Influencing Student Attitudes Through a Student-Directed Interprofessional Learning Activity: A pilot study

Gillian Nisbet
The University of Sydney, Australia

Christopher J. Gordon
The University of Sydney, Australia

Christine Jorm
The University of Sydney, Australia

Timothy Chen
The University of Sydney, Australia

Abstract

A student-directed approach to interprofessional learning (IPL) can overcome difficulties such as incompatible timetables, limited staff resources and crowded disciplinary curricula. However, it is unclear whether such approaches to IPL can produce quality student learning, including attitudinal change. This study aimed to investigate the influence of a student-directed experiential IPL activity on attitudes towards interprofessional learning and working. A single group, pre/post-test design was used. Participants from medicine, nursing, exercise physiology, diagnostic radiography, occupational therapy, pharmacy, physiotherapy, and speech pathology disciplines completed three validated questionnaires (Revised Readiness for Interprofessional Learning Scale (RIPLS); Modified Interdisciplinary Education Perception Scale (IEPS); and Interprofessional Relationships Scale (IRS)) before and after a five week student-directed interprofessional learning activity. Students were also surveyed on frequency of social media usage and mode of communication with team members during the IPL activity. Seventy-seven students participated in the IPL activity. There were significant increases in the modified IEPS and IRS scores before and after the IPL activity but not the RIPLS. Social media and face-to-face meetings were used equally by students to communicate with team members during the IPL activity. The overall results support the effectiveness of a student-directed experiential IPL activity to significantly influence attitudes towards interprofessional learning and working. This approach may offer a viable means of overcoming the curricular challenges faced when implementing IPL on a large scale. The role of social media in facilitating collaborative learning warrants further exploration.

Keywords: attitudes; healthcare; interprofessional learning; social media; student-directed;

Introduction

Despite interprofessional learning (IPL) being widely acknowledged as a necessary component of pre-qualification health curricula (Orchard *et al.* 2010, The Interprofessional Curriculum Renewal Consortium Australia 2014, World Health Organization 2010), there are considerable challenges in embedding it within curricula (Nisbet *et al.* 2011). The most common difficulties voiced relate to timetabling, fitting IPL within already crowded curricula and the staff resources required (Nisbet *et al.* 2011). In response to these difficulties, over the past three years we have run a largely student-directed extra-curricular IPL activity modeled on the previously developed 'Health Care Team Challenge' (Boyce *et al.* 2009, Moran *et al.* 2007, Newton *et al.* 2013). The Health Care Team Challenge, as described in the literature, requires interprofessional student teams to develop and present a management plan for a complex case scenario where the patient has multiple health problems and a detailed social situation. This extra-curricular activity is largely student-directed: student teams, once given the case, learning outcomes and task, work independently and outside time-tabled hours to develop their management plan. Teams decide how, when and where they will meet to complete the task. Student teams then present their case to an audience. In its original format, real or standardized patients were incorporated to play the role of the patient on the presentation day, and teams were given new developments in the clinical case to work through live on stage. These two components of the original Health Care Team Challenge were not included in our IPL activity mainly because of the additional presentation time required'.

The extra-curricular and student-directed nature of the Health Care Team Challenge eliminates many of the curriculum timetabling issues experienced when trying to align calendars across many academic and placement programs (Moran *et al.* 2007) and also minimizes staff resources required as student teams work as independent learners in completing the task.

Over the four years of running this student-directed IPL activity, we observed that student groups who formed strong social networks produced highly creative and high quality management plans. These teams spent time in informal learning settings and collaborated extensively via social media. Whilst attitudinal change was not explored with these students, we speculated that a student-directed creative open-ended IPL could be effective in changing attitudes. In 2014, we introduced a revised IPL activity – students were tasked with creating a five-minute video explaining their case management approach. This was supplemented with a one-page abstract detailing the evidence-based plan. In this way, we crafted an assessment that combined creativity through digital media use with traditional scholarship. To accompany this we conducted research looking both at attitudinal change and any association between students' attitudinal change and their use of social media. We hypothesized that the student-directed activity would produce attitudinal change and that there would be a positive correlation between the social connectedness of students and IPL attitudinal change.

Whilst it has been more recently suggested that IPL researchers need to move beyond attitudinal outcome measures (Reeves 2010, Thistlethwaite 2012), attitudinal change is closely associated with bringing about change in behaviour (Ajzen and Fishbein 2000). Attitudinal change is often a major goal of many pre-qualification structured IPL programs (Giordano, Umland, and Lyons 2012). However, IPL programs are not always successful in producing attitudinal change and certainly mandating students to spend time together can be counter-productive (Curran *et al.* 2010, Delunas and Rouse 2014, Tunstall-Pedoe, Rink, and Hilton 2003). What is unknown is the influence of a student-directed IPL program on attitudes.

Our interest in the use of social media in student learning reflects increased use in society generally. For many, social media are an essential part of everyday communication (Choi *et al.* 2011). A recent review reported the proportion of pharmacy students with a Facebook profile to be between 76% and 100%, of whom three quarters logged in daily (Benetoli, Chen, and Aslani 2015). Social media are sometimes used within curricula to engage students (Cheston, Flickinger, and Chisolm 2013, Grindrod *et al.* 2014, Moran,

Seaman, and Tinti-Kane 2011). However, less is known about their use within student-directed learning activities.

Guiding our research, in particular the design of our IPL intervention, are two related learning theories: sociocultural theories of learning; and collaborative learning. Sociocultural learning theories view learning as participatory (Elmholdt 2004), social (Kaufman and Mann 2010) and contextual (Hager 2008). Collaborative learning draws from the theoretical base of sociocultural theory but highlights the importance of social interaction to the learning process (Jeong and Chi 2007). Through interaction, learners build and develop a shared conception and cognition of a problem (Dillenbourg and Traum 2006).

Also guiding this research is the concept of student-directed learning. Based on principles of adult learning (Knowles 1984), student-directed learning is underpinned by the desire to develop student independence and responsibility for their learning. For Katz (1996), this is best achieved through four criteria: students have ownership of their learning; students are active in the learning process; students are accountable for the outcome; and students have control over the events.

This proof-of-concept exploratory research aimed to investigate the influence of a student-directed experiential IPL activity on firstly, student attitudes towards interprofessional learning and working; secondly, the ways students communicate and interact with each other; and thirdly, the relationship between mode and frequency of communication, and attitudes to interprofessional learning and working.

Methods

A single group pre/post-test design was used to evaluate the influence of a student-directed IPL activity on attitudes towards interprofessional learning and working. The study was conducted in conjunction with an extra-curricular voluntary IPL activity implemented at The University of Sydney by the Medical and Nursing Schools, Faculties of Health Sciences (disciplines of occupational therapy, speech pathology, physiotherapy, diagnostic radiography and exercise physiology) and Pharmacy.

The IPL Activity

Adapted from the "Health Care Team Challenge" model (Moran *et al.* 2007, Newton *et al.* 2013), the IPL Activity (intervention) involved student teams developing and presenting a management plan for a patient with a complex health condition. Students registered to participate in the IPL activity.

Registered students were assigned to teams to ensure at least five professions were represented within each team. Teams comprised 2nd year students from medicine (but in a postgraduate program), and senior year students (years 3 and 4 of undergraduate program; 1st and 2nd year of postgraduate program) from nursing, pharmacy and health sciences (disciplines of occupational therapy, speech pathology, physiotherapy, diagnostic radiography and exercise physiology). In total, there were 13 teams (77 students) participating in the IPL activity.

Student teams were provided with a written patient case scenario and over a five week period developed and submitted a five-minute video of their management plan. The case focused on John, an 18 year old male who sustained a traumatic brain injury as a result of a pedestrian-car accident. After an extensive hospital stay, John was due for discharge to continue his rehabilitation in the community. The student team was tasked with developing a comprehensive plan for John during his ongoing rehabilitation. Apart from an initial face-to-face workshop and some activity guidelines (Appendix 1), student teams worked independent of faculty advice to complete the video. This was complemented with a one-A4 page evidence-based abstract in which student teams needed to detail the IPL model underpinning the management plan and provide high-quality evidence that supported assessments and interventions that were considered pertinent to the case study. All student teams successfully completed and submitted their video and abstract.

Study Participants

All students who had registered for the IPL activity were sent an email inviting them to participate in the study. Of the 77 students participating in the IPL activity, 42 students agreed to participate in the study.

Data collection

All data were collected via an online survey (Survey Monkey™) administered one week prior to the IPL activity before students had been notified of their teams and at the end of the IPL activity. All data were coded to ensure confidentiality. The study was approved The University of Sydney Human Ethics Committee.

Demographic data collected one week prior to the IPL activity included the participant's degree program, year of study, gender, age, and previous participation in an IPL program (Likert scale response: No previous participation; Yes, 1-2 occasions; Yes, more than 2 occasions; Not sure).

Objective 1 (attitudes towards interprofessional learning and working) was addressed using three validated questionnaires:

- 1. Revised Readiness for Interprofessional Learning Scale (RIPLS) (19 items) (McFadyen *et al.* 2005, McFadyen, Webster, and Maclaren 2006). This scale measures attitudes towards IPL and includes four sub-scales: teamwork and collaboration (9 items; cronbach alpha 0.79-0.88); negative professional identity (3 items; cronbach alpha 0.69-0.76); positive professional identity (4 items; cronbach alpha 0.76-0.81); and roles and responsibilities (3 items; cronbach alpha 0.40-0.43).
- 2. Modified Interdisciplinary Education Perception Scale (IEPS) (16 items) (Leitch, 2014). This scale measures perceptions of working with other professions and includes three sub-scales: competency and autonomy (6 items; cronbach alpha 0.78); cooperation (6 items; cronbach alpha 0.68); and prestige (4 items; cronbach alpha 0.78).
- 3. Interprofessional Relationships Scale (IRS) (Pollard, Miers, Gilchrist 2005). This 8 item scale measures participants' perceptions of their relationship with colleagues from their own and other professions. Reported internal consistency is 0.71.

These above questionnaires were completed before and after the IPL activity.

Objective 2 (ways of communicating) was addressed using two questionnaires developed by the researchers to capture IT and ICT usage prior to and during the IPL activity (Appendix 2 and 3). Questions included types of social media used, frequency of use, and other forms of communication (e.g. face-to-face interaction).

Data analysis

Descriptive data were reported as means and standard deviations (SD) where applicable. Cronbach alphas were calculated for all questionnaires (IEPS, IRS, RIPLS) to determine internal consistency. Usually alpha scores greater than or equal to 0.7 are acceptable for reliability (Streiner and Norman 2008); however, on the original questionnaires some subscales alpha scores were below 0.7 (e.g. RIPLS and IEPS) despite been used in multiple studies previously. Questionnaire sub-scales were calculated and the aggregated scores were analyzed using paired students' t-tests. Due to the exploratory nature of this study, we explored relationships between independent variables (age, health discipline, and prior IPL experience) and dependent variables (change scores in IEPS, IRS, RIPLS subscales). One-way Analysis of Variance (ANOVA) was used for comparison of participants' discipline (allied health, medical, and nursing) on change scores (pre-, post IEPS, IRS, RIPLS subscale scores), and independent t-tests were used for prior IPL experience. Spearman's rank order correlation examined the impact of age and communication between participant team members (social media and face-to-face meeting frequency)

and change scores (pre-, post IEPS, IRS, RIPLS subscale scores). All statistical tests level of significance was set at p < 0.05.

Results

Demographic variables are shown in Table 1. Participants represented a range of health disciplines and different years of study. Only a small number of students had previously engaged in any formal IPL activity (either 1-2 occasions or more than 2 occasions). The response rate was 55%.

Table 1. Participant demographics (n=42)

Variable	n, (%)
Age (years) - mean (SD) [range]	22.6 (3.0) [20 – 35]
Female	37 (88.0%)
Degree enrolled	
Diagnostic radiology	6 (14.3%)
Exercise physiology	2 (4.8%)
Medicine	5 (11.9%)
Nursing	7 (16.7%)
Occupational therapy	2 (4.8%)
Pharmacy	6 (14.3%)
Physiotherapy	6 (14.3%)
Speech pathology	8 (19.0%)
Degree year	
First year	4 (9.5%)
Second year	8 (19%)
Third year	14(33.3%)
Fourth year	16 (38.1%)
Previous IPL[1]	7 (16.0%)
[1] 'Previous IPL experience' was treated as a binary variable.	

Questionnaires

The internal consistency for the IEPS was α = 0.80, IRS α = 0.63, and RIPLS α = 0.68.

There were significant increases in IEPS aggregated change scores, and the competency and autonomy and prestige subscale scores (Table 2). Similarly, IRS increased significantly following the IPL activity,

however the roles and responsibilities subscale change score of the RIPLS decreased over the course of the IPL activity. The other subscales of the RIPLS showed no significant change.

No difference between scale change scores or sub-scale change scores were detected when data were stratified by health discipline. Similarly, the age of participants and their prior interprofessional-learning experience were not associated with scale-change scores or sub-scale change scores.

Table 2. Change score differences (post-pre) in Interdisciplinary Education Perceptions Scale, Interprofessional Relationship Scale, and Readiness for Interprofessional Learning Scale

Questionnaire	Mean difference (95% CI)	*p* value
Interdisciplinary Education Perceptions Scale	2.15 (0.79 – 3.50)	t=3.197, df=40, 0.003*
Competency and autonomy	1.02 (0.79 – 3.50)	t=3.193, df=40, <0.002*
Cooperation	0.49 (-0.30 – 1.28)	t=-1.244, df=40, 0.221
Prestige	0.63 (0.004 – 1.26)	t=2.033, df=40, 0.049*
Interprofessional Relationship Scale	1.83 (0.83 – 2.83)	t=3.704, df=41, 0.001*
Readiness for Interprofessional Learning Scale	-0.80 (-1.97 – 0.36)	t=-1.402, df=41, 0.169
Teamwork and collaboration	0.15 (-0.90 – 1.19)	t=0.283, df=40, 0. 779
Negative professional identification	-0.02 (-0.63 – 0.58)	t=-0.08, df=40, 0. 936
Positive professional identification	-0.10 (-0.67 – 0.48)	t=-0.342, df=40, 0.734
Roles and responsibilities	-1.12 (-1.62 – -0.81)	t=-6.032, df=40, <0.001*

Participant communication during the IPL activity

Prior to the commencement of the IPL activity, participants were frequent users of social media with 80.4% of participants engaging with social media more than once per day (Table 3). The most frequently accessed social media were Facebook™ (97.6%), Instagram™ (47.6%), Skype™ (38.1%), and Snapchat™ (33.3%). Over half of the participants reported that they were either extremely confident or very confident (54.8%) with using social media; however, 42.9% reported that they were somewhat confident. There was a positive association between frequency of social media access and confidence in social media usage (rho=0.452; *p*=0.003).

During the IPL activity, participants used social media, face-to-face meetings, and other communication pathways. Social media were used frequently to engage with other IPL team members (Table 3), and Facebook™ (90.5%) and Skype™ (26.2%) were the two modalities most frequently used. Participants also reported face-to-face engagement, with over half of the participants engaging more than three times over the four-week course of the event. These face-to-face meetings occurred at a variety of locations

including formal learning spaces on the university campus (90.5%), social venues (e.g. coffee shop), or homes (16.7%).

Table 3. Participants' frequency of engagement with social media at baseline and between team members during the IPL activity

Social media engagement	Baseline (%)	Team member (%)
More than 12 times per day	19.0%	2.4%
Between 7 and 12 times per day	21.4%	9.5%
Between 2 and 6 times per day	50.0%	26.2%
Once per day	4.8%	7.1%
2-4 times per week	2.4%	50.0%
Less than once per week	2.4%	4.8%
Never	0%	0%

As this was an exploratory study of a student-directed IPL event, we were interested in any relationships between type and frequency of communication between team members and IPL attitudinal change during the IPL activity. Accordingly, we used correlational analyses (Spearman's rank order correlation) to determine if relationships existed. There were no significant associations between the frequency of face-to-face meetings and IPL attitudinal change scores. There was a positive correlation between the frequency of social media communication with other team members and the change score of the IEPS competency and autonomy subscale (rho=0.363; *p*=0.020). However, there were no significant associations for any of the other subscales and frequency of social media communication with other team members.

Discussion

Findings from our exploratory study of a student-directed IPL activity indicate this approach to IPL is able to positively change attitudes towards interprofessional learning and working. Students used both social media and face-to-face contact to interact with each other but frequency of communication was not strongly related to changes in attitude. To our knowledge, this is the first study to explore the influence of a student-directed IPL activity on attitudes. Importantly, positive educational outcomes were demonstrated.

A closer examination of attitudinal findings suggests specific benefits gained by students from participating in the IPL activity. The positive change in the competency and autonomy sub-scale of the IEPs suggests students gained insight into the value of their own profession's skill set and its contribution to patient care. Likewise, the positive change in the prestige sub-scale suggests the IPL activity assisted individuals to feel more respected by other professions. This has important implications for working interprofessionally in the future as highlighted by Pullon (2008). In her study exploring relationships between primary care nurses and doctors, Pullon identified that an understanding of one's own and the other health professionals' professional identities "… enabled demonstration of competence, the gaining of mutual respect and the ultimate development of resilient interprofessional trust" (2008: 142).

The positive change in the IRS scale is an important finding as it demonstrates that relationship building is possible from a largely student-directed, less structured and 'one-off' IPL activity. Whilst Pollard and colleagues (Pollard and Miers 2008, Pollard *et al.* 2006) have reported similar findings, their IPL interventions were embedded within curriculum in a structured format over many years.

It is not surprising that there were no significant changes in attitudes towards interprofessional learning (RIPLS). Our students were all volunteers and hence motivated to attend; presumably to learn with, from and about other students. However, our finding of a negative direction of the roles and responsibilities sub-scale was interesting and warrants further investigation as it is not consistent with the findings from the IEPs competency and autonomy sub-scale findings and others (McFadyen *et al.* 2010, Wakely, Brown, and Burrows 2013). McFayden and colleagues (2010), in a longitudinal study, found that all but the roles and responsibilities sub-scale actually decreased over time, but suggested that mean scores were still high and possibly unrealistically high to begin with. They postulated that their increase in scores over time for the roles and responsibilities sub-scale was likely due to students being in their early stage of their professional career, and hence having limited understanding of their future roles and responsibilities. Our students were primarily senior students, possibly explaining the difference. In contrast to McFayden *et al.*, Wakely, Brown, and Burrows (2013) found significant positive changes for three of the sub-scales (teamwork and collaboration, positive identity and negative identity) but no change for the roles and responsibilities sub-scale. Student participation in both these IPL studies was mandatory, however one took place in the clinical setting (Wakely, Brown, and Burrows 2013) whereas the other was classroom-based (McFadyen *et al.* 2010). Differences in context may therefore influence the effect of an educational intervention on RIPLS. An alternative explanation for our findings is that role differentiation became less apparent as a result of the IPL activity. As students interacted with each other and learnt more about the roles of other professions, they possibly began to recognize the overlap between roles, which for some students may have challenged how they viewed their own and other professions.

Our findings support the theoretical basis for a student-directed approach to collaborative learning. Students demonstrated commitment by completing their IPL tasks, and they engaged in the activity independent of staff, with over half of the participants interacting with each other more than three times over the five-week course of the event. However, our hypothesis that there may be a positive correlation between the social connectedness of students as measured by frequency of communication, and attitudinal change was only weakly supported: only the IEPS competency and autonomy subscale was significantly associated with frequency of social media communication amongst team members. Waterston (2011) found teams that reported positive experiences from participating in a blended learning IPL module made more use of the online environment to interact than teams with negative experiences. Our study cannot draw direct comparisons as we did not evaluate IPL activity satisfaction. A more detailed investigation of interactions within student-directed IPL teams would be needed to better understand the collaborative learning process within this context.

Limitations

This study has some limitations. First, participation in this extra-curricular IPL activity was voluntary and hence possibly attracted students with an interest in IPL and interprofessional practice. Second, this study used a tool not previously validated and presents self-reported data which may have over- or under-estimated social media interaction. Future studies might consider tracking interaction *during* the actual IPL activity as well as investigating the quality of these interactions. Third, as this was an exploratory study, with relatively small numbers of student participants and hence underpowered, it was not possible to conduct multivariate analyses (such as multiple regression), to determine whether demographic variables such as age and health discipline predicted scale scores or sub-scale scores. Instead, given the exploratory nature of this study, bivariate analyses were conducted. Fourth, not all participants in teams completed the survey instruments. We therefore cannot make comparisons between teams. Nor can we make comparisons between disciplines. Indeed, due to the small sample size, if we were to have reported

team or discipline data, it may have inadvertently identified participants. Finally, this study did not attempt to investigate associations between the variables included in this study and performance in completing the IPL activity. This requires a reliable IPL video assessment tool which is not currently available.

Despite these limitations, this study has a number of strengths. Importantly, it used three validated questionnaires to measure attitudinal change enabling comparisons with previous research. Moreover, students were from a wide range of health disciplines. The study findings therefore add important empirical data to the IPL literature, particularly in relation to student-directed IPL activity.

Conclusion

Initial findings from this exploratory study suggest a student-directed IPL activity which overcomes many of the logistical difficulties of more structured IPL delivery formats, can positively influence the attitudes required for future interprofessional practice. The role of social media in facilitating collaborative learning warrants further detailed exploration, including a focus on the quality of interactions. Future studies should also incorporate a qualitative component to capture student feedback on their experiences of the IPL activity to enable triangulation of findings.

We hope that a student-directed model of IPL, as described in this study, could be substantially up-scaled to increase its student reach. We suggest scalability requires mandatory inclusion within curricula. However, further research is required to determine whether changes in attitudes can still be obtained within a mandatory activity of this nature. Finally, longitudinal research is required to determine if attitudinal changes resulting from a student directed IPL activity can be sustained longer term.

Acknowledgements

References

Ajzen, I., and Fishbein, M. (2000) Attitudes and the attitude-behavior relation: Reasoned and automatic processes. *European Review of Social Psychology,* 11 (1), 1–33 doi:10.1080/14792779943000116

Benetoli, A., Chen, T.F., and Aslani, P. (2015) The use of social media in pharmacy practice and education. *Research in Social and Administrative Pharmacy,* 11 (1), 1–46 doi:10.1016/j.sapharm.2014.04.002

Boyce, R.A., Moran, M.C., Nissen, L.M., Chenery, H.J., and Brooks, P.M. (2009) Interprofessional education in health sciences: The University of Queensland Health Care Team Challenge. *Medical Journal of Australia*, 190 (8), 433–436

Cheston, C.C., Flickinger, T.E., and Chisolm, M.S. (2013) Social media use in medical education: A systematic review. *Academic Medicine,* 88 (6), 893–901 doi:10.1097/ACM.0b013e31828ffc23

Choi, S.M., Kim, Y., Sung, Y., and Sohn, D. (2011) Bridging or bonding? A cross-cultural study of social relationships in social networking sites. *Information, Communication and Society,* 14 (1), 107–129 doi:10.1080/13691181003792624

Curran, V.R., Sharpe, D., Flynn, K., and Button, P. (2010) A longitudinal study of the effect of an interprofessional education curriculum on student satisfaction and attitudes towards interprofessional teamwork and education. *Journal of Interprofessional Care,* 24 (1), 41–52 doi:10.3109/13561820903011927

Delunas, L.R., and Rouse, S. (2014) Nursing and medical student attitudes about communication and collaboration before and after an interprofessional education experience. *Nursing Education Perspectives,* 35 (2), 100–105 doi:10.5480/11-716.1

Dillenbourg, P., and Traum, D. (2006) Sharing solutions: Persistence and grounding in multimodal collaborative problem solving. *The Journal of the Learning Sciences,* 15 (1), 121–151 doi:10.1207/s15327809jls1501_9

Elmholdt, C. (2004) Knowledge management and the practice of knowledge sharing and learning at work: A case study. *Studies in Continuing Education,* 26 (2), 327–339 doi:10.1080/158037042000225281

Giordano, C., Umland, E., and Lyons, K.J. (2012) Attitudes of faculty and students in medicine and the health professions toward interprofessional education. *Journal of Allied Health,* 41 (1), 21–25

Grindrod, K., Forgione, A., Tsuyuki, R.T., Gavura, S., and Giustini, D. (2014) Pharmacy 2.0: A scoping review of social media use in pharmacy. *Research in Social and Administrative Pharmacy,* 10 (1), 256–270 doi:10.1016/j.sapharm.2013.05.004

Hager, P. (2008) Learning and metaphors. *Medical Teacher,* 30, 679–686 doi:10.1080/01421590802148899

Jeong, H., and Chi, M.T. (2007) Knowledge convergence and collaborative learning. *Instructional Science,* 35 (4), 287–315 doi:10.1007/s11251-006-9008-z

Katz, M. (1996) Teaching organic chemistry via student-directed learning: A technique that promotes independence and responsibility in the student. *Journal of Chemical Education,* 73 (5), 440–445 doi:10.1021/ed073p440

Kaufman, D.M., and Mann, K.V. (2010) Teaching and learning in medical education: How theory can inform practice. in *Understanding Medical Education: Evidence, Theory and Practice.* ed. by Swanwick, T. Chichester, UK: Wiley-Blackwell doi: 10.1002/9781444320282

Knowles, M.S. (1984) *Androgogy in Action: Applying Modern Principles of Adult Learning.* San Francisco, CA: Jossey-Bass

Leitch, J. (2014) Exploring psychometric properties of the interdisciplinary education perception scale in health graduate students. *Journal of Interprofessional Care,* 28 (1), 52–57 doi:10.3109/13561820.2013.820691

McFadyen, A.K., Webster, V.S., and Maclaren, W.M. (2006) The test-retest reliability of a revised version of the Readiness for Interprofessional Learning Scale (RIPLS). *Journal of Interprofessional Care,* 20 (6), 633–639 doi:10.1080/13561820600991181

McFadyen, A.K., Webster, V.S., Maclaren, W.M., and O'Neill, M.A. (2010) Interprofessional attitudes and perceptions: Results from a longitudinal controlled trial of pre-registration health and social care students in Scotland. *Journal of Interprofessional Care,* 24 (5), 549–564 doi:10.3109/13561820903520369

McFadyen, A.K., Webster, V., Strachan, K., Figgins, E., Brown, H., and McKechnie, J. (2005) The Readiness for Interprofessional Learning Scale: A possible more stable sub-scale model for the original version of RIPLS. *Journal of Interprofessional Care,* 19 (6), 595–603 doi:10.1080/13561820500430157

Moran, M., Boyce, R., O'Neill, K., Bainbridge, L., and Newton, C. (2007) The Health Care Team Challenge: Extra-curricula engagement in inter-professional education (IPE). *Focus on Health Professional Education: A Multi-Disciplinary Journal,* 8 (3), 47–53

Moran, M., Seaman, J., and Tinti-Kane, H. (2011) Teaching, learning, and sharing: How Today's higher education faculty use social media. *Babson Survey Research Group.* [online] available from http://eric.ed.gov/?id=ED535130 [25 January 2016]

Newton, C., Bainbridge, L., Ball, V.A., and Wood, V.I. (2013) Health Care Team Challenges: An international review and research agenda. *Journal of Interprofessional Care,* 27 (6), 529–531 doi:10.3109/13561820.2013.800848

Nisbet, G., Lee, A., Kumar, K., Thistlethwaite, J., and Dunston, R. (2011) *Interprofessional health education - a literature review: Overview of international and Australian developments in interprofessional health education (IPE).* [online] available from https://nexusipe.org/resource-exchange/interprofessional-health-education-literature-review [17 September 2015]

Orchard, C., Bainbridge, L., Bassendowski, S., Stevenson, K., Wagner, S.J., Weinberg, L., Curran, V., Di Loreto, L., and Sawatsky-Girling, B. (2010) *A national interprofessional competency framework.* [online] available from http://www.cihc.ca/user [17 September 2015]

Pollard, K.C., and Miers, M.E. (2008) From students to professionals: Results of a longitudinal study of attitudes to pre-qualifying collaborative learning and working in health and social care in the United Kingdom. *Journal of Interprofessional Care,* 22 (4), 399–416 doi:10.1080/13561820802190483

Pollard, K.C., Miers, M.E., Gilchrist, M. (2005) Second year scepticism: Pre-qualifying health and social care students' midpoint self-assessment, attitudes and perceptions concerning interprofessional

learning and working. *Journal of Interprofessional Care,* 19 (3), 251–268
doi:10.1080/13561820400024225

Pollard, K.C., Miers, M.E., Gilchrist, M., and Sayers, A. (2006) A comparison of interprofessional
perceptions and working relationships among health and social care students: The results of a 3-
year intervention. *Health & Social Care in the Community,* 14 (6), 541–552
doi:10.1111/j.1365–2524.2006.00642.x

Pullon, S. (2008) Competence, respect and trust: Key features of successful interprofessional nurse–
doctor relationships. *Journal of Interprofessional Care,* 22 (2), 133–147
doi:10.1080/13561820701795069

Reeves, S. (2010) Ideas for the development of the interprofessional field. *Journal of Interprofessional
Care,* 24 (3), 217–219. doi:10.3109/13561821003788930

Streiner, D.L., and Norman, G.R. (2008) *Health measurement scales. A practical guide to their
development* (4th edn.). Oxford, UK: Oxford University Press

The Interprofessional Curriculum Renewal Consortium Australia. (2014) Curriculum renewal for
interprofessional education in health. Final Report 2014. [online] available from
https://nexusipe.org/resource-exchange/curriculum-renewal-interprofessional-education-health
[17 September 2015]

Thistlethwaite, J. (2012) Interprofessional education: A review of context, learning and the research
agenda. *Medical Education,* 46 (1), 58–70 doi:10.1111/j.1365-2923.2011.04143.x

Tunstall-Pedoe, S., Rink, E., and Hilton, S. (2003) Student attitudes to undergraduate interprofessional
education. *Journal of Interprofessional Care,* 17 (2), 162–172
doi:10.1080/1356182031000081768

Wakely, L., Brown, L., and Burrows, J. (2013) Evaluating interprofessional learning modules: health
students' attitudes to interprofessional practice. *Journal of Interprofessional Care,* 27 (5), 424–
425 doi:10.3109/13561820.2013.784730

Waterston, R. (2011) Interaction in online interprofessional education case discussions. *Journal of
Interprofessional Care,* 25 (4), 272–279 doi:10.3109/13561820.2011.566647

World Health Organization. (2010) Framework for Action on Interprofessional Education and
Collaborative Practice (WHO/HRH/HPN/10.3). [online] available from
http://whqlibdoc.who.int/hq/2010/WHO_HRH_HPN_10.3_eng.pdf [17 September 2015]

Appendix 1

Task guidelines for IPL activity

Video presentation:

The video forms the major component of the Health Care Team Challenge.

We encourage you to be ***creative***, ***innovative*** and ***thought provoking*** with your video presentation.

The video should:

- Highlight the interprofessionality of the case
- Demonstrate an appreciation of depth and breadth of issues, particularly the interprofessional issues
- Integrate an interprofessional approach into the management plan
- Demonstrate a collaborative interprofessional team approach to the overall project

Video size and type requirements

5 minute video

- All file types will be accepted
- All videos are to be submitted through the University large file data submission system.
- Abstract of case management plan:

The abstract should include sufficient detail to outline the management plan for the patient. The following provides structural guidelines for the abstract:

(1) Introduction (what are the top 4 priorities of the plan)
(2) Evidence plan (evidence-based management plan using an *interprofessional* approach)
(3) Team processes (how will the team members work collaboratively)
(4) Conclusion (brief concluding statement)

Appendix 2

Pre IPL Activity questionnaire: IT and ICT usage

What forms of social media have you used in the last fortnight?	Facebook Instagram Twitter Snapchat Skype KIK Tumblr Other:						
On average, how often do you access any form of social media?	More than 12 times per day	Between 7 and 12 times per day	Between 2 and 6 times per day	Once per day	2 – 4 times per week	Less than once per week	Never
How confident are you with using social media?	Extremely confident	Very confident	Somewhat confident	Not very confident	Extremely unconfident		

Appendix 3

Post IPL activity questionnaire: Methods of communication during IPL activity

During the IPL activity, what forms of social media did you use to communicate and interact with **your** team members?	Facebook Instagram Twitter Snapchat Skype KIK Other: None						
During the IPL activity, how often did you access any form of social media to communicate with **your** team members?	More than 12 times per day	Between 7 and 12 times per day	Between 2 and 6 times per day	Once per day	2 – 4 times per week	Less than once per week	Never
	Comment						
During the IPL activity, what other ways did you communicate and interact with **your** team members?	University LMS site Email Met at University meeting spaces e.g. tutorial rooms Met at University campus social venues, e.g. coffee shops Met at social venues, e.g. coffee shops Met at private homes Other:						
During the IPL activity, how often did you meet up face-to-face with **your** team members?	5 times or more	3-4 times	1-2 times	1 time	Never		
	Comment						