

ORIGINAL RESEARCH

Transforming nursing education: Development and evaluation of interprofessional clinical skills training for students on clinical placement

Kerry Hood¹, Michelle Leech², Robyn Cant¹, Alana Gilbee², Julie Baulch²

1. School of Nursing and Midwifery, Monash University, Clayton, Vic, Australia. 2. Southern Clinical School, Monash Health, Clayton, Vic, Australia.

Correspondence: Kerry Hood. Address: School of Nursing and Midwifery, Monash University, Wellington Rd., Clayton, Vic, 3168 Australia. Email: Kerry.Hood@monash.edu

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Abstract

Interprofessional education is viewed as necessary for students in disciplines such as medicine, nursing and allied health in preparation for the real world of collaborative practice. We describe the development, implementation and evaluation of a suite of interprofessional education sessions that were delivered to students in six pre-registration healthcare courses. While on clinical placement, students attended face to face interprofessional clinical education sessions. Interprofessional workshops, seminars, simulation education sessions and tutorials were conducted by clinical educators in addition to other on-site experiential learning. Student surveys (n = 746) and several interviews provided feedback. Students were enthusiastic about learning with other disciplines and gave positive feedback about interactive learning (98% were satisfied). They described knowledge improvement, better understanding of the roles and practices of others, as well as effective teaching strategies. Difficulties occurred in pairing students from more than one discipline to situate them together, because of unequal numbers and scheduling of placement dates. The current model, however, where IPL is delivered to students of multiple disciplines on the clinical placement sites is feasible, practical and desirable. Further work is needed to embed this teaching and learning model in curricula and to develop objective performance assessment.

Key words

Interprofessional learning, Nursing students, Students; medical, Interdisciplinary teaching

1 Introduction

Interprofessional education is viewed as necessary for students in disciplines such as medicine, nursing and allied health in preparation for the real world of collaborative care and working in teams^[1]. Despite consensus that healthcare students need to develop skills in interprofessional working^[2], relatively few pre-registration courses have managed to introduce interprofessional education either in Australia^[3] or internationally^[4,5].

The reasons for this are numerous, including such barriers as administrative and resource differences between various education departments, and logistical difficulties in scheduling students with different timetables to be in the same place at the same time^[6]. Furthermore, a strong culture of uni-professional education has existed until now. For example, in nursing, education has been conducted within an individual 'professional silo' with little reference to other disciplines^[7].

Hence, the introduction of interprofessional education may also require changes in professional cultures ^[8]. Some universities have responded by introducing a common first year curriculum that is shared among healthcare disciplines ^[9], however this approach is rare. Others have introduced an interprofessional academic unit where students share learning during their first year ^[10, 11]. Students' preferences for learning also need to be noted. Some students are not willing to engage in interprofessional learning, preferring to learn within their own discipline ^[12]. All of these issues present challenges to faculty who endeavour to develop an interprofessional curriculum that is meaningful and provides authentic preparation for health care delivery.

Interprofessional learning (IPL) occurs when there is active learning 'with' and 'from' other disciplines: i.e., when two or more students learn *with, from and about each other* in shared exchanges of information ^[13]. This requires interaction between students and is a different approach to that of traditional education, when students from several disciplines may be situated in the same didactic lecture but do not interact with each other. The potential difficulties in scheduling and/or teaching any topic that may be common to more than one discipline have posed barriers to selecting subject matter that is relevant to the available disciplines. Thus, developing models of IPE centred on clinical practices suitable for implementation within the curricula of various disciplines is a challenge. In both medicine and in nursing training in Australia, interprofessional education is prescribed in national standards ^[14, 15] with faculty reporting increasing uptake ^[3].

Studies of IPL range from academic settings or combined academic and inpatient or ambulatory settings, to those in simulation centres or in the community ^[16-20]. Outcomes include a broad range of objective and subjective measures including proxy measures of learning such as self-reports and perceived benefits. Although many studies report positive outcomes few provide objective measures.

In the following report we describe the challenges of conducting face to face interprofessional education for students from multiple disciplines while they are on clinical placement. The project objective was to identify under-utilized clinical learning opportunities for healthcare students on placement with a view to utilizing the environment for interprofessional learning. We aim to describe the development, implementation and evaluation of a suite of interprofessional education sessions that were delivered to students in six pre-registration healthcare courses in one university in Melbourne, Australia ^[21]. The participating students were situated in one healthcare service on clinical placement and hence they were available during this time to attend face to face interprofessional education sessions. These included interprofessional workshops, seminars, simulation education sessions and tutorials conducted by clinical educators as an adjunct to other on-site experiential learning.

2 Methods

This study was an exploratory evaluation of an educational program using both quantitative (survey) and qualitative (focus group and interview) data collection techniques to evaluate the impact on students. The overall project was subjected to a wide-ranging evaluation including feedback from staff, patients and the health service.

2.1 Sample and recruitment

Over three university semesters in 2011-2012 all healthcare students commencing a clinical placement period at a large metropolitan health service (including three acute care hospitals and related services) were invited to participate in a program of IPL 'events'. Student numbers were estimated at over 750 students in nine pre-registration health care degree courses: medicine, nursing, midwifery, paramedicine, nutrition/dietetics, physiotherapy, pharmacy, speech pathology and occupational therapy. Placement duration varied between disciplines, from one week in pharmacy to two weeks in nursing and in nutrition-dietetics, to six weeks in medicine. Most were senior students; years 3-5 in medicine, year 3 in nursing and in midwifery, final year (4th year) in physiotherapy, speech pathology and pharmacy. All students received IPL study information during orientation to the health service. Recruitment was conducted via a group e-mailed invitation to students inviting them to participate in IPL, with a description of the schedule. Students were invited to register on a Web-page to attend any session they might choose as relevant to them. Session schedule updates were sent to students on a regular basis.

2.2 Planning, leadership

The planned program of shared clinical education involved disparate education cultures and various curricula within eight schools in the university. Planning was facilitated by the formation of a strategic advisory group comprising a senior representative from each discipline, with the leadership of a senior academic clinical teacher in medicine and a project manager from nursing. This collaboration ensured further engagement of key groups and clinical supervisors from the disciplines over more than six months of pre-project planning and also continuation throughout the project period of 18 months.

2.3 Educational program development

The project commenced with a scoping procedure to map student placement schedules by discipline group and location. This was necessary to identify time periods when two or more discipline groups would be present at the various sites, thus presenting an opportunity for interprofessional learning activities. No universal placement database was available across disciplines.

Teaching topics were selected by consensus. In consultation with academic and clinical teaching staff, the project team reviewed the various curricula and students' learning objectives with a view to identifying areas of overlap and commonality. Students were invited to contribute their suggestions for content areas and the disciplines they desired to learn more about, or from. Ten clinical topics (listed in Table 1) were selected from a larger list by the multidisciplinary project team as being related to the knowledge and skills levels and to the curriculum of at least two of the disciplines. A project advisory group endorsed decisions around student inclusion criteria, topics, key activities, curriculum alignment and clinical sites.

Table 1. Clinical skills topic, participation and student satisfaction with interprofessional sessional teaching (n = 736)

Topic	Survey participants	Survey response (n/% of all attenders)	Student satisfaction (agree/strongly agree)†
Post- Antibiotics Tutorial and Quiz	Medicine 43 Pharmacy 22	100%	96.9%
Basic Life Support	Medicine 55 Nursing 38	100%	99.0%
Dysphagia Screening Education	Medicine 46 Nursing 18 Nutrition 3	100%-	96.7%
Lower Back Pain Tutorial/education	Medicine 90 Physiotherapy 17	100%	95.3%
Paediatric Resuscitation	Medicine 88 Nursing 18	99%	96.4%
Plastering and Splinting	Medicine 10 Physiotherapy 2	70%	100.0%
Urinary Catheterization	Medicine 21 Nursing 6	100%	96.5%
Venipuncture session	Medicine 18 Nursing 13	100%	100.0%
Vascular Assessment	Medicine 10 Nursing 13	100%	100.0%
Well Women's Education (Obs/gyn)	Medicine 171 Midwifery 31	89%	97.6%
Total		736	Mean 97.7%

Notes. †Percent agreement with the statement: Overall, I was satisfied with the quality of this activity (based on a scale of 1: strongly disagree to 5: strongly agree).

2.3.1 Facilitator training

Twenty-two clinicians who were experienced in their professional field and who normally taught, supervised or mentored students participated in interprofessional teaching. The education sessions were conducted by any of the following: clinical nurse or midwifery educator, clinical nurse consultant, midwifery academic, physician, obstetrician, physiotherapist, speech pathologist, pharmacist- or a combination of these- as appropriate. Nearly all the teacher-facilitators of IPE had attended a one day training workshop which aimed to prepare them to teach interprofessional groups, and all had received a purposely developed manual about how to conduct IPE.

2.3.2 Description of education strategies

The clinical skills topics taught are given in Table 1. The majority of these were presented by clinicians with expertise in their field who facilitated teaching of student groups comprising at least two disciplines. Further details of the program content with session examples, flow charts, data collection tools and summary outcomes were given in a final report^[21].

2.3.3 Feedback techniques

Formative feedback was given to students in the sessions and as this was a pilot program, the topics did not form part of their examined academic curriculum.

Teachers were provided with a session evaluation form for students to record their satisfaction and remarks about the quality of the learning experience. This paper-based survey included 13 question items that were rated on a 5-point scale. This asked about, for example, overall satisfaction, whether the teaching strategies used were effective, and about any benefits to learning from learning with students from other disciplines.

A semi-structured question schedule was used to facilitate focus group and face to face interviews with students at semester end. Discussions were audio-recorded for further analysis.

2.4 Ethical conduct

Institutional and university ethics committee approval was received for the study. Student consent was assumed by the return of a survey questionnaire, and written consent was provided by each student who attended a focus group discussion or interview.

2.5 Data analysis

As teaching sessions were completed, students' survey responses were collected and were entered into a Web-based survey database (SurveyMonkey.com), then downloaded in cross-tabulated pdf format. Summary data (means, percentages) were extracted by sample and by discipline.

Focus group and interview narratives were transcribed word for word by a independent transcription company. One author (RC) used open coding and analysis techniques according to Cresswell^[22] to identify themes and sub-themes in the narratives. These were clustered into a matrix of themes with summary quotations.

3 Results

All students in nine healthcare disciplines were invited to attend interprofessional learning events related to their curriculum, conducted within the health services' sites. At close of program after three university semesters, over 2600 hours of education had been delivered to 1316 learners (note: an individual could be counted more than once). The participation rate was estimated to be 50% of all available hours of optional clinical training. Post-session evaluation surveys were received from 736 students: an estimated 55% of all participants (medicine 552; nursing 107; midwifery 31; pharmacy 22; physiotherapy 19; nutrition-dietetics 3). Seven students: five medical students and two nursing students participated in a focus group or interview to provide feedback about their learning experiences. This number was much lower than anticipated.

The ten clinical skills topics delivered were: antibiotics road-show, basic life support; dysphagia screening and assessment; gynecological/obstetric skills workshop; lower back pain assessment and management; paediatric resuscitation; plastering/splinting skills; urinary catheterization; vascular assessment and venipuncture.

3.1 Conduct of interprofessional education sessions

Each teaching session ran for between two and four hours. Each aimed to include equal numbers of participants from at least two disciplines. Clinical education rooms were used, with or without medical equipment, simulation mannequins and video-recording equipment. The number of students in each teaching session ranged from 6 to 45. This latter large group were in a half-day skills workshop conducted with parallel groups using six rooms with 6-8 students in each working group. Clinical sessions were repeatedly offered over the weeks of the university semester to allow various students to attend during their dates of placement.

Student pairing or mix

The project aim was to conduct interprofessional education and most sessions were conducted with a mix of medical and nursing students owing to both the larger numbers from these degree courses and the relevance of chosen clinical topics. However, the pairing of students by discipline was often not possible. Student attendance was heavily weighted towards medical students with a ratio of three medical students to one in every other discipline (see Table 1). Owing to placement schedules there were also times when a low number of students in one discipline limited the interprofessional nature of teaching altogether. For example, as nursing students were scheduled for block 2-week placement periods, there were a set number of weeks when each (or any) could participate. The pattern of placement was longer for medical students who were on site for much of the year, rotating through departments. Some allied health placements were limited to 3 or 4 days of each week. Similar to nursing, allied health students participated when available and when the topics were relevant to them (eg., back pain assessment was attended by medical and physiotherapy students; dysphagia assessment by medicine, nursing and nutrition/dietetics).

Further, the number of placement positions permitted within the healthcare organisation by discipline limited the matching of student numbers. For example, although each of the three placement hospitals provided midwifery services, there were far fewer midwifery students on placement at any one time than were medical students. This was instanced by a mix of 31 midwifery students and 171 medical students who participated during a series of obstetric and gynecological workshops that used simulated obstetric patient care stations. Nevertheless, both midwifery students and medical students were highly satisfied with these learning experiences.

These time and place constraints effectively limited the number of weeks annually during which on-site clinical education could be optimally interprofessional. This reality reflected already reported difficulties in scheduling students in various disciplines for face to face learning opportunities.

3.2 Student feedback: satisfaction

Students reported high overall satisfaction with the IPL program, with 97.7% (n = 736; range 95%-100%) agreeing or agreeing strongly that they were satisfied. There was no significant difference between disciplines as all groups had rated the experience highly. Although there was no indication of how many sessions each student had attended, we estimated perhaps two sessions each. If there were any negative comments they related to the fact that not all sessions were interprofessional or that information did not match knowledge advancement. For example, a nursing student who attended Basic Life Support reported that there were no other disciplines present; a medical student thought Back Pain Assessment was too basic. Most comments were very positive and some examples are given in Table 2.

Degree of interprofessionality in teaching

Participating students were asked whether teachers used effective teaching strategies. There was an average 98% agreement/strong agreement that this was so, ranging from 86% to 100%.

Table 2. Agreement with two session evaluation statements by discipline, and open-ended comments†

Topic/number of survey respondents	Discipline	The teacher used effective teaching strategies	I benefited from learning with students from other health professions	Participants' comments
Post- Antibiotics Tutorial and Quiz (n = 65)	Medicine	97.6%	47.6%	Med: Didn't really make a difference either way due to the lecture-like style of the tutorial Med: Very well done! Please have it again! Pharm: Really loved it! ... hope there will be similar activities in the future...
	Pharmacy	100.0	86.4	
Basic Life Support (n = 93)	Medicine	100.0	87.6	Med: haven't practiced with any other disciplines before, more like a real situation that way. Med: It satisfied all my expectations. Nursing: No other health professionals present Nursing: more confident and understanding the roles.
	Nursing	100.0	91.1	
Dysphagia Screening Education (n = 67)	Medicine	97.8	61.4	Med: partnered with a stroke nurse this was helpful to learn different phrases to use with patients. Med: Was fab! Nice and brief and to the point. Nutrition: It was easy to understand, but not too basic.
	Nursing	100.0	81.8	
	Nutrition	100.0	66.6	
Lower Back Pain Tutorial/education (n = 108)	Medicine	97.5	54.6	Med: synthesized and integrated basic concepts into a coherent mental picture of back pain patients. Med: at times too basic Physio: We didn't really interact, so there was no opportunity
	Physio	93.7%	48.7	
Paediatric Resuscitation (n = 107)	Medicine	98.9	84.3	Med: Very well organised session, good learning environment. Med: Good to understand roles of different people. Nursing: very beneficial course - thank you.
	Nursing	94.5	94.5	
Plastering and Splinting (n = 21)	Medicine	100.0	90.0	Med: Very good, interactive session. Med: Awesome for next year as an intern.
	Physio	100.0	100.0	
Urinary catheterization (n = 27)	Medicine	85.7	85.7	Med: Very helpful to have the nurses input and aid, as it more accurately simulated a clinical setting.
	Nursing	100.0	100.0	
Venipuncture session (n = 31)	Medicine	100.0	88.9	Med: very interactive and engaging. Nursing: smaller class size was great as it meant each group had a teacher.
	Nursing	100.0	100.0	
Vascular assessment (n = 23)	Medicine	100.0	100.0	Med: Really, really enjoyed working with nursing students. Nursing: learnt a lot, thank you!
	Nursing	100.0	100.0	
Well women's education (n = 203)	Medicine	97.7	72.2	Med: improved my confidence to perform the procedures. Med: well organised, really beneficial to my learning. Midwifery: Great opportunity to learn in a friendly and professional environment.
	Midwifery	100.0	90.0	
Total		Mean % 98.2%	Mean % 80.5%	

When students were asked whether they benefited from learning with students from other health professions, there was strong agreement of average 81% (range: 48%-100%). Although students' open-ended comments were mostly positive (see Table 2), it was also apparent that ratings were affected by some uni-professional sessions (such as a BLS, according to nurses) and the lack of interactive presentation style in some sessions. As stated by a physiotherapy student "We didn't

really interact” in the lower back pain session, and a medical student reported a session as “lecture-like”. The vascular assessment where students worked in interdisciplinary teams of nursing-medical students was rated highly with 100% agreement that students learned from other disciplines. Similarly, venipuncture and urinary catheterization where students worked interprofessionally were rated as highly beneficial. Thus, the degree of *interprofessionalism* was related to the teaching strategy and how the topic was viewed by students. The comments given by students and the survey ratings suggested that students hoped for more opportunities for interprofessional learning.

Some topics such as BLS were intentionally presented by an interprofessional medical-nursing teaching team and students were asked whether teaching by an interdisciplinary teaching team was beneficial to their learning. Responses were available for paediatric resuscitation, venipuncture, urinary catheterization and some of the BLS sessions. There was strong agreement from medical and nursing student participants (n = 206) with a mean positive response of 89% agreeing or agree strongly. There was no significant difference identified between medical and nursing groups. Other sessions such as Well Womens’ were also conducted by interprofessional teaching teams (medicine/midwifery) although student responses were not monitored.

3.3 Exploring students’ views: Focus group themes

Two focus groups were held with five medical students and two interviews were conducted with two nursing students to explore their views about IPL experiences. As participation in this feedback process was much less than anticipated, we present a very brief summary.

A key comment from students was that much of their sessional experience was uni-professional owing to a lack of students from other disciplines. The IPL experiences were perceived, however, as a positive learning environment with ability for students to learn from professional teachers and through an exchange of skills and knowledge between students.

“...it was a really positive experience. Both the groups were lots of fun and I did actually learn a lot from both of them.” (Nursing student 1)

Students thought that their skill bases were often complimentary (for example, in nursing and in medicine) and so they had learned about others’ roles and also about their perspectives. Students had gained in respect for others. A medical student reported:

“I think it’s really important, the fact that in the future we’ll be working with these people and it’s going to be a very group, team- orientated work place. So we need to know exactly what skills they have, what skills we have and how we can work together.” (FG2)

One perceived outcome was better future communication as professional friendships had been formed across disciplines, and with greater awareness of professional roles, students felt they would be confident in speaking with those in other disciplines in future.

4 Discussion

Feedback from students about their experiences in a program of interprofessional clinical education while they were on placement in a health service was shown to be positive, both in course feedback surveys and in limited interview data. Where students worked interprofessionally, these sessions were rated as highly beneficial for their learning. Positive aspects of IPL voiced by students included learning clinical skills, exposure to the skills and knowledge of another discipline that might be complementary to their own, and gaining a better understanding of the roles of other disciplines through experiencing a glimpse of the clinical culture and decision-making of other groups. The expert skills of facilitating clinical teachers were also praised and were perceived as being highly valuable.

If there were any negative responses (see Table 2), these were often based on lack of interprofessional involvement or a disappointment that teaching was more didactic than interactive. In many cases, the participating students would not have had any previous experience of professions other than their own as in a pre-entry survey of these students we found that around one-quarter had prior experience of IPL^[23]. Commonly, there is little exposure to other professions until the students reach the graduate workplace^[24, 25] despite consensus on a need for clinicians to collaborate and be trained in teamwork^[2].

Interprofessional teaching teams provide students with role-modeling of desired collaborative behaviours by observation of communication and interaction amongst the teaching team. The provision of opportunities for students to learn together in an interprofessional learning environment may lessen the impact of the still prevalent uni-professional focus. Khalili, *et al.*^[26] assert that these strong uni-professional cultures contribute to profession-specific cognitive maps that foster a sense of professional difference and superiority. Exposure to future colleagues is essential to create a context that encourage students to learn more about each other, and fosters the development of the dual identity, i.e., profession specific and interprofessional collaborator, necessary for effective future teamwork^[26].

Studies commonly report positive subjective and objective learning outcomes from IPL among student disciplines^[19, 27, 28]. Such experiences have been reported to enhance students' development of a professional identity as they begin to comprehend their future role^[29, 30].

Despite this, numerous studies have reported barriers to the introduction of IPL that principally relate to inevitable differences across various professional teaching schools in university. Issues of different curricula and timing of curriculum topics, different policies and administrations, are central^[6]. It is difficult to situate interdisciplinary groups together while in university, although this has been achieved^[31-33]. Applicable IPL can be conducted off-site and is feasible in clinical placement venues where multiple student disciplines cluster. In USA, eight medical schools successfully implemented shared interprofessional curricula centred on placement venues with clinical teachers the key facilitators^[34]. Thus, our model comes close to meeting the need for IPL among multiple disciplines and can be further developed based on experience. The model is practical, making use of existing expert teachers who, once tutored, are able to extend their teaching skills to interprofessional facilitation^[35]. This model makes a contribution to development of interprofessional curricula in line with recent trends^[16]. At this time, several of the developed sessions in our program will continue to be provided by the interprofessional teachers on a repeated basis through the year, available for each group of students who are on placement in the health service.

Limitations of this study are recognized. A convenience sample of students from multiple healthcare disciplines, with some courses under-represented, may not be indicative of the views of all healthcare students. Self-reported surveys have a risk of bias owing to acquiescence or social desirability. We were unable to discern the views of those who did not participate in a survey or focus group. We conclude, however, that the data presented offers insights into one model of IPL and the benefits that this might offer for students while on clinical placement.

5 Conclusion

The education of pre-registration healthcare students (including nursing students) needs to be transformed to enable greater participation in interprofessional learning. Student disciplines were shown to be enthusiastic about learning with other disciplines and gave positive feedback about interactive learning. They described knowledge improvement, better understanding of the roles and practices of others, as well as effective teaching strategies. Difficulties occur in pairing students from more than one discipline to situate them together because the number from various faculties is not consistently available and the annual weeks of placement and the duration varies between disciplines. The current model, however, where IPL is delivered to students of multiple disciplines on the clinical placement sites makes use of teaching

facilities and is feasible, practical and desirable. Further work is needed to embed this teaching and learning model in curricula and arrange objective performance assessment.

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References

- [1] Brock D, Abu-Rish E, Chiu CR, Hammer D, Wilson S, Vorvick L, Blondon K, Schaad D, Liner D, Zierler B. Interprofessional education in team communication: working together to improve patient safety. *BMJ Qual Saf.* 2013; 22: 414-23. PMID:23293118 <http://dx.doi.org/10.1136/bmjqs-2012-000952>
- [2] Frenk J, Chen L, Bhutta ZA, Cohen J, Crisp N, Evans T, et al., Health professionals for a new century: transforming education to strengthen health systems in an interdependent world. *Lancet.* 2010; 376(9756): 1923-58. [http://dx.doi.org/10.1016/S0140-6736\(10\)61854-5](http://dx.doi.org/10.1016/S0140-6736(10)61854-5)
- [3] Lapkin ST, Levett-Jones T, Gilligan C. A cross-sectional survey examining the extent to which interprofessional education is used to teach nursing, pharmacy and medical students in Australian and New Zealand universities. *J Interprof Care.* 2012; 26: 390-6. PMID:22734941 <http://dx.doi.org/10.3109/13561820.2012.690009>
- [4] Rodger S, Hoffman S, World Health Organization Study Group on Interprofessional Education and Collaborative Practice. Where in the world is interprofessional education? A global environmental scan. *J Interprof Care.* 2010; 24(5): 479-91. PMID:20718594 <http://dx.doi.org/10.3109/13561821003721329>
- [5] World Health Organization and Health Professions Network Nursing and Midwifery Office, Framework for Action on Interprofessional Education & Collaborative Practice. WHO: Geneva 2010. Available from: http://www.who.int/hrh/nursing_midwifery/en/.
- [6] Tourse RWC, Mooney JF, Shindul-Rothschild J, Prince J, Pulcini JA, Platt S, Savransky H. The university/community partnership: Transdisciplinary course development. *J Interprof Care.* 2008; 22(5): 461-74. PMID:24567958 <http://dx.doi.org/10.1080/13561820802355615>
- [7] Ho K, Jarvis-Selinger S, Borduas F, Frank B, Hall P, Handfield-Jones R. Making interprofessional education work: The strategic roles of the academy. *Acad Med.* 2008; 83(10): 934-40. PMID:18820523 <http://dx.doi.org/10.1097/ACM.0b013e3181850a75>
- [8] Engum SA, Jeffries PR. Interdisciplinary collisions: Bringing healthcare professionals together. *Collegian.* 2012; 19(3): 145-51. <http://dx.doi.org/10.1016/j.colegn.2012.05.005>
- [9] Fitzmaurice K, McAlpine I, Pannan L, Oates M. A common first year in a large multi-disciplinary faculty of health sciences. *Int J Learning.* 2011; 17(10): 205-18.
- [10] Curtin University. Annual Report: Interprofessional education. Perth WA: Curtin University, 2013.
- [11] Evans S, S nderlund A, Tooley G. Effectiveness of online interprofessional education in improving students' attitudes and knowledge associated with interprofessional practice. *Focus Health Prof Educ.* 2013; 14(2): 12-20.
- [12] Rose M, Smith K, Veloski JJ, Lyons KJ, Umland E, Arenson CA. Attitudes of students in Medicine, Nursing, Occupational Therapy, and Physical Therapy toward interprofessional education. *J Allied Health.* 2009; 38(4): 196-200. PMID:20011817
- [13] Centre for Advancement of Interprofessional Education. Defining IPE. 2002 Available from: <http://www.caibe.org.uk/resources/>
- [14] Australian Medical Council. Assessment and accreditation for medical schools: standards and procedure. Canberra: AMC, 2009. Available at <http://www.amc.org.au/images/Medschool/standards.pdf> 2009.
- [15] Australian Nursing and Midwifery Accreditation Council. National Accreditation Framework 2011. Canberra: ANMAC, 2011.
- [16] Abu-Rish E, Kim S, Choe C, Varpio L, Malik E, White AA, Craddick K, Blondon K, Robins L, Nagasawa P, et al. Current trends in interprofessional education of health sciences students: A literature review. *J Interprof Care.* 2012; 26: 444-51. PMID:22924872 <http://dx.doi.org/10.3109/13561820.2012.715604>
- [17] Anderson E, Thorpe L, Heney D, Petersen S. Medical students benefit from learning about patient safety in an interprofessional team. *Med Educ.* 2009; 43(6): 542-52. PMID:19493178 <http://dx.doi.org/10.1111/j.1365-2923.2009.03328.x>
- [18] Bradley P, Cooper S, Duncan F. A mixed-methods study of interprofessional learning of resuscitation skills. *Med Educ* 2009; 43(9): 912-22. PMID:19709016 <http://dx.doi.org/10.1111/j.1365-2923.2009.03432.x>
- [19] Nisbet G, Hendry G, Rolls G, Field M. Interprofessional learning for pre-qualification health care students: An outcomes-based evaluation. *J Interprof Care.* 2008; 22(1): 57-68. PMID:18202986 <http://dx.doi.org/10.1080/13561820701722386>

- [20] Wellmon R, Ponzer S, Dahlgren L, Timpoka T, Faresjo T. The benefits of an interdisciplinary collaborative learning experience: The student perspective on outcomes. *International Journal of Interdisciplinary Social Sciences*. 2009; 4(8): 15-27.
- [21] Leech M, Hood K, Baulch J, Gilbee A, Anderson A, Cant R. Creating interprofessional learning opportunities for pre-registration healthcare students to enrich clinical placement: The Increased Clinical Training Capacity (ICTC) Program. (Final report) Melbourne: Monash University; 2013.
- [22] Creswell J. *Research design: Qualitative and quantitative approaches*. London: Sage; 1994.
- [23] Hood K, Cant R, Baulch J, Gilbee A, Leech M, Anderson A, Davies K. Prior experience of inter-professional learning enhances undergraduate nursing and midwifery students' professional identity and attitudes to teamwork. *Nurs Educ in Pract*. 2012; doi.org/10.1016/j.nepr.2013.07.013
- [24] Gilbert JHV. Interprofessional learning and higher education structural barriers. *J Interprof Care*. 2005; 19(s1): 87-106. PMID:16096148 <http://dx.doi.org/10.1080/13561820500067132>
- [25] Sand-Jecklin K. Assessing nursing student perceptions of the clinical learning environment: Refinement and testing of the SECEE inventory. *J Nurs Meas*. 2009; 17(3): 232-46. PMID:20069951 <http://dx.doi.org/10.1891/1061-3749.17.3.232>
- [26] Khalili H, Orchard C, Spence Laschinger H, Farah, R. An interprofessional socialization framework for developing an interprofessional identity among health professions students. *J Interprof Care*. 2013; 27(6): 448-53. PMID:23777592 <http://dx.doi.org/10.3109/13561820.2013.804042>
- [27] Lapkin S, Levett-Jones T, Gilligan C. A systematic review of the effectiveness of interprofessional education in health professional programs. *Nurse Educ Today* 2011; <http://dx.doi.org/10.1016/j.nedt.2011.11.006>
- [28] Thistlethwaite J, Moran M. Learning outcomes for interprofessional education (IPE): Literature review and synthesis. *J Interprof Care*. 2010; 24(5): 503-13. PMID:20718596 <http://dx.doi.org/10.3109/13561820.2010.483366>
- [29] Hood K, Cant R, Leech M, Gilbee A, Baulch J. "Trying on the professional self": nursing students' perceptions of learning about roles, identity and teamwork in an interprofessional clinical placement. *Appl Nurs Res* 2013; <http://dx.doi.org/10.1016/j.apnr.2013.07.003>
- [30] Wilhelmsson M, Ponzer S, Dahlgren L, Timpoka T, Faresjo, T. Are female students in general and nursing students more ready for teamwork and interprofessional collaboration in healthcare? *BMC Med Educ*. 2011; 11: 15. PMID:21510872 <http://dx.doi.org/10.1186/1472-6920-11-15>
- [31] Buelow J, Rathsack C, Downs D, Jorgensen K, Karges JR, Nelson D. Building interdisciplinary teamwork among allied health students through live clinical case simulations. *J Allied Health*. 2008; 23(2): e109-23.
- [32] Reese CE, Jeffries PR, Engum SA. Learning together: Using simulations to develop nursing and medical student collaboration. *Nurs Educ Perspect*. 2010; 31(1): 33-7. PMID:20397478
- [33] Scherer YK, Myers J, O'Connor TD, Haskins M. Interprofessional simulation to foster collaboration between nursing and medical students. *Clinical Simulation in Nursing* 2013; <http://dx.doi.org/10.1016/j.ecns.2013.03.001>
- [34] O'Connell M, Pascoe J. Undergraduate medical education for the 21st century: Leadership and teamwork. *Fam Med*. 2004; 2004(36): S51-56.
- [35] Cant R, Gilbee A, Baulch J, Hood K, Leech M. Teachers' perceptions of effective inter-professional clinical skills facilitation for pre-professional healthcare students: A qualitative study. *Internet J Med Educ* 2013; 1. <http://ispub.com/IJME/3/1/14609#>