

Online Interprofessional Health Sciences Education: Designing Inter-institutional E-Learning

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Abstract

The Institute for Interprofessional Health Sciences Education (IIHSE/IEISS – the Institute) is a virtual learning institute established with health Canada funding in 2005. We are working collaboratively to construct online learning for interprofessional health education. The IIHSE is innovating e learning on several levels by:

- Creating online, asynchronous education materials to support interprofessional health sciences education for undergraduates
- Creating these for professional, in-service education
- Creating a collaborative inter-institutional structure for continued content creation
- Inter-institutional access to electronic libraries and resources

The IIHSE has been founded in order to promote interprofessional education (IPE) across institutions, faculties, practice sites and communities of practice. The Institute uses e-learning technologies to enact a distributed learning paradigm for the delivery of education. This involves the use of web-based teaching and learning tools for encouraging problem-based learning, reflective practice, and the creation of a community of practice around IPE and its transfer into collaborative practice within the healthcare system. This paper outlines the challenges and opportunities encountered in the design of online, interprofessional health sciences education that involves multiple educational and clinical service institutions. This includes issues associated with distributed authoring of content, copyright and intellectual property issues, online library access for students from multiple universities, student articulation among disparate institutions, technical and educational support for distributed content authors and students. The paper will discuss these issues in the context of creating an online, collaborative educational institute for fostering and promoting interprofessional health sciences education at the undergraduate and in-service levels.

Introduction

The Institute uses ICT to enable distributed learning within the institute, and communication with the wider research and clinical communities. Supporting interprofessional education (IPE) and the development and support of communities of practice within various clinical settings and among professions requires the use of innovative and established technologies and distributed learning methodologies.

The objectives of the Institute are listed below, followed by ways we put them into practice leveraging e-learning technologies:

I. Objective I

To promote, implement and evaluate interactive web-based learning modules focusing on interprofessional knowledge, attitudes and skills

- a. develop online learning modules and learning objects with consistent pedagogical and technical standards
- b. use problem-based learning models within interactive learning objects
- c. develop a roster of learning activities that promote and foster IPE collaboration
- d. use a variety of evaluation metrics for tracking levels of student satisfaction, progress, learning, etc.

II. Objective II

To develop and evaluate a process of team development that uses on-site facilitators and targets patient outcomes for patient-centred care

- a. provide a communication framework that fosters IPE, collaboration, and open communication among project participants
- b. provide a common communication mechanism for on-site practitioners, pre-licensure learners, and others involved in the Institute
- c. link the communication to learning objects for “just-in-time” information retrieval and knowledge acquisition
- d. track the communication and use of ancillary learning objects

- e. evaluate the development of learning communities/communities of practice
- III. Objective III**
To pilot and evaluate an educational process for health professional students that is based on a continuum of learning from academic to practice settings
- a. provide a common learning management system (LMS) that will enable Institute participants (on-site practitioners, pre-licensure learners, others) to access learning materials, communicate among and across site groups
 - b. develop learning models for knowledge transfer, and track this progress
 - c. encourage communication, through learning activities and informal learning and mentoring, between participants, and track this development
- IV. Objective IV**
To create a sustainable collaborative consortium of education institutions to support the Institute
- a. use and leverage organizations' existing personnel and technological infrastructure for developing the learning content
 - b. create learning objects according to standards; use metadata to catalogue learning objects; store in a learning object repository
 - c. create a web portal for sharing information, connecting students, project participants
 - d. align the Institute's goals with participating organizations' strategic plans
- V. Objective V**
To stimulate networking and sharing of best practice approaches to disseminate products
- a. use web portal to create networking opportunities
 - b. create working paper series, index on portal, reuse in learning contexts
 - c. create video lecture series for public portal; reuse in learning contexts
 - d. connect to national infrastructure, other Health Canada IECPCP funded projects

E-Learning and Interprofessional Education

Interprofessional education (IPE) is designed to facilitate the transfer into practice of knowledge and skills learned within teams. These teams model how future work within the healthcare sector will be enacted. The goal of the Institute is to create online learning that enculturates learners into team-based or interprofessional learning and practice. The two aspects – learning and practice – should be considered in concert with each other. Those in the pre-licensure stream learn about working in interprofessional healthcare teams, but they will also learn about learning within IPE contexts. This form of enculturation can acclimatise these learners for interprofessional contexts, provided learning activities are designed appropriately. Learning activities should build on learners' core knowledge, while integrating key knowledge about working in interprofessional teams, the implications of this, and what it means to enact interprofessional practice.

With the general move to a distributed and networked culture, a concomitant focus on distributed learning as a way to engage learners in collaborative practice is an important facet of constructing meaningful learning that is situated within the ways in which healthcare practitioners will learn and work together in the future. Situated learning and legitimate peripheral participation are effective means of scaffolding learning within workplaces (Lave & Wenger, 1991; Billett, 1994; Billett, 1993). The construction of learning ecologies will enable collaborative learning to emerge from within online communities of practice (Looi, 2001; Barajas & Owen, 2000). Designing online learning environments that specifically scaffold learning into practice will enhance the transfer of knowledge about IPE, as well as enculturate learners into this form of learning and working together. Such enculturation will better prepare this generation of learners to engage in collaborative practice and other activities mediated by technologies (Luke, 2003), and encourage the construction of communities of practice across disciplines that will have positive effects both in the immediate term of teaching learners about interprofessional care and practice, as well as in teaching them about collaborating within virtual—and real—communities of practice more generally (Richardson & Cooper, 2003).

Knowledge building and constructivist, problem-based, and transformative learning form the pedagogical basis for the online Institute. The IPE content is part of the online collaboration activities, reinforcing the offline and online connections between learning and practice within teams (Vroman & Kovavich, 2002). Participatory and collaborative models of instructional design are used to create IPE material. These are effective means of engaging a dispersed team in collaborative program design and learning (Juntunen & Heikkinen, 2004; Luke, et al., 2004). The connections between the ways in which the Institute is conducted and the ways in which learners engage with each other in online learning reinforce the distributed and collaborative learning paradigm and prepare the students for future learning and work in technologically enabled collaborative practice settings. Learners who participate in

the Institute will be content experts with respect to their clinical area of expertise and IPE. They will also be expert learners, and be able to easily work and learn in the future within distributed environments.

The Institute uses problem based learning (PBL) concepts mapped onto e-learning, in order to effect a transfer of knowledge from the online, to the offline world. An orientation to the goals of IPE is useful. D'Eon 2005 (2005) reports the following key characteristics of IPE:

- The need to challenge students with learning activities and tasks that increase in complexity as they progress through the learning environment
- IPE should use “the five elements of best-practice cooperative learning: positive interdependence, face-to-face promotive interaction, individual accountability, interpersonal and small-group skills, and group processing”
- Experiential learning frameworks should be used to challenge students with “real life” cases, and to test their knowledge and skills and ability to work in IP teams.

What this means for Institute curriculum

- The need to challenge students with learning activities and tasks that increase in complexity as they progress through the learning environment

Institute learning activities should be designed to introduce learners to the competencies/outcomes and objectives in such a way as to build on existing knowledge, create new knowledge, and facilitate movement through the three learning domains from Bloom’s taxonomy, often cited in the medical education literature:

- Cognitive/knowledge: thinking
- Psychomotor/skills: doing
- Affective/attitude: feeling

D'Eon (2005) adds to this list “relating in groups” (p. 50), a key facet of IPE. This aspect of social learning is key to theories of situated learning that see social context as important in the construction of identity, as learners grow from apprentices to masters (Lave & Wenger, 1991; Wenger, 1998; Swanwick, 2005; Wood, 2001; Dolmans, De Grave, Wolfhagen & van der Vleuten, 2005). While each of these aspects of Bloom’s taxonomy can be expanded, for now it is enough to understand that students will need to move through the acquisition of knowledge domains (healthcare role and interprofessionalism), though the motivation to work in interprofessional contexts, to the acquisition and application of new skills, both in terms of learning and working. To this we add the kind of critical reflective practice advocated by theories of transformative learning (Imel 1998; Mezirow 1995) that scaffold learners through constructivist knowledge building (Scardamalia & Bereiter, 1996) within communities of practice. Learning content is therefore synchronized with course-level outcomes in a staged fashion so as to facilitate this type of learning pathway. The goal is to enable our students to be able to transfer what is learned online into interprofessional clinical practice.

Simply put, our learning elements, problems and case studies establish core content, encourage critical reflective practice, and build onto this more complexities so as to challenge learners to integrate new knowledge within clinical care plans and interprofessional practice. This encourages learners to formulate new knowledge based on awareness of prior assumptions and how these “meaning schemes”—and the learners themselves—fit into the world around them (Cranton, 1994; Imel, 1998; Mezirow 1991, 1995, 1997). Reflecting on the context of situated learning is important for learners to garner a sense of their place within their professional world, and how they interact with others. Learning activities that encourage critical reflection within communities of practice will encourage learners to be aware of their professional contexts, and how they can learn—about learning with other professions and in interprofessional groups, as well as learning about the practice of interprofessional healthcare.

- IPE should use “the five elements of best-practice cooperative learning: positive interdependence, face-to-face promotive interaction, individual accountability, interpersonal and small-group skills, and group processing”

These elements of cooperative learning undergird our IPE curriculum development. *Positive interdependence* refers to working in teams to build collective knowledge. Reinforcing this within online IPE contexts and discussions will enable us to teach our students about working with others in the pursuit of clinical problem solving. *Face-to-face promotive interaction* is synchronous purposeful “activity such as discussion, debate and joint decision-making (not declarative piecemeal research) where members help each other to succeed” (D'Eon, 2005, p. 53). We may not have as much opportunity for synchronous conversation such as this, but we can utilize asynchronous discussion boards to meet the same objectives. Threaded discussion boards help us to realize better knowledge acquisition and promotive interaction within the IPE context. *Individual accountability* means that each student is accountable for being a full member of the interprofessional team. For us this means ensuring that each student is tested on core

knowledge/prior learning as a fundamental component of participating in the IPE curriculum. We also use reflective practice, peer assessment and peer review, as well as mentorships, to facilitate individual accountability, learning, and knowledge transfer, as well as growth of professionalism within social context (Swanwick, 2005; McNair, 2005). *Interpersonal and small-group skills* are the essence of interprofessional clinical practice. We use the practice sites as case studies for the modelling of effective team skills. *Group processing* is where we ask our learners to critically reflect on their practice, learning and knowledge transfer.

D'Eon outlines the relationship of these best practices of cooperative learning to both PBL and case based learning. What is significant for us is that we use these practices to construct our curricula by creating learning objects and activities that present problems (of increasing complexity). Learning teams (groups of students; learners can also be paired with practice site mentors) use online discussion forums to tackle the problems. Interprofessional contexts are integrated within these problems and case studies. Self assessment quizzes and other evaluation mechanisms are used to test individual learners' knowledge gains. Collective evaluations are used to measure IP learning and transfer. Finally, learning groups collectively critique their experiences through reflective practice.

- Experiential learning frameworks should be used to challenge students with "real life" cases, and to test their knowledge and skills and ability to work in IP teams.

Problem based or case based learning is designed to introduce to the student clinical cases that encourage active learning, critical thinking and *in situ* problem solving. By exposing students to a variety of problems and case studies, they learn to apply their knowledge, and to transfer learning into multiple contexts. Using e-learning in this fashion assists in knowledge transfer and change in practice (Curran & Fleet, 2005). Curran and Fleet recommend an adaptation of Kirkpatrick's model for summative evaluation that evaluates learning based on reaction, learning, behaviour, results (Kirkpatrick, 1994), with results being patient/health outcomes (Curran & Fleet, 2005, p. 563).

Developing learning activities

Learning activities are constructed according to the PBL template discussed above. These take advantage of the capabilities of e-learning technologies inherent in the LMS used to deliver content and facilitate learning. This entails designing learning activities that require communication (often done asynchronously on the LMS bulletin board/discussion forum, or synchronously through a chat feature). Case studies are developed that emphasize the various roles inherent in collaborative patient-centred care, with communication requirements that encourage critical reflection by each learner, and comparison and contrast activities among the group of learners.

Oandasan and Reeves (2005, p. 45), using (D'Amour & Oandasan, 2004), provide an IPE pedagogical model that is ostensibly based on Bloom's taxonomy. Their model focuses on moving learners from understanding their role and others' roles (knowledge domain), enhancing skills and behaviours in both communication and reflection, and fostering attitudes of "mutual respect, open[ness] to trust, and willing[ness] to collaborate." Encouraging learners to understand their own role, and that of others, can be based upon critical reflection of their own prior knowledge, attitudes and skills, and the emergence into interprofessionalism. Oandasan and Reeves' tripartite structure provides a useful framework for the design of the learning activities, as illustrated below.

Knowledge: Roles

Information is taxonomized to enable delivering the right information, to the right person at the right time. In concert with this information delivery, the learning activities fashion interaction among the learners to engage with each other over facilitating understanding among roles and responsibilities. This interaction is focused on the case studies/PBL exercises, and may take the form of learner interaction with learning objects, learner-learner interaction using communication tools, or learner-mentor discussion.

Skills/Behaviours: Communication and Reflection

Fostering effective communication skills is done in concert with the learning activity design as outlined above. Utilizing the communication technologies within the LMS being used enables distributed teams to communicate, and have a record of their case-based PBL communication activities. Reflective practice can be implemented within the curricula by having learners keep a journal, and engaging in reflective practice exercises and learning objects. They can share their reflections within their learning communities through online discussions, web pages (personal and project/team), and by using mentorship models with those already working in the practice sites.

Attitudes: Respect, Trust, Collaboration

This aspect of the IPE structure is for higher-cognition/domain activities. Communication and reflective practice activities are worked into the learning activities in order to broker learner engagement within communities, and

facilitate the development of communities of practice within interprofessional teams. Comparison on learners within role-based cohorts should also be facilitated (nurses-nurses, physicians-physicians, etc.); these can be compared to understandings of roles from each perspective as the development of wider interprofessional practice is fostered.

Conclusion

This discussion of the design of the IIHSE foregrounds the work we have done in establishing inter-institutional learning contexts for interprofessional health sciences education. Throughout this process we have encountered many challenges commensurate with using large, distributed teams to create coherent educational materials. Compounding this has been the challenge of working out inter-institutional agreements for students to take courses from other universities than their own. There are also technical challenges associated with using highly innovative technology to design, develop and deliver online learning, including to clinical sites. We have also encountered copyright issues with respect to the use of materials in our courses, as well as in access to online library materials when students do not share the same institutional access to libraries.

Despite these challenges, or maybe because of them, the IIHSE continues to build its base and evaluate the effectiveness of the online materials (our current phase). We are also working on sustainability plans, which include the use of public learning object repositories and linking to other national organizations as a means of providing a single point of access to online IPE materials through federated repositories. Our work continues and this paper is an opportunity to share with others what we have learned to date.

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