INSTRUCTIONAL DESIGN AND ASSESSMENT

The Use of Social Networking to Improve the Quality of Interprofessional Education

Amy L. Pittenger, PharmD, PhD

University of Minnesota College of Pharmacy, Minneapolis, Minnesota

Submitted March 1, 2013; accepted April 18, 2013; published October 14, 2013.

Objective. To evaluate the feasibility and effectiveness of using an online social networking platform for interprofessional education.

Design. Three groups of 6 students were formed with 1 student in each group from medicine, nursing, dentistry, pharmacy, veterinary medicine, and public health. Each group followed a different collaborative educational model with a unique pedagogical structure. Students in all groups interacted via an online social networking platform for a minimum of 15 weeks and met in person once at the end of the 15-week experience for a focus group session. The students were tasked with developing a collaborative recommendation for using social networking in interprofessional education programs.

Assessment. Most of the students who reported in a post-experience survey that their expectations were not met were in the minimally structured group. Almost all students in the facilitated and highly structured groups indicated that this experience positively impacted their knowledge of other health professions. Most students stated that interacting within a social networking space for 15 weeks with other members of the university's health professions programs was a positive and effective interprofessional education experience.

Conclusion. Social networking is feasible and can be used effectively within an overall strategy for interprofessional education, but design and placement within a core content course is critical to success.

Keywords: interprofessional education, social networking, pedagogical models

INTRODUCTION

For quality interprofessional education to occur, members must understand and respect what each profession contributes to the common goal of delivering quality patient care. As with all collaborative educational models, there needs to be a positive interdependence¹ among team members and a shared responsibility and identity as a healthcare team.²⁻⁶ Many barriers make the goal of effective interprofessional education difficult, including different academic calendars, costly interactive face-to-face learning in small groups with significant workload requirements of faculty and staff members, space limitations, and remote campuses, all which introduce logistical burdens with no easy solution. One potential solution is the use of social networking platforms that allow people to interact in a meaningful manner even if separated by

time and distance.^{7,8} Social networking platforms are quickly becoming a natural environment for many people, especially students. Social network use has become a part of everyday life for many students⁹⁻¹¹ and is, perhaps, the least burdensome way to incorporate interprofessional education into content-heavy, high-pressure professional programs.

Social networking examples within the health professions include using Second Life (<http://secondlife.com/>) for continuing professional development for physicians,¹ and social network sites for health professions members to interact exclusively with each other (eg, doc2doc (<http://www.dr2dr.org/>), Sermo (<http://www.sermo.com/>), PharmQD (<http://www.pharmqd.com/>), NurseTogether (<http://www.nursetogether.com/>), and Facebook professional groups) and create virtual rural healthcare teams.¹²

Health professions members are exploring social networking as a tool for fostering communities of practice, and as a mechanism for communicating with patients and providing public health outreach to communities.^{12,14-21} Some exploration of this type of continuing professional

Corresponding Author: Amy L. Pittenger, PharmD, PhD, Room 5-110 WDH; 1332A (Campus Delivery Code), 308 Harvard Street SE, University of Minnesota College of Pharmacy, Minneapolis, MN 55455. Tel: 612-625-7629. Fax: 612-626-4613. E-mail: alp@umn.edu

education has already been tried with virtual Web sites such as Second Life, with physician participants reporting high satisfaction ratings for the experience,¹³ and for the creation of virtual rural healthcare teams.¹² Social networking holds promise as a way to facilitate ongoing interaction among a group of interprofessional students.

This project evaluated the feasibility and effectiveness of an interprofessional education program for students from 6 health professions programs that used an online social networking platform, Ning (Glam Media Inc. Brisbane, CA). Ning was chosen for its focus on group collaboration and ability to control access and membership to the site.

DESIGN

Several groups were formed to compare 3 types of learning environments linked to pedagogical structure. Each group comprised 6 student volunteers with each student representing 1 of 6 health professions programs (medicine, nursing, dentistry, pharmacy, veterinary medicine, and public health). No academic credit was given for participation in the study. Group members interacted with each other for a minimum of 15 weeks and met in person at the end of the 15-week experience for a focus group session. Each of the 3 groups used a collaborative educational model paired with 1 of 3 unique pedagogical structures: in the minimally structured²² group, the faculty member provided only general goals for students to get to know each other and what the final project should address; in the facilitated²² group, the faculty member facilitated²³ group discussions and provided occasional resources but did not direct the experience; and in the highly structured²⁴ group, the faculty member facilitated all discussion topics, controlled the flow of interaction, and directed the final project process. In addition to interacting with each other on various topics, group members were tasked with developing a recommendation for the university to incorporate social networking into interprofessional education.

The 3 Ning Web sites were set up as uniformly as possible to minimize any factors other than pedagogical structure that could influence student experience. Each group's home page showed the pedagogical structure and schedule along the left-hand column, with the main discussion forum in the center of the Web page. All groups used the same design theme.

Participant Recruitment

The author visited students taking an interprofessional teamwork course required for medical students and also offered as an elective for other health professions students. She explained to the students about the

opportunity to participate in an interprofessional social networking experience and the course director forwarded an e-mail to the students inviting them to volunteer. The associate deans for education within each health professions program were asked for their assistance in distributing the e-mail invitation to students. Only students in their second year and beyond were invited to participate in the project. Students were told that the purpose of this project was to evaluate the feasibility and effectiveness of using social networking for interprofessional education and that they would be assigned to 1 of 3 different learning structures because the influence of the environment design was also being evaluated. Students were told what the 3 environments were and to which version they had been assigned. Participants were paid \$100 for completing the entire experience.

EVALUATION AND ASSESSMENT

The Interdisciplinary Education Perception Scale²⁵ (IEPS) and the Readiness for Interprofessional Learning Scale (RIPLS) were the survey instruments used in this study.²³ Both survey instruments were administered at baseline (presocial network group formation) and at the completion of the 15-week experience. The RIPLS is a 19-item scale that uses a 5-point Likert scale ranging from strongly disagree (score of 1) to strongly agree (score of 5). Within the RIPLS there are 4 subscales: teamwork and collaboration, negative professional identity, positive professional identity, and roles and responsibilities.

The IEPS is an 18-item scale that uses a 6-point Likert scale ranging from strongly disagree (score of 1) to strongly agree (score of 6). Scores of 3 and 4 corresponded to rankings of somewhat disagree and somewhat agree, respectively. Within the IEPS there are 4 subscales: competency and autonomy, perceived need for cooperation, perception of actual cooperation, and understanding of others' value. These tools measure student perceptions and attitudes related to interprofessional collaboration and are used routinely in the interprofessional education literature.

Using the guidelines described by Gaddis²⁶ and Dillman and colleagues,²⁷ pre- and post-experience survey instruments were developed that included the 2 validated interprofessional survey instruments, IEPS and RIPLS. Following the initial pre- and post-survey development, a health care professional student took the survey using the think-aloud approach and her feedback was used to revise the pre- and post-experience survey instruments. Both survey instruments were then pilot tested with 10 interprofessional students not involved in the study, resulting in additional minor modifications of the survey instruments. The survey instruments were delivered via

hypertext link within an e-mail invitation. The survey instrument was distributed using Survey Monkey.

Group differences with multiple dependent variables were detected with a multivariate analysis of variance (MANOVA). Online survey data were aggregated and described. Because of the repeated measures of the RIPLS and IEPS, the pre- and post-intervention scores were compared using a paired *t* test and mean scores were compared to other reports in the literature.

The qualitative analysis consisted of content analysis and discourse analysis to examine if the postings within each group were qualitatively different. Content analysis of both the Ning postings and focus group sessions used the classic analysis strategy, a constant comparison-like approach,²⁸ to reveal what participants said within their groups.²⁹ Drawing primarily on the frameworks of Gunawardena³⁰ and functional moves, and on Fairclough³¹ and subject positions, discourse analysis was used to analyze the Ning postings in order to understand how and why participants communicated thoughts and interacted with group mates.²⁹ Transcripts of Ning postings and focus group sessions were reviewed for emerging themes. After several passes over the postings and transcripts, themes were combined when appropriate and compared across groups, a process which also informed the discourse analysis and identification of functional moves. While groups had some similar themes, there were also themes unique to each pedagogical structure group. This study was deemed exempt from review by the University of Minnesota Institutional Review Board on June 3, 2009.

Thirty-seven students consented to participate in the project. From this pool of 37 volunteers, students were selected in the order in which they volunteered until there were 3 students from each of the 6 university health professions programs represented. Of the 18 students, 2 did not complete the entire experience: 1 nursing student in the highly structured group and 1 public health student in the facilitated group.

The 18 participants were between 22 and 26 years of age, and 13 were women and 5 were men. Fifteen identified themselves as white and 2 as Asian. Nine of the participants were second-year students in their professional program, 7 were third-year students, and 1 was a fourth-year student.

All 18 students had past experience with a social networking Web site, and all except 1 veterinary medicine student were active on at least 1 social networking Web site. Most students logged into their personal social networking Web sites at least once a day. The time spent on the Web site with each login varied, with most respondents indicating they spent less than 15 minutes or between 15 and 30 minutes on the site. Despite little

instruction, all students were able to successfully access the Ning group to which they had been assigned and set up their individual pages without asking for help.

Total number of posts and time spent by individual members of each group were not significantly different ($p=0.467$). Between-subjects test showed that which group individuals were in was not significantly related to their number of posts ($p=0.256$) or time spent on the Web site ($p=0.962$).

To determine if the social networking experience impacted participants' scores on the RIPLS and IEPS survey instruments, the pre- and post-intervention scores for each participant were compared using a paired *t* test. No significant differences were noted in the pre- or post-RIPLS and IEPS scores.

Qualitative Results

Using the recommendations of Gunawardena, Lowe, and Anderson,³⁰ 3 functional moves were identified (social, collaborative discussion, transmission of emotion) and used for coding purposes to evaluate the level of student-to-student interaction and to determine if function of this interaction could be identified.

Social functional moves were those posts which sought to find out more about other group mates from a social perspective such as asking about where they wanted to live after graduating or discussing a particular television program. These social posts were not related to any interprofessional education topic being discussed. The social functional moves suggested an interest in the group members and an attempt to know them beyond the professional roles they represented.

The collaborative discussion functional move was used to identify those posts that involved student back-and-forth discussion on an interprofessional topic being discussed. These posts included elaborating on ideas, probing for additional detail or information, and challenging and agreeing with viewpoints posted by group mates. These functional moves were posts that could be categorized as "on task" but simply posting on a topic was not enough, there had to be student-to-student discussion and interaction. The collaboration functional moves were evidence that group members were using each other as resources and combining knowledge and experience to develop new ideas and solutions.

The last functional move category was transmission of emotion. This coding category was used to identify those posts that used symbolic and other textual strategy to convey emotion. Examples included emoticons and emphatic use of punctuation, eg, multiple exclamation points. The use of these symbolic strategies is identified separately because of the informal and conversational

tone they imply. Underlying this analysis was the assumption that these attempts to transmit emotion through the use of symbolic gestures will primarily occur when people are comfortable and friendly with one another.^{29,30}

Other indicators that described the overall social networking experience and indicated feasibility and effectiveness of using a social network for interprofessional education are successful completion of a semester project by all groups, willingness to continue and expand the use of the social networking group once the formal study period has ended, and recommendations by students for widespread implementation of such a strategy throughout the university health professions programs.

No differences were found between the number of postings on the Ning Web sites or self-reported time on the Web site, but there were qualitative differences in the pattern and nature of the activity within the 3 groups. Because the facilitated group was the most engaged, only this group is discussed in detail.

Minimally Structured Group

The minimally structured group was not a successful structure for engaging interprofessional collaboration. By the fourth week, only 1 person typically posted and there were weeks with no activity on the Ning Web site.

The minimally structured group failed to collaboratively develop the list of recommendations for the university on the use of social networking for interprofessional education within the Ning Web site and could not find a time to meet for the focus group session. The group held its focus group online over a 5-day period, and it was during this process that they generated their list of recommendations with investigator prompts to provide this list.

Facilitated Group

While not significant, the amount and type of activity within the facilitated group was qualitatively different from the minimally structured group. The posts of the facilitated group tended to be longer (400 to 600 words), interaction was common among group members (the facilitator was not as present in the discussion), and all group members regularly participated. This group did have 1 dropout member, the public health student, who last posted during week 6 of the 15-week experience. This group successfully came up with a list of recommendations for the use of social networking for interprofessional education and was willing to adjust schedules several times in order to meet in person for the focus group session. Because of the amount of discussion and level of participation of all group members, there were several themes identified within the facilitated group Ning discussions (Table 1).

Using the 3 functional move categories of social, collaborative discussion, and transmission of emotion to better understand and describe the purpose behind the statements posted, the discourse analysis revealed that not only did students post frequently and extensively, but they also engaged in functional moves with each other. Table 2 provides a tally and comparison of functional moves across groups. The facilitator was not a central presence in this group's discussions. These students interacted with each other and responded, elaborated on ideas, probed for additional detail or information, and challenged and agreed with viewpoints posted by group members. These students discussed topics outside of health professions programs, including places people had lived and traveled, and experiences the participants had prior to entering their programs.

While posts to the personal pages were not a major focus (group members commented that they would prefer to use the main discussion forum), there was an ongoing engaged discussion, which resulted in these students describing the experience as positive and valuable. The 5 students in this group who completed the experience stated in the discussion forum that this was a valuable experience that they enjoyed. The students learned a lot about the other professions and could not think of how they would have had this experience other than in an online discussion.

Highly Structured Group

The highly structured group appeared to have had a different qualitative experience than the other 2 groups. While not a total failure as the minimally structured group was, the formal nature of the environment seems to have inhibited the student-initiated activity that occurred within the facilitated space. In the beginning, when the experience was less formal and students were posting on each other's personal pages, this group looked more like the facilitated group. When the directed weekly topics structure began, the interaction among students stopped and was replaced by formal, essay/assignment-like postings. The medical student stopped posting all together in the main discussion forum and did not post again until week 15. The public health student was also less active during the other sections of the experience but did post periodically. He apologized for his erratic posting pattern, explaining that his busy schedule was interfering with his participation, but he was reading the posts of others.

Each group was also given the task of collaboratively developing a list of recommendations for the Academic Health Center about the use of social networking to foster interprofessional education. The recommendations task acted as another marker of engagement within the groups

Table 1. Themes Identified Within the Facilitated Group Ning Discussions

Theme 1: Excitement about participating in this social networking experience.	Students expressed excitement regarding the opportunity to interact with each other and interest in their group mates, both from professional and personal perspectives.
Theme 2: Feelings of being misunderstood or undervalued.	<p>The issue of feeling misunderstood and/or undervalued also was identified as a theme and common concern.</p> <p>All students in this group (except dentistry) voiced this concern.</p> <p>The dentistry student never did comment on how she felt dentists were viewed – even when a student directly asked her to – but she did agree with the misconceptions others posted regarding their professions (that is, she agreed that their professions were misunderstood and undervalued).</p> <p>Pharmacy, nursing and veterinary medicine students in this group voiced frustration at the limited view both the public and other health professions have of their specific professions.</p> <p>Pharmacy and nursing students, because of their consultant and auxiliary role within the healthcare team, felt the power imbalance within the healthcare team more keenly than the other professions.</p> <p>Both the medical student and public health student felt that the public and other health professions misunderstand them and unfairly assign attitudes and philosophies to them that are either historical or due to being unfamiliar with what their role is.</p> <p>The public health student felt that his profession was viewed as being concerned solely with financial aspects of health care, even at the expense of patient well-being</p> <p>The medical student felt that physicians are assumed to be poor team-players.</p>
Theme 3: This generation of health professional students is more willing to collaborate.	<p>The group discussed that a combination of shifting healthcare structure, additional and more complicated medical interventions, and the democratization of medical information with the Internet may force a collaborative structure that was not required in the past.</p> <p>This group also believes that as a generation they are more open to a collaborative model.</p>
Theme 4: The need for interprofessional education opportunities.	This group of self-selected students desire interprofessional interaction and believe it is essential to their education as a future healthcare professional. Within this discussion theme was also the issue that students expected more interprofessional education opportunities than they have had – they believed interprofessional education was already a widespread reality within health professions programs.

that was potentially influenced by the pedagogical structure. The summary of the recommendations from the groups is described in Table 3 (except the minimally structured group, which failed to create this list).

Results of the Post-experience Survey

In the 15th and final week of the experience, students were asked to complete a post-experience survey instrument. Of the 18 students who volunteered for this study, 16 completed the post-experience survey instrument. From the post-experience survey, students indicated they used their other personal social networking Web sites with this project.

Expectations of this experience were generally that they hoped to learn more about the other professions. Ten students stated in the post-experience survey that their expectations were met and 6 students stated their expectations were not met. When student responses were broken down by pedagogical group, most of those students who reported that their expectations were not met were in the minimally structured group. The one student in the highly structured group who answered “no” was the medical student and his explanation for why his expectations were not met was, “I didn’t have expectations.”

All students in the facilitated and highly structured groups (except for the medical student in the

Table 2. Discourse Analysis Functional Moves Among Health Professions Students Participating in an Interprofessional Social Networking Group

Group	Functional Move		
	Social	Collaborative Discussion	Emotion Transmission
Minimally structured	5	8	10
Facilitated	21	78	36
Highly structured	7	13	12

highly structured group) indicated that this experience positively impacted their knowledge of other health professions. Students in the minimally guided group felt that it did not meet their expectations of learning more about other professions but they were still in favor of using social networking for interprofessional education.

DISCUSSION

This pilot project demonstrated that using a social networking platform for interprofessional education is feasible. Most students stated that interacting within a social networking space for 15 weeks with other members of the university's health professions programs was a positive and effective interprofessional education experience. All students were able to use and navigate the Ning Web site without assistance or prior instruction. Students reported in the focus group sessions that the Ning Web site was easy to use and many suggested that it continue to be the platform used for any future interprofessional social networking initiatives. Students continued to use their own personal social networking sites during the project. This suggests that social networking activity is something that students engage in even during times of heavy academic requirements, and work and personal life demands. This provides additional support for exploring social networking as an interprofessional educational strategy because students appear to view social networking activity as a natural part of their lives. The use of this activity may be the least burdensome and most acceptable addition to their respective curriculums to encourage dialog among interprofessional education students.

Others have explored the used of social networking within an educational context.³²⁻³⁵ The University of Alberta in Canada transitioned an interprofessional course into one that used limited social networking strategies as a complement to the course discussions over a 12-year period.³²⁻³⁵ The 5-week-long course focused on better understanding across professions and demonstration of team process. The authors described issues reported in nonhealthcare education studies with ineffective

facilitation, lack of full engagement with the tool once the novelty wore off (which was quickly with this course after the first week), lack of sufficient time (only 5 weeks), and inconsistent engagement among the health professions groups.³⁴ Most students were open to the use of social networking and there was some suggestion of advantages to using a virtual meeting space. While essentially a cross-media comparison study, this example suggests that students who were randomized to using the social networking component vs the strictly face-to-face version engaged more fully in the interprofessional discussions and self-reported better interprofessional skills.³² This example is consistent with the findings of this project that social networking can be used as a solution to the current impasse of implementing large-scale, long-term interprofessional education within health professions curricula, but also highlights the difficulties of community development within an academic course setting.

The RIPLS and IEPS were used to measure improvement in interprofessional attitudes and professional identity. The RIPLS or IEPS scores of this group of students did not change, so it cannot be concluded that this experience was effective at improving interprofessional attitudes based on this objective measure. There were no differences between the pre-experience and post-experience survey instruments for either of these tools or any of the subset scores within these survey instruments, but pre- and post-experience mean scores are similar to mean scores for these survey instruments reported in the literature with similar representation of interprofessional student participants.³⁶⁻⁴⁰ These student volunteers probably already felt positively about interprofessional approaches and it may have been difficult to show an improvement from an already high baseline score. There has been some discussion in the interprofessional literature that RIPLS and IEPS are better suited for measuring attitudes among practicing professionals rather than students.⁴¹

Creating an environment that facilitates and supports participation by all health professions members is the goal for interprofessional education. Within a participatory culture, participation from individual members will not be equal all the time, but all members must feel free to contribute and know that their participation matters.⁴² Interprofessional education, if it is successful, will help individual health professions students move from being autonomous problem solvers to collective thinkers drawing on different sets of expertise.⁴³⁻⁴⁷ Not understanding the value of individual members or not knowing how to effectively consult these other members is a barrier to interprofessional delivery of care, but the power imbalance, perceived or real, is also a barrier. In the past, and

Table 3. Focus Group Recommendations for the Use of Social Networking in Interprofessional Education

Theme 1: Student desire for interprofessional education.	Students consistently voiced disappointment with the reality of interprofessional education within the university and many students were motivated to participate in this study because they either desired this kind of interaction and/or wanted to influence the university progression with the design of interprofessional experiences.
Theme 2: Differences in perceived pressure to represent profession.	<p>The veterinary medicine, pharmacy and nursing students in both the facilitated and highly structured groups said they felt pressure to represent their professions well through the Ning Web site. Because of a general feeling that these professions are undervalued and they (at least nursing and pharmacy) lack certain autonomous privileges, the pressure to do an exemplary job presenting the most positive version of the profession was important. The students representing these professions stated in the Ning Web site discussions as well as during the focus group that their professions were misunderstood and undervalued. They agreed that one of the positive things about this experience was the opportunity to explain their professions to an interprofessional group.</p> <p>The dentistry and medicine students both stated that they did not feel this pressure to represent their professions as exemplary examples, and agreed that perhaps it was because they are in a position of power and society already understands what they do. One exception to this statement, however, was the medical student's expression of irritation and frustration over the assumption that medical students will not work collaboratively unless forced to. The medical students felt this assumption about their profession was unjustified and because they felt their generation of future physicians was more oriented toward a collaborative approach, they were open to the idea that the structure of practice may teach and reinforce an old power structure. Both wondered if they would be able to implement the team-based approaches that had been emphasized the past 2 years once they entered practice.</p>
Theme 3: Social networking should be explored but only if embedded into a core course and if the interactions with other health professions students had some practical purpose.	<p>Students felt social networking interprofessional education opportunities should start early, such as the second semester of the first year, and use a facilitated structure.</p> <p>Most students felt the purpose of this experience was to build awareness and respect for the other professions and to become comfortable communicating interprofessionally, so when in practice you would know to reach out to another professional for assistance, know what to expect from them and be comfortable communicating with them.</p> <p>Students stated that standalone courses devoted to professional development, interprofessional education, and other non-science, noncore topics are not valued by students. They strongly felt the only way a social networking experience would be valued and taken seriously is if it were embedding into a core course and the interactions with other health professions students had some practical purpose</p>

in many cases still today, the physician is the ultimate expert—the one member who is expected to know everything. But within the concept of participatory culture and collective intelligence, “everyone knows something, nobody knows everything, and what any one person knows can be tapped by the group as a whole.”^{42(p.39)}

This project examined the influence of pedagogical model with the intention of discovering ways to design spaces that may ultimately foster a participatory culture.

The literature concerning language and the understanding of language shares the central tenet that language (language creation, use, and understanding) is a social act.^{30,48,49} While learning is social, the individual also influences and is influenced by the thinking of the group, even if it is only to disagree.^{30,49} The function of language, a principle which guided and informed the qualitative analysis in this project, is mediated on the context of the environment and interactions with participants.

Gee says that discovering function is central to discourse analysis and that the primary function of language can be summarized as “to support the performance of social activities and social identities and to support human affiliation within cultures, social groups, and institutions.”^{48(p1)}

Gunawardena argues that the quality of interactions between and among members of an online discussion (the function of language use) cannot be determined with quantitative strategies, which simply tally number of posts, lengths of post, and interactions patterns of members.³⁰ Instead, she states that quality of interactions must involve an analysis which attempts to describe the function of the post. To determine the how and why of participant posting, a discourse analysis strategy was used. A functional move is defined as “. . .the function or purpose served by a particular part of a message.”^{29(p10)}

Pedagogical model did influence the success of achieving something approaching a participatory culture for students in the facilitated group, which in turn impacted their overall experience. Posting numbers were not quantitatively different between the 3 groups, but pattern of posts, the type of interaction between group members, and collaboration on the list of recommendations to the university did differ qualitatively. The rich list of recommendations produced from the facilitated group appears to be a result of this engaged experience. While it appears as though the facilitated learning environment impacted the results of this project, there are other possible influences, including the personalities of the individuals assigned to each group, the other factors specific to these participants that were not captured. This was a small study and the results require further testing within professional curricula. The amount of instructor or facilitator time required when this strategy is applied within an educational setting with specific learning objectives is also an important area of research.

Participants in this project shared a certain identity; they were all health professions students. But they also had many differences, including the identity differences among the health professions which involve different levels of power within the healthcare system, and differences in salary, education, and sometimes gender. These differences create the hierarchical nature of the healthcare team environment, which is present even pre-licensure. The design of a virtual learning space may allow for a flatter structure, resulting in more even participation.

SUMMARY

The purpose of this project was to evaluate the feasibility and effectiveness of using social networking for interprofessional education and to explore the influence of pedagogical model on the experience. The social

networking Web site Ning for interprofessional education is feasible. The pedagogical model did impact student engagement and enjoyment, with the facilitated approach being a qualitatively superior experience. The students who participated in this project recommended that social networking be incorporated into a core course and that all students in the Academic Health Center should be required to participate. The use of learning technologies to create a meeting space not dependent on time or place is a potential solution to the logistical barriers that have prevented wide-scale, longitudinal interprofessional education.

REFERENCES

1. Johnson DW, Johnson RT. New developments in social interdependence theory. *Genet Soc Gen Psychol Monogr*. 2005; 131(4):285-358.
2. Carabajal K, LaPointe DK, Gunawardena CN. Group development in online learning communities. In: Moore MG, Anderson WG eds. *Handbook of Distance Education*. 2nd ed. Mahwah, NJ: Lawrence Erlbaum; 2007:1037-148.
3. Lave J, Wenger E. *Situated Learning: Legitimate Peripheral Participation*. New York, NY: Cambridge University Press; 1991.
4. Lund A. Wikis: a collective approach to language production. *ReCALL*. 2008;20(1):35-54.
5. Meads G, Aschcroft J. *The Case Interprofessional Collaboration*. Oxford, UK: Blackwell Publishing; 2005.
6. Riel M, Polin L. Online learning communities. In: Barab SA, Kling R, Gray JH, eds. *Designing for Virtual Communities in the Service of Learning*. Cambridge, UK: Cambridge University Press; 2004:16-50.
7. Shen D, Nuankhieo P, Huang, X, Amelung, C, Laffey, J. Using social network analysis to understand sense of community in an online learning environment. *J Educ Comput Res*. 2008;39(1): 17-36.
8. Zhu E. Interaction and cognitive engagement: an analysis of four asynchronous online discussions. *Instr Sci*. 2006;34(6): 451-480.
9. Cain J. Online social networking issues within academia and pharmacy education. *Am J Pharm Educ*. 2008;72(1):Article 10.
10. Sandars J, Schroter S. Web 2.0 technologies for undergraduate and postgraduate medical education: an online survey. *Postgrad Med J*. 2007;83(986):759-762.
11. Chretien KC, Greysen SR, Chretien JP, Kind T. Online posting of unprofessional content by medical students. *JAMA*. 2009;302(12): 1309-1315.
12. Vroman K, Kovacich J. Computer-mediated interdisciplinary teams: theory and reality. *J Interprof Care*. 2002;16(2):159-170.
13. Wiecha J, Heyden R, Sternthal E, Merialdi M. Learning in a virtual world: experience with using Second Life for medical education. *J Med Internet Res*. 2010;12(1):e1.
14. Bastida R, McGrath I, Maude P. Wiki use in mental health practice: recognizing potential use of collaborative technology. *Int J Ment Health Nurs*. 2010;19(2):142-148.
15. McKenzie AB. What about social networking? *J Cont Educ Nurs*. 2009;40(10):436-437.
16. Bernardo TM. Harnessing collective knowledge to create global public goods for education and health. *J Vet Med Educ*. 2007;34(3): 330-334.

17. Chou WY, Hunt YM, Beckjord EB, Moser RP, Hesse BW. Social media use in the United States: implications for health communication. *J Med Internet Res.* 2009;11(4):1-9.
18. Medicine Eysenbach G. 2.0: social networking, collaboration, participation, apomediation, and openness. *J Med Internet Res.* 2008;0(3):e22.
19. Kamel Boulos MN, Wheeler S. The emerging web 2.0 social software: An enabling suite of social technologies in health and health care education. *Health Inf Libr J.* 2007;24(1):2-23.
20. Nordqvist C, Hanberger L, Timpka T, Nordfeldt S. Health professionals' attitudes towards using a web 2.0 portal for child and adolescent diabetes care: qualitative study. *J Med Internet Res.* 2009;11(2):e12.
21. Supe AN. Networking in medical education: creating and connecting. *Indian J Med Sci.* 2008;62(3):118-123.
22. Hill JR, Domizi DP, Hannafin MJ, Kim MC, Kim H. Teaching and learning in negotiated and informal environments. In: Moore MG, ed. *Handbook of Distance Education.* Mahwah, NJ: Lawrence Erlbaum Associates; 2007:271-284.
23. McFadyen AK, Webster V, Strachan K, Figgins E, Brown H, McKechnie J. The readiness for interprofessional learning scale: a possible more stable sub-scale model for the original version of RIPLS. *J Interprof Care.* 2005;19(6):595-603.
24. Sharma P, Olkver KM, Hannafin MJ. Teaching and learning in directed environments. In: Moore MG, ed. *Handbook of Distance Education.* Mahwah, NJ: Lawrence Erlbaum Associates; 2007: 259-270.
25. McFadyen AK, Maclaren WM, Webster VS. The interdisciplinary education perception scale (IEPS): an alternative remodeled sub-scale structure and its reliability. *J Interprof Care.* 2007;21(4):433-443.
26. Gaddis SE. How to design online surveys. *Train Dev.* 1998; 52(6):67-71.
27. Dillman DA, Tortora RD, Bowker D. Principles for constructing web surveys (Technical Report 98-50). Pullman, Washington: Social and Economic Sciences Research Center, Washington State University 1998. <http://134.121.51.35/dillman/papers/1998/PrinciplesforConstructingWebSurveys.pdf> survey.sesrc.wsu.edu/dillman/papers/websurveyppr.pdf. Accessed August 21, 2013
28. Krueger RA, Casey MA. *Focus Groups: A Practical Guide for Applied Research, 4th edition.* Thousand Oaks, CA: Sage Publishing, Inc; 2009.
29. Paulus TM. Challenge or connect? Dialogue in online learning environments. *J Comput High Educ.* 2006;18(1):3-29.
30. Gunawardena CN, Lowe CA, Anderson T. Analysis of global online debate and the development of an interaction analysis model for examining social construction of knowledge in computer conferencing. *J Educ Comput Res.* 1997;17(4):397-431.
31. Fairclough N. Semiotic aspects of social transformation and learning. In: Rogers R, ed. *An Introduction to Critical Discourse Analysis in Education.* Mahwah, NJ: Lawrence Erlbaum Associates, Publishers; 2004:225-235.
32. King S, Greidanus E, Carbonaro M, Drummond J, Patterson S. Merging social networking environments and formal learning environments to support and facilitate interprofessional instruction. *J Med Educ Online.* 2009;14(5):1-9.
33. Taylor EA, Cook D, Cunningham R, King S, Pimlott J. Changing attitudes: health sciences students working together. *Internet J Allied Health Sci Pract.* 2004;2(3):1-10.
34. Hind M, Norman I, Cooper S, et al. Interprofessional perceptions of health care students. *J Interprof Care.* 2003;17(1):21-34.
35. Horsburgh M, Lamdin R, Williamson E. Multiprofessional learning: the attitudes of medical, nursing and pharmacy students to shared learning. *Med Educ.* 2001;35(9):876-883.
36. Rose MA, Smith K, Veloski JJ, et al. Attitudes of students in medicine, nursing, occupational therapy, and physical therapy toward interprofessional education. *J Alli Health.* 2009;8(4): 196-200.
37. Coster S, Norman I, Murrells T, Kitchen S, Meerabeau E, Sooboodoo E, d'Avray L. Interprofessional attitudes amongst undergraduate students in the health professions: a longitudinal questionnaire survey. *Intern J Nurs Stud.* 2008;45(11):1667-1681.
38. Margalit R, Thompson S, Viscovsky C, et al. From professional silos to interprofessional education: campuswide focus on quality of care. *Qual Manage Health Care.* 2009;18(3):165-173.
39. Mann, K, McFetridge-Durdle, J, Breau, L, et al. Development of a scale to measure health professions students' self-efficacy beliefs in interprofessional learning. *J Interprof Care.* 2012; 26(2):92-99.
40. Jenkins H, Clinton K, Purushotma R, Robinson AJ, Weigel M. Confronting the challenges of participatory culture: media education for the 21st century [Report]. Chicago: The MacArthur Foundation; 2006. http://mitpress.mit.edu/sites/default/files/titles/free_download/9780262513623_Confronting_the_Challenges.pdf. Accessed august 21, 2013.
41. Billet S. Learning through practice. In: Billet S, ed. *Learning Through Practice.* London: Springer; 2010: 1-20.
42. Eraut M. *Developing Professional Knowledge and Competence.* London: The Falmer Press; 1994.
43. Laurillard D. *Rethinking University Teaching: A Conversational Framework for the Effective Use of Learning Technologies,* 2nd ed. London: Routledge Falmer; 2002.
44. McLoughlin C, Luca J. A learner-centered approach to developing team skills through web-based learning and assessment. *Br J Educ Tech.* 2002;33(5):571-582.
45. Parboosingh JT. Physician communities of practice: where learning and practice are inseparable. *J Contin Educ Health Prof.* 2002;22(4):230-236.
46. Gee JP. *An Introduction to Discourse Analysis Theory and Method,* 2nd ed. New York: Routledge; 2005.
47. Lewis C, Ketter J. Learning as social interaction: interdiscursivity in a teacher and researcher study troupe. In: Rogers R, ed. *An Introduction to Critical Discourse Analysis in Education.* Mahwah, NJ: Lawrence Erlbaum Associates, Publishers;2004: 117-146.
48. Carbonaro M, King S, Taylor E, Satzinger F, Snart F, Drummond J. Integration of e-learning technologies in an interprofessional health science course. *Med Teach.* 2008;30(1):25-33.
49. King S, Taylor E, Satzinger F, Carbonaro Greidanus E. Developing interdisciplinary team competencies in a blended learning course: impact on student learning. *Internet J Allied Health Sci Pract.* 2008;6(1):1-6.