

Readiness for inter-professional education at health sciences: A study of educational technology perspectives

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ABSTRACT

Background: Interprofessional Education (IPE), is the engagement of two or more healthcare professions in an integrated learning environment to foster collaboration and improve healthcare services. In IPE, initiatives are taken where technology is a crucial part of the learning process. Current technology practices in IPE comprise eLearning modules on collaborative practice skills and many others. This study aims to determine the readiness for interprofessional education of the health sciences students. **Methods:** A questionnaire called Readiness for Interprofessional Learning Scale (RIPLS) was used to assess attitudes related to interprofessional collaboration & education. Descriptive and non-parametric statistics were used to analyze the results in aggregate, as well as by each faculty. **Results:** Medical students gave a higher rating in terms of the perceived benefits of working together to solve patient problems compared to other faculties. Also, they were more open to working in small-group projects with other healthcare students and value the importance of shared learning to clarify the nature of patients' problems. But compared to others, the Nursing students were unsure of what their professional role will be and wanted to acquire more knowledge and skills than other healthcare students. The total RIPLS score amongst all was in the high range. **Conclusion:** Thus, students were deemed ready for IPE. **Recommendations:** The University need to consider how to implement IPE within their curricula, define learning outcomes and/ or competencies, develop and utilize the 4 Dimensional curriculum development framework in line with the health professional accreditation standards in order to promote collaboration and competence amongst all students, whereby upon graduation, they as healthcare professionals, in turn will optimize health services, strengthen health system and improve health outcomes.

Keywords: four dimensional curriculum; inter-professional education; inter-professional learning; medical education,

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1. Introduction

Interprofessional Education (IPE), an essential pedagogical approach in healthcare education, is deemed crucial in equipping healthcare professionals to deliver safe and optimal patient care that is of high quality (Buring, 2009). According to the World Health Organization (WHO), IPE is an experience that “occurs when students from two or more professions learn about, from, and with each other”. This engagement of two or more healthcare professions in an integrated learning environment is a means to foster collaboration and improve health care services. (WHO, 2010).

1.1 Theoretical perspectives of educational technology

Educational technology is the effective use of technological tools in learning. Learning can occur in or out of the classroom. It can be self-paced, asynchronous learning or may be instructor-led, synchronous learning. There are many updated trends in Educational Technology

1. Collaborative Learning. In a classroom learning model, teachers encourage collaboration by assigning group activities and tasks. This collaborative learning approach helps students to interact with their peers and build their interpersonal skills. 2. Learning Outside the Classroom Environment. Mobile-based devices have taken learning outside of the classroom. With mLearning and eLearning,, students can learn at their own pace and time. 3. Social Media in Learning. The teachers have found a way to utilize this trend and turn it into a powerful tool for enhancing the learning process. 4. Interactivity in Classroom Bringing technology into the classroom has made classrooms lively and interactive. 5. Data Management & Analytics. Teachers can now have complete analytics of a student’s performance, such as the number of tests attempted, chapters completed etc. 6. Immersive Learning with AR and VR -with the introduction of augmented reality and virtual reality into the education system, learning has become much more immersive than traditional methods. 7. Gamification in Education This trend has been gaining popularity for the simple reason that it increases student engagement. 8. Online Data and Cybersecurity The need for data security is at an all-time high. While cloud storage has become the norm these days, it could prove disastrous at times.

1.2 Education technology link with IPE

In IPE there are many initiatives taken where technology is a crucial part of the learning process. A core concern of IPE however is forming professional identities in a way that is open to collaboration with others in the interest of providing care. (Barr, 2005)

Current technology practices in IPE comprise eLearning modules on collaborative practice skills., reusable learning objects centred towards concepts, and real life cases and a creative patient journeys (CIPE 2009, Jonsson et al 2006) as well as technology that connects people in virtual communities. However to be beneficial for practitioners and patients, introduction of technology in IPE needs to be driven more by everyday challenges in education and practice. These challenges consist of answering how technology can contribute in core areas of IPE: values, communications and social processes. To improve IPE there is need for reflections on how today and tomorrow’s technology can contribute.

1.3 Related research

During the past decade, a number of IPE systematic reviews have been conducted. (Cooper H et al, 2001; Hammick M et al 2007; Reeves S et al 2008).. There were six reviews included in the synthesis report on the effects of over 200 IPE studies spanning 30 years. The six reviews report on studies which differ in methodological quality and report a range of outcomes associated with IPE, yet all reviews share a similar definition of IPE (“ two or more professions learning with, from and about each other to improve collaboration and the quality of care”). Globally, for over three decades, the key roles of IPE in improving

health care systems and outcomes has emerged. (WHO 1976; WHO 2010). Also, over the past ten years IPE has particularly been at forefront of much research, policy and regularity activity on an international level. (Institute of Medicine, 2013) The need for IPE stems from five reasons: (1) the complexity and multifaceted nature of patients' health and social care needs which require effective coordination of services (Institute of Medicine, 2013). (2) research demonstrating that collaboration amongst multiple health care providers is essential for provision of effective and comprehensive care (Barr H et al, 2005).

(3) Studies in North America, showing how damaging the impact of communication failures can be for patients in undermining patient safety and causing serious injury and even death (Williams RG et al 2007; Brock D et al 2013). (4) Policy documents supporting the need for IPE to help improve collaborative competencies ((Interprofessional Education Collaborative Expert Panel, Washington (DC) 2011. & The Interprofessional Curriculum Renewal Consortium. Sydney, 2013). (5) Re-enforced World Health Organization's commitment to IPE highlighting the importance of IPE to develop skills needed to be ready for collaborative practice and safe patient care. (WHO 2010).

Many studies have been done to find out when is most effective time to implement IPE. Some studies showed that IPE, if delivered at first year of a pre qualification program will diminish effects of professional socialisation such as hostile stereotyping. (Barr H et al 2005). In contrast, others have suggested that post qualification IPE is more effective because participants have a firmer understanding of their own professional identity and role. Other studies by Rees D et al 2007 and Wilhelmsson M et al 2009 have shown important facts relating to Faculty Development and Organizational factors affecting IPE.

Globally many Studies on the Readiness for Interprofessional education has been found to be done. Of note are (1) the effectiveness of an interprofessional education program using team based learning for medical students: a randomized controlled trial. Hamada S et al (2019). They concluded that learning in multiprofessional groups increased medical students' readiness for interprofessional learning in an IPE Program using Team based Learning. (2) Readiness for interprofessional learning among health care professional students Talwalkar JS (2016). They concluded that important differences in baseline readiness emerged but noted that the findings are different from those studies done outside the United States

1.4 Gaps in research related to IPE

Future directions is towards meaningful research linking IPE interventions with sustained changes in practice and patient outcome. Other gaps are methodological limitations in proposed studies; effective planning and implementation in relation to developing collaborative competencies that can positively affect the delivery of patient care and health outcomes. Critical knowledge gaps still exist around how leadership, management and teamwork processes can better integrate expertise from different disciplines to make cross-disciplinary research more effective. Individual researchers, research team leaders, academic institutions and research funders, can improve cross-disciplinary research in global health Ding Y, Pulford J, Bates I (2020).

Going in tandem with changing times and Educational Technology few points need to be highlighted. The challenges faced by the health care system, in particular are, an aging population, complex health issues, higher life expectancy, and chronic illnesses, as well as the quality of education of health professionals. According to The Lancet Commission, as reported by Frenk, et al. (2010), the education obtained by graduates of various health professions are generally inadequate to meet the health challenges worldwide, in the twenty-first century. This is largely due to the static and outdated curricula, which is also said to be fragmented. Lennon-Dearing, et al. (2009) further added that their education centered on their respective disciplines alone. Additionally, these healthcare professionals, including nurses and physicians, need communication skills and a team-oriented mindset to provide

patients with quality health care, whether in a pharmacy, hospital, or clinic. This is why many, are one, in saying that interprofessional (IP) teamwork is a must during undergraduate studies, as this will pave the way for a workforce that is practice-ready and collaborative, thereby improving the outcomes and services related to healthcare (WHO 2010; Bridges et al. 2011; Hammick et al. 2007). This is also, because IPE will promote the interaction of students from different disciplines and backgrounds at certain points throughout their education, allowing them to learn from, with, and about each other.

Since most educational institutions still offer traditional education in silos, where-in curricula are offered separately and are not integrated, there are limitations, in terms of clinical and didactic teaching. As a result, each profession learns exclusively, independent of other professions. There is evidence that supports the notion that improving medical knowledge, skills, and social requirements such as teamwork and collaboration promotes effective care for the patients (Marzo, RR. 2018). Medical and pharmacy students, in particular, are clueless in terms of the roles of their colleagues because their education is limited to the current “silo” model. Not only that, but the students upon graduation, are also generally unprepared to enter the workplace, specifically in terms of interacting with other health care members.

Notwithstanding its growing popularity, IPE is not a recent phenomenon. In 1969, a paper entitled "Interprofessional Education in the Health Sciences" reported: It appears that health professionals employ their talents inappropriately, and, as a consequence, scarce human resources are wasted. Evidence also indicates fragmentation and compartmentalization and poor communication between those who provide different components of the health services. Accordingly, a committee on IPE in the health sciences has been established to promote interprofessional education and to experiment with educational programs to arrive at recommendations concerning what the students should learn together and how they should learn it [Gilbert GH, 2010].

In the mid-1990s the Center for advancement of Interprofessional Education (CAIPE) formally defined IPE as “occasions when two or more professions learn with, from and about each other to improve collaboration and the quality of care” (Barr H 2005.) The World health organization's 2010 Report: Framework for Action on Interprofessional Education and Collaborative Practice, further elevated IPE to the global health and education agenda when it recognized IPE as a necessary component to every health professional's education.

There is a pressing need to redesign health professions education and integrate an interprofessional and systems approach into training. At the core of interprofessional education (IPE) are creating training synergies across healthcare professions and equipping learners with the collaborative skills required for today's complex healthcare environment.

One IPE program using a Team Based Learning (TBL) , format conducted among second-year medical students found improved readiness for interprofessional learning among medical students assigned to multiprofessional groups compared to those assigned to unprofessional groups. IPE using TBL may be helpful for improving readiness for future Interprofessional Workers (IPW) (Hamada, 2019)

1.5 Purpose of the study

The aim of this study is to determine the readiness for interprofessional education of the professional health science students.

2. Methodology

This study, which is descriptive in nature, was designed to determine student perception about the application of IPE, particularly in terms of readiness, at the Asia Metropolitan University's three faculties of health sciences, namely the Faculty of Health Care Management, Faculty of Medicine, and Faculty of

Nursing. Ethical and Research approval for this research was obtained prior to data collection. Convenience sampling was used to select the sample population of this study, which consisted of 158 respondents. This number meets the minimum number of respondents for a descriptive study, which must be between 10 to 20% of the total population. Structured questionnaires (RIPLS) were used for data collection, which was conducted from June to December 2019.

Those students who agreed to participate in the study were given the informed consent sheet for their signatures and the questionnaire, for them to fill in, all of which took 15 to 20 minutes on average. For accuracy, the researchers were in close proximity to the respondents while they were answering, allowing them to clarify and to answer any questions the respondents may have about the questionnaire at any time. Quantitative assessment, particularly involving descriptive statistical distribution, was the primary means of analyzing data to determine student perceptions. In terms of the RIPLS items, the Fischer Exact test was used, while ANOVA test was in comparing three or more group means among faculties.

2.1 Study instrument

The questionnaire used for the study consisted of two parts. The first part, consisted of the Demographic data, including sex, age, religion, ethnicity, and the faculty to which the respondent belongs to. The second part, used the RIPLS, or the Readiness for Interprofessional Learning Scale (McFadyen, 2005), which had 4 subscales, with a total of 19 items. These subscales are: 1) Teamwork and Collaboration (items 1 to 9 with a total possible score of 45), 2) Negative Professional Identity (items 10 to 12 with a total possible score of 15), 3) Positive Professional Identity (items 13 to 16 with a total possible score of 20), and 4) Role and Responsibilities (items 17 to 19 with a total possible score of 15).

Similar to the 5-point Likert scale, the RIPLS also consisted of 5 responses indicating the respondent's level of agreement or disagreement, with a stronger agreement to the items indicated by a higher score. In particular, high scores obtained on the subscales involving Teamwork and Collaboration and Positive Professional Identity are indicative of the respondent's agreement in terms of the importance of collaborating with other professionals involved in health care and finding value when it comes to sharing experiences with them respectively, a high score on the Negative Professional Identity subscale indicates disagreement to learning in collaboration with other professionals, and a high score on the Roles and Responsibilities subscales is indicative that the respondent does not have a clear perception of their role, as well as the roles of other professionals. The content validity index was 0.916 with a Cronbach's alpha of 0.86.

2.2 Data analysis

Statistical analysis was conducted using IBM SPSS Version 22. Based on the valid RIPLS, we consequently performed a Fisher exact test, non-parametric test to measure of association based from factorial formula. This is an alternative test in cases where chi-square test are invalid due to low expected frequencies. One way analysis of variance was also used to compare three or more group means.

3. Results

A total of 158 respondents were recruited for this study. The majority of respondents were female (80.4%), Indian (38.6%), Hindu (37.3%) and the Nursing students are (46.2%), as seen in Table 1.

Table 1: Sociodemographic Characteristics of the Respondents

Characteristics	Frequency n =158	Percentage (%)
Age		
Mean = 19.44 years		
Gender		
• Male	31	19.6
• Female	127	80.4
Ethnicity		
• Malay	51	32.3
• Chinese	16	10.1
• Indian	61	38.6
• Others	30	19.0
Religion		
• Islam	58	36.7
• Hindu	59	37.3
• Buddhist	21	13.3
• Christian	17	10.8
• Others	3	1.9
Faculty		
• Nursing	73	46.2
• Medicine	57	36.1
• Healthcare Management	28	17.7

Table 2 summarises the response to the RIPLS items of the questionnaire from the respondents. Medical students gave a higher rating to the benefits of working together in order to solve patient problems compared to the other faculties. They were also more open to working small-group projects with other healthcare students and believed in the importance of shared learning to clarify the nature of patients' problems as compared to the other two faculties.

On the other hand, the Nursing students believed that sharing learning will enable them to discover / understand their limitations. But surprisingly, they expressed that they were not sure what their professional role will be and that they wanted to acquire much more knowledge and skills as compared to the other respondents.

Table 2: Response to RIPLS Items by All Respondents (Fischer Exact Test)

No	Statement	Strongly Disagree	Disagree	Faculty (n=158)			p-value
				Neutral	Agree	Strongly Agree	
1	Learning with other students will help me become a more effective member of a health care team	2	0	17	89	50	0.155
2	Patients would ultimately benefit if health care students worked together to solve patient problems	0	0	18	86	54	*0.050
3	Shared learning with other health care students will increase my ability to understand clinical problems	0	0	14	74	70	0.212

4	Learning with health care students before qualification would improve relationships after qualification	0	2	35	72	49	0.126
5	Communications skills should be learned with other health care students	1	1	25	75	56	0.660
6	Shared learning will help me to think positively about other health care professionals	0	1	16	78	63	0.197
7	For small-group learning to work, students need to trust and respect each other	0	1	5	51	101	0.181
8	Team-working skills are essential for all health care students to learn	1	1	10	65	81	0.159
9	Shared learning will help me to understand my own limitations	3	1	14	91	49	*0.018
10	I don't want to waste my time learning with other health care students	0	3	17	72	66	0.085
11	It is not necessary for undergraduate health care students to learn together	4	7	39	60	48	0.718
12	Clinical problem-solving skills can only be learnt with students from my own department/ school / organisation	29	47	50	26	6	0.107
13	Shared learning with other health care students will help me to communicate better with patients and other professionals	0	3	19	74	62	0.399
14	I would welcome the opportunity to work on small-group projects with other health care students	0	4	29	75	50	*0.029
15	Shared learning will help me to clarify the nature of patients' problems	0	0	26	81	51	*0.028
16	Shared learning before qualification will help me become a better team worker	1	1	24	82	50	0.108
17	The function of nurses and therapists is mainly to provide support for doctors	2	17	43	62	34	0.163
18	I am not sure what my professional role will be	59	40	31	23	5	*0.002
19	I have to acquire much more knowledge and skills than other health care students	8	14	59	45	32	*0.017

**p*-value of <0.05

Table 3 analyzed the differences among the respondents , in terms of readiness to IPE using the total RIPLS score, as well as each of the subscale scores. The test analysis demonstrated no statistically significant

differences in mean scores,(in terms of the total RIPLS scores or any of the subscales),amongst them. This illustrate,thatthe students are equally ready for interprofessionaleducation. The total RIPLS scores amongst the students range from 83.34 to 84.56. Thus, it can be said that the majority of the students were ready for IPE.

Table 3: RIPLS p-value Scores in Each of the ThreeFaculties(ANOVA test)

RIPLS ITEM/subscale	<i>p-valuescores</i>	Nursing	Medicine	Healthcare Management
		Mean(SD)	Mean(SD)	Mean(SD)
Subscale 1: Teamwork and collaboration	0.459	4.73 (0.36)	4.81(0.29)	4.76 (0. 33)
Subscale 2: Negative Professional Identity	0.259	4.19 (0.28)	4.22 (0.34)	4.17 (0.35)
Subscale 3: Positive Professional Identity	0.200	4.26 (0.45)	4.31(0.37)	4.25(0.40)
Subscale 4: Roles and Responsibilities	0.263	3.72(0.30)	3.79 (0.33)	3.70 (0.28)
Total RIPLS Score		83.34	84.56	83.45

3.1 Discussion

The results show readiness for interprofessional learning within allfaculties..To be efficient and effective, there has to be a cross-disciplinary approach to the health care system, particularly in terms of collaboration and communication.The determination of the readiness for interprofessional education has opened the gates for the implementation of IPE to be realized.In present study, it was opportunistic because there was no presence of conflict of Multi Site context. This makes it feasible for the design, development and utilization of the 4 Dimensional Curriculum which highlights onthe following:First Dimension,asks“whatisthiscurriculumfor?”“Whatistheprofessionallandscapehatitaimstopreparestudent sfor,nowandinthefuture?” .SecondDimensioninvitesconsiderationofthespecificknowledge, skills, and capabilities that define competency in a particular area. Third Dimension ,looksat how thecurriculumistobedeliveredintermsoftheteaching,learning,andassessmentpracticesFourth Dimension, addressesoften overlooked aspects of what shapes curricula at the local level, forexample, culturalnormsandpractices, institutional protocols, procedures, and, inevitably, the politics of local institutions (Buring S.M, Bhushan A,2009)

4. CONCLUSION

The results show that the students from the three faculties, are ready for IPE.For many institutions, IPE is still in its nascent stages. Expanding opportunities for bridging IPE between academic settings and

practice environments can be supported through partnerships that embrace interactive methods of teaching that interfaces IPE principles and practices into existing policy, plans, and evaluation of outcomes in the clinical setting

Thus it is critical to actively nurture administrative interest in IPE at our University. Interprofessional Education requires creative scheduling coordination, but most importantly, requires buy-in from Faculty. IPE can be developed most successfully by a program whose leadership embrace and embodies the change that is desired.

4.1 Recommendations

The university need to consider how to implement IPE within their curricula in line with health professional accreditation standards. It is recommended that the learning outcomes, competencies and all the other components, according to the 4-dimensional curriculum development framework be developed and implemented.

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