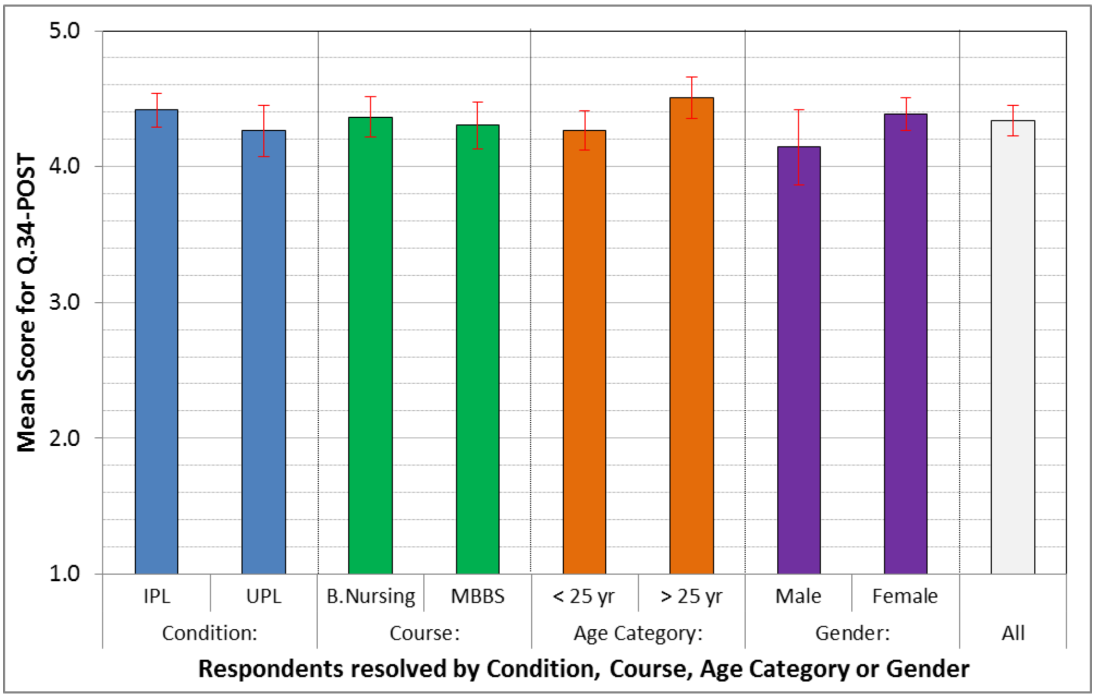


Figure 10.14: Plot of the Mean response values for Q.34 (Post) for all groups.

Table 10.23 presents the results of comparisons between groups for Q.34 after applying the 'Independent Samples T-test'.

Independent Samples Test (Equal variances not assumed)					
Q34. Today's learning experience has increased my confidence in the collaborative management of a patient with delirium.	t-test for Equality of Means				
	Mean Difference	Std. Error Difference	t	df	Sig. (2-tailed)
Condition:	.154	.111	1.382	177.273	.169
Course:	.062	.113	.547	183.874	.585
Age:	-.241	.105	-2.285	161.896	.024*
Gender:	-.243	.152	-1.603	58.040	.114

Table 10.23: 'Independent Samples T-test' to the pairs of Mean values between groups plotted in Figure 10.14.

Remarks

On average, an increase in confidence in collaboratively managing a patient with delirium was observed more in older students compared to younger students, to a statistically significant degree at the $p < 0.05$ level.

k. Comparisons resolved according to Course and Gender

Table 10.24 presents the results of comparisons between groups for Q.34 resolved according to both Course and Gender.

Course		**N**	**Mean**	**Std. Deviation**	**Std. Error of Mean**
B.Nursing	Male	9	4.56	.527	.176
	Female	105	4.34	.830	.081
MBBS	Male	33	4.03	.951	.166
	Female	53	4.47	.639	.088
All		200	4.34	.804	.057

Table 10.24: Mean response values to Q.34-POST resolved according to both Course and Gender.

The Mean value response and 95% C.I. data from Table 10.24 is plotted in Figure 10.15.

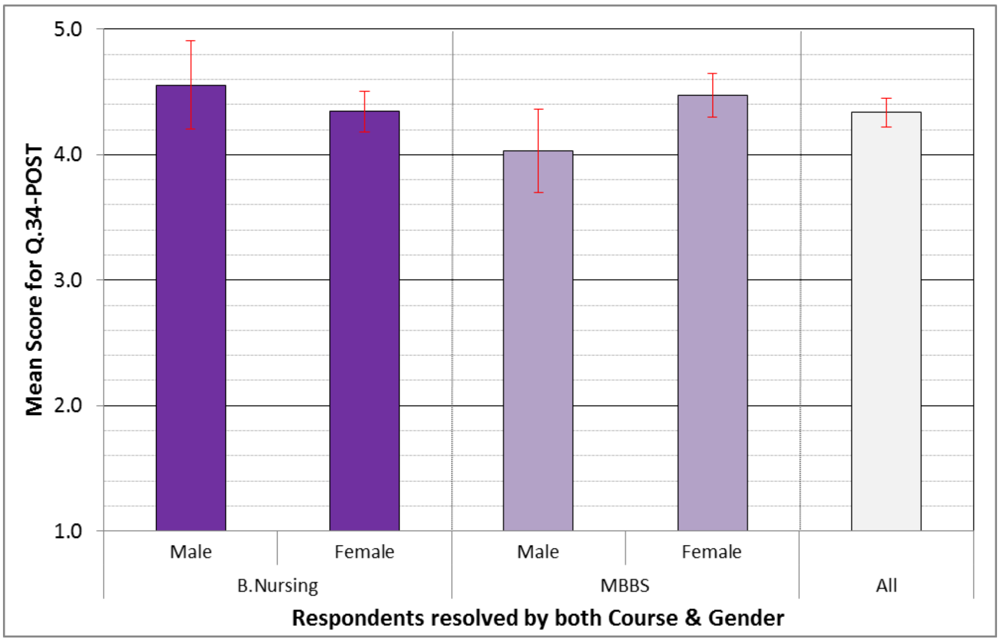


Figure 10.15: Plot of the Mean response values resolved according to Course and Gender.

Table 10.25 presents the results of comparisons between groups for Q.34 after applying the 'Independent samples T-test'.

Independent Samples Test (Equal variances not assumed)					
Q34. Today's learning experience has increased my confidence in the collaborative management of a patient with delirium.	t-test for Equality of Means				
	Mean Difference	Std. Error Difference	t	df	Sig. (2-tailed)
B.Nursing: [Male] - [Female]	.213	.193	1.099	11.723	.294
MBBS: [Male] - [Female]	-.441	.187	-2.355	50.047	.022*

Table 10.25: 'Independent Samples T-test' to compare Mean values resolved according to Course and Gender.

Remarks

On average, an increase in confidence in collaboratively managing a patient with delirium was observed more in female medical students compared to male medical students, to a statistically significant degree at the $p < 0.05$ level.

Part B: Comparisons 'Between Responses' for Q.30 - 33

Part B presents results that compare responses between each of the four questions (Q.30 – 33). This reveals quantitative measures of the respondents' relative preferences of each of the four learning Processes, namely '*Lecture'* alone, '*Case Study'* alone, '*Simulation'* alone, and the '*Combination'* of Lecture, plus Case Study, plus Simulation.

Various differences ('contrasts') between the Mean Scores for the four different Learning Processes were analysed using One-Way ANOVA Contrast Testing. This identified those 'contrasts' that were/were not statistically significant. For those 'contrasts' found to be significant this was at the level of $p<0.05$ or at $p<0.01$.

These relative preferences are then analysed for differences in these preferences according to:

- Course: Nursing and MBBS students, separately;
- Age Category: Less than and More than 25 yrs, separately;
- Gender: Male and Female respondents, separately;
- Learning Condition: IPL and UPL respondents, separately; and finally,
- Nursing × IPL, Nursing × UPL, MBBS × IPL, and MBBS × UPL groups, separately.

In the reporting of these comparisons, only results where the 2 factor-analysis yields a significant difference ($p<0.05$) between a pair of Mean values are included.

a. Summary results for Q.30 – 33 post the intervention

Table 10.26 presents the raw response frequency data for each of the four questions related to Learning Process.

Learning Process Scores	N	Mean Score	Std. Deviation	Std. Error of Mean	95% C.I.
Q.30 Lecture alone	204	3.04	1.22	.085	0.171
Q.31 Case study alone	204	3.04	1.19	.083	0.166
Q.32 Simulation alone	204	3.32	1.22	.085	0.171
Q.33 Lecture + Case study + Simulation	204	4.42	0.82	.057	0.114

Table 10.26: Summary statistics, including Mean Score and 95% Confidence Interval for Q.30-Q.33.

Figure 10.16 plots the results of Table 10.26.

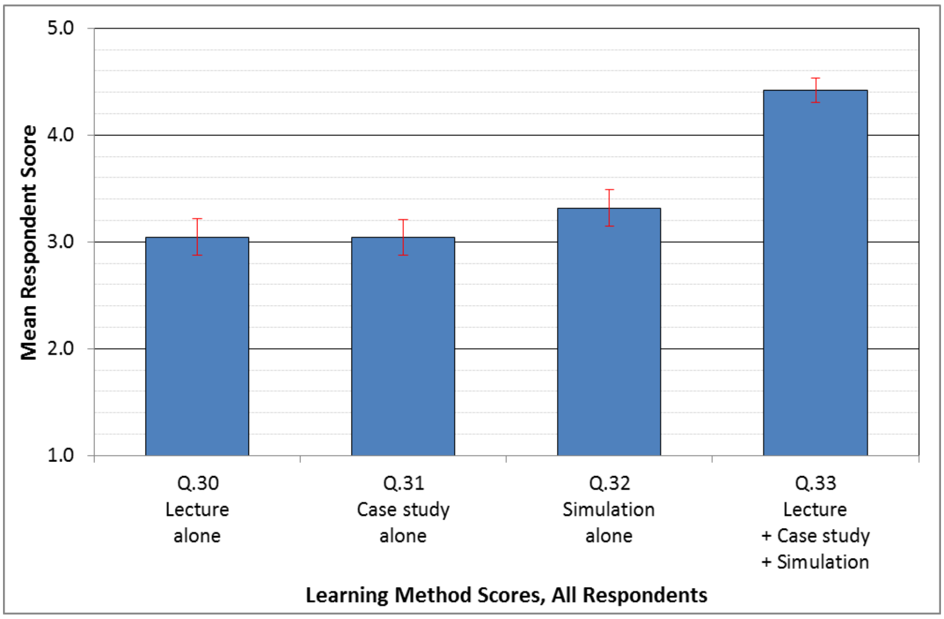


Figure 10.16: Plot of the Mean values, and their 95% Confidence Intervals, of the responses to Q.30-Q.33, from Table 10.26.

Table 10.27 presents the results from applying a one-way ANOVA contrast test to the Mean Score values plotted in Figure 10.16. Each of six possible pairwise comparisons ('contrasts' or 'differences') of the four different Mean Score values is considered, as listed in the second column. The final column lists the 'Significance' of the Contrast.

One-Way ANOVA Contrast Tests (Does not assume equal variances)

Contrast		Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Learning Process Scores	[Q30 Lecture] - [Q31 Case study]	0.0000	.11928	0.000	405.7	1.000
	[Q30 Lecture] - [Q32 Simulation]	-.2745	.12086	-2.271	406.0	.024*
	[Q30 Lecture] - [Q33 Combined]	-1.3725	.10286	-13.343	354.5	.000**
	[Q31 Case study] - [Q32 Simulation]	-.2745	.11925	-2.302	405.7	.022*
	[Q31 Case study] - [Q33 Combined]	-1.3725	.10097	-13.594	359.9	.000**
	[Q32 Simulation] - [Q33 Combined]	-1.0980	.10283	-10.678	354.6	.000**

Table 10.27: 'One-Way ANOVA Contrast Tests' to the Mean Score values plotted in Figure 10.16.

Remarks

Table 10.27 indicates that on average for all respondents (n=204):

- The 'Combined' Learning Process is significantly preferred over each of the three 'Single' Learning processes, (p <0.01)
- The 'Simulation' Learning Process is significantly preferred over both of the other 'Single' Learning processes (Case Study and Lecture), (p <0.05).

Each of these relative preferences for various groups of the cohort is now considered separately.

b. Comparisons between questions resolved according to Learning Condition

Table 10.28 presents the results of comparisons between Learning condition for Q.30 – Q.33.

Condition	Learning Process Scores	N	Mean Score	Std. Deviation	Std. Error of Mean	95% C.I.
IPL	Q30 Lecture	101	2.93	1.21	.120	.241
	Q31 Case study	101	3.05	1.19	.118	.236
	Q32 Simulation	101	3.39	1.22	.122	.244
	Q33 Combined	101	4.51	0.63	.062	.125
UPL	Q30 Lecture	103	3.16	1.23	.121	.242
	Q31 Case study	103	3.04	1.20	.118	.236
	Q32 Simulation	103	3.25	1.22	.120	.240
	Q33 Combined	103	4.32	0.96	.095	.190

Table 10.28: Summary statistics, including Mean Score and 95% Confidence Interval for Q.30-Q.33, resolved by Condition.

Figure 10.17, plots the results from Table 10.28.

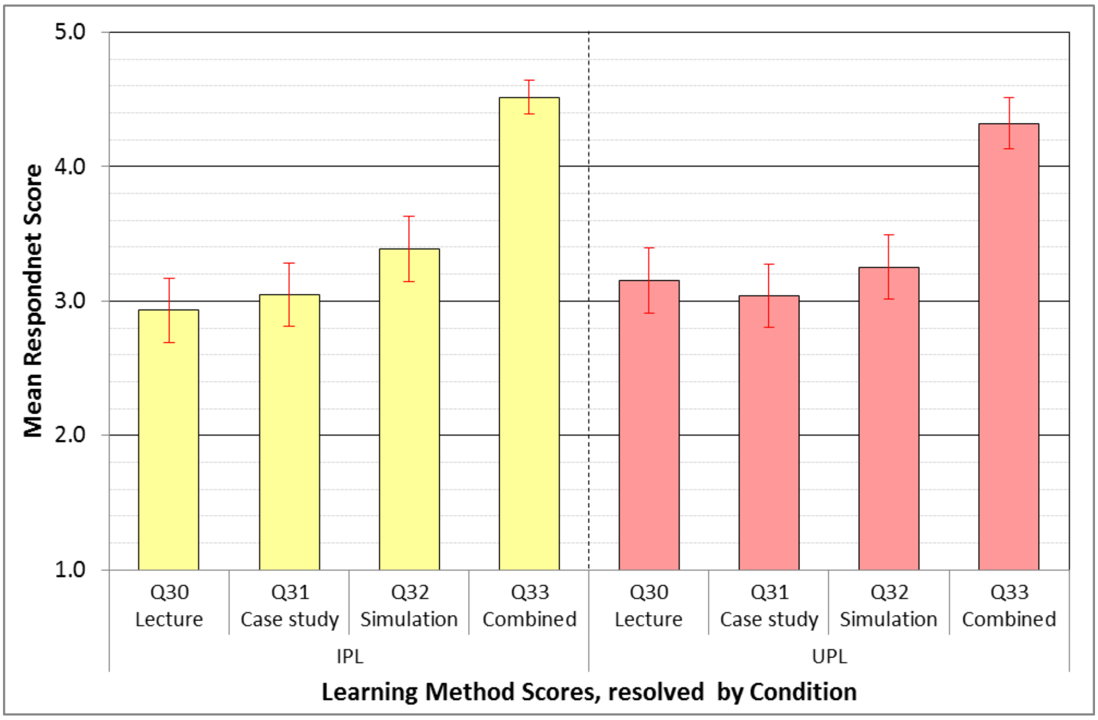


Figure 10.17: Plot of the Mean values, and their 95% Confidence Intervals, of the Condition resolved responses to Q.30-Q.33, from Table 10.28.

Table 10.29 presents results of applying 'One-Way ANOVA Contrast Tests' to the Mean Score values for Learning condition plotted in Figure 10.17.

One-Way ANOVA Contrast Tests (Does not assume equal variances)								
Condition	**Contrast**		**Value of Contrast**	**Std. Error**	**t**	**df**	**Sig. (2-tailed)**
IPL	Learning Process Scores	[Q30 Lecture] - [Q31 Case study]	-.1188	.16865	-.704	199.9	.482
		[Q30 Lecture] - [Q32 Simulation]	-.4554	.17132	-2.658	200.0	.008**
		[Q30 Lecture] - [Q33 Combined]	-1.5842	.13561	-11.682	150.0	.000**
		[Q31 Case study] - [Q32 Simulation]	-.3366	.16965	-1.984	199.8	.049*
		[Q31 Case study] - [Q33 Combined]	-1.4653	.13349	-10.977	151.7	.000**
		[Q32 Simulation] - [Q33 Combined]	-1.1287	.13686	-8.247	149.0	.000**
UPL	Learning Process Scores	[Q30 Lecture] - [Q31 Case study]	.1165	.16880	.690	203.9	.491
		[Q30 Lecture] - [Q32 Simulation]	-.0971	.17037	-.570	204.0	.569
		[Q30 Lecture] - [Q33 Combined]	-1.1650	.15362	-7.584	193.0	.000**
		[Q31 Case study] - [Q32 Simulation]	-.2136	.16822	-1.270	203.9	.206
		[Q31 Case study] - [Q33 Combined]	-1.2816	.15123	-8.474	195.1	.000**
		[Q32 Simulation] - [Q33 Combined]	-1.0680	.15298	-6.981	193.6	.000**

Table 10.29: 'One-Way ANOVA Contrast Tests' to the Mean Score values for Learning Condition plotted in Figure 10.17.

Remarks

Table 10.29 indicates that on average:

- The IPL group (n=101) significantly preferred the **'Combined'** learning process over each of the three 'Single' learning processes ($p<0.01$)
- The UPL group (n=103) significantly preferred the **'Combined'** learning process over each of the three 'Single' learning processes ($p<0.01$)
- The IPL group (N = 101) significantly preferred the **'Simulation'** learning process over the 'Case study' learning process ($p<0.05$ level)
- The IPL group (N = 101) significantly preferred the **'Simulation'** learning process over the 'Lecture' learning process ($p <0.01$).

c. Comparisons resolved according to Course

Table 10.30 presents the results of comparisons between Courses for Q.30 – Q.33.

Course	Learning Process Scores	N	Mean Score	Std. Deviation	Std. Error of Mean	95% C.I.
B.Nursing	Q30 Lecture	118	3.22	1.23	.114	.227
	Q31 Case study	118	3.16	1.22	.112	.224
	Q32 Simulation	118	3.31	1.24	.115	.229
	Q33 Combined	118	4.40	0.88	.081	.162
MBBS	Q30 Lecture	86	2.80	1.17	.126	.252
	Q31 Case study	86	2.88	1.13	.122	.244
	Q32 Simulation	86	3.34	1.19	.129	.258
	Q33 Combined	86	4.44	0.73	.079	.157

Table 10.30: Summary statistics, including Mean Score and 95% Confidence Interval for Q.30-Q.33, resolved by Course.

This data is plotted in Figure 10.18, below.

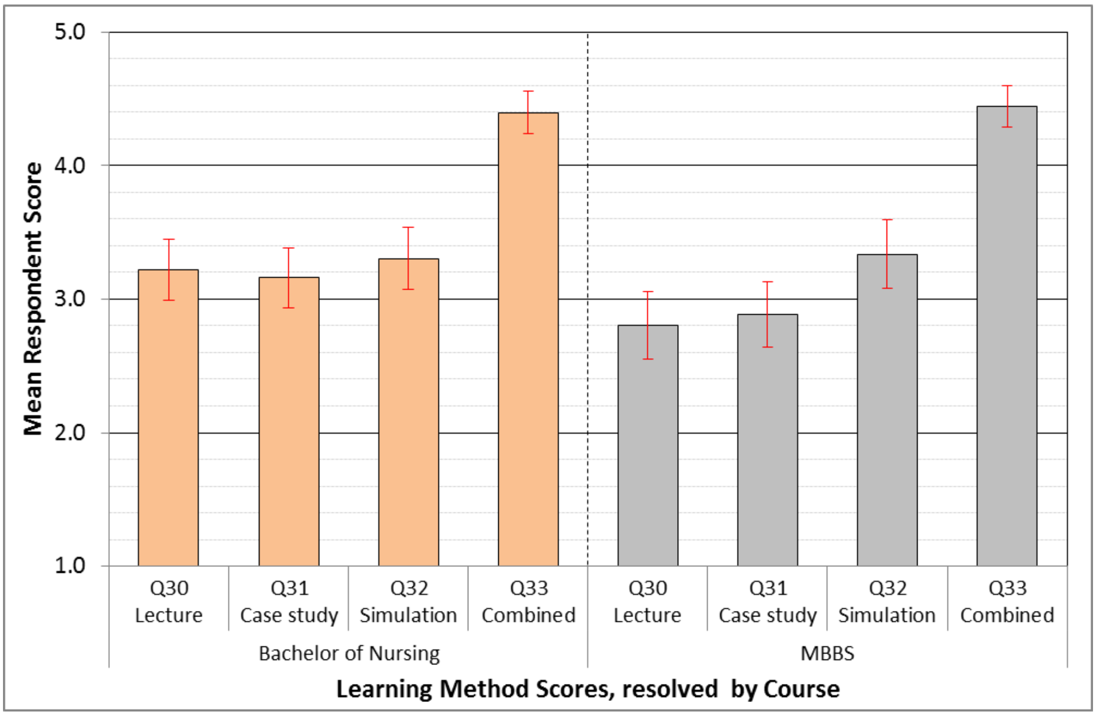


Figure 10.18: Plot of the Mean values, and their 95% Confidence Intervals, of the Course of Study resolved responses to Q.30-Q.33, from Table 10.30.

Table 10.31 presents results of applying 'One-Way ANOVA Contrast Tests' to the Mean Score values plotted in Figure 10.18.

One-Way ANOVA Contrast Tests (Does not assume equal variances)							
Course	**Contrast**		**Value of Contrast**	**Std. Error**	**t**	**df**	**Sig. (2-tailed)**
B.Nursing	Learning Process Scores	[Q30 Lecture] - [Q31 Case study]	.0593	.15972	.371	234.0	.711
		[Q30 Lecture] - [Q32 Simulation]	-.0847	.16132	-.525	234.0	.600
		[Q30 Lecture] - [Q33 Combined]	-1.1780	.13947	-8.446	211.3	.000**
		[Q31 Case study] - [Q32 Simulation]	-.1441	.16034	-.898	233.9	.370
		[Q31 Case study] - [Q33 Combined]	-1.2373	.13834	-8.944	212.7	.000**
		[Q32 Simulation] - [Q33 Combined]	-1.0932	.14018	-7.799	210.5	.000**
MBBS	Learning Process Scores	[Q30 Lecture] - [Q31 Case study]	-.0814	.17524	-.464	169.8	.643
		[Q30 Lecture] - [Q32 Simulation]	-.5349	.18001	-2.971	169.9	.003**
		[Q30 Lecture] - [Q33 Combined]	-1.6395	.14834	-11.053	142.7	.000**
		[Q31 Case study] - [Q32 Simulation]	-.4535	.17740	-2.556	169.5	.011*
		[Q31 Case study] - [Q33 Combined]	-1.5581	.14517	-10.733	145.2	.000**
		[Q32 Simulation] - [Q33 Combined]	-1.1047	.15089	-7.321	140.7	.000**

Table 10.31: ‘One-Way ANOVA Contrast Tests’ to the Mean Score values for Age plotted in Figure 10.18.

Remarks

Table 10.31 indicates that on average:

- The Nursing students (n=118) significantly preferred the **‘Combined’** learning process over each of the three ‘Single’ learning processes (p<0.01)
- The Medical students (n=86) significantly preferred the **‘Combined’** learning process over each of the three ‘Single’ learning processes (p<0.01)
- The Medical students only (N = 86) significantly preferred the **‘Simulation’** learning process over the ‘Case study’ learning process (p<0.05 level)
- The Medical students only (N = 86) significantly preferred the **‘Simulation’** learning process over the ‘Lecture’ learning process (p <0.01).

d. Comparisons resolved according to Gender

Table 10.32 presents the results of comparisons between Gender for Q.30 – Q.33.

Gender	Learning Process Scores	N	Mean Score	Std. Deviation	Std. Error of Mean	95% C.I.
Male	Q30 Lecture	42	2.90	1.27	.195	.390
	Q31 Case study	42	3.10	1.25	.192	.384
	Q32 Simulation	42	3.64	1.19	.183	.366
	Q33 Combined	42	4.29	0.89	.138	.275
Female	Q30 Lecture	158	3.07	1.21	.096	.193
	Q31 Case study	158	3.01	1.17	.093	.187
	Q32 Simulation	158	3.23	1.23	.097	.195
	Q33 Combined	158	4.46	0.80	.064	.128

Table 10.32: Summary statistics, including Mean Score and 95% Confidence Interval for Q.30-Q.33, resolved by Gender.

This data is plotted in Figure 10.19, below.

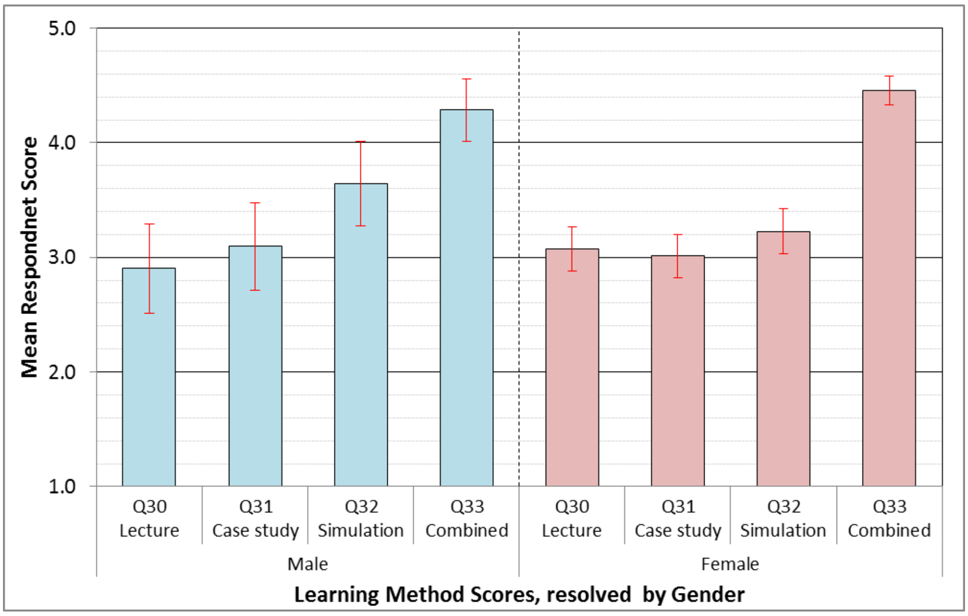


Figure 10.19: Plot of the Mean values, and their 95% Confidence Intervals, of the Gender resolved responses to Q.30-Q.33, from Table 10.32.

Table 10.33 presents results of applying 'One-Way ANOVA Contrast Tests' to the Mean Score values plotted in Figure 10.19.

One-Way ANOVA Contrast Tests (Does not assume equal variances)							
Gender		**Contrast**	**Value of Contrast**	**Std. Error**	**t**	**df**	**Sig. (2-tailed)**
Male	Learning Process Scores	[Q30 Lecture] - [Q31 Case study]	-.1905	.27395	-.695	82.0	.489
		[Q30 Lecture] - [Q32 Simulation]	-.7381	.26755	-2.759	81.7	.007**
		[Q30 Lecture] - [Q33 Combined]	-1.3810	.23879	-5.783	73.7	.000**
		[Q31 Case study] - [Q32 Simulation]	-.5476	.26537	-2.064	81.8	.042*
		[Q31 Case study] - [Q33 Combined]	-1.1905	.23635	-5.037	74.3	.000**
		[Q32 Simulation] - [Q33 Combined]	-.6429	.22889	-2.809	76.1	.006**
Female	Learning Process Scores	[Q30 Lecture] - [Q31 Case study]	.0570	.13412	.425	313.7	.671
		[Q30 Lecture] - [Q32 Simulation]	-.1582	.13707	-1.154	314.0	.249
		[Q30 Lecture] - [Q33 Combined]	-1.3861	.11559	-11.991	272.7	.000**
		[Q31 Case study] - [Q32 Simulation]	-.2152	.13495	-1.595	313.4	.112
		[Q31 Case study] - [Q33 Combined]	-1.4430	.11307	-12.762	277.6	.000**
		[Q32 Simulation] - [Q33 Combined]	-1.2278	.11655	-10.535	270.8	.000**

Table 10.33: 'One-Way ANOVA Contrast Tests' to the Mean Score values for Age Category plotted in Figure 10.19.

Remarks

Table 10.33 indicates that on average:

- Male students (n=42) significantly preferred the **'Combined'** learning process over each of the three 'Single' learning processes (p<0.01)
- Female students (n=158) significantly preferred the **'Combined'** learning process over each of the three 'Single' learning processes (p<0.01)
- Male students only (N = 42) significantly preferred the **'Simulation'** learning process over the 'Case study' learning process (p<0.05 level)
- Male students only (N = 42) significantly prefer the **'Simulation'** learning process over the 'Lecture' learning process (p <0.01).

e. Comparisons resolved according to Age Category

Table 10.34 presents the results of comparisons between Age Category for Q.30 – Q.33.

Age Category	Learning Process Scores	N	Mean Score	Std. Deviation	Std. Error of Mean	95% C.I.
Less than 25 yr	Q30 Lecture	142	3.00	1.20	.100	.201
	Q31 Case study	142	3.01	1.16	.097	.194
	Q32 Simulation	142	3.32	1.22	.102	.204
	Q33 Combined	142	4.35	0.88	.074	.147
More than 25 yr	Q30 Lecture	61	3.11	1.27	.162	.324
	Q31 Case study	61	3.10	1.25	.160	.320
	Q32 Simulation	61	3.31	1.25	.159	.319
	Q33 Combined	61	4.57	0.64	.083	.165

Table 10.34: Summary statistics, including Mean Score and 95% Confidence Interval for Q.30-Q.33, resolved by Age.

This data is plotted in Figure 10.20, below.

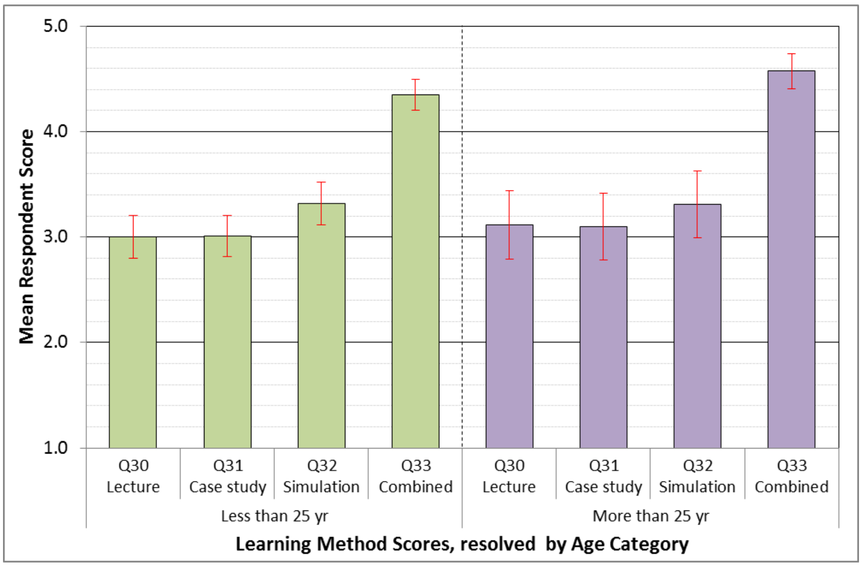


Figure 10.20: Plot of the Mean values, and their 95% Confidence Intervals, of the Age resolved responses to Q.30-Q.33, from Table 10.34.

Table 10.35 presents results of applying 'One-Way ANOVA Contrast Tests' to the Mean Score values plotted in Figure 10.20.

One-Way ANOVA Contrast Tests (Does not assume equal variances)							
Gender	**Contrast**		**Value of Contrast**	**Std. Error**	**t**	**df**	**Sig. (2-tailed)**
Less than 25 yr	Learning Process Scores	[Q30 Lecture] - [Q31 Case study]	-.0070	.13974	-.050	281.7	.960
		[Q30 Lecture] - [Q32 Simulation]	-.3169	.14323	-2.213	281.9	.028*
		[Q30 Lecture] - [Q33 Combined]	-1.3521	.12451	-10.859	258.5	.000**
		[Q31 Case study] - [Q32 Simulation]	-.3099	.14094	-2.198	281.3	.029*
		[Q31 Case study] - [Q33 Combined]	-1.3451	.12187	-11.037	262.7	.000**
		[Q32 Simulation] - [Q33 Combined]	-1.0352	.12585	-8.225	256.3	.000**
More than 25 yr	Learning Process Scores	[Q30 Lecture] - [Q31 Case study]	.0164	.22761	.072	120.0	.943
		[Q30 Lecture] - [Q32 Simulation]	-.1967	.22741	-.865	120.0	.389
		[Q30 Lecture] - [Q33 Combined]	-1.4590	.18191	-8.021	89.1	.000**
		[Q31 Case study] - [Q32 Simulation]	-.2131	.22573	-.944	120.0	.347
		[Q31 Case study] - [Q33 Combined]	-1.4754	.17981	-8.206	89.9	.000**
		[Q32 Simulation] - [Q33 Combined]	-1.2623	.17956	-7.030	90.0	.000**

Table 10.35: 'One-Way ANOVA Contrast Tests' to the Mean Score values for Age plotted in Figure 10.20.

Remarks

Table 10.35 indicates that on average:

- Younger students (n=142) significantly preferred the **'Combined'** learning process over each of the three 'Single' learning processes (p<0.01)
- Older students (n=61) significantly preferred the **'Combined'** learning process over each of the three 'Single' learning processes (p<0.01)
- Younger students only (N = 142) significantly preferred the **'Simulation'** learning process over the 'Case study' learning process (p<0.05 level)
- Younger students only (N = 142) significantly preferred the **'Simulation'** learning process over the 'Lecture' learning process (p <0.05).

f. Comparisons According to Course and Learning Condition

Table 10.36 presents the results of comparisons between Learning condition for Q.30 – Q.33.

Course × Condition	Learning Process Scores	N	Mean Score	Std. Deviation	Std. Error of Mean	95% C.I.
Nursing × IPL	Q30 Lecture	57	2.98	1.26	.167	.334
	Q31 Case study	57	3.04	1.28	.170	.339
	Q32 Simulation	57	3.33	1.30	.172	.344
	Q33 Combined	57	4.56	0.66	.087	.174
Nursing × UPL	Q30 Lecture	61	3.44	1.18	.151	.301
	Q31 Case study	61	3.28	1.16	.148	.296
	Q32 Simulation	61	3.28	1.20	.154	.307
	Q33 Combined	61	4.25	1.03	.132	.263
MBBS × IPL	Q30 Lecture	44	2.86	1.15	.174	.348
	Q31 Case study	44	3.07	1.07	.161	.321
	Q32 Simulation	44	3.45	1.13	.170	.341
	Q33 Combined	44	4.45	0.59	.089	.178
MBBS × UPL	Q30 Lecture	42	2.74	1.19	.184	.367
	Q31 Case study	42	2.69	1.18	.182	.364
	Q32 Simulation	42	3.21	1.26	.194	.389
	Q33 Combined	42	4.43	0.86	.133	.265

Table 10.36: Summary statistics, including Mean Score and 95% Confidence Interval for Q.30-Q.33, resolved by both Course of Study and Condition.

This data is plotted in Figure 10.21, below.

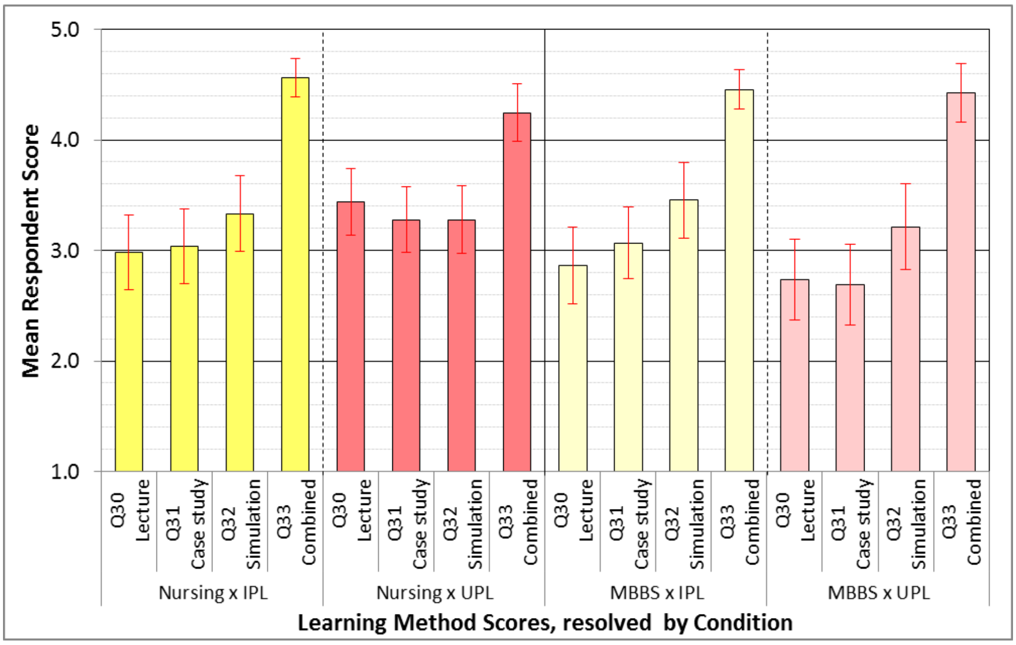


Figure 10.21: Plot of the Mean values, and their 95% Confidence Intervals, of the responses to Q.30-Q.33, resolved by both Course and Condition, from Table 10.36.

Table 10.37 presents results of applying 'One-Way ANOVA Contrast Tests' to the Mean Score values plotted in Figure 10.21.

One-Way ANOVA Contrast Tests (Does not assume equal variances)							
Course × Condition	**Contrast**		**Value of Contrast**	**Std. Error**	**t**	**df**	**Sig. (2-tailed)**
Nursing × IPL	Learning Process Scores	[Q30 Lecture] - [Q31 Case study]	-.0526	.23807	-.221	112.0	.825
		[Q30 Lecture] - [Q32 Simulation]	-.3509	.23986	-1.463	111.9	.146
		[Q30 Lecture] - [Q33 Combined]	-1.5789	.18817	-8.391	84.2	.000**
		[Q31 Case study] - [Q32 Simulation]	-.2982	.24178	-1.234	112.0	.220
		[Q31 Case study] - [Q33 Combined]	-1.5263	.19060	-8.008	83.4	.000**
		[Q32 Simulation] - [Q33 Combined]	-1.2281	.19284	-6.368	82.7	.000**
Nursing × UPL	Learning Process Scores	[Q30 Lecture] - [Q31 Case study]	.1639	.21124	.776	120.0	.439
		[Q30 Lecture] - [Q32 Simulation]	.1639	.21508	.762	120.0	.447
		[Q30 Lecture] - [Q33 Combined]	-.8033	.19997	-4.017	117.9	.000**
		[Q31 Case study] - [Q32 Simulation]	0.0000	.21330	0.000	119.8	1.000
		[Q31 Case study] - [Q33 Combined]	-.9672	.19806	-4.883	118.4	.000**
		[Q32 Simulation] - [Q33 Combined]	-.9672	.20216	-4.784	117.2	.000**
MBBS × IPL	Learning Process Scores	[Q30 Lecture] - [Q31 Case study]	-.2045	.23667	-.864	85.5	.390
		[Q30 Lecture] - [Q32 Simulation]	-.5909	.24340	-2.428	86.0	.017*
		[Q30 Lecture] - [Q33 Combined]	-1.5909	.19520	-8.150	64.0	.000**
		[Q31 Case study] - [Q32 Simulation]	-.3864	.23412	-1.650	85.7	.103
		[Q31 Case study] - [Q33 Combined]	-1.3864	.18350	-7.555	67.0	.000**
		[Q32 Simulation] - [Q33 Combined]	-1.0000	.19210	-5.206	64.7	.000**
MBBS × UPL	Learning Process Scores	[Q30 Lecture] - [Q31 Case study]	.0476	.25853	.184	82.0	.854
		[Q30 Lecture] - [Q32 Simulation]	-.4762	.26747	-1.780	81.7	.079
		[Q30 Lecture] - [Q33 Combined]	-1.6905	.22658	-7.461	74.6	.000**
		[Q31 Case study] - [Q32 Simulation]	-.5238	.26622	-1.968	81.6	.053
		[Q31 Case study] - [Q33 Combined]	-1.7381	.22511	-7.721	75.0	.000**
		[Q32 Simulation] - [Q33 Combined]	-1.2143	.23532	-5.160	72.4	.000**

Table 10.37: 'One-Way ANOVA Contrast Tests' to the Mean Score values for Course and Learning condition plotted in Figure 10.20.

Remarks

Table 10.37 indicates that on average:

- IPL Nursing students (n=57) significantly preferred the **'Combined'** learning process over each of the three 'Single' learning processes ($p<0.01$)
- IPL Medical students (n=44) significantly preferred the **'Combined'** learning process over each of the three 'Single' learning processes ($p<0.01$)
- UPL Nursing students (n=61) significantly preferred the **'Combined'** learning process over each of the three 'Single' learning processes ($p<0.01$)
- UPL Medical students (n=42) significantly preferred the **'Combined'** learning process over each of the three 'Single' learning processes ($p<0.01$)
- IPL Medical students only (N = 42) significantly preferred the **'Simulation'** learning process over the 'Lecture' learning process ($p <0.05$).

10.2 Chapter overview

Regardless of course, age, gender or learning condition, students considered the use of the blended teaching process using a combination of lecture, case study and simulation as the most effective and preferred method to teach them about interprofessional practice with 92.2% (n=188) of students endorsing (Agree/Strongly Agree) this statement, and with statistically significant outcomes across all groupings (course, age, gender and learning condition). This is strong endorsement and validation of the value of multiple methods for teaching this topic and the value students place in using a variety of methods for enhanced learning. Of the three single teaching processes, the simulation was found to be the most preferred approach with approximately half the students endorsing (Agree/Strongly Agree) this statement 54.5% (n=111). This finding was statistically significant for the IPL students, medical students, younger students and male students. The preference for simulation was most likely due to its immersive, 'hands on', interactive nature and its ability to allow students to put their skills and knowledge immediately into practice. The technicality of the simulation may also have been more appealing to a younger male generation of learners. Uniquely, UPL students expressed more preference for the lecture and case study format compared to IPL students with nursing being the only other cohort to single out one of these methods (nursing students found the lecture more useful than medical students). In the absence of a full IPL experience it may be that the content of the lecture became an important aspect to learning for the UPL cohort.

The learning experience significantly contributed to students' development of confidence in the collaborative management of a delirious patient with 88.7% (n=181) endorsing (Agree/Strongly Agree) this statement. This change occurred for all groups. A significant increase in confidence was observed in older students (>25 years) compared to younger students (<25 years). As older students were nurses it reveals that the gains in confidence for this group were the most beneficial of all.

This Chapter (in conjunction with the previous four Chapters of this thesis), has provided rich quantifiable data to reflect attitudes towards IPL and ICP and the learning experience. In the chapters that follow (Chapters 11 and 12), the focus shifts to the qualitative data to enable a deeper exploration of the nature and extent of these attitudes, feelings and perceptions. This will enable an analysis of student responses to help explain why certain responses have been given and determine if any trends exist.

The next Chapter (Chapter 11) will provide a more in-depth analysis of students' perceptions of their experience based on qualitative responses to open-ended questions about the teaching components and about IPL and ICP. This will contribute to a greater understanding of some of the findings discussed in this Chapter and also begin to highlight the value of a mixed method approach in researching work of this nature. As the following chapters make clear, a full and detailed understanding of the thinking underpinning particular generalised findings leads to more informed conclusions and assists in highlighting the 'why' of the research.

CHAPTER 11

Results – Questionnaire (Pre and Post)

11.1 Introduction

This Chapter presents findings from the open-ended questions in the questionnaire. Multiple levels of analysis were used in this chapter to address Kirkpatrick's levels 1, 2a and 2b. The questions gleaned learners' views on the learning experience overall and their attitudes and perceptions of the effectiveness of this experience. It also enabled an exploration of their attitudes and perceptions towards IPL and ICP and whether the experience developed their knowledge and skills in this area.

To achieve this, two types of questions were asked:

1. Defining IPL: Questions in the pre-test questionnaire included asking participants to define IPL. The post-test questionnaire repeated the question on defining IPL.
2. Perceptions of the learning experience: Participants were asked additional questions related to their perceptions of the learning experience such as:
    a. What aspects were most valued and why?
    b. What aspects were least valued and why?
    c. How could the learning experience be improved for future students?

The results presented in this chapter provide an overall description of the participants' responses to these questions and help to distinguish between perceptions according to profession (medicine or nursing) and learning condition (IPL or UPL).

11.2 Defining IPL

Participants were asked to define interprofessional learning both before and after the learning experience. Results to this question were firstly analysed by categorizing responses according to the universally accepted definition of IPL published by CAIPE (2002):

> IPL is where two or more disciplines learn with, from and about each other to improve collaboration and quality of care. (p.2)

To achieve this, a matrix of key words and phrases was developed for each element of this definition to more accurately refine and thematically determine responses. Additional terms were also identified from the data set and key words for these new terms were likewise developed to ensure consistency in analysis. The matrix of key words can be seen in Table 11.1.

Definition Terms	Examples of Key Terms / Phrases
Learning **with** other health professionals	Learning, working or interacting with, beside, between another health professional
Learning **from** other health professionals	Sharing or exchanging knowledge, ideas, opinions, experiences, backgrounds, values, differences, customs with another health professional etc.
Learning **about** other health professionals	Learning about the other professions' roles, skills and knowledge. Developing an appreciation of another health professional
To improve **collaboration** and quality of **care** (patient centred)	Outcome orientated statements focused on collaborative practice/ teamwork or contributing to patient outcomes/management goals
Learning about a clinical **topic**	Learning about delirium, learning a subject or topic
A **process** of learning	Terms related to the educational experience such as the learning method or the nature of the learning (i.e. interactive, informal, interesting, fun)

Table 11.1 Matrix of key words/phrases – Definition of IPL

Table 11.2 provides examples of responses to demonstrate this level of analysis

Definition Terms	Example
Learning **with** other health professionals	*"…medical and nursing students learning together…" (IPL nursing student, pre-test)* *"…learning with other professional groups…" (UPL medical student, post-test)* *"…learning experience between professionals…" (IPL medical student pre-test)*
Learning **from** other health professionals	*"…an opportunity to see how other professionals perceive different scenarios and how they respond to them…" (UPL nursing student, pre-test)* *"..providing one another with knowledge, expertise and opinions…" (IPL nursing student, post test)* "*…understanding viewpoints/strengths/weakness of various team members…" (IPL medical student, post-test)*
Learning **about** other health professionals	*"…learning and understanding other health professional roles …" (IPL medical student, post-test)* "*…understanding roles that other health professionals play in patient care…" (UPL medical student, post-test)* *"…getting to know each other's roles and responsibilities…" (UPL nursing student, post-test)*
To improve **collaboration** and quality of **care** (patient centred)	*"…to improve patient management and interdisciplinary communication…"(UPL medical student – pre-test)* *"…to establish best outcome for patients…" (UPL nursing student – post-test)* *"…so that all may contribute to the care of the patient such that nothing is left out in the management…" (IPL medical student, post-test)*

Learning about a clinical **topic**	*"…a day to learn about delirium…" (UPL nursing student, pre-test)* *" ..learning about a particular topic…" (IPL medical student, pre-test)* *"…learning about relevant topics…" (UPL medical student, post-test)*
A **process** of learning	*"…helpful, interesting, enjoyable…" (IPL nursing student, post-test)* *"… interactive group learning…" (UPL medical student, post-test* *"…an effective learning tool placing theory into practice…" (UPL nursing, post-test)* *"…learning…in a non-threatening simulated environment…" (IPL medical student pre-test)*
Other responses	*"…Can't really say til it's over! - Haven't attended anything like this before…" (IPL nursing student pre-test)* *"…I don't know as only just started but I think it is fine I have no problem with this delivery…" (UPL nursing student pre-test)*

Table 11.2: Matrix of key words/phrases – Definition of IPL

Next, frequencies were calculated according to the total number of responses given to define IPL as per the developed matrix. In many cases more than one response per participant was recorded.

Students provided responses to this question pre and post the intervention. Table 11.3 presents frequencies of responses for the **whole cohort** in relation to comments made about defining IPL categorised according to the matrix of key words and phrases.

Definition Terms	**ALL PRE-INTERVENTION** n=175 respondents n=280 responses %(n)	**ALL POST-INTERVENTION** n=181 respondents n=284 responses %(n)
Learning **with** other health professionals	46.1% (129)	46.1% (131)
Learning **from** other health professionals	12.5% (35)	9.2% (26)
Learning **about** other health professionals	3.9% (11)	8.5% (24)
To improve **collaboration** and quality of **care** (patient centred)	16.8% (47)	22.5% (65)
Learning about a clinical **topic**	7.1% (20)	2.5% (7)
A **process** of learning	6.8% (19)	7.7% (22)
Other	6.8% (19)	3.2% (9)
	100%	*100%*

Table 11.3: Comparison of frequencies to definition terms (pre and post) for whole cohort.

The majority of participants were able to define IPL as learning *with* another health professional group. This remained the same both before and after the experience (46.1%). Post the intervention, more responses were observed for the definition of terms related to learning *about* each other (8.5%) and IPLs ability to improve *collaboration and quality of care* (22.5%). Responses were decreased for learning *from* other health professionals and learning about a *clinical topic*. Overall the understanding of the terms varied little pre and post for the entire cohort.

Table 11.4 presents a comparison of the frequencies of responses between medical and nursing students pre and post the learning experience. Slightly fewer comments to IPL being defined as 'learning *with* other health professionals' were noted with medical students whereas there was a 4% increase in this term for nursing students. The term '*learning from'* other health professionals decreased for both medical and nursing students but '*learning about'* increased for both (increased by 7.2% for nurses). The most notable difference for both groups was the attribution of IPL being less concerned with *'learning about a clinical topic'* post the intervention and more about '*patient centred'* outcome statements (up 6% for both).

Definition Terms	**Medicine** %(n)		**Nursing**	
	PRE n=83 respondents n=134 responses	**POST** n=78 respondents n=133 responses	**PRE** n=92 respondents n=145 responses	**POST** n=103 respondents n=151 responses
Learning **with** other health professionals	53.0% (71)	48.9% (65)	40.0% (58)	44.0% (66)
Learning **from** other health professionals	13.4% (18)	12.0% (16)	11.7% (17)	6.7% (10)
Learning **about** other health professionals	5.2% (7)	6.8% (9)	2.8% (4)	10.0% (15)
To improve **collaboration** and quality of **care** (patient centred)	17.2% (23)	23.3% (31)	16.6% (24)	22.7% (34)
Learning about a clinical **topic**	6.7% (9)	3.8% (5)	7.6% (11)	1.3% (2)
A **process** of learning	4.5% (6)	4.5% (6)	9.0% (13)	10.7% (16)
Other	0.0% (0)	0.8% (1)	12.4% (18)	4.7% (7)
	100%	*100%*	*100%*	*100%*

Table 11.4: Comparison of frequencies to definition terms (pre and post) according to profession.

In comparisons for learning condition (Table 11.5), the majority of participants, whether UPL or IPL, defined IPL as '*learning with'* another health professional group. There was a slight decrease for both groups on '*learning from'* and a slight increase for '*learning about'* other health professionals. For all other items the trends were consistent for both groups such as an increase in '*learning about'* each other and an increased emphasis on IPL as a means of improving '*collaboration* and the *quality of patient care'*. Overall, it appears that post the learning experience, there was less focus on IPL being about learning a *clinical topic* and more on its capacity to foster shared learning with *patient focused outcomes* regardless of profession or learning condition (increased by 8.8% for the UPL group and 3.6% for the IPL group).

Definition Terms	**UPL group** %(n)		**IPL group** %(n)	
	PRE n=88 respondents n=129 responses	**POST** n=89 respondents n=135 responses	**PRE** n=87 respondents n=151 responses	**POST** n=92 respondents n=149 responses
Learning **with** other health professionals	45.0% (58)	45.9% (62)	47.0% (71)	46.3% (69)
Learning **from** other health professionals	12.4% (16)	6.7% (9)	12.6% (19)	11.4% (17)
Learning **about** other health professionals	3.1% (4)	5.9% (8)	4.6% (7)	10.7% (16)
To improve **collaboration** and quality of **care**	18.6% (24)	27.4% (37)	15.2% (23)	18.8% (28)
Learning about a clinical **topic**	7.8% (10)	3.0% (4)	6.6% (10)	2.0% (3)
A **process** of learning	5.4% (7)	6.7% (9)	7.9% (12)	8.7% (13)
Other	7.8% (10)	4.4% (6)	6.0% (9)	2.0% (3)
	100%	*100%*	*100%*	*100%*

Table 11.5 Comparison of frequencies to definition terms (pre and post) according to learning condition.

11.3 Comparing definitions of IPL

In addition to comparing the numbers of responses categorically aligned to the CAIPE definition of IPL pre and post the intervention, an analysis of the data was undertaken to determine whether an individual's post-test definition was identical or similar to the pre-test or whether new terms were included in the post-test. This was to see whether the experience had increased the participant's knowledge and understanding of IPE and its contribution towards ICP. A new response was seen as the addition of one or more of the key terms not mentioned in the pre-test according to the CAIPE definition. A change could also constitute no response in the pre-test and a new response provided in the post-test. Responses left blank in the post-test were not included in the calculations. Examples of what was considered to be a new response can be seen in Table 11.6.

Participant	Pre (original definition)	Post (new key terms in definition)
IPL medical student	*"Working together with other members of the profession* ***(Learning with)***	*"Working together with other professions in harmony to better provide patient care"* ***(Learning with and to improve collaboration and quality of care)***
UPL medical student	*"Learning together with other health care professionals, how to work as a team to provide best patient care in the future* ***(Learning with and to improve collaboration and quality of care)***	*"Learning with other health care professionals, to identify each other's roles, and how to work as a team in health care"* ***(Learning with, learning about and to improve collaboration and quality of care)***
IPL nursing student	*"It's a day to learn a topic, like delirium in group environment with other health care professionals"* ***(Learning a clinical topic and learning with)***	*Learning with other health professionals – e.g. doctors and getting the different points of view* ***(Learning with and learning from)***
UPL nursing student	*"A diverse group of professionals getting together to share their knowledge to help others..."* ***(Learning with and learning about)***	*"A group of people from different professions working in unison to establish the best outcomes for patients"* ***(Learning with and to improve collaboration and quality of care)***

Table 11.6 New, or developed, responses to defining IPL post the intervention.

Of the 180 participants who responded to this item pre and post, 55% (n=99) had similar definitions post and almost half of the student cohort (45%, n=81) had additional key terms in their definitions. The most notable difference was with nursing students who had 52.9% (n=59) of new key terms post the intervention compared to medical students who had 31.4% (n=27). Interestingly, UPL students had more new key terms post 49.4% (n=44) than IPL students with 40.7% (n=37). Overall, nearly half of the participants who responded to this question pre and post had an experience which impacted enough to change their view, or helped them determine a new way of thinking about what IPL meant. In other words, approximately half of the participants kept the same definition and the other half developed a new one post the experience regardless of learning condition. This was more obvious with nurses. Figure 11.1 presents this comparison graphically.

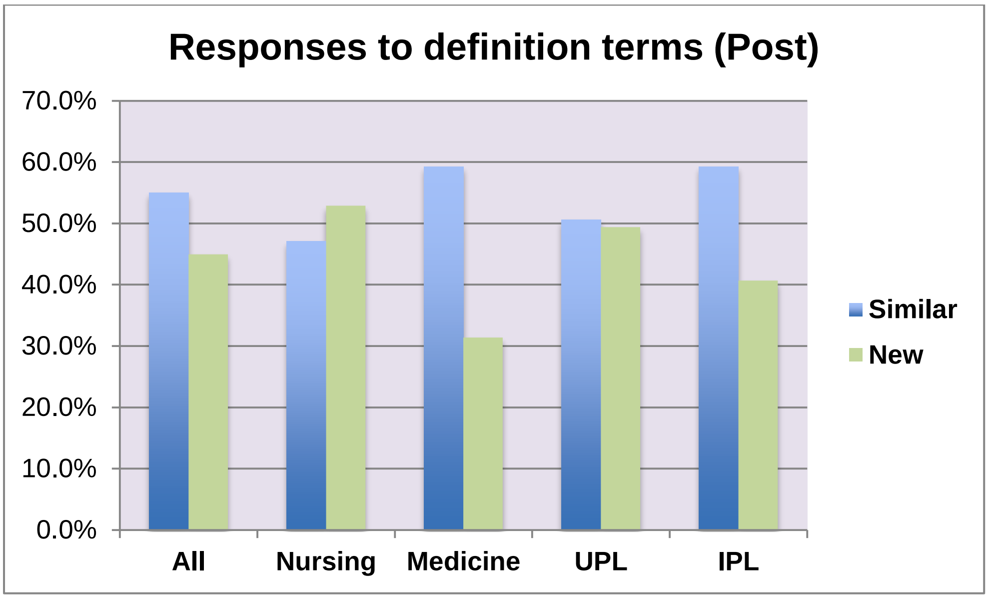


Figure 11.1 Comparison of definitions post the intervention according to all students, profession and learning condition.

11.4 Most valued aspects of the learning experience

Post the intervention, students were asked what they valued the most about the day and why. Of the 211 participating students, 186 responded to this question providing a total of 257 comments. Comments were coded and grouped into themes, which are presented below. In terms of what was valued most, four major themes emerged with sub-themes observed in Themes 1 and II.

Theme I: Interprofessional Collaborative Practice

a. Teamwork and collaboration
b. Interprofessional communication
c. Roles and responsibilities
d. Patient centredness

Theme II: The teaching – learning methods

a. The simulation
b. The learning process

Theme III: Learning about delirium

Theme IV: Other comments

Each of these themes is discussed in the following sections in more detail and, where appropriate, specific comments from students are included within the text to help exemplify key points.

Theme I: Interprofessional Collaborative Practice

The ICP competencies featured strongly in the comments, particularly those relating to the value of teamwork and collaboration. Regardless of profession or learning condition many comments demonstrated an appreciation of the opportunity to learn with students from the other profession in a team-based clinical scenario. For the IPL group this occurred at all stages of the intervention, for the UPL group this only occurred in the simulation scenario. The scenario was common to all.

a. Teamwork and collaboration

IPL nursing students valued the opportunity to meet, interact and work with student doctors. They felt this was not a common feature of their pre-registration training so the uniqueness of this experience was a highlight.

> "…The interaction with medical students doesn't happen often at university…"

Experiencing teamwork and collaborating with another profession was seen by these students as an important component of clinical work with the value of this experience providing an opportunity to be involved in this.

> "…Working with the doctors … where working together is essential, has been fantastic..."
>
> "…That as student nurses we worked together with student doctors. Assimilation was a fantastic tool…"
>
> "…I valued working with the nurses & interns as a team as it provided a really good experience for us to work together…"
>
> "…Working with med students allowed for an equal level of teamwork to be reached & collaborative care to be achieved…"

There was also recognition of the existence of barriers between doctors and nurses in clinical practice and that this was undesirable. IPL nursing students viewed this experience as contributing to breaking down some of these barriers in order for future collaborative work to be more effective.

> "…In the real world there are divisions between the 2 (doctors & nurses), it shouldn't really be like that…"
>
> "…Working with other professional students has helped to break down the barrier…"
>
> "…Interaction with medical students, to break the nurse/doctor barriers…"
>
> "…Interprofessional team work as it bridges the nurse - doctor relationship gap…"

Although there were no comments about existing barriers, for **IPL medical students** the opportunity to meet, interact and learn with nursing students as well as the ability to learn important teamwork skills was highly valued.

> "…The chance to interact with nursing students was particularly helpful because it helps to know the challenges of nurses…"
>
> "…Practical skills esp. in regard to team work..."
>
> "…Importance of teamwork…"

Despite less opportunity to be learning together, similar views about teamwork and collaboration were expressed by UPL students. With **UPL nursing students** it was again about the importance of teamwork and putting those skills into practice: *"…learnt that team work is very important in clinical care…"*; *"…to initiate teamwork in every situation…"; "…looking forward to good team work in real life…"; and, the opportunity to interact with medical students, "…working with other health students, makes you more aware of how important team work is…"*

Interprofessional relationships were also highlighted with **UPL medical students** during the scenario: *"…interacting with nursing students appropriately…"; "…ability to learn with other students, interacting with them…"; "…enabled me to interact with the nursing students for the first time…" ; "…having the opportunity to work with nursing students - whom we may work with together next year..."; as was teamwork and collaboration "…collaborative approach with involvement of nursing students"; "…team work skills - important & practical in real life…"*

b. Interprofessional communication

For **IPL nursing and medical students** the key points identified about interprofessional communication was the ability to listen to and share ideas, opinions, points of view and perspectives on how a clinical problem should be approached as well as getting feedback from both sides about a way in which a clinical problem could be managed. This was gained from all aspects of the teaching experience (case study as well as simulation).

> "…Getting other professionals opinion on what they would do in a situation…" (IPL nursing student)
>
> "…Discussing what people's needs are and difficulties they encounter in hospitals (especially communication barriers…" (IPL medical student)
>
> "…Hearing point of view of other students…"; "…it's nice to get their perspective on things…" (IPL nursing student)
>
> "…The tutorial environment - good opportunity to learn by people's different views. To hear the perspectives of nursing students. Will guide my communication in the workplace…" (IPL medical student)
>
> "…Feedback from both medical & nursing student…" (IPL nursing student)
>
> "…To hear what the nursing students appreciate and want Drs to understand…" (IPL medical student)
>
> "Knowledge gained from med students in relation to assisting them and vice versa…" (IPL nursing student)

However, with **UPL students**, despite an appreciation of the importance of communication this was not specifically applied to interprofessional communication. Rather, these students simply valued the interactive nature of the discussions in the case study and post simulation debrief.

> "…incorporating others ideas, thoughts towards working to a goal that is appropriate for the situation. The importance of communication…" (UPL nursing student)

For one nursing student however, *"…being able to talk to medical students. Never done this before!..."* was a particular highlight emphasising a general lack of opportunities to bring the two professions together in prior educational experiences.

c. Roles and responsibilities

The value of the intervention in being able to foster mutual respect across the two professions and to enable students to develop an appreciation and understanding of the different roles and responsibilities in managing the problem of delirium was evident with the IPL students.

For **IPL nursing students** it was largely about raising awareness of the doctor's role and respecting this:

> "…Respect for each other…"
>
> "…Awareness of other health professional roles…"
>
> "…That medical students can see more of the nurses role, & visa-versa..."
>
> "…helping understand each other's role…"

It was also about viewing doctors as equals:

> "…seeing that they can get as anxious as nursing students about doing scenarios - reassuring to see we all react the same…"
>
> "…helps me to realise everyone is equally important & all needed…"

IPL medical students expressed similar views about knowing and respecting the nurse's role and the potential differences that each group brings to the collaborative management of delirium:

> "…Understanding the different skills that nurses and doctors can bring to the care of a patient with delirium..."
>
> "…knowledge about different roles of different professions…"
>
> "…what to handover and what is important for nurses to know…"
>
> "…Reduces stereotype, allows more respect & understanding…"

UPL nursing and medical students likewise appreciated the need to develop a greater understanding of each other's roles and how that translates to clinical practice - but there were less comments to this effect.

> "…understand more about other health care professionals' role…" (UPL nursing student)
>
> "…Learning about the role of nurses in the management of delirium…" (UPL medical student)
>
> "…analysing our roles as professions as I can apply these skills in my own profession practice…" (UPL nursing student)

> "…Appreciate role of nursing staff to assist with making decision and utilised their skills and knowledge…" (UPL medical student)

In relation to issues of equality, one UPL nursing student even commented on how reassured she was that *"…Junior doctors are just as scared as junior nurses!…"*

d. Patient Centredness

Comments focused on patient related outcomes as a result of this intervention were not a strong feature in either the UPL or IPL groups however there was a general view that the learning highlighted how an interprofessional approach to a clinical problem could contribute to good outcomes for patients.

> "…how important it is to incorporate other health care professionals in a patients care - is essential to good outcomes for a patient…" (IPL nursing student)
>
> "…gave me confidence in working with a pt with delirium…" (IPL nursing student)
>
> …"Interprofessional learning is valuable method to approach clinical case problems…" (UPL nursing student)
>
> "…Opportunity to practice managing a patient with delirium in a safe environment…" (UPL medical student)
>
> "…Remember patient safety first before doing other things…" (IPL medical student)

Theme II: The teaching – learning methods

Comments about the teaching and learning methods used in the intervention was an aspect valued by the participants with comments primarily focused on students' appreciation of the simulation as a method of delivery. This was often followed by comments as to why the simulation was thought to be effective. Alternatively students commented on the value of the sequential learning process.

a. The Simulation

IPL nursing students valued the experiential nature of the simulation due to its realism, and its ability to portray how a typical delirious patient would present.

> "…Being a part of the simulation gave me confidence in working with a patient with delirium…"
>
> "…being put in a "real life" scenario…" ; "…in a more realistic, practical setting…"
>
> "…I have enjoyed the simulation exercise, as it was helpful physically seeing how delirium in a patient looks & effective ways it can be managed…"

IPL medical students likewise valued the simulation in terms of its realism but also its ability to bridge the theory to clinical practice gap. They elaborated on other benefits such as reinforcing the importance of communication, increasing their confidence to work in teams and providing an opportunity for reflection and feedback.

> "…gives you a chance to see how you react to the scenario…"
>
> "…to put what we learn into practice…"
>
> "…it really reinforced the importance of communication…"
>
> "…increases confidence …"
>
> "…much better for reflecting on strengths and weaknesses…"
>
> "… most similar to real life experience, appreciating some of the difficulties in applying theory/structure to an acute delirious patient…"

UPL nursing students likewise appreciated the scenario's realism through using a real person (rather than a mannequin) and that it therefore provided an accurate depiction of a delirious patient.

> "…Interesting to see how patients that may have delirium actually behave…"
>
> "…Simulation was good - using real person…"

Other attributes described by UPL nursing students in relation to the simulation included the scenario's ability to encourage reflective practice and as with IPL students, it provided a bridge from theory to practice.

> "…being able to put into practice with the simulation. Simulation & review is a good way of learning…"
>
> "…to embed learned knowledge from lecture & case study…"
>
> "…The simulation component assisted with thought processing & problem solving skills. An effective reflection tool…"

UPL medical students also appreciated simulation as a teaching method "*good learning", "fun and interesting", "most exciting and practical".* Their view was that the simulation enabled an effective transition from theory into practice.

> "…opportunity to apply knowledge from lecture/case & be confronted with the situation…"
>
> "…gain practice & see the knowledge gaps…"
>
> "…to allow us to apply what we have learned today in 'real' situation…"

b. The Learning Process

From a general perspective a number of comments focused more broadly on the overall teaching and learning process. It was noted that the theory to practice continuum, associated with the simulation comments above, were especially valued. Of even greater significance however was the appreciation of the three-staged sequential process used for the teaching such as the lecture, case study followed by the simulation. The nature of many of the teaching/learning approaches was also well regarded such being 'interactive', 'experiential', 'informative', 'relaxed', 'supportive', 'non-threatening' and 'fun'.

For IPL nursing and medical students the responses were mostly related to the learning process and as a subset of this, the integration from theory to practice – an outcome of the learning process.

The learning process

> "…Learning in a relaxed environment and having 3 types of learning experiences - DVD, case study, simulation…" (IPL nursing student)
>
> "…The simulation in conjunction with the pre-teaching session really cemented my previous knowledge and understanding management pathways of delirium…" (IPL medical student)
>
> "…To repeat delirium learning in a number of methods…" (IPL medical student)
>
> "…The key concepts were taught in 3 different ways and reinforced giving me the best chance to retain them!..." (IPL medical student)
>
> "…Use of different learning methods reinforces the knowledge & skills for dealing with cases…" (IPL medical student)

Theory to practice

> "…The integration of theory and practice: a brief refresher of the theory and experiential learning process…" (IPL nursing student)
>
> "…Opportunity through case study & simulation to put information into practice…"
>
> "…Learning new things and then seeing them put into action…" (IPL nursing student)

The nature of the learning

> "…Case study very informative…" (IPL nursing student)
>
> "…Very interesting way of learning…" (IPL nursing student)
>
> "…A non-threatening environment…" (IPL medical student)
>
> "…Supportive learning environment…" (IPL medical student)

For UPL nursing and medical students however the focus was solely on the 3 staged teaching–learning process and the benefits that arose from this.

> "…The step build-up of lecture - providing knowledge and revision, which I needed, before applying to a case scenario which wasn't in a confronting setting before stepping into a simulation - close to real life scenario as much as possible…" (UPL medical student)
>
> "…The multi-faceted approach to how the same information was reinforced in different mediums…" (UPL nursing student)
>
> "…The tute, lect & simulation was very valuable in the cementing of this new knowledge…" (UPL nursing student)
>
> "…The 3 sessions were all valuable. The first two were necessary to gain the knowledge to then take part in the role play…" (UPL nursing student)
>
> "…The lecture, understanding, applying, & implementing in case scenarios…"

> "…The succession of lecture - case study – scenario…" (UPL medical student)

Theme III: Learning about delirium

For many students the value of the intervention was in learning more about delirium as a topic. They viewed this teaching as a 'refresher', or as an opportunity to gain further knowledge of delirium in relation to specific aspects of the topic.

For **IPL students** (medicine and nursing) there were general comments about delirium from both professions. Being able to recognise delirium and know its causes was observed with nursing students and a gain in knowledge specifically about the medical management was a priority for medical students.

Delirium general

> "…Learnt about delirium, as I knew nothing! Important too!..." (IPL nursing student)
>
> "…A good refresher…" (IPL nursing student)
>
> "…Case study – good revision on delirium"… (IPL medical student)
>
> "…Important to treat delirium. It is reversible. It is common…" (IPL medical student)
>
> "…Revision of delirium – Mx, causes etc. Good factual info to have…" (IPL medical student)

Recognition and causes

> "…The CAMS diagnostic tool is a very simple technique to identify pts with delirium. It was great to know the signs & symptoms & also the causes of delirium…" (IPL nursing student)
>
> "…Learnt more about delirium & how it presents…" (IPL nursing student)
>
> "…Recognition of the underlying causes of delirium…" (IPL nursing student)

Management

> "…Medical management & investigation of delirium…" (IPL medical student)
>
> "…Intro lecture – CAMS model – Structural approach to environmental/non-pharmacological mix of delirium…" (IPL medical student)
>
> "…Much clearer about delirium identification & management…" (IPL medical student)
>
> "…Mx of delirium refined…" (IPL medical student)

Compared to the IPL groups, there were more comments from the UPL students related to learning about delirium as the most valued part of the day. **UPL nursing students** had more comments than any other group in this category suggesting that this might be an indication of a curriculum gap. Many of these comments were quite specific in nature.

> "…Learning about delirium, didn't know anything about it before…" (UPL nursing student)
>
> "…Learning signs & symptoms of delirium because it will help in clinical situations…" (UPL nursing student)
>
> "…Knowledge on delirium & its prevalence. The 20 minute video provided the most education…." (UPL nursing student)
>
> "…Learning the signs & assessment tools of delirium…" (UPL nursing student)
>
> "…Learning how to detect delirium and how important that is. Also learning ways how to deal with the situation…" (UPL nursing student)
>
> "…Identify difference between deliriums with dementia…" (UPL nursing student)
>
> "…How to identify delirium and the management protocols put into practice…" (UPL nursing student)

For **UPL medical students** comments were mostly limited to an appreciation of the lecture and of one of the assessment tools used in the diagnosis of delirium (the CAM).

> "…Lecture - helped me consolidate my knowledge base..."
>
> "…The lecture was good revision…"
>
> "…CAM. Concise info about delirium - definition, causes, signs & symptoms, Management…"
>
> "…Learning about the CAM model of assessing delirium…"
>
> "…I am more confident in dealing with pt with delirium…"

Theme IV: Other comments

Other miscellaneous comments ranged from simply liking the food - "the lunch. It is free!!" (UPL medical student) to general positive comments reflecting the student's views on the overall experience.

> "…Everything, provides the complete picture…" (IPL nursing)
>
> "…Very Important…" (UPL nursing)
>
> "…Everything, it covers all aspects…" (IPL nursing)
>
> "…It was valuable, thanks!..." (UPL medical student)

11.5 Most valued aspects of the learning experience (frequencies)

Once all comments were categorised into the respective themes, it was possible to calculate frequencies for each theme. This was important in order to be able to observe overall trends for all students as well as for differences according to profession and learning condition in terms of that which was considered to be a highlight of the learning experience.

What was valued the most (All Students)

Table 11.7 presents the responses from 186 students who gave 257 types of responses to this question. When grouped into the four broad themes, ICP was found to be the most valued aspect of the intervention at 42.8% (inclusive of the sub-themes of teamwork and collaboration, roles and responsibilities, interprofessional communication and patient centredness). This was followed by the teaching-learning methods (35.8%) - primarily the use of simulation, and then learning about delirium (16.3%) with miscellaneous comments coming in at 5.1%.

Theme	ALL STUDENTS n=186 respondents n=257 responses %(n)
I: Interprofessional collaborative practice (ICP)	42.8% (110)
II: The teaching – learning methods	35.8% (92(
III: Learning about Delirium	16.3% (42)
IV: Other	5.1% (13)
	(100%)

Table 11.7: Responses to the four themes for all students**.**

When examined across sub-themes the most valued aspect for all students was the simulation (22.1%), then teamwork and collaboration (18.8%) and learning about delirium (16.2%). Patient centredness was least common at 4.7% (Table 11.8).

Sub-Themes	ALL STUDENTS %(n=257 responses)
The Simulation	23.7% (61)
Teamwork and Collaboration	20.2% (52)
Learning about Delirium	16.3% (42)
The Learning Process	12.1% (31)
Roles & Responsibilities	11.3% (29)
Interprofessional Communication	6.6% (17)
Patient Centredness	4.7% (12)
Other	5.1% (13)
	(100%)

Table 11.8: Responses to the sub-themes for all students**.**

What was valued the most (by Profession)

Responses were then calculated according to medicine and nursing (Table 11.9). In terms of the overarching themes, comments were fairly evenly divided between medical and nursing students with the majority stating ICP was the most valued aspect of the intervention. There were slightly increased numbers of responses from nursing students than medical students on the value of ICP and learning about delirium and slightly more medical student comments on the teaching learning methods (39.3%).

Theme	MEDICINE n=81 respondents n=112 responses %(n)	NURSING n=119 respondents n=145 responses %(n)
I: Interprofessional collaborative practice (ICP)	41.1% (46)	44.1% (64)
II: The teaching – learning methods	39.3% (44)	33.1% (48)
III: Learning about Delirium	15.2% (17)	17.2% (25)
IV: Other	4.5% (5)	5.5% (8)
	(100%)	*(100%)*

Table 11.9: Responses to the four themes by Course.

Table 11.10 presents the responses for each profession across all sub-themes with a higher percentage of medical students favouring the simulation compared to nursing students but again there was consistency across the professional groups on all aspects.

Sub-Themes	MEDICINE %(n)	NURSING %(n)
The Simulation	27.7% (31)	18.9% (30)
Teamwork and Collaboration	20.5% (23)	18.2% (29)
Learning about Delirium	15.2% (17)	15.7% (25)
The Learning Process	11.6% (13)	11.3% (18)
Roles & Responsibilities	9.8% (11)	11.3% (18)
Interprofessional Communication	5.4% (6)	6.9% (11)
Patient Centredness	5.4% (6)	3.8% (6)
Other	4.5% (5)	5.0% (8)
	(100%)	*(100%)*

Table 11.10: Responses to the sub-themes by Course.

What was valued the most (by Learning Condition)

From Table 11.11 it can be seen that exactly half (50%) of the IPL students considered ICP to be the most valued aspect of the learning experience. This was 16.7% higher than the UPL students who preferred the teaching-learning methods marginally over ICP. This was significant as it indicated that the intervention created enough impact on those students who were engaged in IPL activities for the entire duration of the intervention for them to appreciate the importance of interprofessional collaboration. UPL students also had a greater number of responses to learning about delirium than the IPL students indicating that delirium might have become a stronger focus than ICP in the absence of sustained IPL activity.

Theme	UPL n=92 respondents n=111 responses %(n)	IPL n=94 respondents n=146 responses %(n)
I: Interprofessional collaborative practice (ICP)	33.3% (37)	50.0% (64)
II: The teaching – learning methods	37.8% (42)	34.2% (48)
III: Learning about Delirium	20.7% (17)	13.0% (25)
IV: Other	8.1% (5)	2.7% (8)
	(100%)	*(100%)*

Table 11.11: Responses to the four major themes by Learning Condition.

Table 11.12 presents the frequency of responses by learning condition across all sub-themes with simulation valued the most for both groups. Learning about delirium was again a focus for UPL students in favour of 'teamwork & collaboration' and 'roles & responsibilities' elements. Only one UPL student commented on interprofessional communication. This was in contrast to the 11.0% of IPL students who identified this as a feature of the day.

Sub-Themes	UPL %(n)	IPL %(n)
The Simulation	25.2% (28)	22.6% (33)
Teamwork and Collaboration	20.7% (23)	19.9% (29)
Learning about Delirium	20.7% (23)	13.0% (19)
The Learning Process	12.6% (14)	11.6% (17)
Roles & Responsibilities	6.3% (7)	15.1% (22)
Interprofessional Communication	0.9% (1)	11.0% (16)
Patient Centredness	5.4% (6)	4.1% (6)
Other	8.1% (9)	2.7% (4)
	(100%)	*(100%)*

Table 11.12: Responses to the sub-themes by Learning Condition.

11.6 Least valued aspects of the learning experience

Post the intervention, students were asked what they valued least about the day and why. Of the 212 participating students, 128 responded to this question providing a total of 138 comments. Comments were coded and grouped into themes. In terms of what was valued least, 9 themes emerged. Themes I to IV were more prominent themes. Fewer comments were recorded in relation to Themes V to VII. Positive comments were also strongly expressed as well as a number of miscellaneous items (IX).

Theme I: The Lecture

Theme II: Other Teaching Approaches

Theme III: Research Focus

Theme IV: Lack of IPL

Theme V: Missing Clinical Placement

Theme VI: The Location of the Teaching

Theme VII: Delirium Knowledge Test

Theme VIII: Positive comments

Theme IX: Other comments

Theme I: The Lecture

The majority of responding students found the lecture to be the most problematic aspect of the day. Comments were mostly related to its didactic nature by having to watch a DVD. For some the content of the lecture was appreciated but most expressed concern over the lack of engagement and interaction and a desire to have this type of teaching done in person. It also appeared to be less aligned to students' learning preferences.

> "…The video lecture was not an interactive experience even though the content was useful…" (IPL nursing student)
>
> "…Video lecture at commencement was not conducive to my learning style…" (IPL nursing student)
>
> "…The lectures were very informative but not very interactive; a tutorial style such as the case study worked well. The didactic lectures could be more interactive…" (IPL medical student)
>
> "…Lecture - would have preferred in person so students could ask questions along the way…" (UPL nursing student)
>
> "…The video lecture. It's a good lecture with lots of info I just don't like the idea of watching a video. Would prefer a "live" lecture…"

For some groups there were technical difficulties.

> "…The lecture was videotaped which proved not to work properly & therefore the "lecture" wasn't useful…" (IPL nursing student)
>
> "…DVD lecture - hard to hear & focus…" (IPL nursing student)

For a number of medical students the content of the lecture appeared to repeat previous learning experiences. A number of students commented on the same lecture being delivered in a previous clinical rotation, which was unsatisfactory.

> "…The videotape because we have had the lecture last yr during our GP rotation…" (UPL medical)

> "…The lecture - I wanted new material and it was all rehash…" (UPL medical student)

> "…The lecture. It was not that exciting & it was a repeat of a lot of what we already learned…" (IPL medical student)

There was also a view that the lecture lacked some depth of information.

> "…The lectures could have been more detailed. It was good to transmit basic messages but may have been more developed to address complexities & management issues. This was a useful activity. Provision of more take-home materials would also be useful…" (IPL medical student)

Overall, the lecture in the video format was not valued or seen as useful as other elements of the learning experience by the majority of students responding to this question.

Theme II: Teaching Approaches

Aside from the lecture, there were other comments about specific features of the teaching approaches such as the case study, simulation and debrief. For some it was fear about participating in the simulation and for others it was about its purpose around shared learning.

> "…Found the simulation a little daunting. Gained valuable information as an observer - not sure about the role play (some would be more comfortable than others)…happy to discuss later in the group debrief" (UPL nursing student)

> "…Feeling forced to participate in the simulation…" (UPL nursing student)

> "…simulation scenario was useful but doesn't need to be mixed…" (IPL medical student)

A number of students made comments about the lack of authenticity of the simulation scenario.

> "…Too obvious that patient has delirium in clinical situation…" (IPL medical student)

> "…The case simulation was probably not realistic…" (UPL medical student)

Other students commented that the teaching approaches seemed repetitive and there was a lack of opportunity for full participation in the simulation.

> "…Going over some issues multiple times, eg., "how you felt"…" (IPL medical student)

> "…The case study was basically a recap of the lecture…" (UPL medicine)

> "…Discussion about case scenario & simulation scenario sometimes overlapped…" (IPL medical student)

> "…Watching the video again. Perhaps have simulation at the beginning of the day before everything and then watching again later??..." (UPL medical student)

> "…Would have been good if more people were able to participate…" (IPL nursing student)

> "…Low interaction for some participants…" (UPL nursing student)

Theme III: The Research Focus

Despite the students consenting to participate in the research elements of this study the requirement to complete the numerous pre and post-test evaluations were viewed negatively. This seemed to be related to the volume of questions being asked and the number of times the forms had to be completed. This was noted to be more of a problem for nursing students than medical students.

> "…Completing & recompleting forms…" (IPL nursing student)
>
> "…Quiz too long & too many questions to answer…" (IPL nursing student)
>
> "…All the reflection and questionnaires…" (IPL medical student)
>
> "…The length of the evaluation tasks, very long and difficult to maintain concentration (IPL medical student)
>
> "…Paperwork is never fun…" (UPL nursing student)
>
> "…Too many questionnaires & questions at the end…" (UPL nursing student)

Further, for a couple of nursing students there seemed to be too much focus on the research overall.

> "…It being more of a research project rather than aiming to teach us about delirium…" (UPL nursing student)
>
> "…Would have liked it to be more about delirium and less about the research project…" (IPL nursing student)

Theme IV: Lack of IPL

For UPL participants exclusively, the lack of IPL was the least valued aspect of the day. This was a significant finding, as even though they had a chance to participate in the simulation together this was not viewed as sufficient.

> "…Not enough time with med students in debrief…" (UPL nursing student)
>
> "…The segregation of medical & nursing students…" (UPL nursing student)
>
> "…Being separated from the nursing students…" (UPL medical student)
>
> "…I was in the 'med' only group and don't really feel I've participated in interprofessional learning…" (UPL medical student)

UPL students commented on less opportunity to learn interprofessional skills and no ability to discuss and learn from different perspectives and points of view on how to manage the patient from the other profession as well as to learn about each other's role. This was seen as less beneficial for their learning and impacted on their enjoyment of the experience.

> "…Did not learn interprofessional skills at all…" (UPL nursing student)

"…Not being able to discuss the simulation with medical students…" (UPL nursing student)

"…Not working with nursing students. No feedback as group to assess dr/nurse role…" (UPL medical student)

"…We were only able to work with students from other disciplines for the scenario & therefore did not get the valuable learning experience of working together on the case study or debriefing…" (UPL nursing student)

"…Debriefing without knowing/hearing input from the medical students of their personal impressions of the scenario…" (UPL nursing student)

"…Case study: was a bit boring. Would have been better if half the group were nursing students…" (UPL medical student)

"…I was in nursing only group so only interaction with Med students was in the simulation - so I don't know what the point was - no real interprofessional. I could have done the simulation, lecture etc in a normal mental health tute…" (UPL nursing group)

Theme V: Missing clinical placement

When negotiating this IPL learning experience, the lecturers from the School of Nursing felt this day could be considered a clinical placement day because it was focused on a clinical simulation. For some nursing students however, the day was not viewed in the same way. They felt it had removed them from what should have been a more genuine and valued experience in a real clinical hospital setting. This alternative clinical placement day about delirium was therefore not viewed favourably.

"…Missing a day of clinical placement at the RCH!" (IPL nursing student)

"…Having to take a day off from clinical because I value my clinical time very highly…" (IPL nursing student)

"…It took me away from valuable clinical experience…" (IPL nursing student)

"…Being taken off clinical placement to attend…" (UPL nursing student)

Theme VI: Location of the teaching

Another less common theme that was only expressed by medical students was the location of the teaching. This was the first experience for medical students at an alternative campus (outer metropolitan) so there was a need to travel to this venue and for many this was by public transport, (a number of medical students were international students or from Monash University, Malaysia). It was therefore an unfamiliar environment. For nursing however, this was their 'home' campus and they were familiar with the venue and its facilities.

"…Frankston is very far from my house…" (IPL medical student)

"…Location .. too far…" (IPL medical student)

> "…The travel to Frankston! Somewhere more central would be nice…" (UPL medical student)

Theme VII: Delirium Knowledge Test (DKT)

For some students the DKT was the least valued aspect because either the correct answers were not provided at the end of the day or did not fully reflect the content of the teaching accurately.

> "…That not all MCQs were addressed…" (IPL medicine)

> "…Still don't know the answers to the delirium test…" (UPL medical student

> "…the questions weren't answered from the day's learning. Improving the questions such that more accurate assessment of how the day helped can be obtained…" (IPL medicine)

> "…I think that many questions in the test wasn't covered by the session today.." (UPL nursing student)

For some nursing students it was more about wanting the content knowledge prior to taking the test.

> "…The pre-test - no knowledge previously, some questions - just guessing…" (IPL nursing student)

> "…The questionnaire at the beginning, because I didn't know the answers. I thought that it was more productive to give us information before asking questions…" (UPL nursing student)

Theme VIII: Positive comments

Despite this question calling for comments about what was valued least, many students' answers were comprised of positive comments about the overall learning experience. Considering responses in other sections (e.g., as noted above) although this suggests that they did not see anything wrong with the day, perhaps there was a tacit sense of wanting to state something positive about the day.

> "…Everything valuable…" (IPL nursing student)

> "…All enjoyable…" (IPL medical student)

> "…But it was all good…" (UPL nursing student)

> "…Interprof. learning. - help me how to work in future…" (IPL medical student)

> "…It was fun & interesting way to learn about delirium. The tutors were great…" (UPL nursing student)

> "…Initially it was slightly scary working with med students as we automatically felt inferior & that they knew more - due to stigma. However, by the end of the session, collaboration & teamwork made everyone feel we were on the same level…" (IPL nursing student)

Theme IX: Other comments

There were a number of miscellaneous comments that too few to group into a theme. These were often based on general aspects of the day.

> "…The catering! Hot water ran out for the coffee and the croissants are delicious but not very nutritious! (This is a very minor criticism, today has been fabulous). (IPL nursing student)

There was a valuable comment made from one student about an alternative view of IPL stating that a shared learning approach may not always be the best solution.

> "…it tried to have us all think about the problem the same when I think nursing staff should focus on pt care & safety & medical staff focus on care & safety but mainly the illness & what is the best steps to return the pt back to their previous state…" (IPL nursing student)

One student made a noteworthy suggestion about the need to emphasise social interaction.

> "…Not many people arrived early. Perhaps a sit down breakfast with deliberately mixed med/nursing seating arrangement would also be good so we can socialise and get to know each other before the training sessions…" (IPL medical student)

All in all there were many consistent views on the least valued aspect (the lecture) as well as some specific ideas. As with the previous question, calculations of the frequencies of this item were again performed to consider overall trends for all students as well as by profession and learning condition.

11.7 Least valued aspects of the learning experience (frequencies)

What was valued the least (All Students)

Table 11.13 presents the responses from 128 students who gave 138 types of responses to this question. When grouped into the nine themes, there was a broad spectrum of comments with the lecture being the least valued aspect of the intervention overall at 21.7%. This was followed by the research focus of the day (11.6%), aspects of the teaching approaches used (11.6%), and the lack of IPL (8.0%). Almost 20% of students however responded with positive comments stating that there was nothing negative about the day.

Theme	**ALL STUDENTS** n=128 respondents n=138 responses %(n)
I: Lecture	21.7% (30)
III: Other Teaching Approaches	13.8% (19)
II: Research Focus	11.6% (16)
IV: Lack of IPL	8.0% (11)
V: Missing Clinical Placement	5.8% (8)
VI: Delirium Knowledge Test	5.8% (8)
VII: The Location	3.6% (5)
VIII: Positive Comments	*19.6% (27)*
IX: Other comments	*10.1% (14)*
	(100%)

Table 11.13: Responses to the nine themes for all students.

What was valued the most (by Course)

Responses were then calculated according to medicine and nursing (Table 11.14). There were clearer differences in relation to what concerned medical students compared to nursing students in a number of the themes. Both groups found the lecture problematic but this was significantly more of an issue for medical students (31.0%) compared to nursing students (15.0%). Nursing students were more negative about the focus of the day being on the research (17.3%) with only 3 medical students commenting on this aspect (5.2%). For medicine, missing clinical placement was of no concern but 10.0% of nursing students found this challenging. Medical students however exclusively found the location a problem (8.6%). Overall, more nursing students compared to medical students made positive comments in relation to this question.

Theme	MEDICINE n=54 respondents n=58 responses %(n)	NURSING n=71 respondents n=80 responses %(n)
I: Lecture	31.0% (18)	15.0% (12)
III: Teaching Approaches	19.0% (11)	10.7% (8)
II: Research Focus	5.2% (3)	16.3% (13)
IV: Lack of IPL	8.6% (5)	7.5% (6)
V: Missing Clinical Placement	0.0% (0)	10.0% (8)
VI: Delirium Knowledge Test	8.6% (5)	3.8% (3)
VII: The Location	8.6% (5)	0.0% (0)
VIII: Positive Comments	*13.8% (8)*	*23.8% (19)*
IX: Other comments	*5.2% (3)*	*13.8% (11)*
	(100%)	*(100%)*

Table 11.14: Responses to the nine themes by Course.

What was valued the most (by Learning Condition)

The most significant finding from Table 11.15 is that for UPL students, the lack of IPL during the learning experience was the most negative aspect of the day when compared to IPL students with no comments on this issue. This is not surprising as the UPL students only worked together in the simulation. From this it could be interpreted that IPL is something they valued but they were denied the opportunity and that was viewed as unsatisfactory. The IPL group had more concern over the lecture component and had more positive comments to make overall than the UPL group.

Theme	UPL n=61 respondents n=69 responses %(n)	IPL n=67 respondents n=69 responses %(n)
I: Lecture	18.8% (13)	24.6% (17)
III: Teaching Approaches	14.5% (10)	13.0% (9)
II: Research Focus	13.0% (9)	10.1% (7)
IV: Lack of IPL	15.9% (11)	0.0% (0)
V: Missing Clinical Placement	2.9% (2)	8.7% (6)
VI: Delirium Knowledge Test	5.8% (4)	5.8% (4)
VII: The Location	2.9% (2)	4.3% (3)
VIII: Positive Comments	*17.4% (12)*	*21.7% (15)*
IX: Other comments	*8.7% (6)*	*11.6% (8)*
	(100%)	*(100%)*

Table 11.15: Responses to the four themes by Learning Condition.

11.8 The aspects to improve for future students

Post the intervention, students were asked for suggestions as to how the learning experience could be improved for future students. Responses to this question largely mirrored the previous question on what was least valued about the day. Of the 212 participating students, 149 responded to this question providing a total of 165 comments. Comments were again coded and grouped into themes. In terms of what could be improved 7 themes emerged.

Theme I: The Lecture

Theme II: Other Teaching Approaches

Theme III: More IPL

Theme IV: More opportunities for participation in the learning activities

Theme V: More preparation for the learning activities

Theme VI: Positive comments

Theme VII: Other comments

Theme I: The Lecture

Just as this was the least valued aspect of the day, this likewise was the area that the students felt needed the most improvement. The key aspects mentioned were the need for this aspect to be face-to-face teaching, the need to have more interaction such as the ability to ask questions of the presenter, the preference for additional resources like lecture notes and the dislike of the video technology and the technical problems associated with presentation.

> "…I would have preferred the lecture to be real, not recorded…" (IPL nursing student)
>
> "…Having an actual person give the lecture so that questions may be asked as it was easy to miss points while writing them down…" (UPL nursing student)
>
> "…Ensure DVD doesn't skip. - Ensure adequate volume for DVD. - Could probably been done in half the time…" (IPL medical student)
>
> "…Shorter lecture & provision of notes prior to lecture..." (IPL medical student)

Theme II: Other teaching approaches

Most comments in relation to teaching approaches were about the simulation. It was certainly highly valued and many students wanted more of this modality in their training as reflected in comments such as: *"…have more simulation exercises during the undergraduate course. (UPL nursing student); "…perhaps more simulation scenarios (1) hypoactive pt. (2) hyperactive pt. (IPL medical student)* but there were a number of suggestions about how this could be improved to make the experience even better. For many, there was a concern about environmental fidelity. The actor was perceived to be very authentic in the way she portrayed a delirious patient but some environmental features were either missing or not recreated accurately enough. Further there was a view that the students should have more briefing about their role and the clinical context to enhance the flow of the scenario.

> "…Consideration to making simulation exercise more real. Actor great. Perhaps manipulation of environment…" (IPL nursing student)
>
> "…Increased clarity of simulation description…" (IPL nursing student)
>
> "…Perhaps making the simulation more realistic (i.e., the people would have more of a background knowledge of the patient) this would encourage more communication - when no one knows the patient or what is going on at all, it can be difficult. (IPL medical student)
>
> "…More information and equipment e.g., obs (sic) machine…" (UPL nursing student)

Other teaching aspects of the simulation were suggested such as increasing the length of the debriefing time, incorporating other features into the scenario such as family members, swapping over roles to gain further insights and less pressure on volunteers to participate in the simulation.

> "…Teach us what we should have done in the simulation & let us re-attempt the simulation afterward…" (UPL medical student)
>
> "…Longer debrief & discussion time…" (IPL nursing student)
>
> "…Less pressure for students to participate in video!..." (IPL nursing student)
>
> "…Have simulated family members. Consideration of other aged care topic…" (UPL medical student)
>
> "…Swap video watching between simulation groups (we can see what others do). Placing medical students in nursing simulation roles & visa versa…" (UPL medical student)

Less frequent comments were made on other teaching issues such as decreasing the length of the session, including more visual aids and formulating clearer take home messages.

> "…More visual aids such as video - lecture, examples of delirium patients…" (IPL nursing student)
>
> "…Speed up teaching/tute session - 3+ hr spent on delirium is quite long…" (IPL medical student)
>
> "…The summary of key points given at the start of the day was good but if there was a more detailed outline for students to search and answer key points I feel the take home message would be better remembered…" (IPL medical student)

One student astutely commented on the tension between learning about content areas such as delirium as opposed to learning about interprofessionalism: *"…It's a balance between making the case the focus or the relationships the focus…" (UPL medical student)*

Theme III: More IPL

What was most significant about this question was that for the two groups of UPL students, the lack of interprofessional learning during the session was the main aspect that needed improving. They were acutely aware that they did not have the full interprofessional experience and this was viewed as less effective. A sample of these types of comments is reflected below:

> "Enable more interprofessional interaction. I was in the med student group only during the lecture & case study. I think it's more helpful being in the mixed group." (UPL medical student)
>
> "…Maybe have the debrief groups either facilitated by a party from the other discipline or have separate nursing & medical debriefs then a combined one so we can hear key issues for each other…" (UPL medical student)
>
> "…More interaction/simulated situations with other health care professional students throughout course of study…" (UPL nursing student)
>
> "…Feedback between nurses/doctors to define roles - i.e., how handover would be more useful. Idea of interprofessional learning is good but would be more useful if at least some feedback was interprofessional!.." (UPL medical student)
>
> "…Have proper groups of interprofessionals…" (UPL nursing student)
>
> "…I understand it is a research project, why one group did not have much contact with other health profession, but would be good if had more…" (UPL medical student)
>
> "…Nursing students should be allowed to debrief with med students…" (UPL nursing students)
>
> "…Knowing what roles other health professionals play and where we all overlap or come across each other…" (UPL medical student)

Theme IV: More opportunities for participation in the learning activities

A small number of students commented on the desire to have more opportunities to engage with the learning activities particularly the simulation scenario. This was only possible for 4 of the students during each simulation. Suggestions included having smaller groups to therefore provide more chances to go through the role-play and more simulation. For these students the simulation was highly valued and more engagement with this was desired.

> "…Allow all students to have a chance to participate in simulation…" (UPL nursing student)
>
> "…More time for the role plays…" (IPL nursing student)
>
> "…Small group simulation, so that more people can get the chance to do it. Also would be less intimidating…" (IPL medical student)
>
> "…Have 2 simulated sessions so that every student can have a go at playing the roles of drs/nurses…" (IPL medical student)
>
> "…If everyone could do the scenario, it would be a more valuable experience for those who observed…(emotional experience)…"

Theme V: More preparation for the learning activities

Some students expressed a need for more advanced preparation for the learning experience. They felt this should be given prior to the day or at the start of the day before events unfold. This was more commonly suggested by nursing students rather than medical students. As this was a new and innovative experience for both groups it appeared that there was a need to provide more scaffolding in the form of guidance and support, particularly for nurses.

> "…More information before the day about what was involved…" (UPL nursing student)
>
> "…Explaining what is expected, so students could be more adequately prepared…" (IPL nursing student)
>
> "…More time, more information on what is to happen on the day…" (IPL nursing student)
>
> "…More guideline in what they will be required to do…" (UPL medical student)

Theme VI: Positive comments

As with the previous question, rather than suggestions for improvement the question tended to evoke positive comments from many students with more positive comments from IPL students than UPL students. Overall, IPL students were very satisfied with the learning. Phrases used included: *"very beneficial"; "not as boring as expected"; "excellent work"; "wonderful- well done!"; "really very good day"; "this was a useful activity"; and, "so much learned through this workshop".*

The benefits as perceived by some students included:

> "…It makes me feel more confident to deal with situations as was demonstrated in the simulation session..." (IPL nursing student)
>
> "…consolidated [my] learning well. (IPL medical student)
>
> "…Yes! Simulation helps students to understand scenarios better. Get them ready for their professional role…" (UPL nursing student)

Participants also drew attention to how this type of activity should continue more broadly in the future and across other areas of the curriculum.

> "…Future students should undertake this experience. Include other health professionals." (IPL nursing student)
>
> "…be an on-going process so eventually you build inter-professional relationships/bonds & are able to maximise the learning opportunities…" (IPL nursing student)
>
> "…Make more of these interactions as part of our curriculum at uni before we actually go into the workforce…" (UPL nursing student)
>
> "Keep it the same, do more interprofessional stuff at clinical level." (IPL medical student)

Theme VII: Other comments

A broad selection of miscellaneous comments were noted. These were often based on general aspects of the day and ranged from "more food", "holding it during teaching time rather than clinical", "providing lunch earlier", "more factual evidence", "more written take home materials" and "having it closer to the main campus".

11.8 The aspects to improve for future students (frequencies)

How can it be improved - All Students

Table 11.16 presents the responses from 149 students who gave 165 types of responses to this question. When grouped into the 7 themes, there was a broad spread of comments with the lecture being the item that needed most improvement overall at 18.2%, followed by suggestions on other teaching approaches (17.0%), and the need for more IPL (12.1%). Students also cited the need for more participation in (9.7%), and preparation for, the learning activities (5.5%). Nearly 18% of students did not believe that any improvements were needed as they enjoyed the session in many ways.

Theme	ALL STUDENTS n=149 respondents n=165 responses %(n)
I: The Lecture	18.2% (30)
III: Other Teaching Approaches	17.0% (28)
III: More IPL	12.1% (20)
IV: More Participation in the Learning Activities	9.7% (16)
V: More Preparation for the Learning Activities	5.5% (9)
VI: Positive Comments	*17.6% (29)*
VII: Other comments	*20.0% (33)*
	(100%)

Table 11.16: Responses to the nine themes for all students**.**

How can it be improved - by Course

Responses were then calculated according to medicine and nursing (see Table 11.17). There were clearer differences in relation to what aspects needed improving for medical students compared to nursing students in a number of the items. Both groups found the lecture problematic but nursing students (22.0%) wanted this aspect improved more than medical students (14.5%). That finding was the opposite to the previous question (about that which was valued least) with medical students disliking the lecture more than nursing students. These results also revealed that medical students wanted more attention given to other teaching approaches (18.1%) and more IPL (15.7%) compared to nursing students (15.9%) and (8.5%)

respectively. Overall, more nursing students compared to medical students made positive comments in relation to this question.

Theme	MEDICINE n=70 respondents n=83 responses %(n)	NURSING n=79 respondents n=82 responses %(n)
I: The Lecture	14.5% (12)	22.0% (18)
III: Other Teaching Approaches	18.1% (15)	15.9% (13)
III: More IPL	15.7% (13)	8.5% (7)
IV: More Participation in the Learning Activities	14.5% (12)	4.9% (4)
V: More Preparation for the Learning Activities	2.4% (2)	8.5% (7)
VI: Positive Comments	*13.3% (11)*	*22.0% (18)*
VII: Other comments	*21.7% (18)*	*18.3% (15)*
	(100%)	*(100%)*

Table 11.17: Responses to the seven themes by Course.

How can it be improved - by Learning Condition

The most significant finding from Table 11.18 was the need for more IPL as expressed exclusively by the UPL students. This was considered to be the most important aspect in need of improvement for this group. The other significant finding was that IPL students had more positive comments to make overall than the UPL students. From this it could be interpreted that the IPL students were able to get the most benefit from the day due to the integrity of having the full IPL experience. It appeared to be a less fulfilling experience for the UPL students because of the lack of opportunity for interprofessional learning.

Theme	UPL n=74 respondents n=82 responses %(n)	IPL n=75 respondents n=83 responses %(n)
I: The Lecture	17.1% (14)	19.3% (16)
III: Other Teaching Approaches	17.1% (14)	16.9% (14)
III: More IPL	24.4% (20)	0.0% (0)
IV: More Participation in the Learning Activities	7.3% (6)	12.0% (10)
V: More Preparation for the Learning Activities	6.1% (5)	4.8% (4)
VI: Positive Comments	*11.0% (9)*	*24.1% (20)*
VII: Other comments	*17.1% (14)*	*22.9% (19)*
	(100%)	*(100%)*

Table 11.18: Responses to the four themes by Learning Condition.

11.9 Chapter Overview

This Chapter has highlighted students' developed understanding of IPL as a result of participating in the intervention and its influence on interprofessional collaboration in future practice. In relation to this understanding, students were able to identify that IPL was learning with, from, and about other health professionals with an emphasis on 'learning with'. As a result of the intervention there was less focus on IPL being about learning a clinical topic and more about its capacity to foster shared learning with patient-focused outcomes. Despite the importance of interprofessional collaboration, the relevance and significance of learning about a clinical topic was still a frequent theme cited in many of the data sources.

This chapter has also shown that the impact of the education intervention in relation to developing an appreciation of Interprofessional Collaborative Practice (ICP) competencies was highly valued by all students, equally valued by medical and nursing students but more valued by the IPL students. Of particular value to the IPL students was the opportunity to develop teamwork and collaboration skills, expand interprofessional communication capabilities and to learn about the roles and responsibilities of others in the management of delirium. Teamwork and collaboration was equally important to the UPL students but less emphasis was placed on roles and responsibilities and interprofessional communication. For both groups, patient centredness did not feature strongly.

The nature of the learning experience was also viewed as integral to the achievement of these goals with a blended learning approach (combination of lecture, case study and simulation) found to be especially useful. The ability to bridge theory to practice by using a 3-staged teaching and learning process was frequently referenced by many students regardless of learning condition or course. The culmination of participating in the simulation was found to be the most critical stage in the reporting of benefits with the majority of students claiming this to be the best part of the experience. Those students who missed out on the full IPL experience were less enthusiastic and positive about the experience overall and favoured learning about the topic of delirium more than the IPL participants.

The outcomes of this chapter also revealed that it is important to ensure that all elements of the teaching process are of high quality. Of note was the poor response to the lecture by all groups of students. This was clearly a major area requiring attention. For the UPL group the strongest criticism of the experience was the lack of IPL and the desire for more of that type of experience.

Overall, students highly valued the teaching and learning experience. It taught them a lot about ICP and delirium and the process used to teach those aspects was greatly appreciated. The next Chapter will further elaborate on these themes.

CHAPTER 12

Results - Interview Responses

12.1 Introduction

This Chapter presents findings from the individual interviews. It further expands on insights gained in Chapter 10 and continues to analyse the data using Kirkpatrick's Levels 1, 2a and 2b. The 14 semi-structured questions were designed to illuminate more in-depth views from the students about their learning experience and their views on ICP. A number of questions asked about personal learnings from the experience and whether the experience had developed students':

- ability to work in a team;
- confidence in interprofessional communication;
- appreciation of the role of the other profession; and,
- confidence in managing a patient with delirium.

Other questions related to specific aspects of the teaching/learning approach such as whether the lecture and case study prepared students for the interprofessional simulation and whether the interprofessional simulation prepared them for interprofessional practices. In addition the interviewer sought to ascertain whether or not the students were happy to be involved in this type of learning experience in the future.

The results in this chapter are presented in such a way as to provide a summary of the characteristics of the students interviewed and an overall description of the participants' responses to these questions. It will distinguish between perceptions according to the learning condition where appropriate (IPL or UPL).

12.2 Characteristics of the students interviewed

Table 12.1 presents a summary of the interviews. There were 211 participating students in the study. Ninety-nine students (46.7%) consented to be available for interview. Of these, 26 were interviewed (12.2% of total cohort). Twelve were from the IPL group and 14 from the UPL group. There were only 8 medical students interviewed but 18 nursing students contributed. The disparity in medical and nursing student numbers was due to the unavailability of many of the volunteering medical students due to their numerous rotations and placements in their final year including rural, interstate and international electives.

No. of students interviewed (n=26 in total)	UPL		IPL	
	Medicine n=5	**Nursing** n=9	**Medicine** n=3	**Nursing** 9

Table 12.1: Numbers, Course and Learning Condition of interviewed students.

12.3 General aspects about the learning experience and ICP

From the range of questions asked of students designed to glean their insights about what they felt they had learnt about interprofessional collaborative practice from their involvement in the learning experience, responses have been grouped to reflect the following overall themes.

1. Interprofessional teamwork
2. Interprofessional communication
3. Appreciation of roles
4. Attitudinal change and development of respect
5. The learning sequence
6. Significance of delirium as a topic
7. Putting knowledge into practice
8. Views on the future of ICP and IPL

Differences observed between the UPL and IPL students in their responses will be reflected in each theme.

Interprofessional teamwork

Students were asked to describe a significant aspect of the experience and whether it had increased their ability to work as a team. Responses were unanimously affirmative for 24 of the interviewed students. The development of teamwork skills was based on a greater understanding of roles within the team and the different sets of skills required to achieve a shared result in patient management.

> "…That doctors were all thinking in the same direction but the nurses were thinking in a different direction and different priorities but you could see the value of having the two working side by side…" (Q3. UPL medical student)
>
> "…Recognition of different team members roles is valuable…" (Q6. UPL medical student)
>
> "…Yes, everyone has an individual role and that the overall effort is a team effort…" (Q6. UPL nursing student)
>
> "…It was a really interesting team work exercise. It gave me a better understanding of the different roles we play…" (Q6. UPL medical student)

Students also valued seeing teamwork in action.

> "…Everyone appeared to be working well together…" (Q6. UPL nursing student)

> "…Yes, definitely – need the drs there- you cannot do it alone…" (Q6. UPL nursing student)

> "…Just to be able to know that the doctors are there if we need them…" (Q6. UPL nursing student)

It also provided an opportunity to practise teamwork and therefore build confidence.

> "Yes, helped me to know how to interact with the doctor" (Q6. IPL nursing student)

> "…I think it was a good. It was fun because it was a team based activity and it was good to have the two disciplines, nursing and medical together…hopefully we can keep on working together…" (Q6. IPL nursing student)

> "…Yes, I actually think I have learnt quite a lot from this scenario the performance during though wasn't that good, but after the scenario I think that I have improved a lot and am more confident in working in a team…" (Q7. UPL medical student)

Interprofessional communication

The building of confidence to communicate with the other profession following this experience was also a feature for the majority of students interviewed. It helped them to realise the importance of speaking out, to not be afraid to ask questions and to openly provide information with the other profession.

> "…It was just interesting to see how the doctors work, and the importance of communication. We don't often tell the doctors what's going on, they don't know how to deal with them properly, or you know we need to know what medications their on. Its really important for us to communicate I suppose, so it was just interesting to even hear some of the doctors, perspective on care of the delirious person…" (Q6. IPL nursing student)

> "…Yes, the importance of giving and getting information…" (Q9. IPL nursing student)

> "…Nursing staff really need to explain what they've seen and what they've done as well as doctors being able to ask questions concerning that…" (Q9. IPL nursing student)

> "…Yes, it helped to clarify roles and expectations, importance of keeping the communication open…" (Q7. UPL medical student)

> "…how important the communication is and the process you need to go through to communicate with each other…" (Q7. IPL nursing student)

Effective communication was also viewed as leading to improved patient outcomes.

> "…The most significant thing was the simulation. As an observer, I could see where the communication was breaking down between the doctors and nurses and how it could be improved and how little things can enhance the patient management…" (Q2. IPL medical student)

> "…Always have thought this was a significant role – has helped me to know that I need to call doctors, and that its

> better to work together to deal with finding the cause…" (Q7. UPL nursing student)

> "…Yes, this [communication] is extremely important as its going to bring the best possible outcome for the patient…" (Q7. UPL nursing student)

The opportunity to practise interprofessional communication was also noted.

> "…For sure, it was good practice and to find out what the nurse knew and didn't know and to practice sharing and communicating with them…" (Q7. UPL medical student)

> "...Learning to communicate between doctors and nurses - getting together as a team…" (Q1. IPL nursing student)

> "…Gave me an opportunity to talk with doctors…" (Q7. IPL nursing student)

Appreciation of roles

Two questions were asked to elicit students' views on professional roles and whether the experience had developed a greater appreciation of their own role and that of the other profession.

The Nurse's role

The following section describes how nursing students viewed their own role and how doctors viewed the nursing role. For nursing students the responses reflected the nature or specific characteristics of the role and the actual value that this role has in recognising delirium early and then calling for help. There was also an awareness of the constant interaction they had with patients, which created a high level of responsibility in the early detection of delirium. The need to keep the patient safe and to know how to manage delirious behaviours was an additional insight. For one nurse it was an enlightening experience.

> "…Made me realise how to manage delirium from a nursing point of view and how to see it from the patient's perspective and how to manage them in hospital. I guess I understand a bit more about what to do…" (Q4a IPL nursing student)

Table 12.2 presents the views expressed by nurses on their role.

Table 12.3 presents the views of medical students on the role of the nurse (mostly similar to views expressed by nurses). What was unique about the medical students' views of the nurse was a new understanding of the regularity in which nurses have to interact with patients. They became more aware that nurses were likely to see changes in the patient condition. This appeared to develop their appreciation of the critical importance of the nursing role in the early recognition and management of a patient with delirium. It therefore highlighted the need for doctors to be responsive to these nursing assessments. For these medical students it became clear that they should not ignore the nurse's judgments and their calls for help in this type of situation as it could potentially be harmful for the patient.

Views on the nurse’s role	Examples
Nurses views on the nursing role (Characteristics of the role) • Recognise delirium / early assessment • Call for help • Manage patient (particularly the role of reassurance and patient safety) • Identify underlying causes • Be flexible, non-judgmental / patient (particularly in dealing with the patient’s fluctuating state)	*“…To recognise it and to provide initial treatment such as reassurance, how to settle the patient before medical attention…” (Q4a UPL nursing student)* *“…To identify underlying causes that I wasn’t aware of; skills to deal with delirium; how to resolve it…” (Q4a UPL nursing student)* *“…Being able to recognise and assess more…” (Q4a UPL nursing student)* *“…To be flexible and expect all sorts of reactions when dealing with a delirious pt…” (Q4a UPL nursing student)* *“…We see the pt the most so we can pick up the signs early and we should then get help when needed…” (Q4a UPL nursing student)* *“…To get more background information to recognise it earlier…” (Q4a UPL nursing student)* *“…How you shouldn’t judge people and the role of reassurance…” (Q4a UPL nursing student)* *“…Helping to understand what the problem is about and how to get help from other professionals…” (Q4a IPL nursing student)* *“…We need to have a lot of patience…” (Q4a IPL nursing student)* *“…safety aspects; the person touch; preventing further confusion; minimising effects of delirium…” (Q4a IPL nursing student)*
Nurses views on the nursing role (Value of the role) • Importance of role in early recognition • High level of responsibility • Vigilance (as the nurse is the constant and consistent care giver) • High level of specific nursing care	*“…The nurse is the one who has the patient care and the doctors are not always there…” (Q4a IPL nursing student)* *“…How important nursing care is…” (Q4a IPL nursing student)* *“…Very important because we are with the patient more than the doctor. Because of the fluctuating course, we can be more aware of the changes Like if the doctor only see’s the patient at their best, then they won’t think that they have delirium…” (Q4q IPL nursing student)* *“…Nurse is first person to recognise it therefore their role is critical…” (Q4A UPL nursing student)* *“…Made me more aware of how often it occurs and how important our role is “lot more care in relation to us…” (Q4q IPL nursing student)*

Table 12.2 The characteristics and value of the nurse’s role as viewed by nurses.

Views on the nurse's role	Examples
Doctor's views on the nurse's role (Value of the role) • Importance of role in early recognition • Communicating concerns (therefore doctors should pay attention!) • High responsibility in managing the patient • Vigilance	*"…They are the most important person in recognising the delirium and bringing it to the attention of medical staff…" (Q4a UPL medical student)* *"…Basically I think the nurse plays a very important role in dealing and managing a pt with delirium…" (Q4a UPL medical student)* *"…Made me realise that the nurses spend far more time with the pt and will notice the changes with the pt faster than a doctor…" (Q4a UPL medical student)* *"…I have always considered the nurse to be the other part of the puzzle. It just reinforced how important it is work effectively…" (Q4a UPL medical student)* *"…Whatever the nurse tells the doctor is very important; their observations; their handover, all the previous behaviours is all very important…" (Q4a IPL medical student)*

Table 12.3 The value of the role of nurses as viewed by medical students.

The Doctor's Role

There were fewer comments in general from medical students about their role due to reduced numbers of interviewees. Their views however reflected their knowledge in assessment and diagnosis and their ability to investigate causes and treat delirium. How they saw the value of their role can be seen in Table 12.4.

For two medical students there were new learnings and confidence gained.

> "…I am now more confident to manage a patient with delirium. I have learnt a lot to be honest…" (Q4b UPL medical student)
>
> "…Helped me understand delirium a lot better. I would now feel a lot more confident with the situation. How to watch for certain things, call for help…" (Q4b IPL medical student)

Nursing students also appreciated the doctor's knowledge and ability to diagnose delirium and investigate the underlying causes. Of note was how they valued the support doctors could provide the nurse in managing a challenging patient and the fact that a management plan could be implemented which would ultimately ameliorate the delirious symptoms and thereby keep the patient safe.

Views on the doctor’s role	Examples
Doctor’s views on the doctor’s role (Characteristics of the role) • Provide knowledge • Diagnose condition • Investigate underlying causes • Implement management plans	*“…That we have the basic knowledge to assess and manage the patient…” (Q4b UPL medical student)* *“…Important to have the diagnosis in mind – to recognise the signs and instigate a management plan or investigations to find the cause…” (Q4b UPL medical student)* *“…Need to be proactive and to screen patients carefully. In the short time that we have with the patient we need to be looking for signs…” (Q4b UPL medical student)*
Nurse’s views on the doctor’s role (Characteristics of the role) • Investigate, assess and treat underlying causes of delirium • Implement interventions	*“…To recognise the underlying cause…” (Q4b. UPL nursing student) “…Assessment…” (Q4b. UPL nursing student)* *“…To be part of the team with the patient’s best interest as the primary focus. …” (Q4b. UPL nursing student)* *“…just seeing how …the medical students could give a second opinion… and could clarify what might be the cause, like viewing the blood results and things like that…” (Q4b. IPL nursing student)* *“…They can initiate more interventions to manage the acute delirium patient…” (Q4b. IPL nursing student)* *“…Seeing the medical student’s point of view. They were more focused on the pharmacological based answers. It was good to have an all round opinion…” (Q1. IPL nursing student)*
Nurse’s views on the doctor’s role (Value of the role) • Sharing knowledge • Supporting nurses in managing the patient	*“…Their input is extremely important to help find the cause and treat…” (Q4b. UPL nursing student)* *“…Realising the knowledge they have and the way they relate to nurses (Q4b IPL nursing student)* *“…To assist you as the nurse and to think of other interventions – to support you as another health professional…” (Q4b. IPL nursing student)* *“…They are very important in the hospital setting. When a nurse is not able to manage a patient, you have to call in the doctor. The doctors have their own roles to play in, managing patients with delirium…” (Q4b. IPL nursing student)*

Table 12.4 The value of the doctor’s role as viewed by medical and nursing students.

Breaking down barriers/hierarchy

What was interesting about the interviews was that it exposed some existing attitudinal barriers, particularly with the nursing students. Some nursing students were aware of the hierarchy between doctors and nurses. They held doctors in esteem prior to this experience and this created a barrier to communication. The teaching intervention however contributed to a rethink of this view and a realisation that doctors and nurses were in fact equal.

> "…There's not really problems talking to nurses, but doctors I'm sort of on a different level, it kind of put them back down to our level…" (Q7. UPL nursing student)
>
> "…I now realise how important it is to discuss with doctors about things instead of putting them on a pedestal…" (Q7. IPL nursing student)

For nursing students the intervention appeared to break down some of these stereotypical views and helped them to see the importance of developing a positive relationship between the two professions.

> "…First experience with med students helps bridge gap…" (Q3. UPL nursing student)
>
> "…Yes and that's why we need to do more. It helps to overcome barriers…" (Q9. UPL nursing student)
>
> "…I observed and I could see how it helped us develop a better relationship with medical staff…" (Q9. UPL nursing student)

For one student the simple opportunity to 'chat' to a medical student in an informal setting over morning tea made her realise that they both had similar experiences and that there was no reason why doctors should be thought of differently.

> "…So, even just outside of that scenario, just that normal socialising, because I found that when we went into the room and were waiting for…the lecture to be put on … you know we did have a bit of a chat and we discussed where we'd come from and stuff like that and I think that was quite beneficial because it took a bit of an edge off, thinking; 'Oh you know, all doctors are quite scary, but you sit there and you go, these guys are coming from the same sort of area as us and they're really not that scary you know. They've had to go through the same sort of stuff as what we have.'" (Q11. IPL nursing student)

A small number of medical students likewise identified the existence of barriers between the two professions, and that these still exist in practice. As such there appeared to be more skepticism about whether this could be changed after this experience.

> "…Being the first time it probably wasn't that effective because we weren't used to the environment and the situation. There were certain barriers that we needed to be overcome but these are probably in the clinical setting as much as anywhere…." (Q6. UPL medical student)
>
> "…I think what you're trying to do, is change the culture of both the studying of medicine and the studying of nursing and I think [when] you put final years in together you've got a

> group of people with quite set preconceptions about each other's profession…" (Q11. UPL medical student)
>
> "…regardless of whether they're nursing or medical they've spent a reasonable amount of time in the hospital already and have already developed a lot of ideas and you know notions about the other, you know how they feel about the other profession…" (Q11. UPL medical student)

One interesting comment from an IPL medical student was the view that doctors were the leaders in the delirium scenario, *"…To exclude any organic causes, underlying pathology and that doctors are the leader in the management of delirium…" (Q4b IPL medical student).* This attitude could be perceived as perpetuating the hierarchy. There was no profession specific leader allocated in the delirium scenario and no reason why a nurse could not in fact lead the simulation.

Despite this there was a strong sense that this experience had helped the students see the 'big picture' and that they had gained an appreciation for the other profession and the distinct and important role each had to play. This was more prominent with nursing students. Further, it appeared that they believed this was likely to transfer to the reality of their future working experiences.

> "…I'm not quite sure what it would have been like for some of the other groups where they might not have had the medical staff, but you know I think I found that the interaction with the medical staff, the whole thing overall made a much bigger picture and… understanding of it…" (Q2. IPL nursing student)
>
> "…I just thought it was really good to have…the two tutor people who are both kind of still current with their practice…. and working with the med students was good, because they've been taught kind of more in-depth things, but not so much the nursing management side of things and so it was good to see that they knew stuff that we didn't and we knew stuff they didn't…" (Q2. IPL nursing student)
>
> "…Yep, for sure. I really enjoyed the scenario, working with the doctors as well. I think there should be a lot more of that, because that's what's really going to happen…" (Q6. IPL nursing student)

Attitudinal change and development of respect

As an extension of the views expressed in the previous chapter, it was evident from the interviews that for some students there was a definite attitudinal change as a result of the educational experience and a newfound respect for the other profession. This was encouraging to see and it occurred in both UPL and IPL conditions.

Doctors respecting nurses

For one medical student he/she praised the difficult role that nurses have in managing patients due to the constant interactions that take place in the clinical workplace and how skilled nurses are at these interactions.

> “…To be a nurse is hard, like their job is a bit more complicated compared to a doctor. It was good to see things from their side. They have to hard work and they really do a better job than the doctor because they have to deal with the patient before they have to call for help…” (Q4a UPL medical student)

A similar sentiment was expressed by other medical students about the intensity of the nurse-patient interaction, its importance in the management of the patient and the lack of awareness they had about nurse’s skills even after five years of medical school.

> “…I really began to see how much patient contact the nurses have in comparison to medical students – they really see the patient a lot and can notice the change in the patient condition and they can give really valuable feedback to the doctor and the way they counsel the patient was different. As a medical student we are wanting to ask questions to find a cause. I have realised that what they do is really important…” (Q4a UPL medical student)

For two medical students it changed their perception of the role of the nurse.

> “…Changed my view of the role of the nurse…” (Q4a IPL medical student)

> “…I think for the first time, I got to see things from a nursing point of view and how they actually manage a pt. It has actually helped me a lot in terms of understanding how they function and how they work…” (Q1. IPL medical student)

Nurses respecting doctors

Similar attitudinal changes were expressed by nursing students (more for IPL nurses), particularly a new appreciation of the challenges that doctors face in the task of diagnosis and treatment and the need to value their contributions and the importance of working together.

> “…Made quite a difference; before I had a negative attitude towards them but then I realised that we were all on the same level and everyone was so cooperative with each other. There was some information that they had and there was other information that we had. And it was interesting how there was a slight bit of overlap, but it was always interesting knowing each other’s point of view… I’ve probably developed much better respect and probably will develop a much better relationship with the doctors from now on…” (Q4b. IPL nursing student)

> “…Their diagnosis and how difficult it must be for them to go through diagnosing a patient and I think there’ve got a pretty hard enough job to do themselves, so yeah definitely I think their role is probably more difficult in diagnosis, but with the working together on the day, that was real good, so good to see how it all went together…” (Q4b. IPL nursing student)

> “…Yes, it is the first time we have had any interaction with medical students and I thought it was terrific. It was important to have the respect of the two professions…” (Q7. UPL nursing student)

(These insights are particularly noteworthy outcomes of this research and will be elaborated further in Chapter 14.)

Confidence in managing a patient with delirium

Most students believed delirium to be a significant topic for this type of education. They appreciated how vital it was to be aware of the condition, how to identify it, recognise the symptoms and how to treat it.

> "…Delirium was a great topic to use: relevant, under-diagnosed and important and a good broaching point between the two professions…" (Q11. UPL medical student)

> "…All good- really enjoyed it – it all came together really well. I couldn't fault it. It's definitely made me more aware of delirium in the hospital…" (Q2. UPL nursing student)

For nursing students it was having new knowledge about the condition.

> "…Yeah, definitely…I was pretty unaware before the day, but now, yep it's been good…" (Q5. IPL nursing student)

> "…Yes, definitely what causes it, what treatment. I didn't know much before and now I do…" (Q5. IPL nursing student)

> "…Yes, definitely– being able to recognise it, never knew there were so many causes and putting a plan into action…" (Q5. UPL nursing student)

> "…Didn't know much about delirium it taught me what to deal with and the causes which I wasn't aware of…" (Q3. UPL nursing student)

It extended existing knowledge for other nursing students.

> "…My understanding of delirium is now increased…" (Q2. UPL nursing student)

> "…Yeah. I suppose more for me, it was a refresher in skills in dealing with the delirium patient and safety and stuff like that because they are very tricky people to deal with in hospital…" (Q5. IPL nursing student)

> "…Yes definitely I have more of an understanding of what it is, what causes it, how to deal with it and that it is short term…" (Q5. UPL nursing student)

Students identified the importance of differentiating delirium from dementia.

> "…Naturally, a lot about delirium and the difference between delirium and dementia and how to treat it …" (Q3. IPL nursing student)

> "…It certainly did. I have had a lot do with patients and now I realise they probably had delirium not dementia…" (Q5. IPL nursing student)

> "…The acute onset, the fluctuations, the difference to dementia and to manage patients well to avoid other complications…" (Q3. UPL medical student)

Specific skills were enhanced for students including how to talk to the patients with delirium, and being vigilant.

> "…Learnt a lot about delirium and watching the video [post-simulation] helped me to view myself and improve my practice, clinical skills, how I talk to patients and how I view others such as nurses and doctors…" (Q3. UPL medical student)

> "…Yeah it did. I understood that I have to be there [with the patient] and I have to use some techniques…like be patient and make sure the environment is safe…" (Q5. IPL nursing student)

For all but one of the students interviewed there was global agreement that the intervention developed their confidence in managing a patient with delirium.

> "…I am now more confident right now to deal with the patients, I mean more competent to manage a patient with delirium and more easy for me to be aware and to discover the conditions…" (Q2. UPL medical student)
>
> "…Being involved with the medical students we develop maturity and develop the confidence on how to approach delirium patients in the ward…." (Q2. IPL nursing student)
>
> "…Definitely having spent a whole day on the topic it has increased my confidence identifying delirium in patients…" (Q5. UPL medical student)

The learning sequence

As was mentioned in Chapter 10 from the results of the questionnaire, a surprise feature of students' perceptions was the value placed on the learning sequence of lecture, case study and simulation. This appeared to be a unique feature and one that was greatly appreciated.

> "…The logical sequence of didactic learning to interaction to simulation…" (Q2. IPL medical student)
>
> "…Practical aspects and the sequencing of steps was valuable…" (Q3. UPL medical student)
>
> "…Yes, the sequence was very good. It was a good way to train junior doctors – having theory first very helpful and very informative…" (Q8. UPL medical student)
>
> "…This was the best way to do it. Education, case study, then see the pt.- it makes sense doesn't it…" (Q8. UPL medical student)

As noted by the students, the lecture provided the necessary information (content knowledge), the case study afforded time to discuss features of the case and to reflect on this information which then prepared them for the simulation.

> "…Yes it was helpful to be told information before the scenario. It made my role easier in knowing what to do…" (Q8. UPL nursing student)
>
> "…It refreshed your ideas of delirium before handling it in the simulation…" (Q8. IPL medical student)
>
> "…I did enjoy the lecture and case study beforehand and it did prepare you…" (Q8. IPL nursing student)
>
> "…Yes, especially the case study. I thought back to it a lot as I was participating in the simulation…" (Q8. IPL nursing student)

This then culminated in the simulation, which put it all into practice, and the theory could then be applied to a realistic scenario.

> "…One thing led to another which finished with the simulation which was good…" (Q8. UPL nursing student)

> "…Yes it was good. It put the whole picture together…" (Q8. IPL nursing student)

Putting it into practice

In relation to the simulation, students reflected on the value of being able to directly apply what they had learnt in theory to a practical scenario.

> "…The simulation – it put everything we had learnt into practice right then and there…" (Q1. UPL nursing student)

> "…You don't often get the opportunity to put stuff into practice right away…" (Q2. IPL medical student)

Of particular value was the realism and immediacy of the scenario and how it provided practical insights into their own responses and that of others. The students were clearly able to 'buy into' the scenario, dispel disbelief and make this an authentic learning experience for themselves.

> "…Simulation was fantastic – so lifelike "fantastic to see the medical students responses and the questions they might ask of nursing staff…" (Q11. UPL nursing student)

> "…I was just an observer but I thought it was so real and the responses from the nursing and medical staff were so genuine…" (Q11. UPL nursing student)

The benefits of the simulation were to enable students to carry out specific actions, make decisions in real time and interact with others.

> "…Simulation scenario has had a big impact on me in that a lot of the information I need to obtain from the nurse for the doctor to make the correct diagnosis…" (Q9. UPL medical student)

> "…Yes, had to make judgments on the spot and try and work out the best course of action, allowed me to understand what was going on and to deal with it quickly, you have to act…" (Q9. UPL nursing student)

> "…the simulation allowed me to know that the simple things like putting a bed down are important to do…" (Q5. UPL nursing student)

The debriefing at the end of the simulation enabled students to receive important feedback on their interactions and gain fresh insights.

> "…Debrief brought everything together…" (Q8. UPL nursing student)

> "…Have a better understanding of what to do and what NOT to do. It was good to talk it all through after the simulation because you can be very hesitant about dealing with a patient with delirium. It gave me more of an awareness of what could happen with this type of patient…" (Q5. IPL nursing student)

One IPL nursing student went further to describe how memorable the whole process was in creating clarity about managing a patient with delirium and interprofessional practice.

> "…I think I will always remember a lot from the delirium because of the style of it I think, because of the fact that you had the lecture beforehand and the group session and then you went into the clinical setting and it all sort of interrelated together. And I think with having that medical stuff as well, it

> sort of made everything a lot clearer… a lot of the time we always see things just from the nursing side…" (Q10. IPL nursing student)

Differences between groups (UPL & IPL)

Comments in the interviews were mostly generic in nature but three UPL students did reflect on the lack of IPL they experienced compared to IPL students. One medical student stated that not being able to interact with nursing students prior to the simulation posed a barrier.

> "…Being in just the medical group created a bit of a barrier when we went into the simulation because we were only familiar with the role that we were playing. I felt in the dark about what the nursing students had done. I really would have wanted to do the lecture and case study with the nursing students…" (Q8. UPL medical student)

For the other two students there was a desire for more IPL.

> "…I just wished we had more of it…" (Q2. UPL medical student)

> "…No for it to be effective there needed to be joint feedback. You can't really have a sandwich without bread. It felt like something was missing…" (Q9. UPL medical student)

The Future

Students were finally asked in the interview if they would like to participate in this type of experience again with 25 of the 26 students wholeheartedly agreeing. Comments reflected the view that IPL should be introduced early in the pre-registration years and the need for cultural change to embed this more holistically.

> "…A whole designated day like this on a specific topic that is common is quite important…" (Q11. UPL medical student)

> "…This needs to be integrated from quite early on…to sort of become ingrained in the culture… If this were to continue it needs to start early on…" (Q11. UPL medical student)

> "…If we could have more of that stuff early on in our study …that would probably be better…" (Q11. IPL nursing student)

One student felt that it should be integrated across the entire curriculum.

> "…Needs to be incorporated throughout the entire curriculum from year 1. Start small and then build. Also roles need to be explained so that when we hit the wards we understand that an intern is in their first year just like our grad year and that they too might need extra assistance and a boost of confidence…" (Q11. UPL nursing student)

Another UPL nursing student realised the value in this integration and how it had potential for preparing nurses for future interprofessional practice.

> "…If we can work together or learn to work together while we are still at uni and scenarios and stuff, by the time we hit the wards we've got a better idea of what each one does and work better as a multidisciplinary team…" (Q3. UPL nursing student)

12.4 Chapter overview

As the data in this Chapter illustrates, the interviews reinforced outcomes from all other data sources of this research. It has demonstrated the value that students place on interprofessional teamwork, and through rich 'thick' qualitative data (Geertz, 1994) has offered the thinking and reasoning underpinning the quantitative data sets. As a result of their experience in the study it taught participants the importance of clearly understanding roles within the team and of acknowledging the different sets of skills that are needed to make teams work. The ability to interact with the other profession helped the students gain confidence in interprofessional communication with the opportunity to practice those skills being of most value.

Insights from this Chapter also revealed that attitudinal barriers do exist and that nursing students, in particular, were most aware of the hierarchy between doctors and nurses. This may be because they have had more exposure to the clinical setting in the past. The intervention however, appeared to contribute to the breaking down of these barriers.

The interviews also revealed that as a result of their experience, these students have developed a much greater appreciation of the role of their own profession and that of the other with a distinct development of mutual respect and admiration. Medical students developed a new understanding of the critical role of nurses in relation to patient interaction, assessment and safety. Nursing students demonstrated a new appreciation of the doctor's role in having the required knowledge and ability to diagnose and investigate a problem. Together they could see the value of implementing a joint management plan in their future responsibilities.

The interviews also reinforced the value of the learning sequence as a contributor to the development of many of these values and concepts. The learning process appeared to strongly influence the achievement of the learning objectives and it strengthened delirium as a topic of importance, relevance and interest to both sets of students. The enormous value that students placed in putting theory to practice particularly in the simulation was clear with a view that it developed their confidence in managing a patient with delirium and their confidence in working as a team. The views expressed by the students who participated in the interviews firmly places IPL as a means of learning ICP and that it is something they wish to experience more fully in the pre-registration and post-registration learning years.

The final Chapter of results (following) presents the data on the delirium knowledge test.

CHAPTER 13

Results - The Delirium Knowledge Test

13.1 Introduction

This final 'data' chapter presents the results of the Delirium Knowledge Test (DKT). The DKT consisted of 34 multiple-choice questions administered before and after the learning experience. This chapter is divided into three parts – Part A: The raw results for the DKT; Part B: Independent Samples t-Test of the DKT for 'Between Group' differences; and, Part C: Paired samples t-Test of the DKT for 'Within Group' differences, Pre versus Post the intervention.

The aim of the DKT is to measure students' knowledge of delirium and its management and to measure differences across the many sub-groups of the study cohort, particularly to see whether individual learner characteristics impact the results. The other aim is to explore whether or not the education intervention significantly increased students' knowledge of delirium and its management and to ascertain differences within groups. Of particular importance is whether or not there was a significant difference observed in the IPL intervention group.

The data is presented in Table and Figure form. For all results presented in this chapter, results that are significant at the $p<0.05$ level are shaded in green and marked with a single asterisk '*'. Results that are significant at the $p<0.01$ level are also shaded in green but marked with a double asterisk '**'.

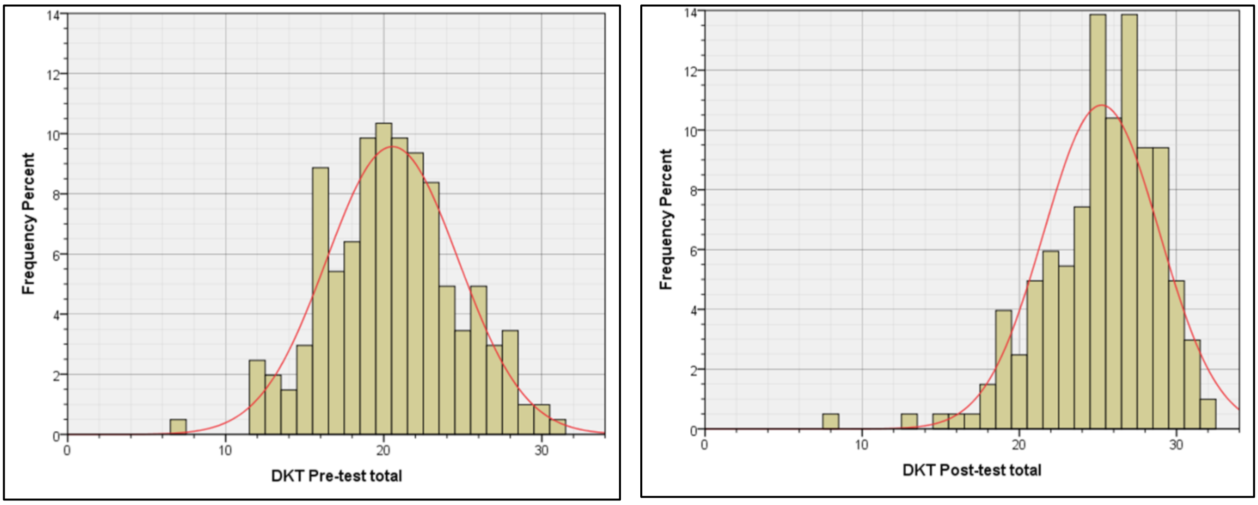
In relation to Kirkpatrick's levels of evaluation the DKT is aligned to level 2b, that is, whether the students have acquired knowledge of delirium.

Part A: Delirium Knowledge Test raw results

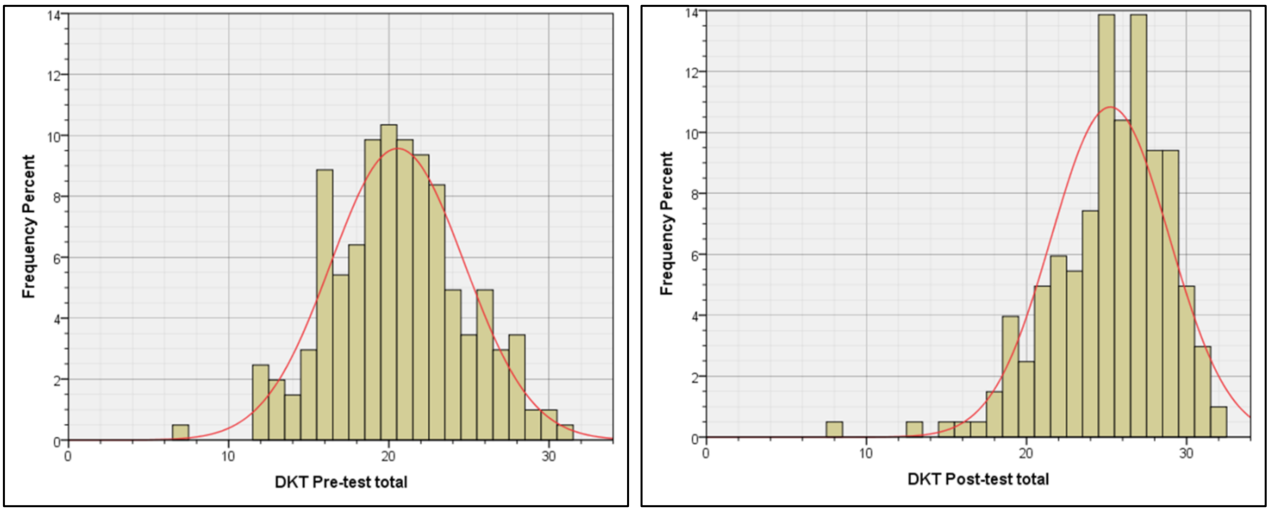
The raw score results for the DKT Pre and Post the intervention can be viewed in Table 13.1. The data is also plotted in histograms (Figures 13.1 and Figure 13.2). A normal distribution is observed.

Total Score (marks)	DKT_PRE		DKT_POST	
	Frequency	Percent	Frequency	Percent
0	0	.0	0	.0
1	0	.0	0	.0
2	0	.0	0	.0
3	0	.0	0	.0
4	0	.0	0	.0
5	0	.0	0	.0
6	1	.5	0	.0
7	0	.0	1	.5
8	0	.0	0	.0
9	0	.0	0	.0
10	0	.0	0	.0
11	5	2.5	0	.0
12	4	2.0	1	.5
13	3	1.5	0	.0
14	6	2.9	1	.5
15	18	8.8	1	.5
16	11	5.4	1	.5
17	13	6.4	3	1.5
18	20	9.8	8	3.9
19	21	10.3	5	2.5
20	20	9.8	10	4.9
21	19	9.3	12	5.9
22	17	8.3	11	5.4
23	10	4.9	15	7.4
24	7	3.4	28	13.7
25	10	4.9	21	10.3
26	6	2.9	28	13.7
27	7	3.4	19	9.3
28	2	1.0	19	9.3
29	2	1.0	10	4.9
30	1	.5	6	2.9
31	0	.0	2	1.0
32	0	.0	0	.0
33	0	.0	0	.0
34	0	.0	0	.0
No response	**1**	**0.49**	**2**	**0.98**
Total	**204**	**100**	**204**	**100.0**

Table 13.1: Raw results of the DKT Scores Pre and Post intervention.



Figures 13.1: Left, histogram of the DKT scores Pre intervention. Right, histogram of the DKT Scores Post intervention. In both cases the vertical (frequency) scale is simply by counts. A 'Normal' distribution curve is fitted to the data.



Figures 13.2: Same as Figure 13.1 except the vertical (frequency) scale is now a percentage.

Part B: DKT results 'Between Groups' comparisons

This part of the chapter presents results from the Independent Samples t-Tests for 'Between Group' comparisons for the DKT.

'Between Group' differences are resolved according to the following categories:

- Learning Condition
- Course
- Gender
- Age Category
- Learning Condition and Course
- Learning Condition and Gender
- Learning Condition and Age Category
- Course and Gender
- Course and Age Category
- Gender and Age

It should be noted that results for the summary statistics for each category have been pooled from the Pre and Post Questionnaire results.

a. Comparison according to Learning Condition

Table 13.2 presents between group summary statistics of the DKT resolved according to the Learning Condition (IPL/UPL).

Condition: IPL/UPL	N	Mean	Median	Std. Deviation	Std. Error of Mean
IPL	202	22.90	23.00	4.467	.314
UPL	203	22.87	23.00	4.693	.329
All	405	22.88	23.00	4.576	.227

Table 13.2: Summary statistics for DKT-Score resolved according to Learning Condition.

The Mean and 95% Confidence Interval (C.I.) data is plotted below in Figure 13.3.

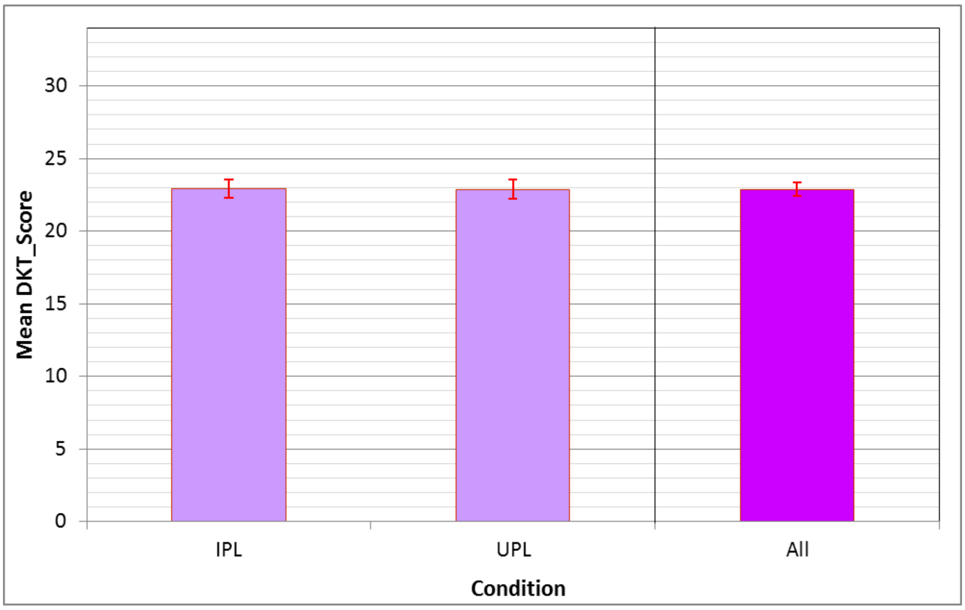


Figure 13.3: Plot of the Mean DKT-Score and their 95% C.I., resolved according to Learning Condition.

Table 13.3 reports the results by applying the 'Independent Samples t-Test' to the specified differences between Means, i.e., those pooled Pre and Post pairs of results plotted in Figure 13.3.

Independent Samples t-test [Equal variances not assumed]					
	t-test for Equality of Means				
Comparison	Mean Difference	Std. Error Difference	t	Df	Sig. (2-tailed)
[IPL] - [UPL]	.024	.455	.053	402.209	.958

Table 13.3: 'Independent Samples t-Test' to the specified differences between Means according to Learning condition.

Remarks:

According to Table 13.3, there was no statistically significant difference in pooled rating scores between the IPL and UPL groups.

b. Comparison according to Course

Table 13.4 presents between group summary statistics of the DKT resolved according to Course (Nursing/Medicine).

Course	N	Mean	Median	Std. Deviation	Std. Error of Mean
Nursing	235	21.16	21.00	4.430	.289
MBBS	170	25.26	26.00	3.614	.277
All	405	22.88	23.00	4.576	.227

Table 13.4: Summary statistics for DKT-Score resolved according to Course.

The Mean and 95% C.I. data is plotted below in Figure 13.4.

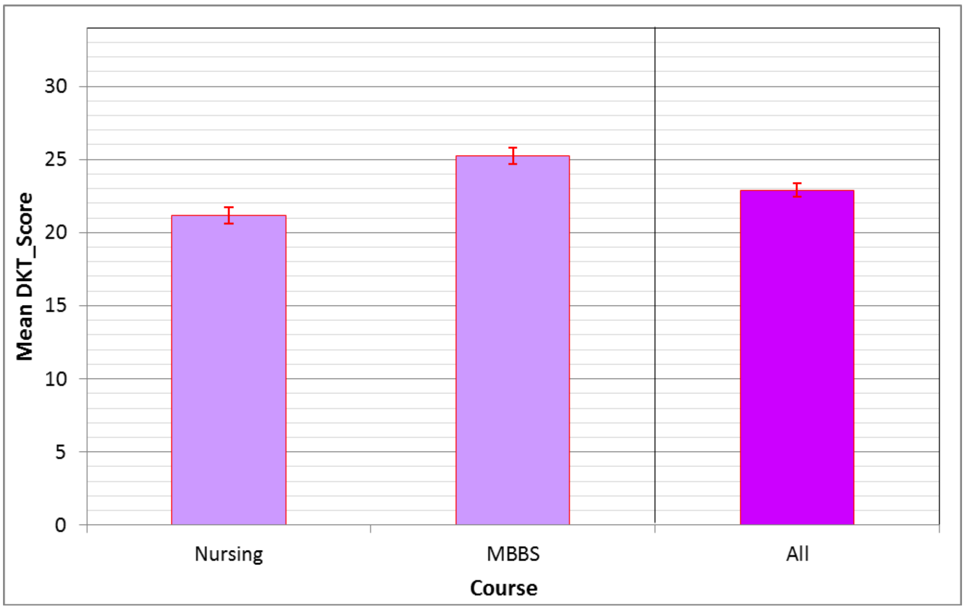


Figure 13.4: Plot of the Mean DKT-Scores and their 95% C.I., resolved according to Course.

Table 13.5 reports the results from applying the 'Independent Samples t-Test to the specified differences between Means, i.e., those Pre and Post pairs of results plotted in Figure 13.4.

Independent Samples t-test [Equal variances not assumed]					
	t-test for Equality of Means				
Comparison	Mean Difference	Std. Error Difference	t	Df	Sig. (2-tailed)
[Nursing] - [MBBS]	-4.103	.400	-10.247	397.166	.000**

Table 13.5: 'Independent Samples t-Test' to the specified differences between Means according to Course.

Remarks:

According to Table 13.5, Medical students had a significantly higher DKT score than Nursing students. The difference in this case is significant at the p<0.01 level.

c. Comparison according to gender

Table 13.6 presents between group summary statistics of the resolved according to Gender (Male/Female).

Gender	N	Mean	Median	Std. Deviation	Std. Error of Mean
Male	83	24.01	24.00	4.098	.450
Female	314	22.66	23.00	4.666	.263
All	405	22.88	23.00	4.576	.227

Table 13.6: Summary statistics for DKT-Score resolved according to Gender

The Mean and 95% C.I. data is plotted below in Figure 13.5.

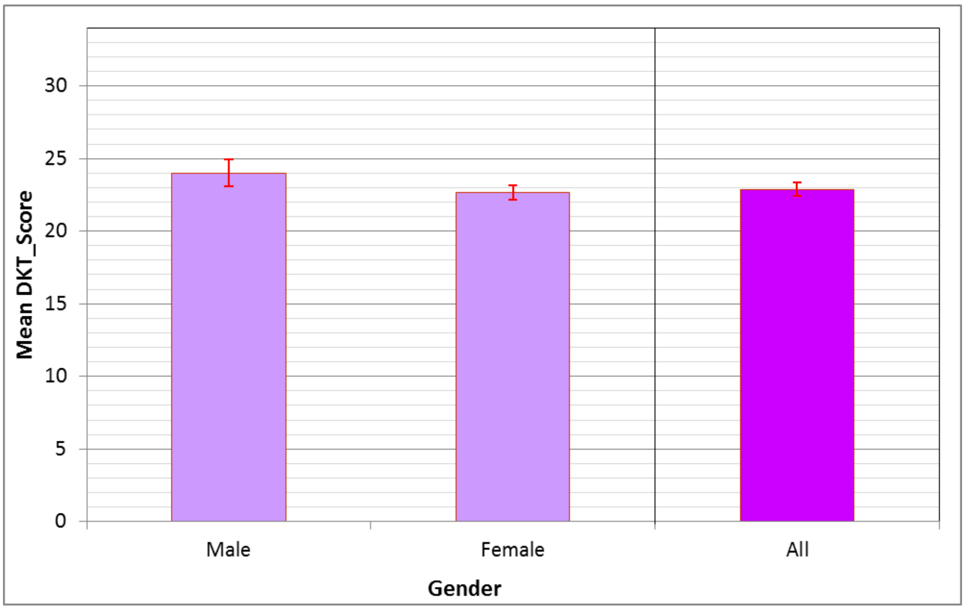


Figure 13.5: Plot of the Mean DKT-Score and their 95% C.I., resolved according to Gender.

Table 13.7 reports results by applying the 'Independent Samples t-Test to the specified differences between Means, i.e., those Pre and Post pairs of results plotted in Figure 13.5.

Independent Samples t-test [Equal variances not assumed]					
	t-test for Equality of Means				
Comparison	Mean Difference	Std. Error Difference	t	Df	Sig. (2-tailed)
[Male] - [Female]	1.353	.521	2.596	143.422	.010*

Table 13.7: This table reports the results of applying the 'Independent Samples t-Test' to the specified differences between Means plotted in Figure 13.5.

Remarks:

According to Table 13.7, Male students had a significantly higher DKT score than Female students. The difference in this case is significant at the $p<0.05$ level.

d. Comparison according to Age Category

Table 13.8 presents between group summary statistics of the DKT resolved according to Age Category (<25 years/>25 years).

Age category	N	Mean	Median	Std. Deviation	Std. Error of Mean
Less than 25 yr	283	23.31	24.00	4.665	.277
More than 25 yr	120	21.93	22.00	4.211	.384
All	405	22.88	23.00	4.576	.227

Table 13.8: Summary statistics for DKT-Score resolved according to Age Category.

The Mean and 95% C.I. data is plotted below in Figure 13.6.

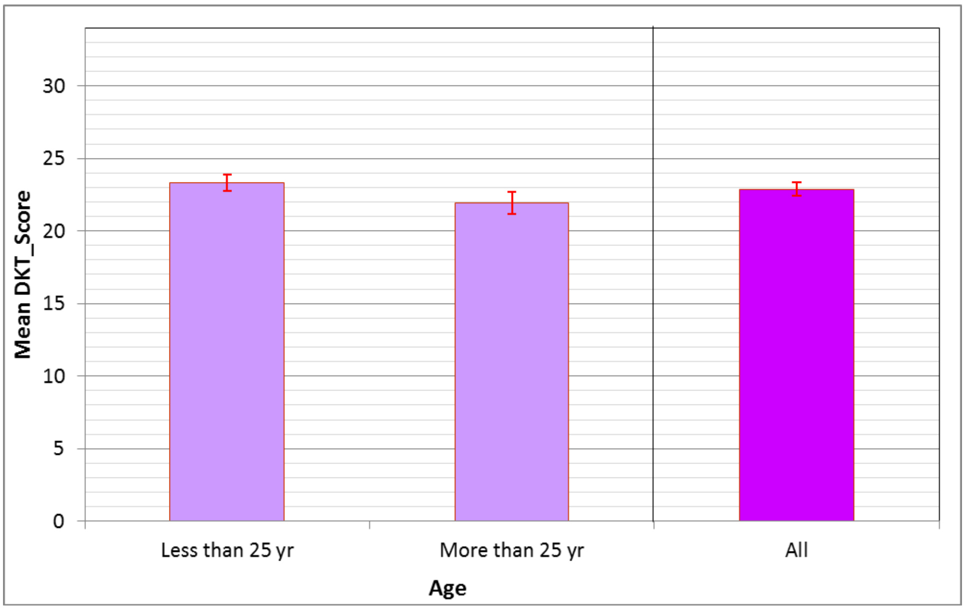


Figure 13.6: Plot of the Mean DKT-Score and their 95% C.I., resolved according to Age Category.

Table 13.9 reports the results by applying the 'Independent Samples t-Test to the specified differences between Means, i.e., those Pre and Post pairs of results plotted in Figure 13.6.

Independent Samples t-test [Equal variances not assumed]					
	t-test for Equality of Means				
Comparison	Mean Difference	Std. Error Difference	t	Df	Sig. (2-tailed)
[Less than 25 yr] - [More than 25 yr]	1.382	.474	2.917	246.845	.004**

Table 13.9: 'Independent Samples t-Test' to the specified differences between Means resolved according to Age Category.

Remarks:

According to Table 13.9, Younger students had a significantly higher DKT score than Older students. The difference in this case is significant at the $p<0.01$ level.

e. Comparisons according to Learning Condition and Course

Table 13.10 presents between group summary statistics of the DKT resolved according to Learning Condition and Course.

Course x Condition	N	Mean	Median	Std. Deviation	Std. Error of Mean
[Nursing x IPL]	114	21.08	21.00	4.303	.403
[Nursing x UPL]	121	21.24	22.00	4.563	.415
[MBBS x IPL]	88	25.25	25.50	3.481	.371
[MBBS x UPL]	82	25.28	26.00	3.772	.417
All	405	22.88	23.00	4.576	.227

Table 13.10: Summary statistics for DKT-Score resolved according to both Learning Condition and Course.

The Mean and 95% C.I. data is plotted below in Figure 13.7.

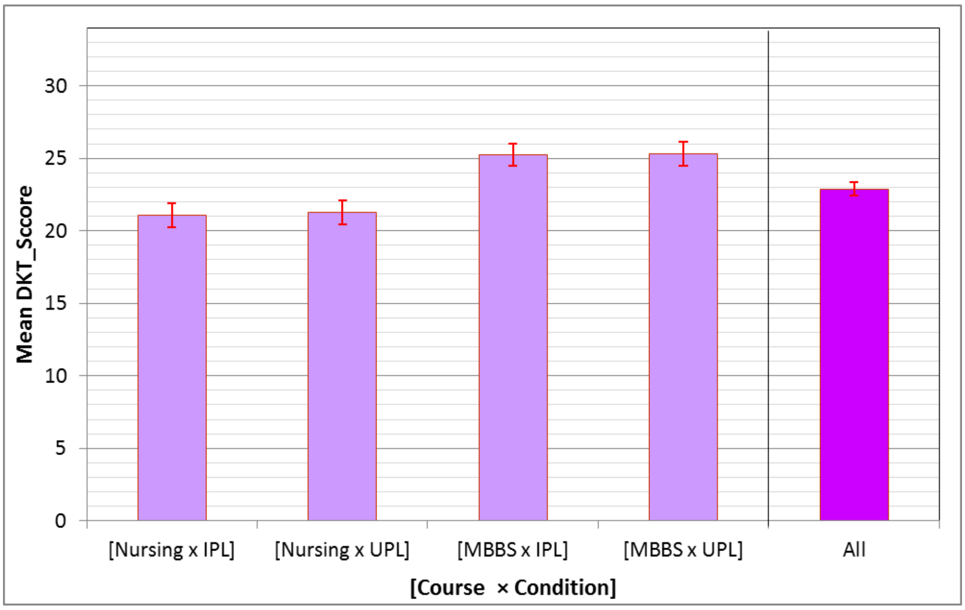


Figure 13.7: Plot of the Mean DKT-Score values and their 95% C.I., resolved according to both Learning Condition and Course.

Table 13.11 reports the results by applying the 'Independent Samples t-Test to the specified differences between Means, i.e., those Pre and Post pairs of results plotted in Figure 13.7.

Independent Samples t-test [Equal variances not assumed]					
	t-test for Equality of Means				
Comparison	Mean Difference	Std. Error Difference	t	Df	Sig. (2-tailed)
[Nursing × IPL] - [Nursing × UPL]	-.161	.578	-.278	233.000	.781
[MBBS × IPL] - [MBBS × UPL]	-.030	.558	-.055	164.265	.956
[Nursing × IPL] - [MBBS × IPL]	-4.171	.548	-7.613	199.537	.000**
[Nursing × UPL] - [MBBS × UPL]	-4.041	.588	-6.874	193.108	.000**

Table 13.11: 'Independent Samples t-Test' to the specified differences between Means, resolved according to Learning Condition and Course.

Remarks**:**

According to Table 13.11 the following statistically significant results were observed:

- Higher score for IPL Medical students compared to IPL Nursing students ($p<0.01$)
- Higher score for UPL Medical students compared to UPL Nursing students ($p<0.01$)

f. Comparisons according to Learning Condition and Gender

Table 13.12 presents between group summary statistics of the DKT, resolved according to Learning Condition and Gender.

Condition × Gender	N	Mean	Median	Std. Deviation	Std. Error of Mean
[IPL × Male]	40	24.98	25.50	3.718	.588
[IPL × Female]	156	22.46	23.00	4.524	.362
[UPL × Male]	43	23.12	23.00	4.272	.651
[UPL × Female]	158	22.86	24.00	4.808	.382
All	405	22.88	23.00	4.576	.227

Table 13.12: Summary statistics for DKT-Score resolved according to both Learning Condition and Gender.

The Mean and 95% C.I. data is plotted below in Figure 13.8.

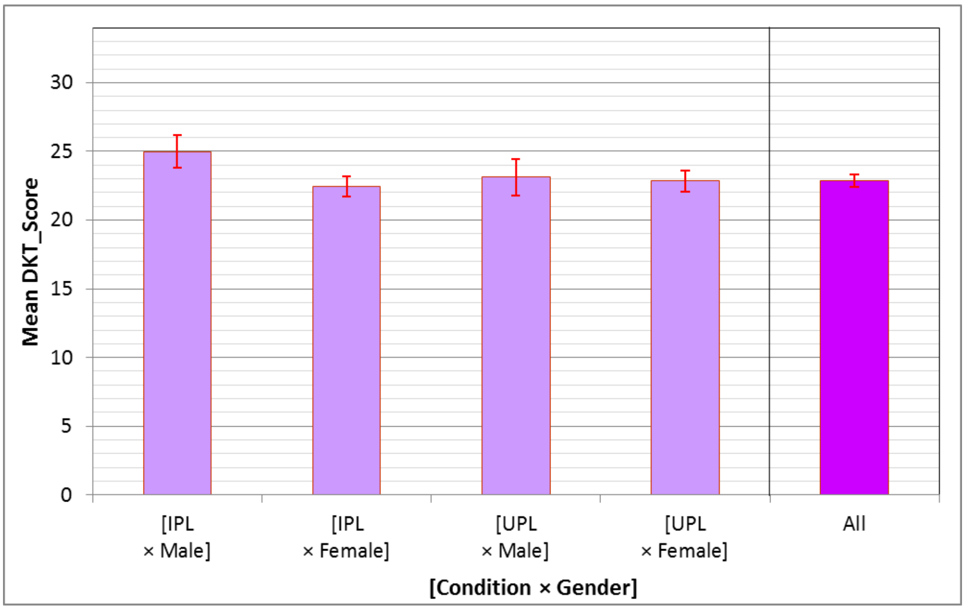


Figure 13.8: Plot of the Mean DKT-Score values and their 95% C.I., resolved according to both Learning Condition and Gender.

Table 13.13 reports the results by applying the 'Independent Samples t-Test to the specified differences between Means, i.e., those Pre and Post pairs of results plotted in Figure 13.8.

Independent Samples t-test [Equal variances not assumed]					
	t-test for Equality of Means				
Comparison	Mean Difference	Std. Error Difference	t	Df	Sig. (2-tailed)
[IPL × Male] - [IPL × Female]	2.520	.690	3.650	71.647	.000**
[UPL × Male] - [UPL × Female]	.256	.755	.338	73.608	.736
[IPL × Male] - [UPL × Male]	1.859	.877	2.118	80.654	.037*
[IPL × Female] - [UPL × Female]	-.406	.527	-.770	311.285	.442

Table 13.13: This table reports the results of applying the 'Independent Samples t-Test' to the specified differences between Means plotted in Figure 13.19.

Remarks:

According to Table 13.13, the following statistically significant results were observed:

- Higher score for IPL Male students compared to IPL Female Nursing students ($p<0.01$)
- Higher score for IPL Male students compared to UPL Male students ($p<0.05$)

g. Comparisons according to Learning Condition and Age Category

Table 13.14 presents between group summary statistics of the DKT, resolved according to Learning Condition and Age Category.

Condition × Age	N	Mean	Median	Std. Deviation	Std. Error of Mean
[IPL & < 25 yr]	142	23.27	23.50	4.596	.386
[IPL & > 25 yr]	58	22.05	21.50	4.015	.527
[UPL & < 25 yr]	141	23.34	24.00	4.749	.400
[UPL & > 25 yr]	62	21.81	22.00	4.416	.561
All	405	22.88	23.00	4.576	.227

Table 13.14: Summary statistics for DKT-Score resolved according to both Learning Condition and Age Category.

The Mean and 95% C.I. data is plotted below in Figure 13.9.

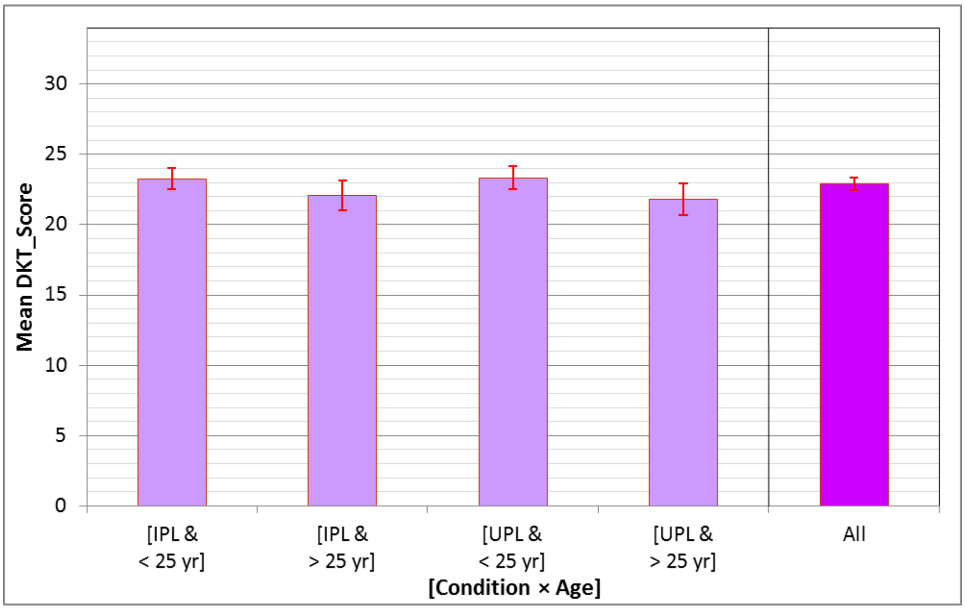


Figure 13.9: Plot of the Mean DKT-Score values and their 95% C.I., resolved according to both Learning Condition and Age.

Table 13.15 reports the results by applying the 'Independent Samples t-Test to the specified differences between Means, i.e., those Pre and Post pairs of results plotted in Figure 13.9.

Independent Samples t-test [Equal variances not assumed]					
	t-test for Equality of Means				
Comparison	Mean Difference	Std. Error Difference	t	df	Sig. (2-tailed)
[IPL & < 25 yr] - [IPL & > 25 yr]	1.223	.653	1.872	120.399	.064
[UPL & < 25 yr] - [UPL & > 25 yr]	1.534	.689	2.227	124.757	.028*
[IPL & < 25 yr] - [UPL & < 25 yr]	-.066	.556	-.118	280.554	.906
[IPL & > 25 yr] - [UPL & > 25 yr]	.245	.770	.319	117.908	.751

Table 13.15: 'Independent Samples t-Test' to the specified differences between Means, resolved according to Learning Condition and Age Category.

Remarks:

According to Table 13.15, Younger UPL students had a significantly higher DKT score than Older UPL students. The difference in this case is significant at the $p<0.05$ level.

h. Comparison according to Course and Gender

Table 13.16 presents between group summary statistics of the DKT Pre and Post the intervention, resolved according to course and gender.

Course × Gender	N	Mean	Median	Std. Deviation	Std. Error of Mean
[Nursing × Male]	18	21.06	22.00	3.670	.865
[Nursing × Female]	209	21.22	21.00	4.532	.313
[MBBS × Male]	65	24.83	25.00	3.847	.477
[MBBS × Female]	105	25.53	26.00	3.453	.337
All	405	22.88	23.00	4.576	.227

Table 13.16: Summary statistics for DKT-Score resolved according to both Course and Gender.

The Mean and 95% C.I. data is plotted below in Figure 13.10.

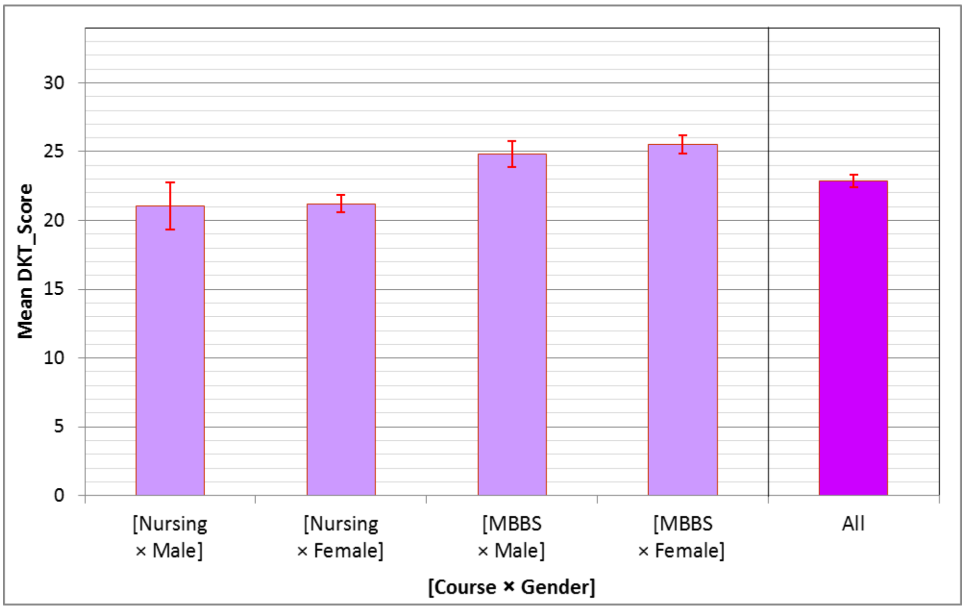


Figure 13.10: Plot of the Mean DKT-Score values and their 95% C.I., resolved according to both Course and Gender.

Table 13.17 reports the results by applying the 'Independent Samples t-Test to the specified differences between Means, i.e., those Pre and Post pairs of results plotted in Figure 13.10.

Independent Samples t-test [Equal variances not assumed]					
	t-test for Equality of Means				
Comparison	Mean Difference	Std. Error Difference	t	Df	Sig. (2-tailed)
[Nursing × Male] - [Nursing × Female]	-.160	.920	-.174	21.728	.864
[MBBS × Male] - [MBBS × Female]	-.703	.584	-1.203	124.680	.231
[Nursing × Male] - [MBBS × Male]	-3.775	.988	-3.822	28.226	.001**
[Nursing × Female] - [MBBS × Female]	-4.318	.460	-9.382	263.271	.000**

Table 13.17: This table reports the results of applying the 'Independent Samples t-Test' to the specified differences between Means plotted in Figure 13.15.

Remarks:

According to Table 13.17, the following statistically significant results were observed:

- Higher score for Male Medical students compared to Male Nursing students ($p<0.01$)
- Higher score for Female Medical students compared to Female Nursing students ($p<0.01$)

i. Between group comparison according to Course and Age Category

Table 13.18 presents between group summary statistics of the DKT, resolved according to Course and Age Category.

Course × Age	N	Mean	Median	Std. Deviation	Std. Error of Mean
[Nursing & < 25 yr]	122	20.58	21.00	4.617	.418
[Nursing & > 25 yr]	111	21.81	22.00	4.137	.393
[MBBS & < 25 yr]	161	25.37	26.00	3.503	.276
[MBBS & > 25 yr]	9	23.33	25.00	5.099	1.700
All	405	22.88	23.00	4.576	.227

Table 13.18: Summary statistics for DKT-Score resolved according to both Course and Age Category.

The Mean and 95% C.I. data is plotted below in Figure 13.11.

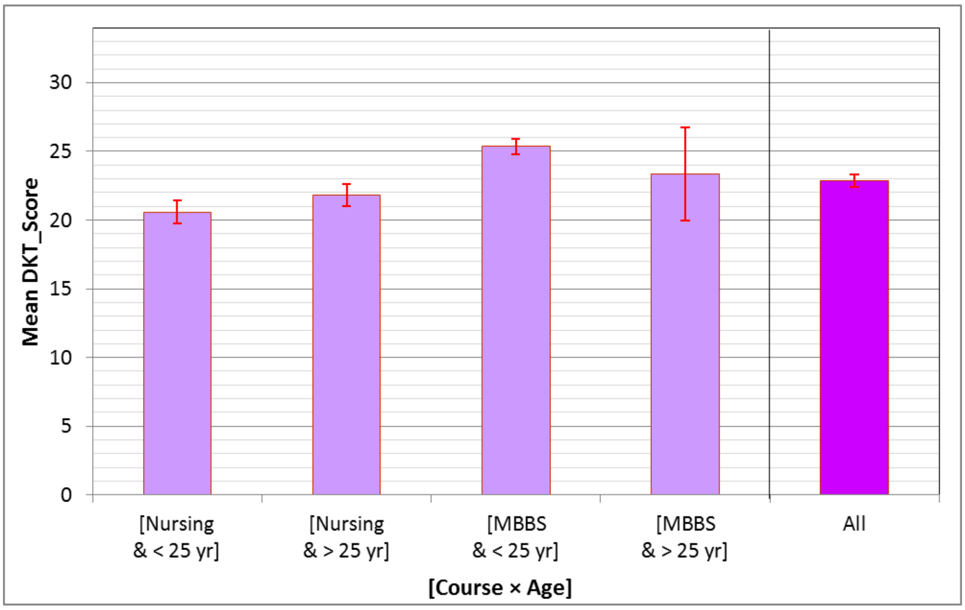


Figure 13.11: Plot of the Mean DKT-Score values and their 95% C.I., resolved according to both Course and Age Category.

Table 13.19 reports the results by applying the 'Independent Samples t-Test to the specified differences between Means, i.e. those Pre and Post pairs of results plotted in Figure 13.11.

Independent Samples t-test [Equal variances not assumed]

Comparison	t-test for Equality of Means				
	Mean Difference	Std. Error Difference	t	Df	Sig. (2-tailed)
[Nursing & < 25 yr] - [Nursing & > 25 yr]	-1.229	.574	-2.142	230.949	.033*
[MBBS & < 25 yr] - [MBBS & > 25 yr]	2.039	1.722	1.184	8.427	.269
[Nursing & < 25 yr] - [MBBS & < 25 yr]	-4.791	.501	-9.563	218.189	.000**
[Nursing & > 25 yr] - [MBBS & > 25 yr]	-1.523	1.744	-.873	8.875	.406

Table 13.19: This table reports the results of applying the 'Independent Samples t-Test' to the specified differences between Means plotted in Figure 13.16.

Remarks:

According to Table 13.19, the following statistically significant results were observed:

- Higher score for Older Nursing students compared to Younger Nursing students ($p<0.05$)
- Higher score for Older Medical students compared to Younger Nursing students ($p<0.01$)

j. Comparisons according to Gender and Age Category

Table 13.20 presents between group summary statistics of the DKT, resolved according to Gender and Age Category.

Gender × Age	N	Mean	Median	Std. Deviation	Std. Error of Mean
[Male & < 25 yr]	68	24.47	25.00	3.907	.474
[Male & > 25 yr]	15	21.93	21.00	4.431	1.144
[Female & < 25 yr]	211	23.01	24.00	4.832	.333
[Female & > 25 yr]	103	21.93	22.00	4.236	.417
All	405	22.88	23.00	4.576	.227

Table 13.20: Summary statistics for DKT-Score resolved according to both Gender and Age Category.

The Mean and 95% C.I. data is plotted below in Figure 13.12.

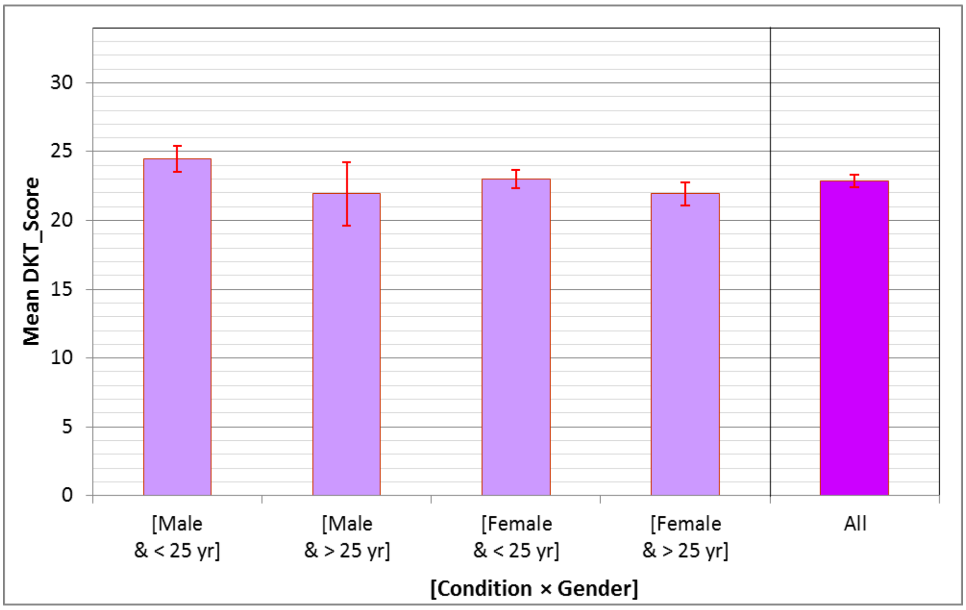


Figure 13.12: Plot of the Mean DKT-Score values and their 95% C.I., resolved according to both Gender and Age Category.

Table 13.21 reports the results by applying the 'Independent Samples t-Test to the specified differences between Means, i.e., those Pre and Post pairs of results plotted in Figure 13.12.

Independent Samples t-test [Equal variances not assumed]					
	t-test for Equality of Means				
Comparison	Mean Difference	Std. Error Difference	t	Df	Sig. (2-tailed)
[Male & < 25 yr] - [Male & > 25 yr]	2.537	1.238	2.049	19.096	.054
[Female & < 25 yr] - [Female & > 25 yr]	1.082	.534	2.028	228.023	.044*
[Male & < 25 yr] - [Female & < 25 yr]	1.456	.579	2.516	138.573	.013*
[Male & > 25 yr] - [Female & > 25 yr]	.001	1.218	.001	17.931	.999

Table 13.21: 'Independent Samples t-Test' to the specified differences between Means plotted in Figure 13.12.

Remarks:

According to Table 13.21, the following statistically significant results were observed:

- Higher score for Younger Female students compared to Older Female students ($p<0.05$)
- Higher score for Younger Male students compared to Younger Female students ($p<0.05$)

Part C: DKT results 'Within Groups' comparisons

This part presents results from the 'Paired Samples t-Tests for 'Between Group' differences for the DKT Pre and Post the intervention.

'Within Group' Differences are resolved according to the following categories:

- Learning Condition
- Course
- Gender
- Age Category
- Learning Condition and Course
- Learning Condition and Gender
- Learning Condition and Age Category
- Course and Gender
- Course and Age Category
- Gender and Age

a. Comparisons according to Learning Condition

Table 13.22 present summary statistics of the DKT score **Pre** and **Post** the intervention, resolved according to Learning Condition (IPL or UPL).

The summary statistics are reported as N (number of respondents in sub-group); Mean (average IPL rating of this sub-group); Std. Deviation (standard deviation of the IPL ratings of this sub-group); Std. Error of Mean (the 1-sigma uncertainty of the Mean); 2 x SEM (twice the Std. Error of the Mean). This provides the value of the 95% Confidence Interval (i.e., 2-sigma) for the Mean value. The last column shows the percent change in Mean response on the Post questionnaire.

Condition: IPL/UPL		DKT Score_ PRE	DKT Score_ POST	% Change in Mean DKT Score
IPL	N	101	101	
	Mean	20.74	25.05	+20.76
	Std. Deviation	4.108	3.724	
	Std. Error of Mean	.409	.371	
	2 × SEM (95% C.I)	.817	.741	
UPL	N	102	101	
	Mean	20.35	25.42	+24.88
	Std. Deviation	4.239	3.650	
	Std. Error of Mean	.420	.363	
	2 × SEM (95% C.I)	.840	.726	
All	N	203	202	
	Mean	20.55	25.23	+22.81
	Std. Deviation	4.169	3.683	
	Std. Error of Mean	.293	.259	
	2 × SEM (95% C.I)	0.585	0.518	

Table 13.22: Summary statistics for Mean DKT scores, Pre and Post intervention resolved according to Learning Condition.

The Mean values and their 95% Confidence Intervals (C.I.) are plotted in Figure 13.13.

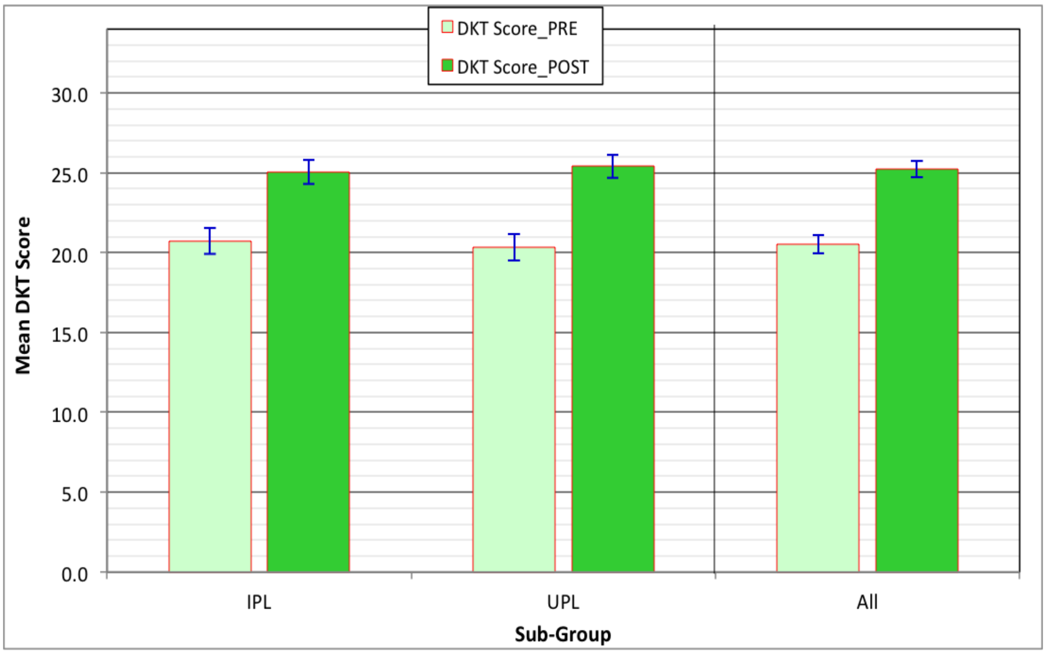


Figure 13.13: Plot of the Mean DKT scores, and their 95% C.I., resolved according to Learning Condition (Pre vs Post).

Table 13.23 reports the results from applying the 'Paired Samples t-Test to the specified differences between Means, to compare IPL with UPL Learning Condition Pre and Post the intervention.

Condition: IPL/UPL		Paired Differences			t	df	Sig. (2-tailed)
		Mean	Std. Dev.	SEM			
IPL	[DKT Score_PRE DKT Score_POST]	-4.31	3.35	0.33	-12.93	100	.000**
UPL		-5.05	3.27	0.33	-15.43	99	.000**
ALL		-4.68	3.32	0.23	-19.95	200	.000**

Table 13.23: Paired Samples t-Test for differences between Means, Pre vs. Post intervention, resolved according to Learning Condition.

Remarks:

According to Table 13.23, there were statistically significant increases in DKT scores post the intervention for the Whole Group, IPL Group and UPL Group. All three differences were found to be significant at the $p < 0.01$ level.

b. Comparisons according to Course

Table 13.24 present summary statistics of the DKT scores **Pre** and **Post** the intervention, resolved according to Course (Nursing or Medicine).

Course		DKT Score_ PRE	DKT Score_ POST	% Change in Mean DKT Score
Bachelor of Nursing	N	117	118	
	Mean	18.62	23.68	+27.14
	Std. Deviation	3.678	3.606	
	Std. Error of Mean	.340	.332	
	2 × SEM (95% C.I)	0.680	0.664	
MBBS	N	86	84	
	Mean	23.16	27.42	+18.37
	Std. Deviation	3.289	2.499	
	Std. Error of Mean	.355	.273	
	2 × SEM (95% C.I)	0.709	0.545	
All	N	203	202	
	Mean	20.55	25.23	+22.81
	Std. Deviation	4.169	3.683	
	Std. Error of Mean	.293	.259	
	2 × SEM (95% C.I)	0.585	0.518	

Table 13.24: Summary statistics for Mean DKT Mean scores, Pre and Post the intervention, resolved according to Course.

The Mean values and their 95% Confidence Intervals (C.I.) are plotted in Figure 13.14.

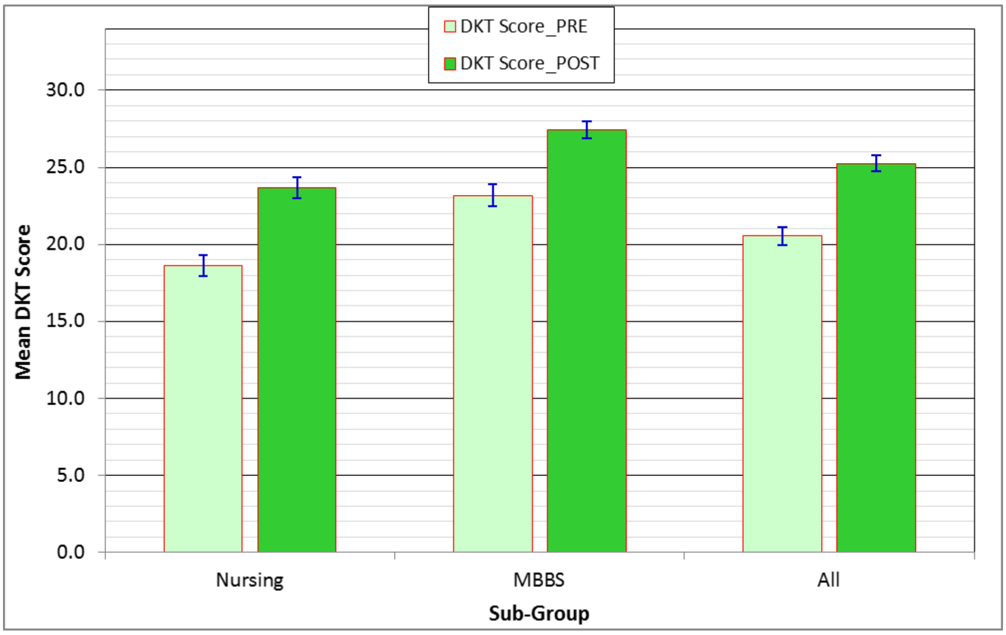


Figure 13.14: Plot of the Mean DKT scores, and their 95% C.I, resolved according to Course (Pre vs Post).

Table 13.25 reports the results from applying the 'Paired Samples t-Test to the specified differences between Means, to compare Medical with Nursing students Pre and Post the intervention.

Course		**Paired Differences**			**t**	**df**	**Sig. (2-tailed)**
		Mean	Std. Dev.	SEM			
Bachelor of Nursing	**[DKT Score_PRE DKT Score_POST]**	-5.07	3.50	0.32	-15.68	116	.000**
MBBS		-4.13	3.01	0.33	-12.60	83	.000**
ALL		-4.68	3.32	0.23	-19.95	200	.000**

Table 13.25: Paired Samples t-Test for differences between Means, Pre vs. Post intervention, resolved according to Course.

Remarks:

According to Table 13.25, there were statistically significant increases in DKT scores post the intervention for Medical and Nursing students. The differences were found to be significant at the p <0.01 level.

c. Comparisons according to Gender

Table 13.26 presents summary statistics of the DKT Score **Pre** and **Post** the intervention, resolved according to Gender (Male or Female).

Gender		DKT Score_ PRE	DKT Score_ POST	% Change in Mean DKT Score
Male	N	42	41	
	Mean	21.90	26.17	+19.48
	Std. Deviation	3.869	3.106	
	Std. Error of Mean	.597	.485	
	2 × SEM (95% C.I)	1.194	0.970	
Female	N	157	157	
	Mean	20.27	25.05	+23.60
	Std. Deviation	4.201	3.811	
	Std. Error of Mean	.335	.304	
	2 × SEM (95% C.I)	0.671	0.608	
All	N	203	202	
	Mean	20.55	25.23	+22.81
	Std. Deviation	4.169	3.683	
	Std. Error of Mean	.293	.259	
	2 × SEM (95% C.I)	0.585	0.518	

Table 13.26: Summary statistics for Mean DKT scores, resolved according to Gender Pre and Post intervention.

The Mean values and their 95% Confidence Intervals (C.I.) are plotted in Figure 13.15.

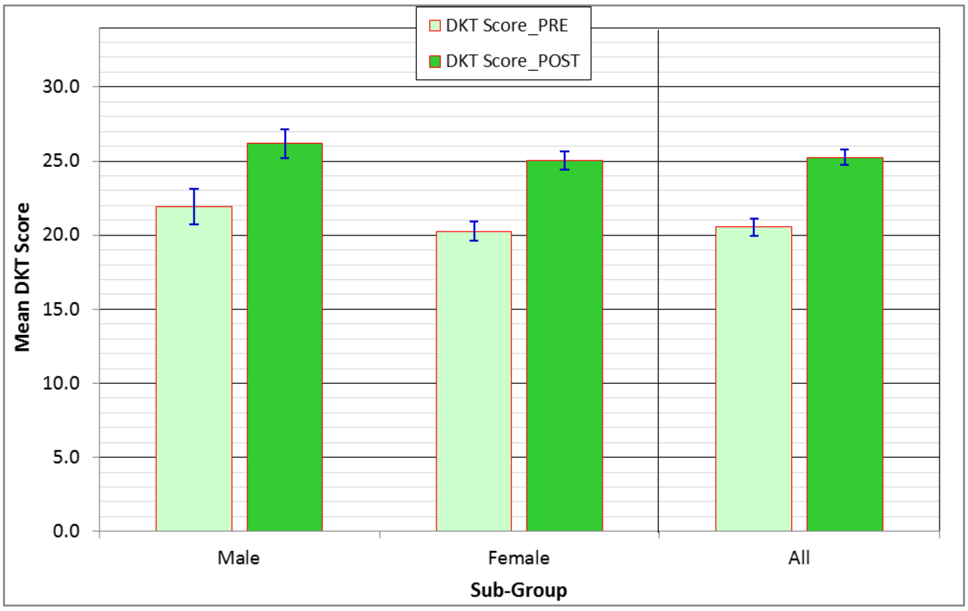


Figure 13.15: Plot of the Mean DKT scores, and their 95% C.I., Pre and Post intervention, resolved according to Gender.

Table 13.27 reports the results from applying the ‘Paired Samples t-Test’ to the specified differences between Means, to compare Medical with Nursing students Pre and Post the intervention.

Gender		Paired Differences			T	df	Sig. (2-tailed)
		Mean	Std. Dev.	SEM			
Male	[DKT Score_PRE DKT Score_POST]	-4.17	3.11	0.49	-8.60	40	.000**
Female		-4.79	3.40	0.27	-17.60	155	.000**
ALL		-4.68	3.32	0.23	-19.95	200	.000**

Table 13.27: Paired Samples t-Test for differences between Means, Pre vs. Post the intervention, resolved according to Gender.

Remarks:

According to Table 13.27, there were statistically significant increases in DKT Scores post the intervention for Male and Female students. The differences were found to be significant at the p <0.01 level.

d. Comparisons according to Age Category

Table 13.28 presents summary statistics of the DKT Scores **Pre** and **Post** the intervention, resolved according to Age Category (<25 years or >25 years).

Age		DKT Score_ PRE	DKT Score_ POST	% Change in Mean DKT Score
Less than 25yr	N	142	141	
	Mean	21.00	25.63	+22.05
	Std. Deviation	4.217	3.883	
	Std. Error of Mean	.354	.327	
	2 × SEM (95% C.I)	0.708	0.654	
More than 25 yr	N	60	60	
	Mean	19.55	24.30	+24.30
	Std. Deviation	3.890	3.027	
	Std. Error of Mean	.502	.391	
	2 × SEM (95% C.I)	1.004	0.782	
All	N	203	202	
	Mean	20.55	25.23	+22.81
	Std. Deviation	4.169	3.683	
	Std. Error of Mean	.293	.259	
	2 × SEM (95% C.I)	0.585	0.518	

Table 13.28: Summary statistics for Mean DKT scores, resolved according to Age Category Pre and Post the intervention.

The Mean values and their 95% Confidence Intervals (C.I.) are plotted in Figure 13.16.

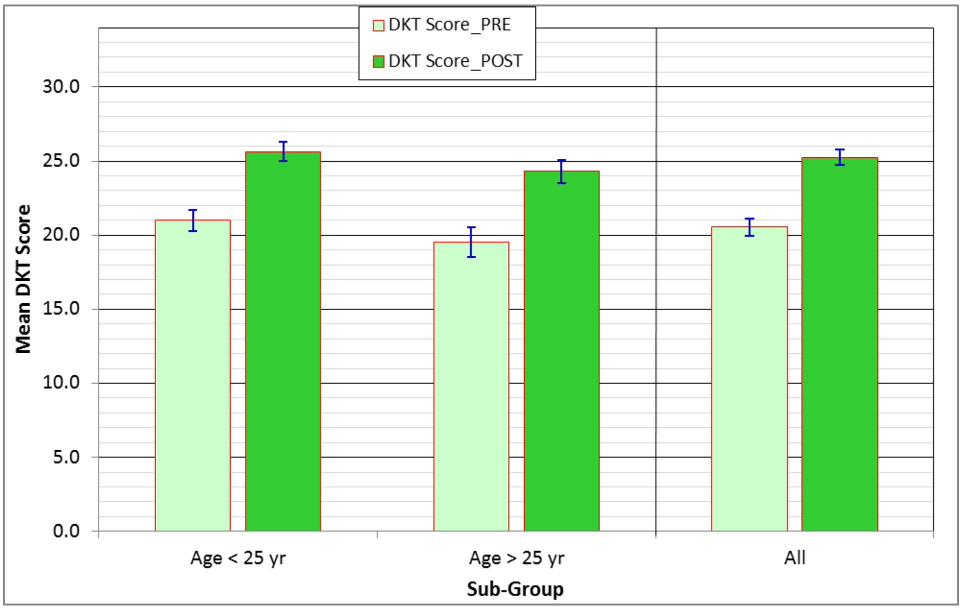


Figure 13.16: Plot of the Mean DKT scores, and their 95% C.I., resolved according to Age Category (Pre vs. Post).

Table 13.29 reports the results from applying the 'Paired Samples t-Test to the specified differences between Means, to compare Older with Younger students Pre and Post the intervention.

Gender		Paired Differences			t	df	Sig. (2-tailed)
		Mean	Std. Dev.	SEM			
Less than 25 yr	**[DKT Score_PRE DKT Score_POST]**	-4.61	3.20	0.27	-17.11	140	.000**
More than 25 yr		-4.76	3.61	0.47	-10.13	58	.000**
ALL		-4.68	3.32	0.23	-19.95	200	.000**

Table 13.29: Paired Samples t-Test for differences between Means, Pre and Post intervention, resolved according to Age Category.

Remarks:

According to Table 13.29, there were statistically significant increases in DKT Scores post the intervention for both Age Categories. The differences were found to be significant at the $p < 0.01$ level.

e. Comparisons according to Learning Condition and Course

Table 13.30 presents summary statistics of the DKT Scores **Pre** and **Post** the intervention, resolved according to Learning Condition and Course.

[Course × IPL/UPL]		DKT Score_ PRE	DKT Score_ POST	% Change in Mean DKT Score
[Nursing x IPL]	N	57	57	
	Mean	18.77	23.39	+24.58
	Std. Deviation	3.620	3.663	
	Std. Error of Mean	.480	.485	
	2 × SEM (95% C.I)	.959	.970	
[Nursing x UPL]	N	60	61	
	Mean	18.48	23.95	+29.58
	Std. Deviation	3.757	3.561	
	Std. Error of Mean	.485	.456	
	2 × SEM (95% C.I)	.970	.912	
[MBBS x IPL]	N	44	44	
	Mean	23.30	27.20	+16.78
	Std. Deviation	3.218	2.520	
	Std. Error of Mean	.485	.380	
	2 × SEM (95% C.I)	.970	.760	
[MBBS x UPL]	N	42	40	
	Mean	23.02	27.65	+20.09
	Std. Deviation	3.396	2.486	
	Std. Error of Mean	.524	.393	
	2 × SEM (95% C.I)	1.048	.786	
All	N	203	202	
	Mean	20.55	25.23	+22.81
	Std. Deviation	4.169	3.683	
	Std. Error of Mean	.293	.259	
	2 × SEM (95% C.I)	0.585	0.518	

Table 13.30: Summary statistics for DKT Mean scores resolved according to Learning Condition and Course, Pre and Post the intervention.

The Mean values and their 95% Confidence Intervals (C.I.) are plotted in Figure 13.17.

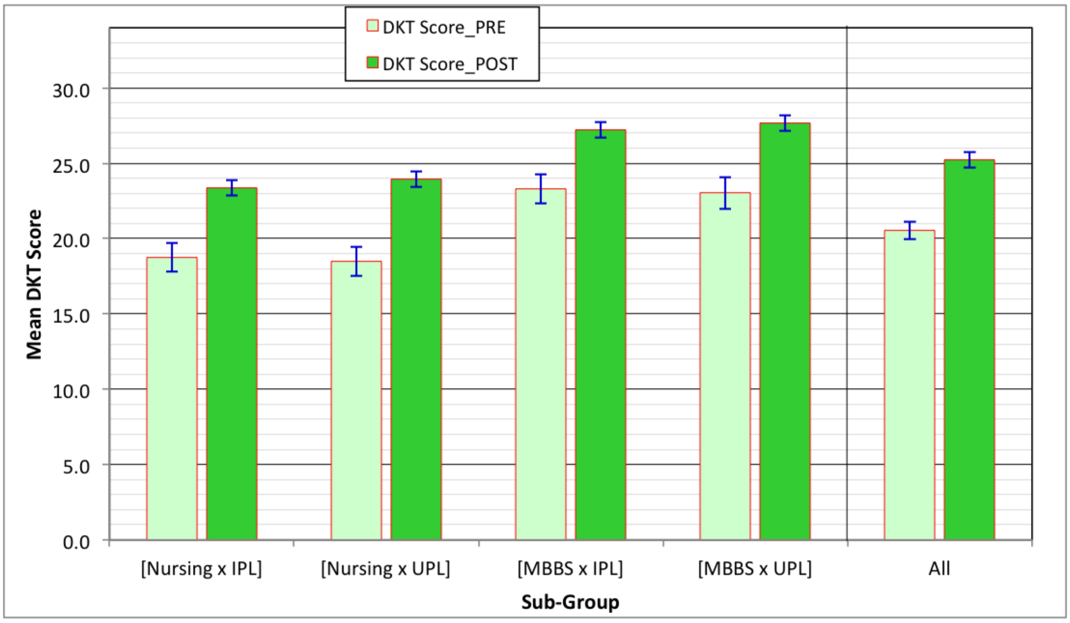


Figure 13.17: Plot of the Mean DKT Scores, and their 95% C.I., resolved according to Learning Condition and Course (Pre vs. Post).

Table 13.31 reports the results from applying the 'Paired Samples t-Test' to the specified differences between Means, to compare Learning Condition with Course Pre and Post the intervention.

Course and Condition		Paired Differences			T	df	Sig. (2-tailed)
		Mean	Std. Dev.	SEM			
[Nursing × IPL]	**[DKT Score_PRE DKT Score_POST]**	-4.61	3.56	0.47	-9.79	56	.000**
[Nursing × NIPL]		-5.50	3.41	0.44	-12.50	59	.000**
[MBBS × IPL]		-3.91	3.05	0.46	-8.51	43	.000**
[MBBS × NPL]		-4.38	2.98	0.47	-9.30	39	.000**
ALL		-4.68	3.32	0.23	-19.95	200	.000**

Table 13.31: 'Paired Samples t-Test' for differences between Mean scores Pre vs. Post the intervention resolved according to Learning Condition and Course.

Remarks

According to Table 13.31, there were statistically significant increases in DKT Scores post the intervention for IPL Nursing students, UPL Nursing students, IPL Medical students and UPL Medical students. All differences were found to be significant at the p <0.01 level.

f. Comparisons according to Learning Condition and Gender

Table 13.32 presents summary statistics of the DKT Scores **Pre** and **Post** the intervention, resolved according to Learning Condition and Gender.

[IPL/UPL and Gender]		DKT Score_ PRE	DKT Score_ POST	% Change in Mean DKT Score
[IPL x Male]	N	20	20	
	Mean	23.10	26.85	16.23
	Std. Deviation	3.726	2.661	
	Std. Error of Mean	.833	.595	
	2 × SEM (95% C.I)	1.666	1.190	
[IPL x Female]	N	78	78	
	Mean	20.26	24.65	21.71
	Std. Deviation	4.040	3.884	
	Std. Error of Mean	.457	.440	
	2 × SEM (95% C.I)	.915	.880	
[UPL x Male]	N	22	21	
	Mean	20.82	25.52	22.60
	Std. Deviation	3.750	3.415	
	Std. Error of Mean	.799	.745	
	2 × SEM (95% C.I)	1.599	1.490	
[UPL x Female]	N	79	79	
	Mean	20.28	25.44	25.47
	Std. Deviation	4.379	3.720	
	Std. Error of Mean	.493	.419	
	2 × SEM (95% C.I)	.985	.837	
All	N	199	198	
	Mean	20.61	25.28	22.65
	Std. Deviation	4.177	3.697	
	Std. Error of Mean	.296	.263	
	2 × SEM (95% C.I)	0.592	0.525	

Table 13.32: Summary statistics for DKT Mean scores resolved according to Learning Condition and Gender, Pre and Post the intervention.

The Mean values and their 95% Confidence Intervals (C.I.) are plotted in Figure 13.18.

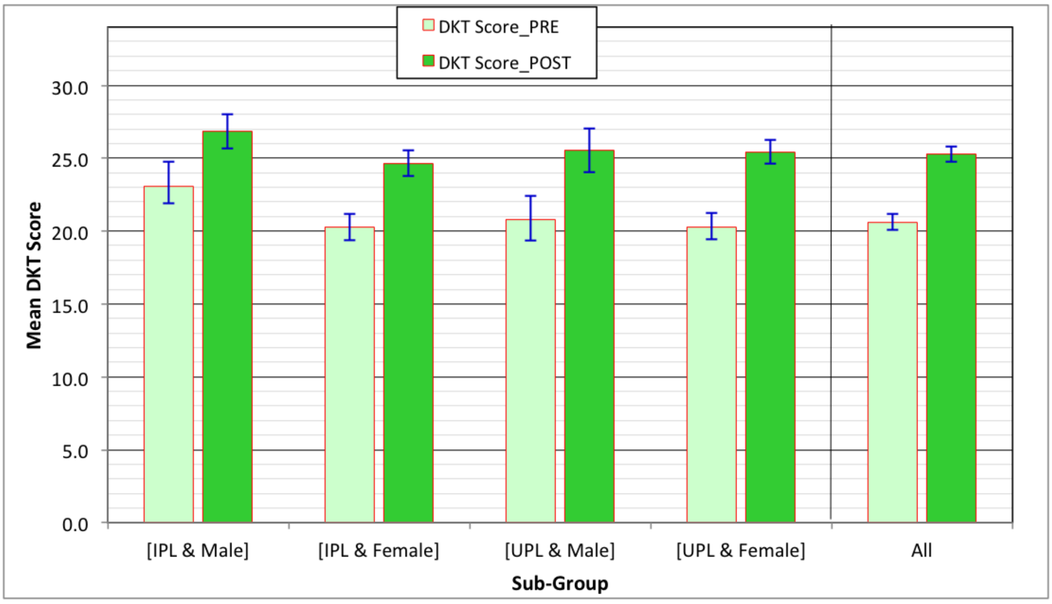


Figure 13.18: Plot of the Mean DKT Scores, and their 95% C.I., resolved according to Learning Condition and Gender (Pre vs. Post).

Table 13.33 reports the results from applying the 'Paired Samples t-Test' to the specified differences between Means, to compare Learning Condition with Gender Pre and Post the intervention.

Course and Condition		**Paired Differences**			T	df	Sig. (2-tailed)
		Mean	Std. Dev.	SEM			
[IPL x Male]	**[DKT Score_PRE DKT Score_POST]**	-3.750	3.401	.760	-4.931	19	.000**
[IPL x Female]		-4.397	3.363	.381	-11.549	77	.000**
[UPL x Male]		-4.571	2.821	.616	-7.426	20	.000**
[UPL x Female]		-5.179	3.410	.386	-13.414	77	.000**
ALL		-4.677	3.324	.234	-19.946	200	.000**

Table 13.33: 'Paired Samples t-Test' for differences between Mean scores Pre vs. Post the intervention resolved according to Learning Condition and Gender.

Remarks

According to Table 13.33, there were statistically significant increases in DKT Scores post the intervention for IPL Male and Female students and UPL Male and Female students. All differences were found to be significant at the $p < 0.01$ level.

g. Comparisons according to Learning Condition and Age Category

Table 13.34 presents summary statistics of the DKT Scores **Pre** and **Post** the intervention, resolved according to Learning Condition and Age Category.

[Learning Condition and Age Category]		DKT Score_ PRE	DKT Score_ POST	% Change in Mean DKT Score
[IPL x < 25 yrs]	N	71	71	
	Mean	21.07	25.48	20.92
	Std. Deviation	4.267	3.805	
	Std. Error of Mean	.506	.452	
	2 × SEM (95% C.I)	1.013	.903	
[IPL x > 25 yrs]	N	29	29	
	Mean	20.10	24.00	19.38
	Std. Deviation	3.639	3.423	
	Std. Error of Mean	.676	.636	
	2 × SEM (95% C.I)	1.351	1.271	
[UPL x < 25 yrs]	N	71	70	
	Mean	20.93	25.79	23.20
	Std. Deviation	4.196	3.981	
	Std. Error of Mean	.498	.476	
	2 × SEM (95% C.I)	.996	.952	
[UPL x > 25 yrs]	N	31	30	
	Mean	19.03	24.67	29.60
	Std. Deviation	4.103	2.631	
	Std. Error of Mean	0.737	0.480	
	2 × SEM (95% C.I)	1.474	.961	
All	N	202	200	
	Mean	20.57	25.25	22.76
	Std. Deviation	4.167	3.694	
	Std. Error of Mean	.293	.261	
	2 × SEM (95% C.I)	0.586	0.522	

Table 13.34: Summary statistics for DKT Mean scores resolved according to Learning Condition and Age Category, Pre and Post the intervention.

The Mean values and their 95% Confidence Intervals (C.I.) are plotted in Figure 13.19.

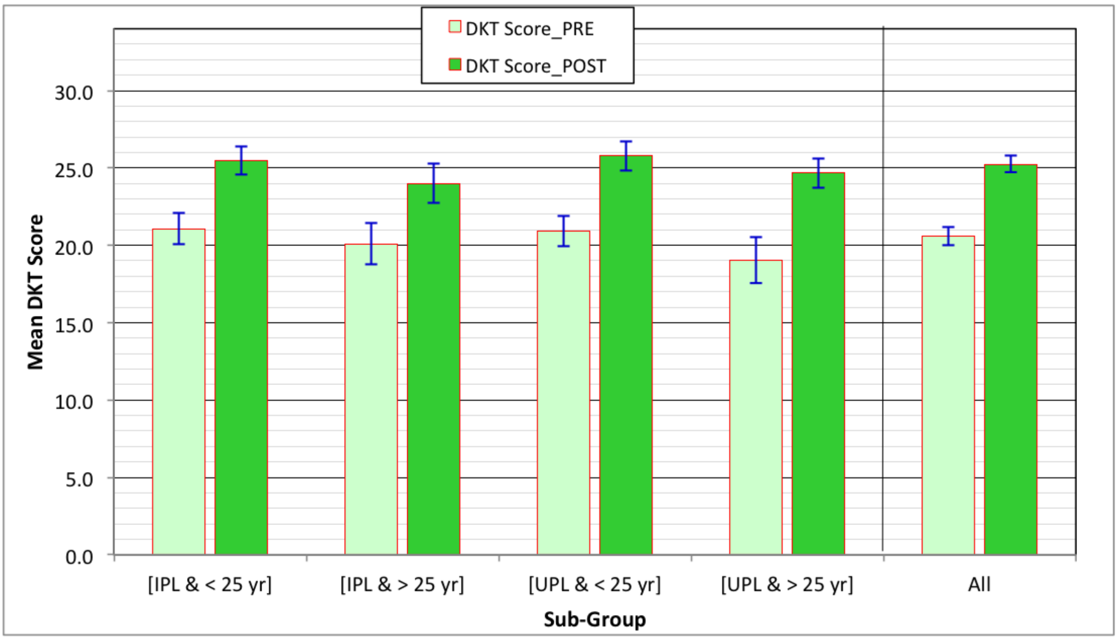


Figure 13.19: Plot of the Mean DKT Scores, and their 95% C.I., resolved according to Learning Condition and Age Category (Pre vs. Post).

Table 13.35 reports the results from applying the ‘Paired Samples t-Test’ to the specified differences between Means, to compare Learning Condition with Age Category Pre and Post the intervention.

Learning condition and Age Category		Paired Differences			T	df	Sig. (2-tailed)
		Mean	Std. Dev.	SEM			
[IPL x < 25 yrs]	**[DKT Score_PRE DKT Score_POST]**	-4.408	3.205	.380	-11.589	70	.000**
[IPL x > 25 yrs]		-3.897	3.658	.679	-5.736	28	.000**
[UPL x < 25 yrs]		-4.81	3.20	0.38	-12.57	69	.000**
[UPL x > 25 yrs]		-5.600	3.420	.624	-8.968	29	.000**
ALL		-4.677	3.324	.234	-19.946	200	.000**

Table 13.35: ‘Paired Samples t-Test’ for differences between Mean scores Pre vs. Post the intervention resolved according to Learning Condition and Age Category.

Remarks

According to Table 13.35, there were statistically significant increases in DKT Scores post the intervention for Older and Younger IPL students and Older and Younger UPL students. All differences were found to be significant at the $p < 0.01$ level.

h. Comparisons according to Course and Gender

Table 13.36 presents summary statistics of the DKT Scores **Pre** and **Post** the intervention, resolved according to Course and Gender.

[Course × Gender]		DKT Score_ PRE	DKT Score_ POST	% Change in Mean DKT Score
[Nursing x Male]	N	9	9	
	Mean	18.89	23.22	+22.94
	Std. Deviation	3.371	2.587	
	Std. Error of Mean	1.124	.862	
	2 × SEM (95% C.I)	2.247	1.725	
[Nursing x Female]	N	104	105	
	Mean	18.65	23.75	+27.33
	Std. Deviation	3.764	3.739	
	Std. Error of Mean	.369	.365	
	2 × SEM (95% C.I)	0.738	0.730	
[MBBS x Male]	N	33	32	
	Mean	22.73	27.00	+18.80
	Std. Deviation	3.617	2.736	
	Std. Error of Mean	.630	.484	
	2 × SEM (95% C.I)	1.259	0.967	
[MBBS x Female]	N	53	52	
	Mean	23.43	27.67	+18.09
	Std. Deviation	3.073	2.332	
	Std. Error of Mean	.422	.323	
	2 × SEM (95% C.I)	0.844	0.647	
All	N	203	202	
	Mean	20.55	25.23	+22.81
	Std. Deviation	4.169	3.683	
	Std. Error of Mean	.293	.259	
	2 × SEM (95% C.I)	0.585	0.518	

Table 13.36: Summary statistics for DKT Mean scores resolved according to Course and Gender Pre and Post the intervention.

The Mean values and their 95% Confidence Intervals (C.I.) are plotted in Figure 13.20.

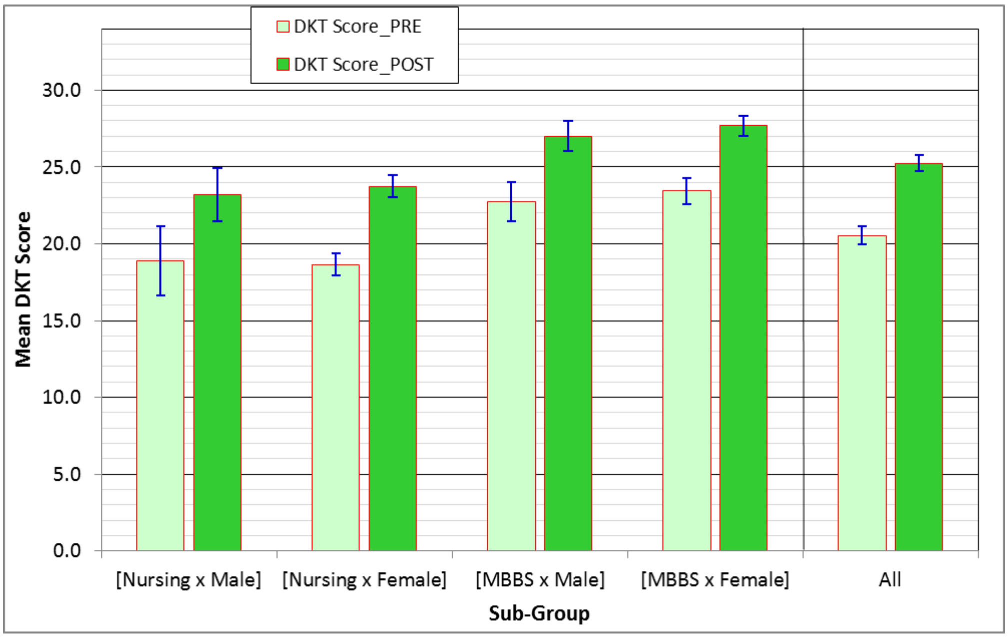


Figure 13.20: Plot of the Mean DKT Scores and their 95% C.I., for Pre and Post-Survey, resolved according to Course and Gender.

Table 13.37 reports the results from applying the 'Paired Samples t-Test' to the specified differences between Means, to compare Course with Age Category Pre and Post the intervention.

[Course and Gender]		Paired Differences			T	df	Sig. (2-tailed)
		Mean	Std. Dev.	SEM			
[Nursing × Male]	[DKT Score_PRE DKT Score_POST]	-4.33	2.83	0.94	-4.60	8	.002**
[Nursing × Female]		-5.12	3.59	0.35	-14.52	103	.000**
[MBBS × Male]		-4.13	3.22	0.57	-7.25	31	.000**
[MBBS × Female]		-4.13	2.90	0.40	-10.29	51	.000**
ALL		-4.68	3.32	0.23	-19.95	200	.000**

Table 13.37: 'Paired Samples t-Test' for differences between Mean values Pre vs. Post the intervention resolved according to Course and Gender.

Remarks:

According to Table 13.37, there were statistically significant increases in DKT Scores post the intervention for Male Nursing Students, Female Nursing students, Male Medical Students and Female Medical students. All four differences were found to be significant at the p <0.01 level.

i. Comparisons according to Course and Age Category

Table 13.38 present summary statistics of the DKT Scores **Pre** and **Post** the intervention, resolved according to Course and Age Category.

[Course × Age Category]		DKT Score_ PRE	DKT Score_ POST	% Change in Mean DKT Score
[Nursing & < 25 yr]	N	61	61	
	Mean	18.00	23.16	28.69
	Std. Deviation	3.578	4.079	
	Std. Error of Mean	.458	.522	
	2 × SEM (95% C.I)	.916	1.045	
[Nursing & > 25 yr]	N	55	56	
	Mean	19.36	24.21	25.05
	Std. Deviation	3.704	2.983	
	Std. Error of Mean	.499	.399	
	2 × SEM (95% C.I)	.999	.797	
[MBBS & < 25 yr]	N	81	80	
	Mean	23.26	27.51	18.29
	Std. Deviation	3.118	2.408	
	Std. Error of Mean	.346	.269	
	2 × SEM (95% C.I)	.693	.538	
[MBBS & > 25 yr]	N	5	4	
	Mean	21.60	25.50	18.06
	Std. Deviation	5.683	3.873	
	Std. Error of Mean	2.542	1.936	
	2 × SEM (95% C.I)	5.083	3.873	
All	N	203	202	
	Mean	20.55	25.23	22.81
	Std. Deviation	4.169	3.683	
	Std. Error of Mean	.293	.259	
	2 × SEM (95% C.I)	0.585	0.518	

Table 13.38: Summary statistics for DKT Mean scores resolved according to Course and Age Category Learning Condition Pre and Post the intervention.

The Mean values and their 95% Confidence Intervals (C.I.) are plotted in Figure 13.21.

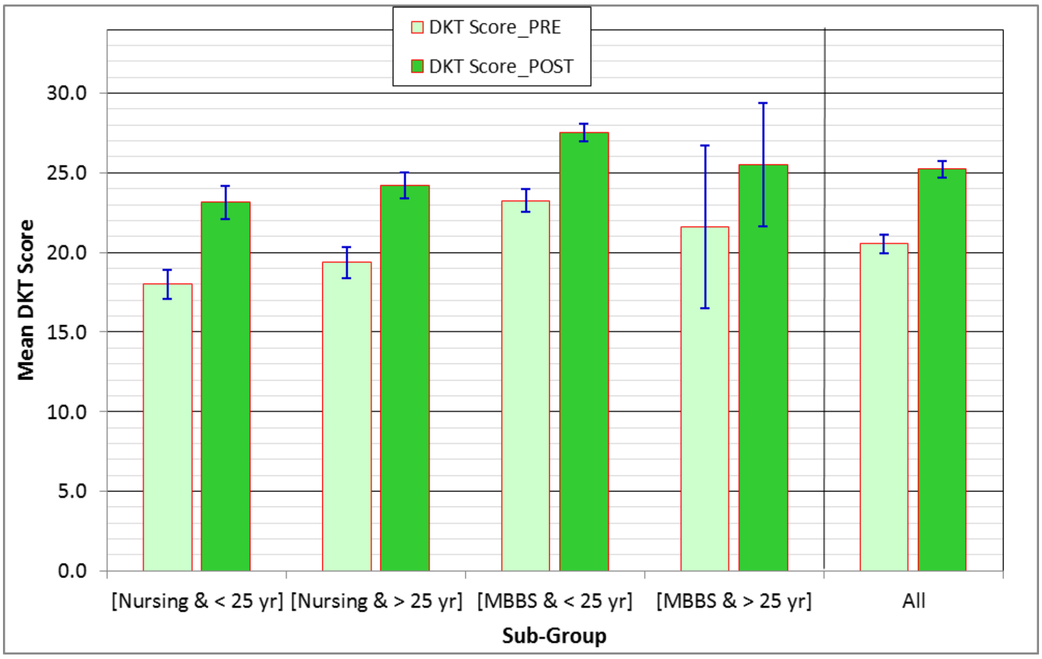


Figure 13.21: Plot of the Mean DKT Scores, and their 95% C.I., resolved according to Course and Age Category (Pre vs Post).

Table 13.39 reports the results from applying the ‘Paired Samples t-Test’ to the specified differences between Means, to compare Course with Age Category Pre and Post the intervention.

[Course & Age Category]		Paired Differences			T	df	Sig. (2-tailed)
		Mean	Std. Dev.	SEM			
[Nursing & < 25 yr]	[DKT Score_PRE DKT Score_POST]	-5.16	3.45	0.44	-11.70	60	.000**
[Nursing & > 25 yr]		-4.89	3.57	0.48	-10.17	54	.000**
[MBBS & < 25 yr]		-4.19	2.95	0.33	-12.69	79	.000**
[MBBS & < 25 yr]		-3.00	4.32	2.16	-1.39	3	.259
ALL		-4.68	3.32	0.23	-19.95	200	.000**

Table 13.39: ‘Paired Samples t-Test’ for differences between Mean values Pre vs. Post the intervention resolved according to Course and Age Category.

Remarks:

According to Table 13.39, there were statistically significant increases in DKT Scores post the intervention for the Younger Nursing students, Older Nursing students and Younger Medical students. All three differences were found to be significant at the $p < 0.01$ level. The only exception was the Older Medical students.

i. Comparisons according to Gender and Age Category

Table 13.40 present summary statistics of the DKT Scores **Pre** and **Post** the intervention, resolved according to Gender and Age Category.

[Gender × Age Category]		DKT Score_ PRE	DKT Score_ POST	% Change in Mean DKT Score
[< 25 yr x Male]	N	34	34	
	Mean	22.32	26.62	19.24
	Std. Deviation	3.641	2.871	
	Std. Error of Mean	.624	.492	
	2 × SEM (95% C.I)	1.249	.985	
[> 25 yr x Female]	N	106	105	
	Mean	20.66	25.39	22.89
	Std. Deviation	4.318	4.120	
	Std. Error of Mean	.419	.402	
	2 × SEM (95% C.I)	.839	.804	
[< 25 yr Male]	N	8	7	
	Mean	20.13	24.00	19.25
	Std. Deviation	4.549	3.512	
	Std. Error of Mean	1.608	1.327	
	2 × SEM (95% C.I)	3.217	2.655	
[> 25 yr x Female]	N	51	52	
	Mean	19.45	24.37	25.27
	Std. Deviation	3.859	3.016	
	Std. Error of Mean	.540	.418	
	2 × SEM (95% C.I)	1.081	.837	
All	N	199	198	
	Mean	20.61	25.28	22.65
	Std. Deviation	4.177	3.697	
	Std. Error of Mean	.296	.263	
	2 × SEM (95% C.I)	0.592	0.525	

Table 13.40: Summary statistics for DKT Mean scores resolved according to Gender and Age Category Pre and Post the intervention.

The Mean values and their 95% Confidence Intervals (C.I.) are plotted in Figure 13.22.

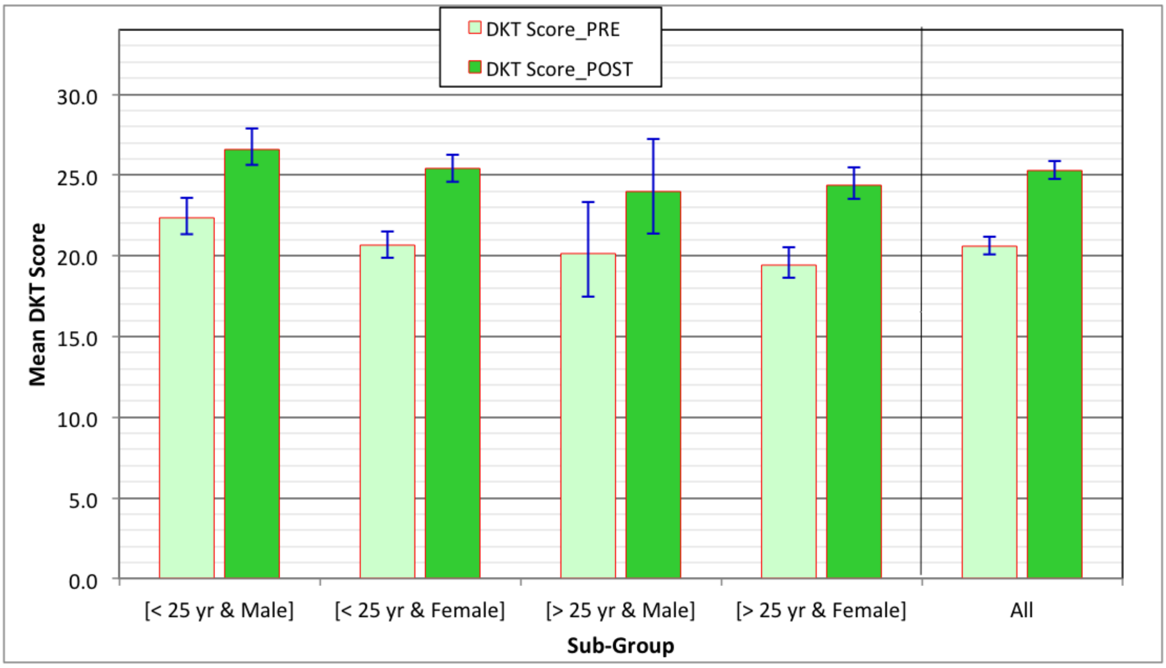


Figure 13.22: Plot of the Mean DKT Scores, and their 95% C.I., resolved according to Gender and Age Category (Pre vs Post).

Table 13.41 reports the results from applying the 'Paired Samples t-Test' to the specified differences between Means, to compare Gender with Age Category Pre and Post the intervention.

[Age Category and Gender]		Paired Differences			T	df	Sig. (2-tailed)
		Mean	Std. Dev.	SEM			
[< 25 yr x Male]	[DKT Score_PRE DKT Score_POST]	-4.294	3.158	.542	-7.929	33	.000**
[< 25 yr x Female]		-4.705	3.252	.317	-14.825	104	.000**
[> 25 yr Male]		-3.571	2.992	1.131	-3.158	6	.020*
[> 25 yr x Female]		-4.961	3.709	.519	-9.551	50	.000**
ALL		-4.677	3.324	.234	-19.946	200	.000**

Table 13.41: 'Paired Samples t-Test' for differences between Mean values Pre vs. Post the intervention resolved according to Gender and Age Category.

Remarks:

According to Table 13.41, there were statistically significant increases in DKT Scores post the intervention for the Younger and Older Male students and Younger and Older Female students. All differences were found to be significant at the $p < 0.01$ level except for Older Male students which was significant at the $p < 0.05$ level.

13.2 Chapter overview

This Chapter examined students' scores on the DKT to identify if any increases in knowledge about the topic of delirium had occurred as a result of the intervention. An important outcome of the results in this Chapter was the amount of statistically significant increases in scores that were observed. Significant increases in scores were reported across all student groups regardless of course, learning condition, age and gender with the exception of young medical students.

In terms of the intervention alone, there was no significant difference between the IPL and UPL experimental group. There were however significantly higher scores drawn from the following groups:

- Medical students compared to nursing students
- Male students compared to female students
- Younger students compared to older students
- IPL medical students compared to IPL nursing students
- UPL medical students compared to UPL nursing students
- Male medical students compared to male nursing students (n=18)
- Older nursing students compared to younger nursing students
- Younger medical students compared to younger nursing students
- Younger UPL students compared to older UPL students

- Male IPL students compared to female IPL students
- Male IPL students compared to male UPL students
- Older female students compared to younger female students
- Young male students compared to young female students

The intervention appears to have increased all students' knowledge of delirium according to the multiple choice questions applied in this study. No statistically observable difference was noted between the education modality of UPL and IPL. Medical students globally scored higher than nursing students and it was not dependent on the learning condition. It appears that gender and age is also a factor in the acquisition of knowledge with males and younger students scoring higher. The exception to this was nursing with older female nursing students scoring higher in the Post test.

This Chapter has provided a range of significant findings that globally indicate improved knowledge and understanding of the topic of delirium as a result of students' experiences in this education intervention. This confirms results from Chapters 11 and 12 where students expressed firm views that their knowledge of delirium was enhanced by the learning experience, and validates the value they place on having this knowledge. It also affirms their view that enhanced knowledge has the potential to contribute to more effective management of the delirious patient in future work practices.

CHAPTER 14

Discussion

14.1 Introduction

In this chapter, the main findings of the research are summarised and discussed. It would appear that from the analysis of the multiple sources of data, five clearly identifiable outcomes have emerged. Each of these will be considered within this chapter. The results from this study resonate with much of the literature. Evaluations of IPL are often positive and this research has been no exception. In consideration of Kirkpatrick's evaluation classification, and for this cohort of students, the education intervention generated positive views about the interprofessional nature of the educational intervention and its potential to influence interprofessional collaborative practice. There were some exceptions in the UPL group but even participating in one third of an IPL experience compared to a full complement of IPL activities (as was the case for IPL students) was enough to make the experience valuable and meaningful for the UPL cohort.

What this study has added to the literature is that IPL does make a difference in developing confidence in performing collaborative competencies. This is one of the emergent themes and each of these competency areas is discussed. Chapter 3's review of the literature revealed there is very little information in studies on the profile of an effective interprofessional learner and the role this might have in shaping IPL programs. This study has shed some light on the characteristics of learners that might make them more ready and receptive to interprofessional learning and subsequently interprofessional working.

The acquisition of knowledge and skills about delirium, interprofessional learning, and interprofessional collaborative practice was also a significant finding particularly the value in learning an important and relevant clinical topic. Emphasising subject content as much as interprofessionalism when designing IPL programs is an area highlighted in this discussion. Evidence suggests that a variety of educational approaches work best with IPL. The vast majority of students favoured the blended learning approach created for this research. The benefits of this approach are explored in this chapter, particularly the impact of using a 5-staged sequential learning design with the addition of simulation.

There is no shortage of literature that lament the challenges associated with developing, implementing and evaluating IPL initiatives, particularly for large groups of pre-registration students. This discussion highlights how these challenges can be overcome and demonstrates that it is feasible to deliver high quality IPL programs.

Outcome 1: Development of Collaborative Competencies

Collaborative competencies are one of the outcome measures of Freeth and Reeves Adaptation of Biggs 3-P model. This study has revealed that medical and nursing pre-registration students strongly value the opportunity to learn together as they believe it contributes to effective interprofessional practice. The significantly positive results from the M-RIPLs and IPLRS along with the perceptions expressed and the attitudes conveyed from students about learning with, from and about each other in the questionnaires and interviews have all revealed a willingness to embrace the concepts of collaboration and teamwork and to learn how to put into practice a truly patient centred approach to health care through effective interprofessional communication. Further there was an overwhelming view that the intervention had increased their confidence in the collaborative management of a patient with delirium.

There is much alignment in results of this study with the competencies first described in Chapters 2 and 3 from the University of British Columbia (UBC, 2008). Each of these will be discussed in light of the findings.

a. Interprofessional Communication

> Courage is what it takes to stand up and speak. Courage is also what it takes to sit down and listen.
>
> **Winston Church** (Churchill, n.d.)

The premise of interprofessional communication is whether health professionals can effectively express their knowledge and opinions to others and actively listen to other team members. One item related to interprofessional communication was embedded in the subscale ‘teamwork and collaboration’ of the M-RIPLS instrument so it is difficult to draw conclusions on whether the intervention significantly improved this competency alone. Whilst this aspect was not a strong measure in this research, the qualitative results indicated that IPL medical and nursing students identified that interprofessional communication was the ability to listen and share ideas, opinions and points of view about the way in which a clinical problem could be managed. Of note was the ability to be assertive and provide open communication. They felt they had gained this from all aspects of the education intervention. For the UPL medical and nursing students, this was not a strong feature of their learning.

b. Teamwork and Collaboration

> Coming together is a beginning
>
> Keeping together is progress
>
> Working together is success.
>
> **Henry Ford** (Ford, n.d.)

The UBC competency framework describes teamwork and collaboration as Team Functioning, that is, using team-building skills to negotiate, manage conflict, mediate and build partnerships in a team setting. Development of the 'Teamwork and Collaboration' competency was one of the strongest outcomes of this study. Chapters 8 and 9 revealed significant outcomes related to this area and demonstrated that students not only held a strong view of this before the research but the experience further enhanced their views with significantly higher teamwork and collaboration scores on the M-RIPLS at the conclusion of the learning regardless of learning condition, course, age and gender.

Whilst there was no significant difference between the groups on the quantitative results, the qualitative data revealed that teamwork and collaboration was a major consideration for the IPL students. Participants reflected on the importance of shared learning and how it was beneficial in terms of learning how to work effectively as a team and to create a positive working culture. There was a genuine desire to develop positive relationships between the two professions as a result of the experience and a strong view that this was an important consideration prior to graduation. UPL students held similar views but there was a greater recognition that they had fewer opportunities to learn together, and therefore did not come to appreciate the value of collaboration.

c. Roles and Responsibilities

> Appreciation is a wonderful thing: It makes what is excellent in others belong to us as well.
>
> **Voltaire** (Voltaire, n.d.)

As one of the key components of the IPL definition, "learning from and about one another" was an important realisation for many students participating in this study. The UBC framework makes this competency clear. It involves consulting, seeking advice and conferring with other team members based on a clear understanding of everyone's capabilities, expertise and culture. Even though teamwork and collaboration was a more obvious outcome measure in this study, the richer qualitative data belonged to 'roles and responsibilities'. It was well defined that this was a first interprofessional opportunity for many of the students and it appeared that they did not have a clear understanding of the roles of each other. This was unique to all groups of students. For some, it was the first time they had even spoken to a member of another health profession. Much of the literature talks about professional boundaries and hierarchies, which delineate roles in professional practice and the detrimental effect these distinctions have on effective clinical practice including causing error and harm. This study has contributed to a much greater understanding for these students about the importance of their own roles and the roles of others. It has demonstrated that the roles do not have to be in conflict with each other; rather they can work harmoniously together. It has demonstrated that students learnt about the value each member of the team brings to the patient care situation and the need for this to be fully acknowledged and appreciated.

As such it has been attitudinal change that has been one of the most noteworthy outcomes of this research. This was often poignantly expressed in the post-test questionnaires from Chapters 11 and the interviews from Chapter 12 (e.g., “changed my view of the role of the nurse”, “I think for the first time, I got to see things from a nursing point of view”, “I think what you are trying to do, is change the culture of both the studying of medicine and the studying of nursing”).

Many students, but particularly nursing students spoke frequently about professional barriers and a desire to break them down. The outcomes of the M-RIPLS indicated that some students, again mostly nurses, held stereotypical views about doctors, potentially based on prior experiences with significantly higher scores on the roles and responsibilities subscale. They frequently commented on how this posed a barrier. Through this education experience, nursing students came to appreciate the important role that medical staff have in helping them solve problems. There was also a realisation that the medical students were their equals - this was an empowering moment. For medical students, there was a new appreciation and an admiration for the many skills nurses bring to the patient care relationship. As a result there was a newfound respect and trust demonstrated between the professions. This was an important outcome and potentially a precursor to changed relationships in future working practice.

d. Patient Centredness

> He who studies medicine without books sails an uncharted sea, but he who studies medicine without patients does not go to sea at all.
>
> **William Osler** (Osler, n.d.)

In many ways this was the absolute driver of the IPL intervention. The focus of health care should always be on the patient; ensuring their goals of care are met and they are kept free from harm. This is why the World Health Organisation has been urging IPL to be embedded in all aspects of health care service delivery for well over 40 years. There is a critical need for doctors and nurses to have a shared understanding of this and a need for their actions and communication to always be directed at the best care possible. Care that compassionately and holistically meets the needs of patients and their families.

This was an area in this research that did not feature strongly. Chapter 6 revealed that prior to the education intervention, students indeed held a view that the patient was central to the care situation with globally high scores on the M-RIPL scale. Nursing students had significantly higher scores overall on the patient centredness subscale than medical students. Scores post the intervention however decreased, significantly so for the nursing students. The questionnaire responses likewise did not profile patient centredness with only 4.7% of students commenting on the value of this aspect with no difference according to learning condition or course. Chapter 8 articulated a number of potential reasons for this finding. The learning experience was very student centric with numerous tasks to complete, new relationships to build and complex learning experiences to achieve. This may have detracted from the focus on the patient. Another factor may be the lack of experience and exposure these students had to these types of challenging patients. This may have been overwhelming for some, (albeit a valuable learning experience), so much so, that the focus again was on their own personal learning and development rather than putting their full attention towards the patient. This is something that may need further consideration when developing these types of initiatives in the future.

Outcome 2: Profile of an interprofessional learner

Education is understanding relationships.
George Washington Carver (Carver, n.d.)

Chapter 3 revealed a lack of evidence of that which constitutes an effective interprofessional learner and the literature reports that these characteristics are often poorly understood. Whilst this aspect was not an overt feature of the study, a number of interesting findings have emerged to indicate that there could be certain groups of learners that may embrace the philosophy of interprofessionalism, or different components of IPL, more readily than others. Both professions (medicine and nursing) appreciated the concepts of IPL and ICP but some of the significant findings revealed that the nursing cohort may have been unique. The nursing group in this study was predominantly female and older having had much greater exposure to prior clinical experiences and real world practices. The nursing group appeared to be very comfortable with the shared learning approach; they strongly valued the opportunity to work cooperatively with the medical students and were the most vocal about existing problems of stereotypical attitudes and lack of teamwork in the clinical workplace. The nursing group was also the most vocal about the need to change this culture. The mature age nurses were the only group to significantly increase their rating of IPL as a driver to influence ICP when compared to younger nurses and they had a significantly higher rating score on the IPLRS than medical students ($p<0.01$). Potentially a more effective interprofessional learner is likely to be mature age, female and in the constraints of this study a nurse. Mature age nurses may very well be the future champions of IPL and ICP.

Medical students on the other hand gravitated to the concept of teamwork and collaboration, which was promoted by the simulation exercise with significantly higher scores on the M-RIPLS scale than nurses. This was more evident with medical students allocated to the IPL group regardless of gender. It seems that if the education is engaging, relevant and impactful they are more likely to see its value, adopt positive attitudes and develop a greater respect for other professions.

In terms of the staging of IPL, this study has indicated that final year medical and nursing students demonstrated the necessary professional role confidence to work together as a team understanding that roles were different but complementary. Comments from the interviews

(Chapter 12) likewise recognised that IPL needs to start early and build in complexity throughout the pre-registration years to enact cultural change amongst the professions. This experience appeared to have the necessary challenge and relevance for these students to make them desire more of it upon graduation.

Outcome 3: Learning about a clinical topic is just as important as learning about teamwork

> To know what you know and what you do not know, that is true knowledge.
>
> **Confucius** (Confucius, n.d.)

Past studies on IPL interventions place much focus on IPL objectives and learning the attributes of interprofessional collaborative practice. Admittedly this was the aim of this research – learning about teamwork & collaboration; patient centredness; and, trust and respect – all highly valued features. What this study has also revealed is the equal importance that students place on learning about a clinical subject. For these students learning about delirium was valued equally to that of learning about interprofessionalism. Students valued learning with, from and about each other, particularly those students who experienced the full range of interprofessional opportunities, but they all clearly enjoyed learning about delirium as well. It appeared to be a topic they were concerned about, had varying degrees of knowledge about, relevance of, and importance. The intervention unequivocally demonstrated the ability to develop students' knowledge about delirium beyond what they had learnt before with significantly higher knowledge scores post the intervention for all groups. In addition, their self-reporting of confidence in managing this complex problem as a result of the experience increased. For female medical students and mature age nurses (predominantly female), this increase in confidence was significant.

What this highlights is the need for program designers to place *equal* emphasis on both the clinical and non-clinical aspects to IPL programs. The literature review of Chapter 3 urged IPL designers to find common ground between the professions and to choose topics appropriate to the groups of learners. Health professional students need to see the value and relevance of the clinical topic, they must be able to 'buy-in' to the learning experience and it must be a topic where teamwork is paramount. So for education designers and teachers it becomes a balancing act where teaching interprofessional competencies is correspondingly poised with developing students' knowledge and understanding of a topic. Both are required in equal proportions. Delirium was clearly an excellent choice of topic in this regard.

In relation to delirium education, Chapter 3 highlighted the need to focus education on core practice level gaps not knowledge gaps in isolation. Whilst gaining knowledge of delirium was evident in this study, it also reinforced the need to move towards more work-based approaches to replicate what students are more likely to experience in the post-registration years. The staged educational design used in this study provides a useful template for future efforts.

Outcome 4: An authentic blended learning approach works best

The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn.

Alvin Toffler (Toffler, n.d.)

A surprising aspect to this study is the knowledge students have of what ‘good teaching’ is and the value they place on being able to engage with interactive teaching methodologies. It is perhaps not surprising that using a variety of educational approaches ensures that learners are full participants in the learning process as it caters for a variety of learners’ needs. The teaching choices made for this intervention clearly ‘found favour’ with the students. The social interaction provided in the breaks served as an effective ‘ice-breaker’ and provided an additional opportunity for students to share experiences informally. Students valued receiving content in the form of the lecture, they valued being able to discuss a case in small groups and most importantly they significantly valued the opportunity to put theory into practice through the simulation and debriefing.

As an extension of this methodology, the simulation was by far the most valued aspect of the teaching approaches used. As was indicated in Chapter 3 the evidence for simulation is strong and growing. The clinical scenario, with the simulated patient, was viewed by the student participants in this study as being credible, safe, engaging and learner centred, and it enabled them to receive corrective feedback on their performance. The role of simulation was important in this study. Often simulation is all about teamwork training not learning about a topic. What can be taken from this research is the need for simulation not to be used in isolation. Simulation is enhanced if the learning objectives are explicit and clear. It could also be enhanced if content knowledge is explicitly addressed at the start. Ensuring that the knowledge components are proportioned to the practice components may provide a more meaningful experience when designing simulation-based education initiatives.

This blended pedagogical approach that took learners from ‘theory to practice’ resonated strongly with the students. What it did was scaffold their learning by moving them progressively towards a stronger understanding of the learning goals. It helped them to bridge any learning gaps and it provided a unique opportunity to put their learning into practice. For the vast majority of students they would not want this changed (apart from raising the quality of the ‘lecture’).

Outcome 5: Large group IPL is possible but it takes a lot of work

> We must give more attention to the interplay between the science of teaching – pedagogy – and the art of teaching … A teacher must be anchored in pedagogy and blend imagination, creativity and inspiration into the teaching learning process to ignite a passion for learning in student.
>
> **Peyton Williams** (P. Williams, n.d.)

The structural and educational barriers to delivering IPL are well reported in the literature. The most commonly cited obstacles relate to logistics such as timetabling, parity of learner numbers, availability of teachers, curriculum timing, alternate clinical placements and locating sufficient learning spaces. Educational barriers also post challenges such as ensuring managerial and institutional support. These obstacles were all encountered at various stages of the research and considerable effort was made to overcome each.

In Chapter 3 it was reported that key facilitating factors for successful IPL are administrative support, financial or grant support, staff support and leadership buy in. In designing the educational approach used in this research, consideration of each of these aspects was given. Each step was carefully planned. Use of Freeth and Reeves 3P model also ensured that attention was rightfully given to the different elements of the IPL intervention so that nothing was overlooked. To enable the study to proceed smoothly a 'top down', 'bottom up' approach was adopted. Institutional support was granted, funding was sought and received and the two academic medical and nursing leads were major contributors to the team including providing content validity to the teaching resources. A group of local administrators and academics provided much assistance in ensuring the scheduling of the students could be accommodated in the medical and nursing curriculum. A best-practice approach was also adopted in the educational design based on findings from the literature review (Chapter 3). Training of tutors was also a challenge, which was overcome by creating a comprehensive tutor guide. All aspects of the teaching process were carefully constructed and trialed; simulations were tested and refined. The educational design took many months to develop and finesse.

The true success of the education intervention was the presence of an effective interprofessional team which was fully committed to ensuring the intervention's success and was prepared to work hard to ensure that all real and anticipated obstacles were overcome. The literature discusses the need for IPL champions to drive these types of initiatives. This was certainly the case in many aspects of this study.

14.2 Chapter overview

To answer the research questions (which will be reintroduced and summarised in Chapter 15), this research has outlined five major outcomes that have contributed to the current state of evidence about the suitability and efficacy of IPL. It is clear from previous work, policy documents and the World Health Organisation that in order to reduce harm and error in health care there is a need to graduate students with well-developed interprofessional competencies. This study has shown that even the smallest proportion of IPL delivered in an effective and engaging manner can improve collaborative competencies in pre-registration learners. It has contributed to more informed understanding about how both professions (medicine and nursing) embraced the concept of ICP and were highly satisfied about learning with, from and about each other (offering a means of sustaining such learning). The nursing profession appears to be particularly open to breaking down the professional siloes that exist between the two groups, particularly amongst mature age learners who have had more exposure to the clinical realities of work. Potentially the more clinical experiences students receive the more the realisation that ICP is needed in health care delivery and that IPL may in fact be an effective way to learn how to achieve improved future collaborative team-based practices. This research also illustrates the importance of topic selection and the need to give equal weight to learning clinical aspects as much as collaborative practices.

Designing IPL is not easy and learners will reject educational initiatives that are not high quality, interactive, authentic or capable of moving them from theory to practice. To design highly effective IPL, it is important to realise that all levels of support are needed including an interprofessional team of teachers who are willing to work hard and commit to making IPL and ICP a success.

CHAPTER 15

Conclusion and recommendations

15.1 Introduction

This research project has offered an opportunity to investigate an innovative teaching and learning approach about a common clinical condition in a safe, supported and highly authentic context designed to best replicate that which undergraduate students will experience in future team-based clinical practice. This final chapter describes the limitations of the work, responds specifically to the research questions and identifies recommendations for the future in terms of education and research.

15.2 Limitations of the research

The major limitation to the findings relate to the lack of control of the IPL experiences between the intervention (IPL) group and the control group (UPL). The UPL group did not have an entirely UPL experience as the simulation was conducted interprofessionally. This impacted the results in that the UPL group gained enough benefit from the simulation to engender positive attitudes towards IPL, which reflected in much of the results. It therefore became difficult to differentiate between the two groups and identify the true impact of the IPL intervention. Other limitations included:

- The facilitation of the teaching by different tutors. This heterogeneity was minimised by offering some ‘one on one’ guidance and training to all tutors prior to commencing the teaching, and the development and use of a common tutor guide which comprehensively laid out each step of the learning process.
- The long-term impact of the intervention was not measured. Whether the positive views and attitudes toward collaborative practice were sustained in these students was not feasible to investigate.
- The small sample size for the interviews meant that those responding students may have been those for whom the intervention met their personal needs and for whom the design of the course was appropriate. The interviewees may therefore not have reflected attitudes that were representative of the whole group. However, whilst this is a recognised limitation, data saturation was achieved and the use of multiple data sets, which overlapped, ensured triangulation of the different sources of evidence.
- Disproportionate numbers of medical (n=88) and nursing students (n=123). The allocation of IPL to UPL students was evenly distributed, however there were more nursing students

compared to medical students. This had the potential to misrepresent the outcomes, however the overall sample size was reasonably high without impacting on the statistical analysis.

15.3 Research Questions

1. Does an interprofessional approach:

(a) Develop medical and nursing students' knowledge of, and confidence in performing interprofessional collaborative practice skills?

Findings from this study showed that the education intervention expanded students' knowledge of interprofessional learning and collaborative practice with almost half the student cohort producing additional key terms in their post intervention definitions of IPL. Nursing students appeared to demonstrate a greater understanding of interprofessional collaborative practice compared to medical students with increased numbers of examples used to define IPL and ICP.

Key learning achievements for all students included a better understanding of interprofessional collaborative practice skills. Interprofessional collaborative practice skills include: teamwork and collaboration; interprofessional communication; and, patient-centredness. The outcomes revealed that all students had a high regard for teamwork and collaboration prior to participating in this study, which was sustained at the end of the study. Analysis of the pre and post results for teamwork and collaboration on the M-RIPLS instrument indicated a global increase in scores post the intervention, regardless of learning condition (IPL/UPL), course (medicine/nursing), gender (male/female) or age category (older/younger). This outcome was the strongest of all four Factor subscales. This implies that for these students the intervention resulted in a greater willingness to work together, to develop a sense of shared learning and to reduce professional separation. The IPL condition did not influence this outcome overall; however, four sub-groups of the IPL group significantly increased their scores post the intervention (medical students, females, males and older students $p<0.01$). As a 'self-contained' group, medical students responded to items in this subscale more positively with higher scores compared to nursing students ($p<0.05$).

All student participants, regardless of learning condition, course, gender and age significantly increased their rating of interprofessional learning as a driver for interprofessional collaborative practice ($p<0.01$). The IPL nursing group had significantly higher rating scores on the interprofessional learning rating scale than UPL nursing students ($p<0.05$), IPL medical students ($p<0.01$), and IPL male students ($p<0.01$).

Very high scores for patient centredness were recorded prior to, and after the educational experience, indicating that students do concern themselves with patient problems and do have a desire to have an empathetic patient focused approach to health care. Post intervention scores however significantly decreased for IPL and nursing students ($p<0.01$) indicating that the intervention took their focus away from the patient and onto their own learning needs. Being in the IPL intervention group did not have a strong influence on promoting a more patient focused approach.

Professional freedom as a subscale on the M-RIPLS significantly decreased only for the UPL students ($p<0.05$) indicating that the lack of IPL interactions may have influenced these students' views on their professional autonomy and their ability to use their own judgement.

Despite no statistically significant difference between the IPL and UPL groups overall, results from the questionnaires more clearly identified that the IPL group had the greater opportunity for shared learning and that this became the most valued aspect of the learning experience with 50% of the IPL group endorsing this view. This compared with 33.3% of UPL students.

(b) Increase students' knowledge of, and confidence in managing patients with delirium?

The intervention significantly increased all students' knowledge of delirium according to the Delirium Knowledge Test applied in this study ($p<0.01$) post the intervention. No statistically observable difference was noted between the education modality of UPL and IPL. Medical students globally scored higher than nursing students ($p<0.01$) and it was not dependent on the learning condition. It appears that gender and age is also a factor in the acquisition of knowledge with males scoring higher than females ($p<0.05$) and younger students scoring higher than older students ($p<0.01$). Given that most nurses were female and the majority of younger students were medical students then this is likely to correlate with the fact that medical students in general scored higher than nursing students. The only individual exception to this was within nursing, with older nursing students scoring higher ($p<0.05$) than younger nursing students. The questionnaire data highlighted the gains in knowledge that students felt they had received such as being able to recognise delirium, know the causes and know how to manage the condition (e.g., "I learnt more about delirium and how it presents" IPL nursing student). In the absence of a full IPL experience, UPL students demonstrated a greater appreciation of the knowledge components with learning about delirium being more valued (20.7%) than IPL students (13.0%).

The vast majority of students (88.7%) endorsed the view that the learning experience had increased their confidence in the collaborative management of delirium. There was no significant difference between the groups on this item apart from female medical students who were significantly more confident post the intervention than male medical students ($p<0.05$) and older students who were more confident than younger students ($p<0.05$). The qualitative data reinforced this view with global agreement that the intervention developed their confidence in collaboratively managing a patient with delirium (e.g., "being involved with the medical students we develop maturity and develop the confidence on how to approach delirium patients in the ward" IPL nursing student).

(c) Develop students' appreciation of the roles of doctors and nurses in the management of delirium?

Roles and responsibilities form one of the interprofessional collaborative competencies, however given the prominence of the findings in this area they are identified as a separate outcome.

Summary statistics showed low scores on the M-RIPLS for the roles and responsibilities subscale indicating that at the commencement of this intervention, students rejected the view that professional practice promotes some health professional roles over others. Nursing students had significantly higher scores on this subscale than medical students ($p<0.01$) indicating that stereotypical views may be more strongly held by this group. This could be based on prior clinical exposure for this cohort. Scores increased significantly post the intervention for the IPL group ($p<0.05$) indicating that potentially the intervention created less clarity of their own role and a realisation that team leadership may in fact be profession specific in certain circumstances.

The qualitative data produced the most meaningful results on this matter where it became apparent that the education intervention fostered mutual respect across the two professions and enabled students to develop a much greater appreciation and understanding of the different roles and responsibilities the two professions have in managing a clinical problem like delirium. These views were held more strongly by the IPL group with frequent words such as: respect; equality; raising awareness; and, understanding each other, being expressed. The interview data clearly represented students' views about the presence of existing attitudinal barriers in the workplace, and the presence of a hierarchy between doctors and nurses. There was a firm belief that the intervention contributed to the breaking down of these barriers. The interviews also revealed that as a result of their experience, these students developed a much greater appreciation of their own professional role and that of their counterparts with a distinct development of mutual respect and admiration. Medical students developed a new understanding of the critical role of nurses in relation to patient interaction, assessment and safety. Nursing students demonstrated a new appreciation of the doctor's role in having the required knowledge and ability to diagnose and investigate a problem. Together, both groups could see the value of implementing a joint management plan in their future responsibilities.

2. Is a blended learning approach an effective way to teaching interprofessional teamwork and collaboration?

From the multiple data sources it is apparent that a blended learning approach overwhelmingly works best. The combined process of lecture, case study, simulation and debrief was significantly preferred over the three single learning approaches by all students regardless of learning condition, course, gender and age category ($p<0.01$).

Importantly, the IPL group had greater preference over some aspects of the teaching methodology. Overall, these students significantly preferred the simulation over the case study ($p<0.05$) and lecture ($p<0.01$) indicating that the culminating effect of the simulation was a powerful component of the shared learning experience. As a single group, the medical students preferred the simulation to the case study ($p<0.05$) and lecture ($p<0.01$). In addition, the IPL medical students preferred the simulation to the lecture ($p<0.05$). If simulation is the teaching approach that is particularly favoured by medicine then education planners would be wise to encourage its use in the IPL education experience.

For the UPL nursing group they significantly preferred the lecture ($p<0.01$) and case study ($p<0.05$) to the UPL medical group.

The value placed on the blended approach was a prominent feature of the qualitative responses from the questionnaire and interviews. When collapsed into themes, the 'Teaching-Learning Method' was viewed as the second most valued aspect of the education experience with 35.8% of students contributing positive comments. The sequential staging of the learning was greatly appreciated as it enabled the students to move from theory directly into practice (e.g., "use of different learning methods to reinforce the knowledge and skills for dealing with cases" IPL medical student).

Results from the questionnaire endorsed the simulation as the most meaningful aspect of the education design due to its experiential nature, its realism and its capacity to allow students to put the theory into practice in a safe and supportive environment. As a single outcome of what was valued the most, the simulation was ranked the highest with 23.7% of students endorsing this view. Medical students favoured this method more than nursing students, which reinforces the outcomes of the quantitative data.

3. Is the modified RIPL scale a valid and reliable instrument to use in the Australian pre-registration context?

The results have demonstrated the value of the Modified version of the RIPL Scale and its validity and reliability in the Australian pre-registration context. The psychometric properties of this tool are comparable to the original RIPLs with the exception of Item 16, which was discarded. The Patient Centredness factor subscale was a valuable addition to the instrument in the modified version used in this cohort where it demonstrated psychometric properties consistent with the only other two validation studies of the modified tool. The subscale Teamwork and Collaboration continues to be a reliable subscale with two additional items being included in this study that have only been reported in one previous study (Tamura et al., 2012). Concerns over the reliability of the Roles & Responsibilities subscale in prior reports (McFadyen et al., 2005; McFadyen et al., 2006; Parsell & Bligh, 1999) were not substantiated in this study. It appears to be a reliable subscale with the enhancement of an additional item (Item 20). As a single-item Factor, the subscale Professional Freedom probably requires further scrutiny and development in a range of contexts.

4. What is the feasibility of implementing a large-scale interprofessional education in the pre-registration years?

The study has demonstrated that large-scale IPL is feasible but there are many processes to follow and obstacles to overcome if success is to be guaranteed. Not surprisingly, all contingencies need to be accounted for, the educational design must follow best-practice including a blended approach, and an interprofessional planning and implementation team is required that include members who are committed and willing to champion the cause; clearly these need to be 'lived in practice' not simply assumed as rhetoric. One of the major learnings and recommendations to come from this study is to rethink the Freeth and Reeves Adaptation of Biggs 3-P Model. Given the work of the WHO in developing a framework for action on IPE and ICP it is also useful to consider this in the planning process for all future IPL interventions (these two aspects are explored in the next section 15.4).

15.4 Future education approaches to IPL design and implementation

This research program has provided an example of an education initiative that appears to have been well received by the recipients with positive outcomes being reported. A recommendation from this work is to build on the success of Biggs original 3P model and further extend the work of Freeth and Reeves' adaption of Biggs 3P model to the IPL context. Chapter 2 highlighted this work and clearly demonstrated the utility of using a model that frames and structures a complex intervention such is the nature of IPL.

The success of the teaching intervention can partly be attributed to the well-constructed education design based on Freeth & Reeves' model. There were numerous points in time where the reported outcomes revealed that the structure and process of the intervention enabled a smooth transition from theory to practice and that the learning process truly enhanced the learning experience and outcomes including the development of interprofessional competencies amongst other things. However, the development of the intervention did not occur without its challenges. Many of the barriers first described in the literature review existed in this research such as: the logistical barriers related to timetabling; alternative clinical placements; disproportionate numbers of learners; availability of teachers; and, curriculum timing. All of these factors took considerable effort to overcome. Cultural barriers were also experienced and there was a need to deal with faculty mindset obstacles such as scepticism and mistrust.

Further, the 2010 WHO Framework for Action on IPE and ICP has arguably been the most significant international publication produced in the last 5 years in relation to embedding IPE and ICP into everyday clinical practice. It provides an evidence-based framework for educational designers to consider when creating interventions which foster teamwork and collaboration and effective collaborative practice.

Considering the outcomes of this study, it is reasonable to suggest that an extended framework be considered that combines the work of WHO with the work of Freeth & Reeves. Clearly, to signify the change, such a framework could be called the 4Bs-4Ps approach to IPL educational design (see Table 15.1 below).

The 4 Bs	The 4 Ps
Build on existing links **B**uild opportunities in clinical settings **B**enefits demonstrated to all stakeholders **B**ased on best-evidence approaches	**P**resage **P**lanning **P**rocess **P**roduct

Table 15.1: The 4Bs and 4Ps approach to IPL educational design

The new framework would use the WHO Framework as the starting point. This becomes the 4Bs part of the model and would incorporate the following:

Build on existing links: Before planning an IPL educational program or learning activity it is important to consider current clinical context and the existing team environment. Questions to ask include:

- How many health professions could be involved?
- How are these members currently linked in terms of health care delivery?
- Is the learning program/course/activity a small or large-scale initiative?
- What ability is there to grow the program into the future?

Build opportunities in clinical settings: This section focuses on embedding the experiencing into a relevant contextual setting:

Questions to ask include:

- What is the clinical context/setting for the potential IPL program/course/activity? (Is it a classroom, acute, sub-acute context or is it in a community, regional, rural or remote setting)
- What clinical topic(s) should be considered and why?

Benefits demonstrated to all stakeholders: Before planning the program it is critically important to clearly identify how the program/course/activity aims to benefit each stakeholder group because without their support the educational initiative is unlikely to succeed. Stakeholders include: learners/students; the healthcare system/organisation/health service; and, most importantly, patients. ‘Selling’ the benefits to each stakeholder group is integral to success.

Based on best-evidence approaches: It is not enough just to surmise that IPL is a good idea, educational designers need to be armed with the evidence of its efficacy to persuade the sceptics and convince stakeholders of its growing evidence base and why it should be included.

The four Ps of the recommended model clearly follow much of Biggs/Freeth & Reeves work of Presage, Process and Product. The additional 'P' would be for Planning and is included to emphasise the essential requirement for careful preparation and planning of all IPL interventions. In fact Presage and Planning go 'hand in hand' with Presage used to identify the issues/items and Planning seen as the action plan to define what is needed to make the Presage happen. IPL creates quite a unique and complex learning environment. It is therefore proposed that the added 'P' for Planning ensures that significant attention is given to this in the education development process.

In this situation, Presage relates to the 'what' and Planning is the 'how' as in the action plan to address the political climate, regulatory frameworks, funding, management support, relationships to stakeholders, learner and teacher characteristics, administration/organisation, space and time constraints and competing curricula demands. In summary, the 4-Ps describe the educational context, the learner/teacher characteristics, the teaching and learning design and the planning and organisational processes needed to explore the outcomes of an IPL intervention.

It should be noted that the 4Bs and 4Ps approach is not sequential or linear. Educational designers could start with a vision or simply a bright idea (Process) then revisit other aspects to ensure all components of the 4Bs and/or Presage and Planning have been addressed. It is therefore an iterative process. Importantly though (and this has been borne out in this research study), equal attention is needed on every component of the 4Bs and 4Ps. Ignoring any could very well make the difference between success and failure.

Finally, the rationale for using a process such as the 4Bs-4Ps approach is based on the call from Hammick et al. (2007) for educational designers and researchers to develop interventions that contribute to an evidenced informed model of IPL.

15.5 Future research

Further research into the field of IPL would be beneficial, particularly through a structured approach using high quality research methods, validated tools and replicating existing work in a range of contexts. Such studies could be of great value, especially so if designed to gather data on actual performance in the simulation and debrief. This would add another layer of Kirkpatrick's Classification (Level 2b) and enable a measure of applied knowledge as well as a measure of skill demonstration linked to the collaborative competencies.

Further research might also be conducted based on a longitudinal assessment of attitude change - particularly in the post-registration years – questioning whether or not the change attitude (as demonstrated in this study) is sustained and the nature of impact on future working practices. In a similar vein, such research could also examine whether or not (and indeed how) knowledge and skills attained might transfer to the actual practice setting and support sustained behavioural change.

15.6 Conclusion

The results from this pre-post IPL intervention study confirms that final year pre-registration medical and nursing students commence their pre-registration years with strong positive views supporting the principles of IPL and that the intervention enhances these views particularly for the IPL intervention group. The intervention appears to have had a stronger impact on the nursing students.

The study has shown that a blended IPL education approach, inclusive of simulation methodology met its primary aims of:

- increasing students' knowledge of, and confidence in, managing patients with delirium;
- developing students' appreciation of each other's roles in the management of delirium; and,
- developing students' knowledge of, and confidence in performing interprofessional collaborative practice skills.

It appears that using an interprofessional approach enhances learning about the collaborative management of delirium, where clear communication, effective teamwork and a mutual understanding of the respective health care team members' roles can enhance knowledge and practice gaps.

Using Freeth and Reeves Adaptation of Biggs 3-P model, a mechanism for designing an effective educational experience has assisted in creating an intervention that has positively changed attitudes towards teamwork and collaboration and fostered mutual respect and trust between this cohort of medical and nursing students. A change in attitude toward interprofessional collaborative practices prior to graduation is a good step towards improving the safety and quality of care called for by the World Health Organisation and other leading national and international organisations.

ADDENDUM

Since this initial pilot study conducted in 2008, Monash University committed additional funding to create a professionally produced video to replace the interprofessional delirium lecture. The IPL Delirium workshop went on to become a core curriculum activity in 2010 for all final year medical and nursing students within the Faculty of Medicine, Nursing & Health Sciences and continues today. By the end of 2015 in excess of 5,600 students will have been trained in this important education initiative. In 2015 it will be implemented across 5 different cohorts including Monash University Central, Monash Malaysia, Regional Victoria and Deakin University. A total of 435 workshops have been conducted and evaluations continue to be strong. It is arguably one of the largest, most sustainable IPL initiatives in the world.

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APPENDICES

APPENDIX A

MBBS Module 5 - Delirium

Module Overview

This module represents a unique and exciting learning opportunity for final year medical students. It is designed to help you learn about the important clinical problem of delirium and to experience its collaborative management in the context of an interprofessional simulated learning environment. During this module you will have the opportunity to work with final year nursing students to develop your collaborative team working skills as you assess and manage a patient with delirium.

Why learn about Interprofessionalism?

Health professional collaboration is now seen as a significant area of clinical practice, particularly in complex health care settings. Interprofessionalism and the concept of interprofessional learning (IPL) have grown significantly in the health disciplines in recent years. A well recognised definition of interprofessional learning is “when two or more professions learn from and about each other to improve collaboration and quality of care”. This module recognizes the importance of developing your interprofessional practices in order to improve the way in health professionals’ work together and to develop a more patient centred approach to the management of the patient with delirium.

The significance of delirium and interprofessional practice.

Delirium is probably the single most common acute neurological disorder affecting adults in general hospitals today. It occurs in 10-20% of all adults, in hospital and 30-40% of older patients, in hospital. Effective management of delirium is contingent upon an interprofessional approach necessitating among other things, clear communication and an understanding of the respective health care team members' roles.

This module offers an innovative teaching and learning opportunity about a common clinical condition in a safe, supported and highly authentic context that best replicates what you will experience in future team-based clinical practice.

Learning objectives

On completion of this module you should be able to:

- Discuss the prevalence and significance of delirium;
- Identify risk factors associated with the development of delirium;
- Discuss the major causes of delirium;
- Describe the use of screening tools to identify cardinal features of delirium to aid diagnosis;

- Apply the confusion assessment method (CAM) to diagnose delirium;
- Recognise the clinical features of delirium;
- Differentiate delirium from other possible diagnoses;
- Describe and implement strategies to ensure safety of the patient with delirium;
- Work collaboratively with nurses in the management of a patient with delirium, including the need to establish and treat the underlying cause;
- Demonstrate effective team working and communication skills in managing a patient with delirium.

Learning activities

This module will be based on the Interprofessional Delirium Workshop which will be scheduled during your Aged Care Rotation or at some other time of the year. The Interprofessional Delirium Workshop will be a 4 hour learning event held at Peninsula campus in the School of Nursing clinical skills laboratories. You will be notified of the date of the Workshop that you have been allocated to by email. This email will provide all the necessary details regarding the location, time and parking arrangements..

Activity 1

Read the article on Blackboard by Young and Inouye on Delirium in Older People or read about delirium in any textbook of general medicine, neurology or geriatric medicine.

Activity 2

Attend the **Interprofessional Delirium Workshop** that you have been allocated to. This is an interprofessional learning activity where you will have the opportunity to participate in a range of learning experiences with final year nursing students to learn together about each others roles in the management of delirium. The workshop has four components

- A short video of a conversation about Delirium with Associate Professors' Wendy Cross and Peteris Darzins.
- Small group discussion about a case facilitated by two clinical experts
- A simulation exercise where you will experience the collaborative management of a patient with delirium
- Group debriefing

The day will be facilitated by two experienced clinicians from medicine and nursing.

Activity 3

Following the Interprofessional Delirium Workshop you are to provide a short [one A4 page maximum] written description of a patient you have observed with delirium. The paragraph should focus on the following areas:

- How did you know the patient had delirium?
- What aspects of patient safety were at risk?
- What was the collaborative management of the patient?
- What suggestions could you make to improve the quality of care? (Consider the collaborative team practices)

Activity 4

Prepare for a discussion with the unit consultant or registrar about the management of delirium.

Please make sure that you have de-identified all information related to patients, staff and the unit/ward/hospital in your case notes and reflections.

Assessment

Interprofessional Delirium Workshops

Attendance and active participation in the Interprofessional Delirium Workshop is required.

ENSURE YOUR CASE NOTES AND ASSESSMENT TASKS ARE SIGNED-OFF ON THE PIA BY YOUR SUPERVISOR.

Workload

The workload associated with this module should comprise:

1 hour preliminary learning activity

5 hours simulated learning activity

2 hours independent learning activity

Total 8 hours

APPENDIX B

Group Allocation Process

Tutor group allocation

Allocation process

As students arrive they will go to the registration desk and pick up either a **RED** or YELLOW ticket

A briefing of the learning activities for the day and the research study will be given at 09.30 in Room E111 with an opportunity for students to read the explanatory statement, ask questions and sign the consent form.

Once consent forms have been handed in:

- Students with **RED** tickets go to the registration desk to be allocated either a BUFF, MAUVE, **PINK**, **or** **ORANGE** ticket.
- Students with YELLOW tickets go to the registration desk to be allocated either a **BLUE** **or GREEN** ticket
- Only those students consenting can be a participant in a simulation (others observe).
- Non consenting students need to be allocated to a videotaped group.

Group	Anticipated Allocation	Actual allocation
Nursing	N=20 RED: N=10 YELLOW: N=10	RED: N= YELLOW: N=
Medicine	N=20 RED: N=10 YELLOW N=10	RED: N= YELLOW N=

GROUP COLOUR CODING

Please note, for the uniprofessional group, your group colour will not change but youR group configuration will be different for the simulation.

Group 1	**Uniprofessional group (RED)**	**N=**	
Case study			
• Sub group 1	UPL 1 (m) n=5 CS 1 (buff)	N=	
• Sub group 2	UPL 2 (m) n=5 CS 1 (mauve)	N=	
• Sub Group 3	UPL 1 (n) n=5 CS 2 (pink)	N=	
• Sub group 4	UPL 2 (n) n=5 CS 2 (orange)	N=	

Simulation			
• Sub group 1	UPL 1 (m) n=5 SIM 1 (buff)	N=	
• Sub group 2	UPL 2 (m) n=5 SIM 2 (mauve)	N=	
• Sub Group 3	UPL 1 (n) n=5 SIM 1 (pink)	N=	
• Sub group 4	UPL 2 (n) n=5 SIM 2 (orange)	N=	
Debrief			
• Sub group 1	UPL 1 (m) n=5 DB 1 (buff)	N=	
• Sub group 2	UPL 2 (m) n=5 DB 2 (mauve)	N=	
• Sub Group 3	UPL 1 (n) n=5 DB 3 (pink)	N=	
• Sub group 4	UPL 2 (n) n=5 DB 4 (orange)	N=	

Case study 1		SIM 1 MED Debrief	
Case study 1		SIM 2 MED Debrief	

Case study 2		SIM 1 NURSING Debrief	
Case study 2		SIM 2 NURSING Debrief	

SIM 1	
SIM 1	

SIM 2	
SIM 2	

Group 2	Interprofessional group (YELLOW)			N=	TUTORS
Case study					
• Sub Group 1	IPL 1 (n)	n=5	CS 3 (blue)	N=	
• Sub group 1	IPL 1 (m)	n=5	CS 3 (blue)	N=	
• Sub group 2	IPL 2 (n)	n=5	CS 4 (green)	N=	
• Sub group 3	IPL 2 (m)	n=5	CS 4 (green)	N=	
Simulation					
• Sub Group 1	IPL 1 (n)	n=5	SIM 3 (blue)	N=	
• Sub group 1	IPL 1 (m)	n=5	SIM 3 (blue)	N=	
• Sub group 2	IPL 2 (n)	n=5	SIM 4 (green)	N=	
• Sub group 3	IPL 2 (m)	n=5	SIM 4 (green)	N=	
Debrief					
• Sub Group 1	IPL 1 (n)	n=5	DB 3 (blue)	N=	
• Sub group 1	IPL 1 (m)	n=5	DB 3 (blue)	N=	
• Sub group 2	IPL 2 (n)	n=5	DB 4 (green)	N=	
• Sub group 3	IPL 2 (m)	n=5	DB 4 (green)	N=	

Case study 3		SIM 3		SIM 3 Debrief	
Case study 3		SIM 3		SIM 3 Debrief	
Case study 4		SIM 4		SIM 4 Debrief	
Case study 4		SIM 4		SIM 4 Debrief	

APPENDIX C

Delirium - Medical Lecture

MONASH University

Delirium

MONARC TOWARDS SUCCESSFUL AGEING · MONASH UNIVERSITY · Southern Health

A conversation with:

Peteris Darzins FRACP FRCPC PhD
Associate Professor in Geriatric Medicine
Consultant Geriatrician, Southern Health

Learning Objectives

- **Why delirium is important**
- **How to recognise delirium**
- **How delirium can be prevented**
- **How to manage delirium**

What is delirium?

- **Acute clinical syndrome**
- **Set of symptoms / not a disease or disorder**
- **Impaired cognitive and physical function**

How to recognise Delirium

- Acute onset / fluctuating course AND
- Inattention AND
- Disorganised thinking OR
- Altered level of consciousness

Why delirium is important - when you are the intern…

- 24 patients
- 2 or 3 admissions per day,
- 10 to 15 patients per week

- 1 to 4 patients admitted per week will have delirium
- 6 to 12 of your patients will have delirium at some stage during their admission

Why delirium is important

- **Mortality**
  - up to 26% initial death rate
  - death rate doubled at 12/12
- **Morbidity**
  - more falls and other complications than similar patients without delirium
  - duration > 1 week in 40%,
- **LOS / cost**
  - half as likely to be discharged in 1/12
  - increased institutionalisation

Delirium complicated by …

pressure ulcers, deconditioning, falls etc

Confusion Assessment Method (CAM) Diagnostic algorithm

1 Acute onset and fluctuating course AND
2 Inattention AND
3 Disorganised thinking OR
4 Altered level of consciousness

Sensitivity >94%, Specificity >90% CAM vs DSM-IIIR for diagnosis of delirium

Inouye SK, van Dyck CH, Alessi CA, et al., Clarifying confusion: the confusion assessment method. A new method for detection of delirium. Annals of Internal Medicine, 1990.

Brain - victim or innocent bystander?

- **no specific pathophysiology**
- **? multiple pathologies that look similar**
- **? final common pathway**

- **specific brain injury is rare**
  - e.g. encephalitis, subdural haematoma, cerebral lymphoma

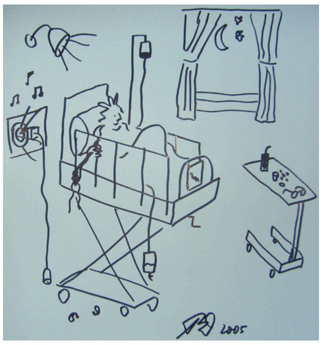
Vulnerability and insults in causation of delirium

High vulnerability	**Moderate to high risk of delirium**	**Very high risk of delirium**
Low vulnerability	**Low risk of delirium**	**Moderate to high risk of delirium**
	Low level insult	**High level insult**

Causes of delirium

- **Drugs**
- **Drugs**
- **Drugs**
- **Infection**
- **Any of the failures (cardiac, respiratory, hepatic, renal, metabolic etc)**
- **A combination of these**
- **Something else**

Risk factors for delirium in hospital



How to decrease delirium in hospital

Management of delirium

- most important thing is to recognise it - often missed.
- identify and treat underlying cause(s)
- good nursing care
  - orient mobilise hydrate
- good medical care
  - consider sepsis avoid drugs
  - haloperidol 0.5mg get help
- one-to-one nursing may be required

Conclusion - Delirium is:

- Common in hospitalised people
- Frequently missed
- Associated with death, functional decline and increased health care costs

What can health professionals do?

- Improve the systems of care to reduce the incidence of delirium
- Increase its recognition to optimise management

APPENDIX D

Delirium - Nursing Lecture

Delirium

Associate Professor Wendy Cross

DELIRIUM

- Characterised by a disturbance of consciousness and a change in cognition that develops over a short period of time and tends to fluctuate during the course of the day, characterized by disorientation to time and place, incoherent speech, aimless physical activity and reduced ability to focus
  - Murphy, Dyer and Gleason (2000)

Delirium

- It can be defined as an acute and reversible condition with multiple aetiologies (APA 1987)

Delirium

- Evidence shows that this condition is usually caused by the direct physiologic consequences of a general medical condition or intoxication or withdrawal from substance abuse
- Develops over a short period of time (hrs to days) and fluctuates during the course of the day

Epidemiology

- 10-15% of patients in general surgical wards
- 15-25% of patients in general medical wards
- 30% of patients in intensive care units
- 40-50% of patients who have had surgery for hip fractures

Epidemiology

- 20% of patients with severe burns
- 30% of patients hospitalised with AIDS
- 30-40% of hospitalised people over 65 years of age.
- one year mortality rate up to 50 percent

Aetiology

- The syndrome is secondary to many underlying disorders that cause temporary, diffuse disturbances of brain functions
  - Drugs or poisons (intoxication or withdrawal)
  - Systems failures (Liver, Kidney)
  - CNS disease (e.g. encephalitis, epilepsy, neoplasms)
  - Endocrine dysfunction
  - Electrolyte imbalances

Aetiology

- Infections
- Metabolic disorders
- Neurological diseases
- Postoperative states and
- Psychosocial stressors

What does delirium look like?

- Delirium is a transiently altered mental state characterized by:-
- Fluctuating cognitive impairment
- Rapid onset
- Clouding consciousness
- Psychotic symptoms, typically visual hallucinations and paranoid delusions
- Abnormalities motor activity, both under and overactivity
- Emotional changes; fear perplexity, etc

Hallmark Symptoms

- Disturbance of consciousness
  - reduced clarity of awareness
  - difficulty/shift attention
  - reduced/focus
  - confusion
- Cognitive changes
  - memory deficit
  - disorientation
  - language disturbance

Common Symptoms

- Mood abnormalities-fear, anxiety and irritability most prominent
- Perceptual disturbances
  - Illusions and hallucinations (usually tactile type)
- Behavioural disturbances
- Disturbance in cortical functioning
  - Agnosia (inability to name objects)
  - Dysgraphia (inability to write)

Other features

- Sudden onset
- Brief and fluctuating course
- Reversible
  - when cause is eliminated
- A syndrome not a disease
  - acute confusional state
  - acute brain syndrome

Other features

- Disorientation to time first then to place and last to person
- Disorientation and confusion are usually markedly worse at night and during early morning.
- Usually experience ‘Sundowning”

Treatment

- Main goal is to treat the underlying cause
- Support and safety needs
  - Physical, sensory, and environmental needs
  - Reality orientation, reduce secondary injury
  - Lower client’ s anxiety, minimize aberrant behaviours
  - Use of simple concrete phrases –level of communication

What is the difference between delirium and dementia?

- Dementia usually has a slow insidious course; delirium has a rapid onset
- In delirium, cognitive impairment and alertness fluctuates markedly, with confusion typically being worse at night. Patients with dementia usually have no loss of alertness
- Hallucinations and delusions are more florid in dementia, and the emotional changes are more prominent
- J Brown & J Hillam (2004)

How can misdiagnosis be avoided?

- The keys to differentiating delirium and dementia are as follows:-
- Obtain accurate information about the onset and course of symptoms from someone who knows the patient well
- Be alert to the possibility of (even trivial) physical illness causing dramatic cognitive changes
- Ensure a doctor undertakes a physical examination and clinical investigations necessary to determine causative pathology

APPENDIX E

Delirium - Interprofessional Lecture

Learning about Interprofessional practice…

delirium

MONASH University
Faculty of Medicine, Nursing & Health Sciences

A conversation with:

Professor Wendy Cross
(Monash University, School of Nursing)
and
Professor Peteris Darzins
(Monash University & Consultant Geriatrician, Eastern Health)

What is delirium?

- An acute clinical syndrome characterised by:
  - a disturbance of consciousness and a change in cognition
  - disorientation to time and place
  - incoherent speech
  - aimless physical activity
  - reduced ability to focus
- Develops over a short period of time and tends to fluctuate during the course of the day Murphy,

Dyer and Gleason (2000)

Why is delirium important?

- **Common**
- **High mortality rate**
  - up to 26% initial death rate
  - death rate doubled at 12/12
- **High morbidity rate**
  - Leads to more falls and other complications
- **Increased LOS / cost**

Confusion Assessment Method (CAM) Diagnostic algorithm

1 Acute onset and fluctuating course AND
2 Inattention AND
3 Disorganised thinking OR
4 Altered level of consciousness

Sensitivity >94%, Specificity >90% CAM vs DSM-IIIR for diagnosis of delirium

Inouye SK, van Dyck CH, Alessi CA, et al., Clarifying confusion: the confusion assessment method. A new method for detection of delirium. Annals of Internal Medicine, 1990.

How to recognise Delirium Cardinal signs….

- Acute onset / fluctuating course AND
- Inattention AND
- Disorganised thinking OR
- Altered level of consciousness

Who is most at risk?

- People over 65 years of age
- People with dementia
- People with severe medical illness

Causes of delirium

- Secondary to many underlying causes
  - Drugs
  - Systems failure (CVS, Resp, Endocrine, Neuro)
  - CNS disease
  - Electrolyte disturbance
  - Infections
  - Post-operative states
  - Psychosocial stressors

Brain - victim or innocent bystander?

- **no specific pathophysiology**
- **? multiple pathologies that look similar**
- **? final common pathway**

- **specific brain injury is rare**
  - e.g. encephalitis, subdural haematoma, cerebral lymphoma

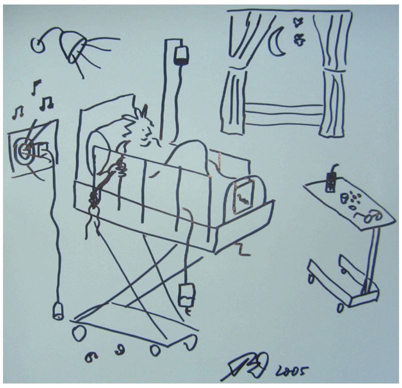
Vulnerability and insults in causation of delirium

High vulnerability	**Moderate to high risk of delirium**	**Very high risk of delirium**
Low vulnerability	**Low risk of delirium**	**Moderate to high risk of delirium**
	Low level insult	**High level insult**

Causes of delirium

- **Drugs**
- **Drugs**
- **Drugs**
- **Infection**
- **Any of the failures (cardiac, respiratory, hepatic, renal, metabolic etc)**
- **A combination of these**
- **Something else**

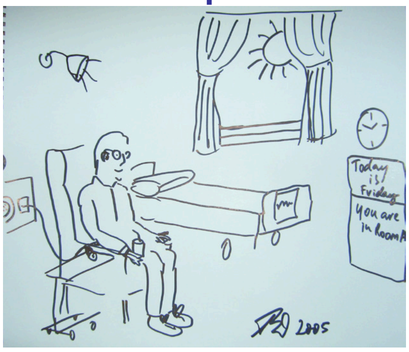
Risk factors for delirium in hospital



Nursing care

- **Support** the patient and keep them **safe**
  - Attend to physical, sensory, and environmental needs
  - Reality orientation, reduce secondary injury
  - Lower client's anxiety, minimize aberrant behaviours
  - Use of simple concrete questions / directions
  - Speak in a calm, polite, professional manner
  - Include family members in care

How to decrease delirium in hospital



Collaborative management of delirium

- most important thing is to recognise it - often missed.
- identify and treat underlying cause(s)
- good nursing care
  - orient mobilise hydrate
- good medical care
  - consider sepsis avoid drugs
  - haloperidol 0.5mg get help

Collaborative management of delirium

- Seeking help
  - Assistance of nursing staff
  - Assistance of medical staff
- Constant patient observation
  - one-to-one nursing may be required
- Patient safety +++

Interprofessional communication

- Nursing assessment and diagnosis
- Medical assessment and diagnosis
- Effective communication to convey the 'full picture"
- Working together to identify and treat underlying causes

Conclusion - Delirium is:

- Common in hospitalised people
- Frequently missed
- Reversible
- Associated with death, functional decline and increased health care costs

What can health professionals do?

- Improve the systems of care to reduce the incidence of delirium
- Increase its recognition to optimise management

APPENDIX F

Written Case Study – Student Instructions

Written case study: John Graythorne

Time allowed: 40 minutes

Learning Objectives

After completing this case, you should be able to:

- Describe the prevalence and significance of delirium;
- Identify risk factors and causes associated with the development of delirium;
- Describe the use of the confusion assessment method (CAM) screening tool to aid diagnosis of delirium;
- Explain possible differential diagnoses of delirium;
- Describe strategies used to ensure safety of the patient with delirium;
- Outline the collaborative management of a patient with delirium;
- Recognise the role of teamwork and interprofessional practices in the management of delirium;
- Explain strategies used for delirium prevention.

John Graythorne – Scenario Part 1

After rheumatic heart disease had led to years of gradually worsening shortness of breath and fatigue, John Graythorne, a 48 year old bricklayer finally consented to a mitral valve replacement. The procedure went well, but the nursing staff noticed that John seemed withdrawn and non communicative. He ignored his wife and teenage daughter during their visits. When he spoke, it was usually to complain about the tube in his nose or about his inability to sleep in the brightly lit intensive care unit.

On the third post operative day John became increasingly restless. After he pulled out his naso-gastric tube and IDC, he was quieter for a short period, but later he was found crying and trying to get out of bed. He asked the nurse why he was there and why his chest hurt. He was incredulous when told that he had had open heart surgery. As they spoke his voice trailed off and he seemed to forget that anyone was there. When he spoke again he asked about the outcome of a football match that had been played the week before.

1. *What do you think is "going on" with John and how did you arrive at this conclusion? Are there any other explanations?*
2. *What aspects of John's case put him at risk of developing delirium?*
3. *What immediate actions should occur to ensure John is kept safe?*
4. *What else do you think needs to happen with John now?*

John Graythorne – Scenario Part 2

The following morning John carried on a normal, though brief, conversation with the patient services assistant who bought him breakfast. He was able to accurately identify the date. By evening he was again talking to himself and had to be restrained from pulling out his IV catheter. Within 36 hours he was fully orientated and conversing normally with his family. He remembered nothing of his behaviour of the past two days and seemed surprised that he had required restraining.

5. *Why is teamwork / effective interprofessional practices important in this case?*
6. *What processes and procedures could be put in place to assist you in managing a simular situation in the future?*
7. *Does this case strike you as being unusual? Why or why not?*

APPENDIX G

Simulation Scenario – Student Instructions

SIMULATION SCENARIO

Title:

"Lorna Smith is looking for her purse"

Instructions for students

Brief for nursing students:

Lorna Smith 78 years of age, was admitted to your general medical ward this morning at around 8am after suffering a fracture of the wrist from a fall at home. When she arrived in the emergency department, she was found to be dehydrated, so after putting a back slab on her broken wrist, an IV line was inserted and she was transferred to the ward. She is now receiving IV fluids.

Student 1

You are a graduate nurse on this ward. When you admitted Mrs Smith this morning, she was alert and orientated. Her vital signs at the time were unremarkable, an IV line was inserted and while you have been looking after her, she has been quiet but cooperative. She had some bloods taken in the ED but the results haven't come through yet.

Mrs Smith is one of 5 patients you are caring for today and you also have a final year nursing student with you. You have asked the student to look after Mrs Smith under your supervision. The intern that admitted Mrs Smith is sitting at the central desk and he also has a final year medical student with him/her. The unit manager is away at a budget meeting and the registrar and consultant are both busy with their outpatient lists.

Your task is to assist your student nurse in the management of Mrs Smith with the assistance of your medical colleagues.

Student 2

You are a final year nursing student. You are in your second week of clinical placement on this ward. The nurse you are working with today has asked you to look after Mrs Smith but she has said to call on her if you need any help at all. Your available colleagues are the intern attached to this unit and a final year medical student.

You task is to continue to look after Mrs Smith who you have developed a good rapport with over the course of the morning.

Brief for medical students:

Lorna Smith 78 years of age, was admitted to this general medical ward this morning at around 8am after suffering a fracture of the wrist following a fall at home. When she arrived in the emergency department, she was found to be dehydrated so after putting a back slab on her broken wrist, an IV line was inserted and she was transferred to the ward She is now receiving IV fluids.

Student 1

You are an intern attached to this unit. When you admitted Mrs Smith to the ward this morning, she was alert and cooperative with some evidence of dehydration on physical examination. Her IV line was patent and you are waiting on her blood results to come through from the lab.

In the meantime, you have a final year medical student with you today. He/she has been assisting you this morning on the ward rounds and helping you with the admission of Mrs Smith. As the registrar and consultant are currently busy in outpatients you are catching up on some paperwork at the desk.

Your task is to attend to any patient needs that arise and supervise your medical student. The nurse in charge of the ward is currently away but one of the graduate nurses is left in charge with her final year nursing student.

Student 2

You are a final year medical student. You are currently on your aged care rotation. The intern that you are working with today asked you to admit Mrs Smith when she arrived on the ward this morning. You are currently writing up your admission notes at the desk. Your available colleagues are the intern and nursing staff.

You task is to continue your management of Mrs Smith who you have developed a good rapport with over the course of the morning.

Learning Objectives

After completing this simulation exercise, all students should be able to

- Recognise the clinical features of delirium through patient assessment;
- Implement immediate strategies to ensure patient safety including calling for help;
- Apply the confusion assessment method to diagnose delirium;
- Differentiate delirium from other possible diagnoses;
- Identify risk factors and causes associated with the development of delirium;
- Work collaboratively in the management of a patient with delirium, including the need to establish and treat the underlying cause;
- Demonstrate effective team working and communication skills in managing a patient with delirium.

Patient information available to the participants

- Patient observation chart
- IV order / Drug chart
- Fluid balance chart
- Confusion Assessment Method (CAM) Chart
- Pathology results
- X-rays – Non specific findings

APPENDIX H

Simulation Scenario – Simulated Patient Instructions

Learning about interprofessional learning in a simulated ward environment

SIMULATION SCENARIO

Title:

“Lorna Smith is looking for her purse”

Instructions for simulated patients

Major purpose of this case

The purpose of this case is to present the complex clinical problem of **delirium** to a small group of nursing and medical students. Students must perform an initial assessment of the situation to note a change in the patient’s condition, recognise signs of delirium, call for help where appropriate, keep the patient safe and work together to identify and manage the underlying causes of the patient problem.

Behaviours and skills to be performed by the students

- Initial nursing assessment of the patient to identify a change in condition
- Calling for help
- Keeping the patient and staff from any harm
- Calling for medical assistance
- Diagnosing a state of delirium
- Working out the underlying causes
- Managing the underlying causes together

Scenario background

You are Lorna Smith - 78 years of age. You live alone and can attend to your daily needs. You are president of the local bridge club and are normally mentally ‘sharp’. You do not suffer from dementia.

Over the past few days, you have had a bit of a cold and you haven’t been eating and drinking all that well. Today you had a fall at home in the early hours of the morning and hurt your wrist. You called an ambulance which brought you into hospital as you were in considerable pain. In the emergency department you had x-rays of your wrist which was found to be broken. The doctors also found you were dehydrated so they admitted you into a general medical ward this morning at around 8am.

You have a plaster ‘back slab’ on your broken wrist to immobilise your arm and you have an intravenous line in another arm which is providing you with fluids.

General instructions

Over the course of the morning you have mostly been cooperative but by the time the scenario starts you are becoming quite confused and restless.

In the initial stages of the scenario you are agitated but not aggressive and you will attempt to find your handbag by getting out of bed. You will show signs of being easily distracted and you will not be able to keep track of what is being said or asked of you. You will be quite physical in your attempts to be agitated but never violent. If the team are working well and communicating effectively with each other and you – this will be a cue to settle, however your state of confusion will fluctuate over the course of the scenario.

At some stage it is hoped that the medical students will attempt to assess you further by having a listen to your chest.

Generally. you will try and respond positively when your concerns (i.e. where's my purse/glasses?) are being met but you will resist any attempt to examine or restrain you. The team should not be able to examine you unless all four are working together.

Time allowed

The simulation should not take any more than 12 - 15 minutes.

Commencement of Scenario

<u>Scene 1:</u> NURSING ASSESSMENT / PATIENT SAFETY / CALL FOR HELP		
Simulated patient behaviour	**Anticipated student actions**	**Approx. time**
Lorna's condition changes. She is now confused and restless ***She can't focus attention, is easily distracted, has a rambling conversation and changes subject matter easily*** Start by picking at the bed clothing and IV line, anything that is attached to you, wriggle around in the bed, rattle the cot sides *"What's this?? .I can't move my arm…This thing shouldn't be here…HELP! HELP!....I need help!"* *"I can't move in this bed. What am I doing here….This is a very uncomfortable bed."* *"I need to get home now. What's this silly thing in my arm here…how did that get there…"* *"I need some help here…I really have to get home"* *"I'm at the hairdressers aren't I? Where's whats her name…she normally does my hair"* *"Yes, yes I fall all the time…that's nothing.. What's this thing here"…*(try and remove anything attached to you, rattle the cot sides again) If it is taking time for the nurse to call for help, start to wriggle down the bottom of the bed and get one leg through the cot side in an attempt to get out of bed. While you wait for someone to come…lie back and go quiet. If the nurse is trying to take some vital signs be a bit uncooperative, but let he/she do it. *"What are you doing that for? I don't like you doing that"*	***Initial nursing assessment*** **Nurse 1** will arrive and start to interact with you. She will be trying to engage in a conversation to determine what the problem is. She should note that there is an obvious change in your mental status She should also attempt to calm you down. She might ask whether you know where you are or what has happened to you. She might try and explain that you have had a fall and that you have broken your wrist and that you are now in hospital and she is the nurse looking after you. She should try and get help, if she doesn't then keep escalating your agitation. She might take some vital signs (temperature, blood pressure, pulse etc)	3 mins

When second nurse arrives, start to build up again. *"What are you doing here? ……..Margery, have you seen my purse? Someone's taken my purse. I am sure I took it with me when I left for the shops this morning! Leave me alone and let me get my handbag"*…try to get out bed again and shoo everyone away. Once you get your purse, you will settle for a bit. *"I've got my bag now*"	**Nurse 2** should arrive if summoned Nurse 1 or Nurse 1 should attempt to diffuse the situation. They should call for the **intern.** The handbag should be given to Lorna which will calm her down. Other things they may do: Use single issue questions or directions, repeat information if necessary Keep on trying to orientate Lorna to the environment Open up the curtains Put the cot sides down One nurse should stay with patient while they go and get the intern. Put things within easy reach	3 mins
<u>Scene 2:</u> **INITIAL MEDICAL ASSESSMENT / DELIRIUM ASSESSMENT**		
When the doctors arrive, start to escalate the agitation again – start rifling through the handbag. *"Someone's got my glasses. Where's my glasses. I need them to read the paper" You seem like a nice young man/lady. Can you go and get my glasses please; they might be on my kitchen table…"* *"Oh dear… I need to go to the toilet."* If one of the nurses tries to get you out of bed to go to the toilet just say *.'I don't need to go anymore".* You will have been incontinent. *"Did I spill my drink:".* .Start getting out of bed again…and shoo people away if necessary. I must go and feed my cat…she will be frantic. (start rifling through the bag again). After a minute or so, settle down and lie back and rest for a moment….	***Medical assessment*** Doctor 1 and 2 will arrive and they will try and work out what the problem is with Lorna. They will need to gather information from the nursing staff. They should identify they need to perform a Delirium assessment They should then start to think about what has caused Lorna's delirium	3 mins

TIME OUT **If the students have not progressed to performing a delirium assessment or trying to determine the underlying causes. The facilitator will call a time out and prompt the students to think through these issues.**		
<u>Scene 3:</u> **FIND AND MANAGE CAUSES TOGETHER**		
During this time, the students will be communicating with each other about any potential causes of your delirium. While this is happening, keep a background state of agitation with some rambling sentences, slight agitation, moments of nodding off etc. If the doctors or nurses attempt to examine or restrain you, grasp the closest person and hold on very tightly. *‘My grandson will know, do you know where he is? Where is my purse/glasses?’* If your nightie is interfered with, keep pulling it down. *“What are you doing that for”* You will generally show a lack of cooperation including: shrugging off and ‘shooing’ away any attempts to touch you.	Students will be thinking of a range of causes and what they should be doing to identify if any are related to Lorna The medical students should perform a physical examination (attempt to listen to your chest) They will be checking blood results and other investigations	5
After 15 minutes, drift into sleep		
SIMULATION COMPLETE		

APPENDIX I

Tutor Guide

MONASH University

Medicine, Nursing and Health Sciences

Learning about interprofessional clinical practice in a simulated ward environment

TUTOR NOTES

This project is conducted by the Centre for Medical & Health Sciences Education, Monash University, Faculty of Medicine, Nursing and Health Sciences

Members of the project team:

Ms Debra Kiegaldie (CMHSE), A/Professor Peteris Darzins (Geriatric Academic Unit, Kingston Centre), A/Professor Wendy Cross (School of Nursing), Professor Barbara Workman (Department of Medicine, Kingston Centre), Ms Jill French (School of Nursing), A/Prof Brendan Flanagan, Dr Geoff White (CMHSE)

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Introduction

This interprofessional learning activity has been designed for final year medical and nursing students. The focus of the activity is on the clinical problem of **delirium.** The activity will compare an interprofessional learning (IPL) approach with a uniprofessional approach. Students' performance in an authentic simulated scenario will be evaluated.

As part of their undergraduate course requirements, all students will participate in a one day learning experience which will include the following:

- Lecture and tutorial
- Videotaped simulation exercise
- Simulation debriefing (group)

Your role:

Your role in this teaching activity is to facilitate the small group case study tutorial, the simulation exercise and the debriefing interview.

Student group allocation:

Approximately 200 students will be participating in this exercise – (100 nursing and 100 medical) over 6 days during April – June 2008. There are eight tutors assigned on each day (four nurses and four doctors).

Students will be allocated to either:

- A discipline specific group consisting of two subgroups each comprised of 50 medical and 50 nursing students
- An interprofessional group of 100 medical and nursing students together

Approximately 40 students (20 nursing, 20 medical) will be participating on each day.

The configuration of the groups on each day can be seen in Table 1.

All groups will be identifiable by a colour coding system. You will have a group and corresponding colour assigned to you for the day. Please make sure that you gather the right configuration of students to your group for the tutorial, simulation and debrief. (Please refer to the separate handout for the colour system that will be used).

DELIRIUM AND INTERPROFESSIONAL PRACTICE - PROGRAM

Time	Activity	Facilitator(s)
08.00 BREAKFAST		
09.30	Overview of the day and briefing of project/consent	DK
09.45	RIPLS Survey Pre-test DKT Pre-test	DK
10.15	**Lecture** Video Lecture Medicine (n=10 m) (30 mins) Video Lecture Nursing (n=10 n) (30 mins) Video Lecture IPL (n=20 m&n) (30 mins)	DK
10.45 BREAK		
11.00	**Case study** Medicine Case study 1 (n=10) Nursing Case study 2 (n=10) IPL Case study 3 (n=10 Med = 5/Nursing = 5) IPL Case study 4 (n=10 Med = 5/Nursing = 5)	2 doctors 2 nurses 1 doctor / 1 nurse 1 doctor / 1 nurse
12.00	**Simulation & Pre-briefing** UPL Sim 1 (n=10 Med = 5/Nursing = 5 – 4 participants) UPL Sim 2 (n=10 Med = 5/Nursing = 5 – 4 participants) IPL Sim 3 (n=10 Med = 5/Nursing = 5 – 4 participants) IPL Sim 4 (n=10 Med = 5/Nursing = 5 – 4 participants)	1 doctor / 1 nurse 1 doctor / 1 nurse 1 doctor / 1 nurse 1 doctor / 1 nurse
12.40	**De-Briefing** UPL Sim 1 (Med debrief n=5) UPL Sim 2 (Med debrief n=5) UPL Sim 1 (Nursing debrief n=5) UPL Sim 2 (Nursing debrief n=5) IPL Sim 3 (Nurse/Med debrief n=10 – Med 5/Nursing 5) IPL Sim 4: (Nurse/Med debrief n=10 – Med 5/Nursing 5)	1 doctor 1 doctor 1 nurse 1 nurse 1 doctor / 1 nurse 1 doctor / 1 nurse
1.40	RIPLS Post Test & Evaluation DKT Post Test	DK
2.00 LUNCH & FINISH		

The Case Study

TUTOR NOTES Written case study: John Graythorne

Introduction

This written case scenario is focused on a patient with delirium following cardiac surgery. The case includes a brief synopsis of the patient events with associated directed questions designed to address the learning objectives.

Your small group tutorial will have approximately 10 students and your role will be to act as a facilitator to support the discussion and ensure that learning objectives have been covered.

Time allowed: 40 minutes

Student Resources:

All groups will be provided with a set of resources which students may use during the discussion. This will include:

1. PowerPoint lecture notes
2. Copy of the Confusion Assessment Method
3. Quick Reference Guide for the Management of Delirium in Older People
4. Copy of Interprofessional Competencies

Learning Objectives

After completing this case, all students should be able to:

- Discuss the prevalence and significance of delirium;
- Identify risk factors associated with the development of delirium;
- Discuss the major causes of delirium;
- Describe the use of screening tools to identify cardinal features of delirium to aid diagnosis;
- Explore possible differential diagnoses of delirium;
- Describe strategies to ensure safety of the patient with delirium;
- Outline the collaborative management of a patient with delirium;
- Recognise the role of teamwork in the management of delirium;
- Explain strategies used for delirium prevention.

Commencing the case study

- Greet everyone, introduce the two tutors and quickly get everyone briefly introduce themselves
- Provide an introduction to the case study format
- "This case study is focused on a patient admitted to hospital for cardiac surgery. We will read the case then have a discussion using the key questions provided in your student notes.
- Ask someone to start by reading Part 1 of the scenario then allow for guided discussion.

John Graythorne – Scenario Part 1

After rheumatic heart disease had led to years of gradually worsening shortness of breath and fatigue, John Graythorne, a 48 year old bricklayer finally consented to a mitral valve replacement. The procedure went well, but during his initial recovery period, the intensive care staff noticed right away that John seemed withdrawn and non communicative. He ignored his wife and teenage daughter during their brief visits. When he spoke, it was usually to complain about the tube in his nose or about his inability to sleep in the brightly lit intensive care unit.

On the 3rd post operative day John became increasingly restless. After he pulled out his naso-gastric tube and indwelling catheter, he was quieter for a short period, but later in the evening he was found crying and trying to get out of bed. He asked the nurse why he was there and why his chest hurt. He was incredulous when told that he had had open heart surgery. As they spoke his voice trailed off and he seemed to forget that anyone was there. When he spoke again he asked about the outcome of a football match that had been played the week before.

1. ***What do you think is "going on" with John and how did you arrive at this conclusion? (Diagnosis / Screening tool-Confusion Assessment Method) (6 mins) Handout 1 & 2***

John is displaying signs of delirium: This can be determined by referring to the CAM Diagnostic Algorithm which outlines the cardinal features of delirium:

  a. *Acute onset: John's thinking & behaviour appears to change immediately post-op (assuming he was OK prior to surgery)*
  b. *Fluctuating course: One moment John is withdrawn and non communicative then he becomes restless and agitated, then he becomes quiet again*
  c. *Inattention: John ignores family members and is having difficulty concentrating*
  d. *Disorganised thinking: John has no recollection of his surgery and talks about unrelated events i.e. football*

e. *Altered level of consciousness: There are moments of hyper alertness – restlessness, complaining, pulling out tubes*

Are there any other explanations? (Differential diagnosis)

- *No – this is typical delirium. A previously well man, has sustained a big "physiological insult" and now has delirium. There are many possible causes for delirium in this situation, but at this stage delirium is the only appropriate diagnosis.*

2. ***What aspects of John's case put him at risk of developing delirium? (Risk Factors / Causes) (7 mins) Handouts 1 & 3***

John has a number of risk factors and potential causes associated with the development of delirium

- *Drugs - Post anaesthesia (medications used during and following surgery)*
- *May have alcohol withdrawal*
- *May have other psychoactive drug withdrawal (eg benzodiazepines, or illicit drugs)*
- *May have developed an infection (surgical wound, UTI from IDC)*
- *May be hypoxic – (confused and restless)*
- *May have an electrolyte imbalance from surgery,*
- *May be volume deplete/dehydrated (not eating/drinking post op – has removed tubes so may have pulled out IV leading to decreased intravascular volume)*
- *Sleep deprivation / sensory impairment from being in an ICU (bright lights / noise)*
- *Pain associated with the surgery*

3. ***What immediate actions should occur to ensure that John is kept safe? (Patient safety) (8 mins) Handouts 1 & 3***

- *Immediate assessment of John's mental state (CAM) and management of risk (reduce risk of injury)*
- ***Get help**** *(other nursing staff / ring RMO or RMO may seek help from more senior medical staff / provide a thorough assessment and handover of patient information)*
- *May need 1:1 nursing care 'special'*
- *Relocate patient closer to nurses station*
- *Reality orientation (single issue questions/directions, repeat information, orientate to surroundings)*
- *Check bed height / ?use of Cot sides / Consider mattress on floor / Use of a low-low bed*
- *Use of a clock might be helpful*

- *Minimise anxiety – Use calm reassurance and explanations*
- *Rationalise the use of tubes (NGT,IDC, IV) Are they necessary?*
- *Decrease light / noise at night – Avoid physical restraints*
- *Recruit the support of family members to come visit and stay with John*

4. *What else do you think needs to happen with John? (Collaborative management)*

(10 mins) ***Handouts 1 & 3***

a. *RECOGNISE IT*
   - *Prompt and accurate nursing assessment*
   - *Medical history and physical examination – diagnosis / DDx*
   - *Use of the Confusion Assessment Method (CAM) to confirm diagnosis*

b. *Identify and treat the underlying cause:*

   See question 3 PLUS:

   - *DRUGS: Assess medications, is there more than 3 drugs ordered? rationalise ones that may be implicated*
   - *INFECTION: Fever?, Urine M&C, Septic workup?*
   - *ELECTROLYTES: Take blood for U&Es, LFTs, Hb,?*
   - *DEHYDRATION/VOLUME DEPLETION: Monitor and restore fluid balance*
   - *NUTRITION: Ensure adequate nutrition*
   - *HYPOXIA: Monitor SaO2, ABGs?, Provide oxygen*
   - *PAIN: Assess for pain, provide analgesia if necessary*
   - *REST/SLEEP: Regular night/day routine, rest, minimise noise*

c. *If aggressive consider the use of Haloperidol 0.5mg*

John Graythorne – Scenario Part 2

The following morning John carried on a normal, though brief, conversation with the patient services assistant who bought him breakfast. He was able to accurately identify the date. By evening he was again talking to himself and had to be restrained from pulling out his IV line. Within 36 hours he was fully orientated and conversing normally with his family. He remembered nothing of his behaviour of the past 2 days and seemed surprised that he required restraining.

5. *Why is teamwork / effective interprofessional practice important in this case?*
(Teamwork considerations / significance) (6 mins) Handout 4

- *Patient has multiple needs which requires a multidisciplinary approach to care*
- *Patient is placed at the centre of the organisation of care*
- *Ensures contributions of all members of the team are recognised, understood and valued in the interests of providing high quality integrated care.*
- *Delirium is associated with a high mortality / morbidity rate (falls and other complications)*

Of the list of interprofessional competencies, the students might like to consider which ones are the most important when it comes to managing delirium and how they could be implemented?

Competencies for inter-professional practice
Knowledge
Awareness of professional role boundaries
Knowledge of other team members expertise, background, knowledge and values
Knowledge of individual roles and processes required to work collaboratively
Skills
Communication skills
Conflict resolution skills
Leadership skills
Collaboration skills
Skills in providing accurate and timely information to those who need it at the appropriate time
Skills in coordinating and integrating care processes to ensure excellence, continuity and reliability of the care provided
Attitudes
Deals with complexity and uncertainty
Respects, understands and supports the roles of other professionals
Adaptive and flexible
Able and willing to share goals

6. ***What processes and procedures could be put in place to assist you in managing a simular situation in the future? (Prevention / Risk factors / Causes) (2 mins)***

    - *Prevention is the most effective strategy for dealing with delirium*
    - *Identify those at risk – Assess **vulnerability** and **level of insult** to determine **degree of risk***
    - *Increased awareness of delirium*
    - *Have a high index of suspicion for delirium (the non-specifically unwell, 'vague', 'off colour' etc*
    - *In this case, anticipation of risk, and good post-operative care is the key to prevention*

7. ***Does this case strike you as being unusual? Why or why not? (Prevalence) (2 mins)***

    - *Common in hospitalised patients but frequently missed*
    - *Delirium manifests in many ways, it is often misdiagnosed*
    - *Clinical features vary*
    - *Can present in a hypoactive/hypoalert form ('cold delirium') as well as hyperactive/hyperalert ('hot delirium')*

The Simulation

TUTOR NOTES Simulation Scenario

Title: "Lorna Smith is looking for her purse"

Introduction

The purpose of this case scenario is to provide the students with an opportunity to work together in managing the problem of **delirium**. Simulated patients have been trained to perform this role. Students must perform an initial assessment of the situation to note a change in the patient's condition, recognise signs of delirium, call for help where appropriate, keep the patient safe and work together to identify and manage the underlying causes of the patient problem.

The simulation involves four phases:

1. Setting up of the simulation and recruiting volunteers,
2. Establishing the ground rules and briefing the students about what to expect, the roles that they will play and the anticipated learning outcomes
3. Conducting the simulation
4. Debriefing the students following the simulation

Time allowed: 100 minutes

- Setting up 10 minutes
- Pre-brief 15 mins
- Simulation 15 minutes
- Debriefing 60 minutes

Resources:

All props and resources have been pre-prepared in each clinical skills lab as follows:

- Adjustable bed
- Cot sides
- Call bell
- Overbed table
- Table or desk (Nurses station)
- Charts

Room set up:

This should already be done, but please make sure that following is in place:

- Bed in high position
- Cot sides up
- Curtains closed
- All lights on
- No clock
- Things out of reach (handbag, glasses)
- Charts at the end of the bed
    - Observation chart
    - CAM
    - Fluid balance
    - IV order / Medication chart
    - Pathology chart
    - Nursing care plan

Learning Objectives

After completing this simulation exercise, all students should be able to

- Recognise the clinical features of delirium;
- Implement immediate strategies to ensure patient safety including calling for help;
- Apply the confusion assessment method to diagnose delirium;
- Differentiate delirium from other possible diagnoses;
- Identify risk factors and causes associated with the development of delirium;
- Work collaboratively in the management of a patient with delirium, including the need to establish and treat the underlying cause;
- Demonstrate effective team working and communication skills in managing a patient with delirium.

Participants:

- Two nurses
  - One graduate nurse
  - One final year nursing student
- Two doctors
  - One intern
  - One final year medical student
- One female actor/simulated patient, aged 60+
- Two facilitators (one medical and one nursing)
- At least six student observers

Equipment:

The following audiovisual equipment will already be set up in each room. Please make sure you are familiar with their operations.

- Video camera
- TV monitor
- Cables
- Facilitator running sheet (this is a checklist of performance indicators to assist in the debrief)

PRE-BRIEFING

1. Set the scene and create an environment of trust (ground rules). Establish the following key points:
    - This learning activity is to be conducted in a safe and supportive environment
    - All actions performed and opinions express should be listened to, valued and respected.
    - Appreciation should be shown to those who have had the courage to volunteer to play the role of the students – encourage the observers to be supportive and positive
2. To emphasise the importance of trust and respect, all students (and tutors) will be asked to sign a written agreement on confidentiality concerning everything that was observed and heard during the simulation experience and debriefing interview.
3. State the purpose of the simulation, the learning objectives and the process of debriefing
4. Call for two nursing and two medical volunteers (these individuals <u>must</u> have previously consented to participate in the videotape of the simulation)
5. Provide the students with a copy of the STUDENT information sheet
6. Walk the students through the learning objectives which will guide their learning and outcome achievements
7. Go through each person’s role and allow them time to ask any questions
8. Indicate to the students that you will be there as a support person (‘in the wings’) if they really get stuck and you will be there to provide supportive cues if necessary. Mention that if needed, you will call a ‘TIME OUT’ so they can gather their thoughts and keep them on track but this will be kept to a minimum.
9. Familiarise the students to the physical layout of the simulation. Go through the functioning of the equipment e.g. how to lower the bed, what props are available e.g. charts at the bedside (refer the students to the instructions on page 1 of their briefing notes)
10. Brief the observers on their role which is to observe the clinical scenario as it unfolds, identify the key issues of the case and observe the actions and interactions of the team members. Ask them to make mental notes on what takes place in light of the objectives of the case so that they can contribute to the debriefing.

THE SCENARIO

Major purpose of this case

The purpose of this case is to present the complex clinical problem of **delirium** to a small group of nursing and medical students. Students must perform an initial assessment of the situation to note a change in the patient's condition, recognise signs of delirium, call for help where appropriate, keep the patient safe and work together to identify and manage the underlying causes of the patient problem.

Behaviours and skills to be performed by the students

- Initial nursing assessment of the patient to identify a change in condition
- Calling for help
- Keeping the patient and staff from any harm
- Calling for medical assistance
- Diagnosing a state of delirium
- Working out the underlying causes
- Managing the underlying causes together

Scenario background

The patient is Mrs Lorna Smith - 78 years of age. She lives alone and has been able to attend to her daily needs. She is president of the local bridge club and is normally mentally 'sharp'. She does not suffer from dementia.

Over the past few days, she has had a bit of a cold and she hasn't been eating and drinking all that well. Today she had a fall at home in the early hours of the morning and hurt her wrist. She called an ambulance which brought her into hospital as she was in considerable pain. In the emergency department she had x-rays of the wrist which was found to be broken. The doctors also found she was dehydrated so they admitted her into a general medical ward this morning at around 8am.

She has a plaster 'back slab' on her broken wrist to immobilise her arm and she has an intravenous line for fluid replacement due to her dehydration.

General features of the case

Over the course of the morning Mrs Smith has been mostly cooperative but by the time the scenario starts she is quite confused and restless.

In the initial stages of the scenario she is agitated but not aggressive and she will attempt to "find her handbag" by getting out of bed. Mrs Smith will show signs of being easily distracted and she will not be able to keep track of what is being said or asked of her. She will be quite physical in her attempts to be agitated but never violent. If the team are working well and communicating effectively with each other and Mrs Smith – this will be a cue for the patient to settle, however her state of confusion will fluctuate over the course of the scenario.

At some stage it is hoped that the medical students will attempt to assess the patient further by examining Mrs Smith i.e. auscultating her chest. In general terms, she will try and respond positively when her concerns are being met but she will resist any attempt to examine or restrain her. The team should not be able to examine Mrs Smith unless all four students are working together.

Scenario flow

Scene 1 NURSING ASSESSMENT / PATIENT SAFETY / CALL FOR HELP

Scene 1 is entry of the student nurse (NURSING STUDENT 1). Her goal is to respond to Mrs Smith's calls for help, recognise that there is a problem, interact with Mrs Smith to allay any anxiety and call for help

The graduate nurse (NURSING STUDENT 2) should respond to the student nurses call for help and provide assistance. She should recognise that Mrs Smith is experiencing an acute change in condition and is showing signs of delirium.

Both nurses should start instituting actions that will keep the patient safe.

- One nurse to stay with the patient at all times
- Listen and discover what the issue is
- Responding to any requests i.e. give Mrs Smith her the handbag, glasses (putting things in easy reach)
- Speak in a clear voice (calm, unemotional speech) "professional and polite"
- Provide simple instructions i.e. one step directions to avoid overloading and further confusion
- Calmly repeat information
- Continue to orientate Mrs Smith to her surrounding but still avoid information overload. Phrases like: "You are in hospital", "you have had a fall", "I am the nurse looking after you". "You need this drip in your arm because you haven't been drinking enough" etc
- Consider lowering the bed
- Consider opening up the curtains
- Keeping noise to a minimum
- Consider calling family members

Towards the end of this scene, Mrs Smith will settle (especially if she is given her handbag). She will quieten down which will give one of the nurses an opportunity to get some medical help.

Scene 2 INITIAL MEDICAL ASSESSMENT / DELIRIUM ASSESSMENT

One of the nurses should call for medical help. Both the intern and student should arrive and ask what is happening with Mrs Smith. Due to the presence of other people, Mrs Smith will become more agitated and start behaving in a confused, non attentive way. The medical staff should interview the nurses about what changes have occurred over the course of the morning and what the problem appears to be now. Due to behaviours exhibited by Mrs Smith, the doctors should also recognise that there has been a change in the patient's condition, the likelihood being Delirium. They should institute the CAM to confirm their diagnosis. The next step in the scenario is for all members of the team to start thinking about identifying underlying causes.

TIME OUT

If the students have not progressed to performing a delirium assessment or trying to determine the underlying causes, the facilitator can call a time out and prompt the students to think through these issues.

Scene 2 FIND AND MANAGE CAUSES TOGETHER

During this scene, the students should be communicating with each other about potential causes or risk factors that may have led to Mrs Smith's state of delirium. Whilst this is happening, Mrs Smith will be continuing in a background state of agitation with some rambling sentences, slight agitation, moments of 'nodding off' etc.

The potential causes/risk factors for the students to consider in this scenario:

- Medications: Analgesics used for broken wrist – any other medications
- Dehydration: Mrs Smith was admitted with dehydration and she has pulled out her drip
- Infection: Has she got a chest infection, UTI
- Electrolyte imbalance: Dehydration
- Pain
- Sensory impairment: Mrs Smith might be hard of hearing (she needs her hearing aid, vision impaired (she needs her glasses)
- Immobility: She is confined to bed with cot sides up

Time allowed

The simulation should not take any more than 15 minutes.

The full facilitator script of the simulation can be found in Appendix 1

TUTOR NOTES Simulation Debrief Interview

Introduction

The role of the debriefing interview is to allow discussion of the events that occurred in the case and the influences of the teaching interventions. It should reinforces the positive aspects of the experience and encourage reflective learning. The debrief provides an opportunity for learners to think critically and to discuss how to intervene professionally if faced with other similar complex situations. Please allow for open and honest discussion. Your role is to guide and direct the discussion and occasionally offer positive reinforcement of key learning issues.

The debrief will explore the following aspects:

- Students experience of the simulation
- Student's perspectives on interprofessional learning
- Influence of the following intervention components on the students ability to perform in the scenario
    a. Lecture
    b. Case study
    c. Simulation

Time allowed: 60 minutes

Resources:

Rewind tape and attach leads to TV monitor.

Replay any video footage to emphasise any points. This should take approximately 15 minutes

Opening debriefing questions: 5 mins

It is important that you allow a few minutes for the student participants to "de-role" from the scenario. This is important because even though the scenarios are artificial they have also been 'mixed' i.e. some of the students will have role-played themselves, some role-playing a more senior role. Still the principle is the same - whether you've been role-playing yourself or someone else, you will get more out if the discussion if you can let go of that 'role'. To do this, you may wish to say something along the lines of:

"Even though this role play has been quite realistic, and you have mostly been playing yourselves, this situation is unusual in that is an artificial situation. So that you don't have any lingering concerns about what you did or didn't do and so that the whole group can make the most of the available discussion time, you need to step out of those roles. Is that OK? Is everyone OK with that?"

- For those involved in the simulation:
    - How do you feel now?
    - Did the situation feel real?

    - How do you feel you managed the situation overall?

- For those involved in observing the simulation:
    - What were your observations in terms of how the scenario played out overall?

Questions about the learning outcomes: 20 mins

- During the simulation what did you think was wrong with Mrs Smith? How did you come to this conclusion?
- What were the patient safety issues that were encountered? How were they resolved? How might they be resolved in other circumstances?
- What measures were undertaken to diagnose the underlying causes? What difficulties did you encounter?
- What difficulties were present in managing Mrs Smith? How were these resolved? How might you resolve these if faced with this situation in the future?
- What communication methods were used with Smith? What are the difficulties of communicating with a patient who has delirium and how might you resolve them?
- What role did your other colleagues play? How did you work together? What worked well? What could have been done differently?

Questions about the process: 20 mins

Spend some time discussing the influences of the prior teaching activities in preparing the students for the simulation?

- What aspects of the lecture did you find useful in preparing you for the simulation?
- What aspects of the case study did you find useful in preparing you for the simulation?
- What aspects of this simulation did you find useful in teaching you about delirium?
- What aspects of this simulation did you find useful in teaching you about effective interprofessional practices?
- Do you feel more confident in dealing with type of clinical problem in the future? Why or why not?
- Is there anything that should have been done differently?

Closure 5 mins

Spend 5 minutes providing a summary of the experience identifying 3 things that the group did well and three things that they can think about for the future. Thank them all for their time and efforts.

They are to be instructed to meet back in the room where they first met in the morning.

Appendix

Commencement of Scenario

<table>
<tr><td colspan="4"><u>Scene 1:</u> NURSING ASSESSMENT / PATIENT SAFETY / CALL FOR HELP</td></tr>
<tr><td>Simulated patient behaviour</td><td>Potential student cues for simulated patient</td><td>Facilitator notes

Expected student actions/behaviours</td><td>Approx. time</td></tr>
<tr><td>Lorna's condition changes. She is now confused and restless

She can't focus attention, is easily distracted, has a rambling conversation and changes subject matter easily

Start by picking at the bed clothing and IV line, anything that is attached to you, wriggle around in the bed, rattle the cot sides

"What's this?? .I can't move my arm…This thing shouldn't be here…HELP! HELP!....I need help!" Repeat if necessary (You will have pulled out your IV line (drip)…You did have an indwelling urinary catheter which you have also pulled out).

"I can't move in this bed. What am I doing here….This is a very uncomfortable bed."

"I need to get home now. What's this silly thing in my arm here…how did that get there…"</td><td>Initial nursing assessment

Nurse 1 will arrive and start to interact with you. She will be trying to engage in a conversation to determine what the problem is. She should note that there is an obvious change in your mental status

She should also attempt to calm you down. She might ask whether you know where you are or what has happened to you.

She might try and explain that you have had a fall and that you have broken your wrist and that you are now in hospital and she is the nurse looking after you.

She should try and get help, if she doesn't then keep escalating your agitation.</td><td>You may prompt nurse 1 to enter scene

• After a few minutes NURSE 1 should CALL FOR HELP

<u>General performance indicators:</u>

• One nurse to stay with the patient at all times
• Listen and discover what the issues are
• Respond to any requests i.e. give Mrs Smith her the handbag, glasses (putting things in easy reach)
• Speak in a clear voice (calm, unemotional speech) "professional and polite"
• Provide simple instructions i.e. one step directions to avoid overloading and further confusion
• Calmly repeat information</td><td>3 mins</td></tr>
</table>

"I need some help here…I really have to get home" *"I'm at the hairdressers aren't I? Where's whats her name…she normally does my hair"* *"Yes, yes I fall all the time…that's nothing.. What's this thing here"…*(try and remove anything attached to you, rattle the cot sides again) If it is taking time for the nurse to call for help, start to wriggle down the bottom of the bed and get one leg through the cot side in an attempt to get out of bed. While you wait for someone to come…lie back and go quiet. If the nurse is trying to take some vital signs be a bit uncooperative, but let he/she do it. *"What are you doing that for? I don't like you doing that"* When second nurse arrives, start to build up again. *"What are you doing here? ……..Margery, have you seen my purse? Someone's taken my purse. I am sure I took it with me when I left for the shops this morning! Leave me alone and let me get my handbag"*…try to get out bed again and shoo everyone away. Once you get your purse, you will settle for a bit. *"I've got my bag now*"	She might take some vital signs (temperature, blood pressure, pulse etc) **Nurse 2** should arrive if summoned Nurse 1 or Nurse 2 should attempt to diffuse the situation. They should call for the **intern.** The handbag should be given to Lorna which will calm her down. Other things they may do: Use single issue questions or directions, repeat information if necessary Keep on trying to orientate Lorna to the environment Open up the curtains Put the cot sides down One nurse should stay with patient while they go and get the intern. Put things within easy reach	• Continue to orientate Mrs Smith to her surrounding but still avoid information overload. Phrases like: "You are in hospital", "you have had a fall", "I am the nurse looking after you". "You need this drip in your arm because you haven't been drinking enough" etc • Consider lowering the bed • Consider opening up the curtains • Keeping noise to a minimum • Consider calling family members • CALL FOR HELP (NURSE TO DOCTORS)	3 mins

<table>
<tr><td colspan="4"><u>Scene 2:</u> INITIAL MEDICAL ASSESSMENT / DELIRIUM ASSESSMENT</td></tr>
<tr><td>Simulated patient behaviour</td><td>Potential student cues for simulated patient</td><td>Facilitator notes

Expected student actions/behaviours</td><td>Approx. time</td></tr>
<tr><td>When the doctors arrive, start to escalate the agitation again – start rifling through the handbag. “Someone’s got my glasses. Where’s my glasses. I need them to read the paper” You seem like a nice young man/lady. Can you go and get my glasses please; they might be on my kitchen table…”

“Oh dear… I need to go to the toilet.” If one of the nurses tries to get you out of bed to go to the toilet just say .’I don’t need to go anymore”. You will have been incontinent. “Did I spill my drink:”. Start getting out of bed again…and shoo people away if necessary. “I must go and feed my cat…she will be frantic”. (start rifling through the bag again). After a minute or so, settle down and lie back and rest for a moment….</td><td>Medical assessment

Doctor 1 and 2 will arrive and they will try and work out what the problem is with Lorna. They will need to gather information from the nursing staff.

They should identify they need to perform a Delirium assessment

They should then start to think about what has caused Lorna’s delirium</td><td>You may prompt the two doctors to enter scene if they haven’t been called

<u>Performance indicators:</u>

• The medical staff should questions the nurses about what changes have occurred over the course of the morning and what the problem appears to be now.

• Doctors should recognise that there has been a change in the patient’s condition with the likelihood being Delirium.

• They should communicate this openly with the nursing staff.

• They (or the nurses) should initiate the CAM to confirm their diagnosis.

• All members of the team should start thinking about the underlying causes

• All members should be attentive to the patients needs throughout this time (i.e. finding the patients glasses, keeping her calm, listening to her concerns etc)</td><td>3 mins</td></tr>
<tr><td colspan="4">TIME OUT
If the students have not progressed to performing a delirium assessment or trying to determine the underlying causes. The facilitator will call a time out and prompt the students to think through these issues.</td></tr>
</table>

Scene 3: FIND AND MANAGE CAUSES TOGETHER			
Simulated patient behaviour	**Potential student cues for SP**	**Facilitator notes** **Expected student actions/behaviours**	**Approx. time**
During this time, the students will be communicating with each other about any potential causes of your delirium. While this is happening, keep a background state of agitation with some rambling sentences, slight agitation, moments of nodding off etc. If the doctors or nurses attempt to examine or restrain you, grasp the closest person and hold on very tightly. *Where is my purse/glasses?' 'My grandson will know, do you know where he is?* If your nightie is interfered with, keep pulling it down. *"What are you doing that for"* You will generally show a lack of cooperation including: shrugging off and 'shooing' away any attempts to touch you.	Students will be thinking of a range of causes and what they should be doing to identify if any are related to Lorna The medical students should perform a physical examination (attempt to listen to your chest)	The potential causes/risk factors for the students to consider in this scenario: • Medications: Analgesics used for broken wrist – any other medications • Dehydration: Mrs Smith was admitted with dehydration and she has pulled out her drip • Infection: Has she got a chest infection, UTI • Electrolyte imbalance: Dehydration • Pain • Sensory impairment: Mrs Smith might be hard of hearing (she needs her hearing aid, vision impaired (she needs her glasses) • Immobility: She is confined to bed with cot sides up Specific actions will include: • Checking investigations: • Blood results, CXR, Urine M&C, • Vital signs • Doctors should proceed with a physical examination (the scenario will not be long enough for a full examination but attempts to do this or listening to the chest should be made	5
After 15 minutes, drift into sleep			
SIMULATION COMPLETE			

APPENDIX J

The Confusion Assessment Method

The Confusion Assessment Method (CAM) Diagnostic Algorithm

Consider the diagnosis of delirium is 1 and 2, AND either 3a and 3b are positive:

1. Acute Onset and Fluctuating Course

Is there evidence of an acute change in mental status from the patient's baseline? ❑

Has the abnormal behaviour fluctuated during the day (tending to come and go, or increase and decrease in severity? ❑

2. Inattention

Is the patient having difficulty focusing attention (e.g. being easily distracted) or having difficulty keeping track of what was being said ❑

3a Disorganised thinking

Is the patient's thinking disorganised or incoherent; such as rambling or irrelevant conversation, unclear or illogical flow of ideas; or unpredictable switching from subject to subject? ❑

3b. Altered Level of Consciousness

Overall, how would you rate this patient's level of consciousness? (alert [normal], vigilant [hyper-alert], lethargic[drowsy, easily aroused], stupor [difficult to arouse], or coma [unrousable]. *Positive for any answer other than "alert".* ❑

Inouye SK, van Dyck CH, Alessi CA, et al., Clarifying confusion: the ***confusion assessment method****. A new method for detection of delirium. Annals of Internal Medicine, 1990.*

Sensitivity >94%, Specificity >90% CAM vs DSM-IIIR for diagnosis of delirium

APPENDIX K

Quick Guide to Delirium

Management of Delirium in Older People

Quick Reference Guide

Please refer to the Clinical Practice Guidelines for the Management of Delirium in Older People for further information.

Definition of delirium

Delirium is a transient mental disorder, characterised by impaired cognitive function and reduced ability to focus, sustain or shift attention.

The disturbance develops over a short period of time and generally fluctuates during the course of the day. Delirium usually only lasts for a few days but may persist for weeks or even months.

Causes and risk factors

The aetiology of delirium is complex and multifactorial, involving an interaction between predisposing factors (individual vulnerabilities) and precipitating factors (insults). Delirium has a large number of possible causes. Some common causes include:

- medication and alcohol use
- general illness and infections
- disorders of metabolism
- central nervous system disorders
- cardiopulmonary disorders.

Risk factors

Of the variety of risk factors that have been studied, the following are based on high level evidence:

- age ≥ 70 years
- pre existing cognitive impairment, including dementia
- visual impairment
- depression
- abnormal serum sodium
- use of indwelling catheter
- use of physical restraint
- addition of 3 or more medications.

Risk Prediction Models

Although models to predict the risk of delirium development exist, the available evidence is limited to distinct groups of hospitalised patients. No model has been tested in Australia.

Epidemiology

Incidence/Prevalence

10-15% of older patients have prevalent delirium on admission to hospital and up to 40% develop delirium during their hospital stay. In residential care 40.5% 14 day period-prevalence has been reported.

Outcomes

Delirium is associated with increased length of hospital stay; higher morbidity and mortality; functional decline; and increased risk of nursing home placement.

Key messages & recommendations

- Delirium in older people is often overlooked or misdiagnosed.
- Delirium is typically precipitated by an underlying acute health condition, which in most (but not all) cases can be identified with careful assessment and investigation.
- Increasing old age, dementia, visual impairment and severe medical illness are important risk factors for delirium.
- A structured process for screening and diagnosing delirium should be established in all health care settings.
- Preventative environmental and clinical practice strategies should be incorporated into the care plan of all older people across all health care settings.
- Non-pharmacological strategies should always be utilised as a first-line measure to manage the symptoms of delirium. These include environmental, behavioural and social strategies.
- Caution should be exercised in prescribing antipsychotic medication to older people with delirium.
- Staff educational strategies aimed at increasing knowledge and awareness about delirium should be considered in all health care settings.
- Information about delirium should be made available to people who have experienced delirium and their family/carers, including the use of the consumer brochure.

Diagnostic criteria

Diagnostic criteria

The DSM-IV criteria is considered the gold standard diagnostic tool for delirium, when administered by a medical specialist with appropriate training such as a geriatrician or psychiatrist.

DSM-IV criteria for delirium (text revised, 2000)

A. Disturbance of consciousness with reduced ability to focus, sustain or shift attention.

B. A change in cognition or the development of a perceptual disturbance that is not better accounted for by a pre-existing, established, or evolving dementia.

C. The disturbance develops over a short period of time and tends to fluctuate during the course of the day.

D. There is evidence from the history, physical examination, or laboratory findings:

- that the disturbance is caused by the direct physiological consequences of a general medical condition; or
- the symptoms of criteria A and B developed during substance intoxication; or
- medication use is aetiologically related to the disturbance; or
- that the delirium has more that one aetiology; or
- a clinical presentation of delirium is suspected due to a general medical condition or substance use but for which there is insufficient evidence to establish a specific aetiology; or
- delirium due to causes not listed (eg sensory deprivation).

Signs and symptoms of delirium

People with delirium may:

- appear confused and forgetful
- be unable to pay attention
- experience disturbance of the sleep-wake cycle
- be very agitated, or quiet and withdrawn, or sleepy
- be disoriented to place or time
- experience emotional disturbances
- see, hear or feel things which are not there.

Prevention of delirium

A number of multifactorial prevention strategies have the potential to reduce the incidence of delirium, the duration of delirium and the severity of delirium.

Environmental and clinical practice strategies should be incorporated into the care plan of all older people across the health care settings. Some examples of these strategies have been listed in middle box.

Detection of delirium

Delirium subtypes

Delirium subtypes have been described and refer to psychomotor activity or level of arousal. They include:

- hyperactive (agitated, hyper-alert)
- hypoactive (lethargic, hypo-alert)
- mixed subtype with alternating features of both forms.

Differential diagnosis

The most common difficulty in the diagnosis of delirium is determining whether the person has dementia or delirium.

Diagnostic tools

A number of tools, such as the Confusion Assessment Method (CAM), have been developed to enable clinicians other than medical specialists to diagnose delirium. The application of diagnostic tools requires training.

Screening of cognitive function

In areas where there is high risk of developing delirium, a formalised process for screening delirium may assist in improving recognition rates and ultimately improving health outcomes. The process may involve: baseline cognitive assessment; regular repeated cognitive assessment; and may be followed by a diagnostic process.

Strategies for prevention & management of delirium

Environmental Strategies

- Lighting appropriate to time of day
- Quiet environment especially at night
- Provision of clock and calendar
- Avoid room changes
- Encourage family and friends to be involved in patient care
- Encourage carers to bring in patient's personal and familiar objects
- Staff caring for people with delirium should establish a communication strategy that incorporates elements of both reality orientation and validation techniques.

Clinical Practice Strategies

- Encourage/assist with eating and drinking to ensure adequate intake
- Ensure that patients who usually wear hearing and visual aids are assisted to use them
- Regulation of bowel function – avoid constipation
- Encourage and assist with regular mobilisation
- Encourage independence in basic ADLs
- Medication review
- Promote relaxation and sufficient sleep
- Manage discomfort or pain
- Provide orienting information including name and role of staff members
- Minimise use of indwelling catheters
- AVOID use of physical restraints
- Avoid psychoactive drugs
- Use interpreters and communications aids for CALD patients
- Use ATSI liaison officer for ATSI patients.

Additional Strategies for Delirium Symptoms

- Use one-on-one nursing or provide a trained sitter
- Allow family members to stay with the patient including overnight
- Endeavour to have the same staff members to care for the patient during and across shifts.

Only if all the above have been addressed do you consider the use of pharmacological interventions.

Management of delirium

In patients with confirmed diagnosis of delirium, or in those for whom there is a high level of clinical suspicion, the following steps are generally required:

- Identify the cause of delirium where possible

  Perform a comprehensive evaluation which includes obtaining a history; physical examination; and investigations.
- Address the cause and any precipitating factors
- Manage the symptoms of delirium

  Start general management with non-pharmacological interventions (see Environmental and Clinical Practice Strategies listed in middle box). In addition, methods for re-orientating and reassuring the patient can be used (see Additional Strategies for delirium symptoms listed in middle box).

  The use of antipsychotic medications for delirium management in older people should be reserved for those cases where the person experiences severe behavioural and/or emotional disturbance symptoms. These medications carry potential side effects and close monitoring of the person and their condition is required. Side effects include extrapyramidal signs and lengthened QT interval (Haloperidol), and increased risk of stroke in older people with dementia (Olanzepine, Risperidone). Consider issues of informed consent.
- Provide a supportive care environment

  Provide adequate sensory, physical and psychological support.
- Prevent complications

  Older people with delirium are at increased risk of complications such as falls and pressure ulcers. Strategies that reduce the risk of, or prevent, complications must be incorporated into their care plan.
- Educate the patient and their carers/family

  Information regarding the diagnosis, cause and management plan should be communicated to the patient and their carers.

Staff education

Staff education strategies aimed at increasing knowledge and awareness about delirium in older people should be considered in all health care settings.

APPENDIX L

Competencies for IPL

Competencies for inter-professional practice
Knowledge
Awareness of professional role boundaries
Knowledge of other team members expertise, background, knowledge and values
Knowledge of individual roles and processes required to work collaboratively
Skills
Communication skills
Conflict resolution skills
Leadership skills
Collaboration skills
Skills in providing accurate and timely information to those who need it at the appropriate time
Skills in coordinating and integrating care processes to ensure excellence, continuity and reliability of the care provided
Attitudes
Deals with complexity and uncertainty
Respects, understands and supports the roles of other professionals
Adaptive and flexible
Able and willing to share goals

Source: Adapted from : *Braithwaite, J, Travaglia, JF. Interprofessional learning and clinical education: an overview of the literature. Canberra: Braithwaite and Associates and the ACT Health Department, 2005.*

APPENDIX M

M-RIPLS Pre-test

MONASH University

Medicine, Nursing and Health Sciences

Code: / .../ .../ ... / ....

00 / 00 / dd / mm / yyyy

Colour Code: YELLOW / RED (please circle)

Readiness for Interprofessional Learning Survey Pre-test

Part A: Demographic information

1. What course are you currently enrolled in? Please tick the appropriate box

- Bachelor of Nursing ☐
- MBBS ☐

2. Your age:

- Less than 25 years ☐
- 26 – 30 years ☐
- 31 – 40 years ☐
- 41 – 50 years ☐
- Greater than 50 ☐

3. Gender

- Male ☐
- Female ☐

4. Other qualifications (i.e. RN, Bachelor of Science, Division 2 nursing etc) Please state:

....

....

....

SECTION B: Readiness for inter-professional learning scale (RIPLS)

	Please indicate the degree to which you agree or disagree with the statement by ticking the box that best expresses your feeling.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	Learning with other students will help me become a more effective member of a health care team	❑	❑	❑	❑	❑
2.	For small group learning to work, students need to trust and respect each other	❑	❑	❑	❑	❑
3.	Team-working skills are essential for all health care students to learn	❑	❑	❑	❑	❑
4.	Shared learning will help me to understand my own limitations	❑	❑	❑	❑	❑
5.	Patients ultimately benefit if health care professionals work together to solve patient problems	❑	❑	❑	❑	❑
6.	Shared learning with other health care professionals will increase my ability to understand clinical problems	❑	❑	❑	❑	❑
7.	Learning with health care students before qualification would improve relationships after qualification	❑	❑	❑	❑	❑
8.	Communication skills should be learned with other health care students	❑	❑	❑	❑	❑
9.	Shared learning will help me to think positively about other professionals	❑	❑	❑	❑	❑
10.	Shared learning with other health care students will help me to communicate better with patients and other professionals	❑	❑	❑	❑	❑
11.	I would welcome the opportunity to work on small-group projects with other health care students	❑	❑	❑	❑	❑
12.	Shared learning will help to clarify the nature of patient problems	❑	❑	❑	❑	❑
13.	Shared learning before qualification would help me become a better team worker	❑	❑	❑	❑	❑
14.	I don't want to waste my time learning with other health care students	❑	❑	❑	❑	❑
15.	It is not beneficial for health care students to learn together	❑	❑	❑	❑	❑
16.	Clinical problem-solving skills should only be learned with students from my own discipline	❑	❑	❑	❑	❑
17.	The function of nurses and therapists is mainly to provide support for doctors	❑	❑	❑	❑	❑
18.	There is little overlap between my role and that of other health care professionals	❑	❑	❑	❑	❑
19.	I would feel uncomfortable if another health care student knew more about a topic than I did	❑	❑	❑	❑	❑

	Please indicate the degree to which you agree or disagree with the statement by ticking the box that best expresses your feeling.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
20.	I would feel uncomfortable if another health care student knew more about a topic than I did	❑	❑	❑	❑	❑
21.	I have to acquire much more knowledge and skills than other health care students	❑	❑	❑	❑	❑
22.	I'm not sure what my professional role will be	❑	❑	❑	❑	❑
23.	I use my own judgment a lot in my professional role	❑	❑	❑	❑	❑
24.	Reaching a diagnosis is the main function of my role	❑	❑	❑	❑	❑
25.	My main responsibility as a professional is to treat my patient	❑	❑	❑	❑	❑
26.	I like to understand the patient's side of the problem	❑	❑	❑	❑	❑
27.	Establishing trust with my patients is important to me	❑	❑	❑	❑	❑
28.	I try to communicate compassion to my patients	❑	❑	❑	❑	❑
28.	Thinking about the patient as a person is important in getting treatment right	❑	❑	❑	❑	❑
29.	In my profession you need skills in interacting and cooperating with patients	❑	❑	❑	❑	❑

30. If asked by one of your colleagues who were not able to attend today, how would you define interprofessional learning?

……

……

……

……

31. Have you had any other experience of interprofessional learning? Is so please briefly describe what you have done.

……

……

……

……

32. On a scale of 1 to 10 with **1 being least important and 10 being most important**, how would you rate the importance of interprofessional learning as a driver to influence effective interprofessional clinical practices?

1	2	3	4	5	6	7	8	9	10
❑	❑	❑	❑	❑	❑	❑	❑	❑	❑

APPENDIX N

Delirium Knowledge Test

MONASH University
Medicine, Nursing and Health Sciences

Code: / ... / .../ ... / ....
00 / 00 / dd / mm / yyyy

Colour Code: **YELLOW / RED (please circle)**

Delirium Knowledge Test

Multiple choice questions

Please choose the option that is most appropriate for each statement.

1. Delirium in hospitals is:
   a essentially unavoidable
   b rare in orthopaedic patients
   c rare in general surgical patients
   d mostly found in geriatric service patients
   e to be found in all adult wards

2. Compared to hypoactive (quiet) delirium, hyperactive (agitated) delirium is:
   a more likely to be associated with death
   b more likely to be associated with personal injury
   c generally worse (more morbidity and mortality)
   d equally likely to be associated with death
   e more important to diagnose and treat

3. Delirium can best be described as:
   a a functional disorder that patients use to get secondary gain
   b primarily a mood disorder
   c a variant of schizophrenia
   d a variant of dementia
   e a transient disorder of brain function

4. What is the comparative mortality rate for patients with delirium compared to non-delirious patients?"
   a. Twice the rate
   b. Three times the rate
   c. Six times the rate
   d. Ten times the rate

5. On admission to hospital the proportion of patients aged ≥ 65 who have delirium is closest to:
   a 0.001%
   b 0.01%
   c 0.1%
   d 1%
   e 10%

6. During hospitalisation the proportion of patients aged ≥ 65 who have delirium at some stage is closest to:
   a 0.005%
   b 0.05%
   c 0.5%
   d 5%
   e 50%

7. Delirium is
   a almost never seen in young hospitalised adults
   b almost universal in intensive care unit patients
   c rarely present in patients who are not in the aged care wards
   d uncommon following hip surgery
   e seldom due to prescription medications

8. In hospitalised patients with delirium:
   a it is usual to find a specific neurological condition responsible for the delirium
   b it is usual to find a specific non-neurological cause
   c a specific cause cannot usually be established
   d decreased oxygen saturation is usually present and does not indicate a specific respiratory problem

9. The most common causes of delirium include all of the following EXCEPT:
   a. infection
   b. dehydration
   c. medications
   d. trauma to the head
   e. disturbance of a major organ system

10. Delirium:
    a. typically includes a broad range of neuropsychiatric symptoms
    b. has disturbances of attention as a central feature
    c. can be diagnosed by the presence of clouding of consciousness alone
    d. rarely involves mood disturbances
    e. is a subtype of acute confusion

11. In the detection of delirium:
    a. non-identification is rarely a problem in clinical practice
    b. up to two thirds of cases are superimposed on dementia
    c. detection can be enhanced by routine cognitive assessment of all patients
    d. prevalence has decreased in recent years
    e. misdiagnosis as dementia is rare

12. A cardinal sign of delirium includes:
    - a neck stiffness
    - b clouding of consciousness
    - c unequal pupils
    - d abnormal extra-ocular muscle movements +/- nystagmus
    - e primitive (frontal release) reflexes

13. A cardinal sign of delirium includes:
    - a a sudden onset
    - b a gradual onset
    - c a stuttering onset
    - d a difficult to determine onset
    - e a variable onset

14. A cardinal sign of delirium includes:
    - a trivial change in attention
    - b somewhat increased attention
    - c increased attention (hypervigilance)
    - d decreased attention

15. A cardinal sign of delirium includes:
    - a a step-wise course
    - b a steady down-hill course
    - c a fluctuating course
    - d a predictable course with steady deterioration over about two days followed by steady improvement over about two days in most patients
    - e a steady course without fluctuations that persists for as long as the cause of the delirium persists

16. In hospital, patients with delirium:
    - a are often embarrassed and hence hide their delirium
    - b often complain of depression
    - c are usually unaware they have delirium
    - d complain mostly of pain, including headache
    - e often describe vivid dreams

17. People with delirium:
    - a usually experience auditory hallucinations telling them to do something
    - b usually experience auditory hallucinations commenting on what they are doing
    - c usually experience psychedelic visual hallucinations
    - d rarely have prominent auditory or visual hallucinations
    - e often have altered or skewed vision that may be incorrectly described as hallucinations

18. People with delirium:
    a prefer to wake early in the morning, and cannot get back to sleep readily
    b often wake many times during the night
    c sleep intermittently for most of the 24 hour cycle
    d have markedly delayed sleep often falling asleep between 0100 and 0300
    e have normal sleep patterns

19. Delirium is best diagnosed by:
    a. clinical history and examination
    b. Computed Tomography scan
    c. Electroencephalography scan b
    d. Magnetic resonance imaging scan
    e. Positron Emission Tomography scan

20. Clinical diagnosis of delirium using the Confusion Assessment Method (CAM):
    a has high sensitivity (≥90%) and low specificity (≤10%)
    b has low sensitivity (≤10%) and high specificity (≥90%)
    c has low sensitivity (≤10%) and low specificity (≤10%)
    d has high sensitivity (≥90%) and high specificity (≥90%)

21. In delirium assessment:
    a. delirium rating scales allow distinction of delirium from dementia
    b. delirium cannot be accurately assessed in mute patients
    c. the Confusion Assessment Method has good coverage of delirium symptoms
    d. the Geriatric Depression Scale has good coverage of delirium symptoms
    e. the Mini Mental State Examination has good coverage of delirium symptoms

22. In routine hospital practice delirium is:
    a. easily diagnosed as it happens to readily identified high risk patients
    b. mainly diagnosed by geriatricians
    c. noticed most of the time when it is present
    d. not noticed most of the time when it is present
    e. so rare and transient that it is seldom diagnosed

23. Mrs Rosa Maurelos is an 85 year old lady who comes to see you, her local doctor, with her daughter. Her daughter tells you that Mrs Maurelos has become increasingly confused over the past few weeks, with occasional urinary incontinence. You consider that Mrs Maurelos is likely to be delirious. Which one of the following neuropsychological features would be supportive of delirium rather than dementia:
    a. Apraxia
    b. Impaired attention
    c. Sleep disruption
    d. Paranoia
    e. Anosognosia

24. Mrs Louisa Dimarzo is a 58 year old woman who presents with tiredness and loss of appetite. What is the most likely explanation for her presentation?
    a. Anxiety
    b. Depression
    c. Delirium
    d. A paranoid state
    e. Bipolar disorder

25. Friends bring a 15 year old male to the emergency department. He has visual hallucinations and has dilated pupils, his speech is slurred. The group has been in a high school party a few hours before. The most likely diagnosis is:
    a. head injury
    b. acute schizophrenia
    c. drug induced delirium
    d. meningitis
    e. migraine

26. In the management of patients with delirium:
    a. iatrogenic causes of delirium are common
    b. involvement of relatives is generally discouraged
    c. risk factor reduction allows episode prevention
    d. delirious patients should contribute to treatment decisions as much as possible
    e. the effectiveness of antipsychotic therapy is principally due to sedative actions

27. In delirium with marked agitation the best initial therapy would be:
    a encouraging usual noise in the ward to help orient the patient to the hospital experience
    b keeping the patient in the corridor to benefit from bright lights overnight
    c leaving the patient alone in a darkened room without external distractions
    d one-on-one nursing
    e placing the patient in a four-bed bay where other patients can talk to the patient

28. Patients with delirium are best managed in:
    a a bean bag on the floor
    b bed with the cot-sides up to prevent injurious falls
    c hospital chairs, restrained by the matching tray tables.
    d low-low beds lowered to the flood except when they are under direct supervision
    e normal hospital beds to encourage mobilisation

29. Patients with delirium:
    a are usually best left undisturbed with only minimal attention to daily routines to allow the delirium to settle
    b should be bathed, dressed and mobilised as much as possible
    c are seldom able to be bathed, dressed and mobilised because of the delirium
    d are usually best managed with physical restraint in bed to minimise the risk of falls
    e usually require physical restraint to prevent them from pulling out IV lines and urinary catheters.

30. Patients with delirium:
    - a are usually unable to benefit from mobilisation, hence physiotherapy is usually not required
    - b do not have much hunger, hence do not require feeding assistance until the delirium resolves
    - c do not require footwear until the delirium resolves and they can be safely mobilised
    - d require dressing, mobilisation and feeding despite the delirium
    - e require minimal nursing involvement, unless they become agitated

31. Patients with delirium:
    - a require urinary catheterisation to monitor output
    - b require urinary catheterisation to monitor output and physical restraint of the arms to prevent the catheter being pulled out
    - c usually drink so little that urinary output is not a problem
    - d require encouragement and physical help to drink adequately
    - e should have nil by mouth until recovered

32. Patients with delirium:
    - a require broad spectrum antibiotic cover until the cause of the delirium is clear
    - b require acid suppression with proton-pump inhibitors to prevent stress ulceration
    - d require nutritional support with multivitamins and mineral supplementation to restore brain function
    - e require sedation to decrease the stress response

33. Patients with delirium derive the most benefit from:
    - a cognitive behavioural therapy
    - b routine nursing care
    - c transcranial magnetic stimulation
    - d bright light therapy
    - e holistic therapy, including aromatherapy for the limbic system

34. In delirium with marked agitation the best initial therapy would be:
    - a haloperidol 0.5mg IM/IV
    - b midazolam 1mg IM/IV
    - c diazepam 10mg IM
    - d tramadol 150 mg IM
    - e phenobarbitone 100 mg IV

APPENDIX O

M-RIPLS Post-test (Open-ended questions)

MONASH University

Medicine, Nursing and Health Sciences

Code: / .../ .../ ... / ....

00 / 00 / dd / mm / yyyy

Colour Code: YELLOW / RED (please circle)

Readiness for Interprofessional Learning Survey
Post-test

	Please indicate the degree to which you agree or disagree with the statement by ticking the box that best expresses your feeling.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	Learning with other students will help me become a more effective member of a health care team	❑	❑	❑	❑	❑
2.	For small group learning to work, students need to trust and respect each other	❑	❑	❑	❑	❑
3.	Team-working skills are essential for all health care students to learn	❑	❑	❑	❑	❑
4.	Shared learning will help me to understand my own limitations	❑	❑	❑	❑	❑
5.	Patients ultimately benefit if health care professionals work together to solve patient problems	❑	❑	❑	❑	❑
6.	Shared learning with other health care professionals will increase my ability to understand clinical problems	❑	❑	❑	❑	❑
7.	Learning with health care students before qualification would improve relationships after qualification	❑	❑	❑	❑	❑
8.	Communication skills should be learned with other health care students	❑	❑	❑	❑	❑
9.	Shared learning will help me to think positively about other professionals	❑	❑	❑	❑	❑
10.	Shared learning with other health care students will help me to communicate better with patients and other professionals	❑	❑	❑	❑	❑
11.	I would welcome the opportunity to work on small-group projects with other health care students	❑	❑	❑	❑	❑
12.	Shared learning will help to clarify the nature of patient problems	❑	❑	❑	❑	❑
13.	Shared learning before qualification would help me become a better team worker	❑	❑	❑	❑	❑
14.	I don't want to waste my time learning with other health care students	❑	❑	❑	❑	❑
15.	It is not beneficial for health care students to learn together	❑	❑	❑	❑	❑

	Please indicate the degree to which you agree or disagree with the statement by ticking the box that best expresses your feeling.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
16.	The function of nurses and therapists is mainly to provide support for doctors	❑	❑	❑	❑	❑
17.	Clinical problem-solving skills should only be learned with students from my own discipline	❑	❑	❑	❑	❑
18.	There is little overlap between my role and that of other health care professionals	❑	❑	❑	❑	❑
19.	I would feel uncomfortable if another health care student knew more about a topic than I did	❑	❑	❑	❑	❑
20.	I have to acquire much more knowledge and skills than other health care students	❑	❑	❑	❑	❑
21.	I'm not sure what my professional role will be	❑	❑	❑	❑	❑
22.	I use my own judgment a lot in my professional role	❑	❑	❑	❑	❑
23.	Reaching a diagnosis is the main function of my role	❑	❑	❑	❑	❑
24.	My main responsibility as a professional is to treat my patient	❑	❑	❑	❑	❑
25.	I like to understand the patient's side of the problem	❑	❑	❑	❑	❑
26.	Establishing trust with my patients is important to me	❑	❑	❑	❑	❑
27.	I try to communicate compassion to my patients	❑	❑	❑	❑	❑
28.	Thinking about the patient as a person is important in getting treatment right	❑	❑	❑	❑	❑
29.	In my profession you need skills in interacting and cooperating with patients	❑	❑	❑	❑	❑
30.	The lecture on delirium by itself would be an effective way of teaching me about interprofessional practices	❑	❑	❑	❑	❑
31.	The case study on delirium by itself would be an effective way of teaching me about interprofessional practices	❑	❑	❑	❑	❑
32.	The simulation on delirium by itself would be an effective way of teaching me about interprofessional practices	❑	❑	❑	❑	❑
33.	The combination of lecture, case study and simulation would be the most effective way of teaching me about interprofessional practices	❑	❑	❑	❑	❑
34.	Today's learning experience has increased my confidence in the collaborative management of a patient with delirium	❑	❑	❑	❑	❑

35. I would define interprofessional learning as:

……

……

……

……

36. What have you valued the most about today and why?

……

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37. What have you valued least about today and why?

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38. How could this experience be improved for future students?

……

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……

……

……

……

On a scale of 1 to 10 with **1 being least important and 10 being most important**, how would you rate the importance of interprofessional learning as a driver to influence effective interprofessional clinical practices?

1	2	3	4	5	6	7	8	9	10
❑	❑	❑	❑	❑	❑	❑	❑	❑	❑

Thank you for being involved in today's learning experience and taking the time to fill in the surveys!

APPENDIX P

RIPLS Comparison Table

RIPLS – readiness for inter-professional learning

(Original and Modified Versions)

		V1	V2
1	Learning with other students will help me become a more effective member of a health care team	TWC1	TW
2	For small group learning to work, students need to trust and respect each other	TWC7	TW
3	Team-working skills are essential for all health care students to learn	TWC8	TW
4	Shared learning will help me to understand my own limitations	TWC9	TW
5	Patients would ultimately benefit if health care students worked together to solve patient problems	TWC2	C
6	Shared learning with other health care students will increase my ability to understand clinical problems	TWC3	C
7	Learning with health care students before qualification would improve relationships after qualification	TWC4	C
8	Communication skills should be learned with other health care students	TWC5	C
9	Shared learning will help me to think positively about other professionals	TWC6	C
10	Shared learning with other health care students will help me to communicate better with patients and other professionals	PI13	C
11	I would welcome the opportunity to work on small-group projects with other health care students	PI14	C
12	Shared learning will help to clarify the nature of patient problems	PI15	C
13	Shared learning before qualification will help me become a better team worker	PI16	C
14	I don't want to waste my time learning with other health care students	PI10	UoD
15	It is not beneficial for undergraduate health care students to learn together	PI11	UoD
16	Clinical problem-solving skills should only be learned with students from my own department	PI12	UoD
17	The function of nurses and therapists is mainly to provide support for doctors	RR17	UofD
18	**There is little overlap between my future role and that of other healthcare professionals**		**UofD**
19	**I would feel uncomfortable if another health care student knew more about a topic than I did**		**UofD**
20	I have to acquire much more knowledge and skills than other health care students	RR19	**UofD**
21	I'm not sure what my professional role will be	RR18	PR
22	**I will be able to use my own judgment a lot in my professional role (professional freedom)**		PR
23	**Reaching a diagnosis will be the main function of my role (clinical object)**		PC
24	**My main responsibility as a professional will be to treat my patient (clinical object)**		PC
25	**I like to understand the patient's side of the problem (patient situation)**		PC
26	**Establishing trust with my patients is important to me (patient situation)**		PC
27	**I try to communicate compassion to my patients (patient situation)**		PC
28	**Thinking about the patient as a person is important in getting treatment right (patient situation)**		PC
29	**In my profession you need skills in interacting and cooperating with patients (patient situation)**		PC

TWC	Team-work and collaboration	PI	Professional identity
RR	Roles and responsibilities	TW	Team-work
C	Collaboration		
UoD	Uniqueness of discipline	PC	Patient-centredness

APPENDIX Q

Explanatory Statement - Medicine

MONASH University

Medicine, Nursing and Health Sciences

March 2008

EXPLANATORY STATEMENT FOR MEDICAL STUDENTS

Learning about interprofessional clinical practice in a simulated ward environment

THIS INFORMATION SHEET IS FOR YOU TO KEEP

Dear student

My name is Debra Kiegaldie and I am conducting a research project with Professor Brian Jolly and Dr. Geoff White from the Centre for Medical & Health Sciences Education towards a PhD at Monash University. We have funding from the Faculty of Medicine, Nursing and Health Sciences to conduct this study and you are invited to participate in the research study related to your undergraduate course. Your contact details have been provided from academic staff of the Year 5 MBBS committee.

This research study will investigate an interprofessional teaching and learning activity for final year medical and nursing students using simulated older patients with delirium in a simulated ward environment. This project aims to develop, trial and evaluate an interprofessional learning (IPL) approach. This will be compared to a uniprofessional educational approach. An evaluation of your experiences in an authentic simulated scenario will be conducted.

As part of your studies in the Year 5 Aged Care Rotation, you will be given the opportunity to participate in a half day learning experience focused on the management of delirium. This learning experience will the focus of the research project and will be held at the Peninsula Campus School of Nursing Clinical Laboratories. The learning experience will involve a lecture, tutorial and simulation exercise.

We are seeking your permission to use the data collected on this day for the purposes of the research.

This includes the following:

- Completion of a **Delirium Knowledge Test** before and after the learning experience;
- Completion of a **Readiness for Interprofessional Learning Scale** Survey before and after the learning experience;
- Participation in the **instructional learning** (lecture and tutorial where you will be allocated to either an interprofessional or discipline specific group);
- Access to your data on the videotape of the interprofessional **simulation exercise;**
- Access to your data on the videotape of the group **debriefing interview**

We are also seeking your permission to participate in a follow up individual telephone interview.

During the simulation exercise, there is potential that you may experience some emotional stress; however the simulation exercise and debriefing interview will be conducted by very experienced simulation facilitators. Every effort will be made to ensure that you are made to feel safe and supported.

Your decision to participate in this study is completely voluntary. All information provided by you will be strictly confidential and all responses will remain anonymous. You can choose not to participate in part or all of the project and you can withdraw at any stage of the project without being penalised or disadvantaged in any way. No findings that could identify any individual respondent will be recorded and only aggregated results will be included in the report to the project group.

Storage of the data collected will adhere to the University regulations and will be kept on University premises in a locked cupboard/filing cabinet for 5 years. After this time, all data will be destroyed. A report of this study will be submitted to the Faculty of Medicine, Nursing and Health Sciences and for publication in a journal, but individual participants will not be identifiable in such a report.

If you would like to participate please complete and sign the attached consent form and hand it to the general staff member on the day of your learning experience. If you have any questions or would like to discuss this project or if you would like to be informed of the aggregate research findings please contact either

Professor Brian Jolly

[redacted]

Dr. Geoff White

[redacted]

Should you have any complaint concerning the manner in which this research [CF08/0127 - 2008000061] is being conducted, please do not hesitate to contact the Monash University Standing Committee on Ethics in Research Involving Humans at the following address:

> The Secretary
>
> The Standing Committee on Ethics in Research Involving Humans (SCERH)
>
> Building 3D
>
> Research and Ethics Branch
>
> Monash University, Victoria 3800
>
> [redacted]

Thank you

Debra Kiegaldie

APPENDIX R

Explanatory Statement - Nursing

MONASH University

Medicine, Nursing and Health Sciences

March 2008

EXPLANATORY STATEMENT FOR NURSING STUDENTS

Learning about interprofessional clinical practice in a simulated ward environment

THIS INFORMATION SHEET IS FOR YOU TO KEEP

Dear student

My name is Debra Kiegaldie and I am conducting a research project with Professor Brian Jolly and Dr. Geoff White from the Centre for Medical & Health Sciences Education towards a PhD at Monash University. We have funding from the Faculty of Medicine, Nursing and Health Sciences to conduct this study and you are invited to participate in the study which is related to your undergraduate course. Your contact details have been provided from academic staff of the School of Nursing Undergraduate Program.

This research study will investigate an interprofessional teaching and learning activity for final year medical and nursing students using simulated older patients with delirium in a simulated ward environment. This project aims to develop, trial and evaluate an interprofessional learning (IPL) approach. This will be compared to a uniprofessional educational approach. An evaluation of your experiences in an authentic simulated scenario will be conducted.

As part of your studies in NUR3104, you will be given the opportunity to participate in a learning experience focused on the management of delirium. This learning experience will be the focus of the research project and will be held at the Peninsula Campus School of Nursing Clinica Laboratories. The learning experience will involve a lecture, tutorial and simulation exercise.

We are seeking your permission to use the data collected on this day for the purposes of the research.

This includes the following:

- Completion of a **Delirium Knowledge Test** before and after the learning experience
- Completion of a **Readiness for Interprofessional Learning Scale** Survey before and after the learning experience
- Participation in the **instructional learning** (lecture and tutorial where you will be allocated to either an interprofessional or discipline specific group)
- Access to your data on the videotape of the interprofessional **simulation exercise**
- Access to your data on the videotape of the group **debriefing interview**

We are also seeking your permission to participate in a follow up individual telephone interview.

During the simulation exercise, there is potential that you may experience some emotional stress; however the simulation exercise and debriefing interview will be conducted by very experienced simulation facilitators. Every effort will be made to ensure that you are made to feel safe and supported.

Your decision to participate in this study is completely voluntary. All information provided by you will be strictly confidential and all responses will remain anonymous. You can choose not to participate in part or all of the project and you can withdraw at any stage of the project without being penalised or disadvantaged in any way. No findings that could identify any individual respondent will be recorded and only aggregated results will be included in the report to the project group.

Storage of the data collected will adhere to the University regulations and will be kept on University premises in a locked cupboard/filing cabinet for 5 years. After this time, all data will be destroyed. A report of this study will be submitted to the Faculty of Medicine, Nursing and Health Sciences and for publication in a journal, but individual participants will not be identifiable in such a report.

If you would like to participate please complete and sign the attached consent form and hand it to the general staff member on the day of your learning experience. If you have any questions or would like to discuss this project or if you would like to be informed of the aggregate research findings please contact either

Professor Brian Jolly

[redacted]

Dr. Geoff White

[redacted]

Should you have any complaint concerning the ma nner in which this research [CF08/0127 - 2008000061] is being conducted, please do not hesitate to contact the Monash University Standing Committee on Ethics in Research Involving Humans at the following address:

> The Secretary
>
> The Standing Committee on Ethics in Research Involving Humans (SCERH)
>
> Building 3D
>
> Research and Ethics Branch
>
> Monash University, Victoria 3800
>
> [redacted]

Thank you

Debra Kiegaldie

APPENDIX S

Consent Form

MONASH University

Medicine, Nursing and Health Sciences

STUDENT CONSENT FORM

Project Title:

Learning about interprofessional clinical practice in a simulated ward environment

NOTE: This consent form will remain with the Monash University researcher for their records

I agree to take part in the above Monash University research project. I have read the explanatory statement, which I keep for my records.

I understand that agreeing to take part means that I am willing to:

	YES	NO
	(please tick box)	
• Complete a **Delirium Knowledge Test** before and after the learning experience		
• Complete a **Readiness for Interprofessional Learning Survey** before and after the learning experience		
• Be randomly allocated to a discipline specific or interprofessional group for the **instructional learning** components (lecture and tutorial)		
• Allow my data on the videotape of the **simulation exercise** to be used for the purposes of the study		
• Allow my data on the videotape of the group **debriefing interview** to be used for the purposes of the study		
• Participate in a follow up **individual telephone interview**		

I understand that any information that I provide is confidential and that any data the researcher extracts for use in reports or published findings will not, under any circumstances, contain names or identifying characteristics.

I also understand that my participation is voluntary, that I can choose not to participate in part or all or the project, and that I can withdraw at any stage of the project without being penalised or disadvantaged in any way.

Name (Please print) **……………………………………………………………..**

Contact telephone number if consenting to a telephone interview **……………………………..**

Signature: **……………………………………………………..** Date: **…………………….**

APPENDIX T

Confidentiality Statement

MONASH University

Medicine, Nursing and Health Sciences

CONFIDENTIALITY STATEMENT

Project Title:

Learning about interprofessional clinical practice in a simulated ward environment

NOTE: This consent form will remain with the Monash University researcher for their records

I agree to maintain confidentiality concerning everything that I observe and hear during the simulation experience and group debriefing interview.

Name (Please print) ....

Position: ....

Signature: .... Date: ....