Developing Clinical Communication Skills in a Constructivist Learning Environment

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Clinical Communications, a course in the Doctor of Pharmacy curriculum, emphasizes the knowledge of drug therapy and the clinical communication skills for interacting with patients. This course consists of laboratory and lecture sessions. The laboratory sessions are designed to facilitate students to apply the communication principles and drug therapy knowledge gained from the lecture sessions. It is found from the anecdotal teaching experiences that students are generally weak in using the knowledge of drug therapy and communication skills in actual clinical practice. Therefore, a web-based cognitive modeling system has been developed as an additional support to the lab sessions in order to foster student critical reasoning process and develop effective communication skills, which can be transferred to the real-world clinical setting. This paper first presents the underlying theoretical framework for the design, followed by the specific description of the web-based support system. The assessment methods will also be discussed in the context of constructivist learning environment.

Characteristics of a Constructivist Learning Environment (CLE)

The design of the web-based cognitive modeling system is mainly based on the theoretical framework of designing constructivist learning environments by Jonassen (1999), and Hanafin, Land, and Oliver (1999). The primary goal of designing a constructivist learning environment is to foster problem solving and conceptual development. In this environment, learning is driven by an ill-structured but authentic problem, question, case, or project. It emphasizes student-centered learning, which promotes ownership of the problem (Jonassen, 1999). In order to engage students in meaningful learning, students should actively engage in a knowledge construction process by participating in the manipulation of the problem space of the cases or projects that represents the real-world complexity. To obtain that end, meaningful contexts should be provided to students through real-world cases, problems, or projects so that student activities become meaningful and intentional (Hannafin, Land, Oliver; Jonassen, 1999). In addition, various instructional support, resources, and scaffolding tools should be provided in order to facilitate students achieve their learning goals (Hannafin, Land, Oliver; Jonassen, 1999).

Resources are source materials that support learning, ranging from electronic media, to print media, to human (e.g., experts, teachers, and peers). Instructional support includes modeling, coaching, and scaffolding. A teacher or an expert not only models performance, but also articulates reasoning. The teacher or the instructor can also provide motivational prompts, provoke reflection, and monitor and regulate the learner performance (Jonassen, 1999). To supplement the instructional strategies, computer-based tools can be provided to facilitate the instructional support. Tools provide overt means through
which students engage and manipulate both resources and their own ideas during knowledge construction and problem solving processes. These include processing tools, which support functions typically associated with information gathering and processing; manipulation tools, which enable students to explore the learning environment and restructure their mental models; and communication tools, which encourage conversations among students about the problem and support collaborative construction of knowledge through social negotiation, which is an essential process of constructivist learning (Hannafin, Land, & Oliver, 1999). The instructional support and the tools serve as a scaffolding mechanism to guide and support student learning effort in different cognitive dimensions, including domain-specific, conceptual, procedural, metacognitive, and strategic dimensions (Hannafin, Land, & Oliver).

The Design of the Web-Based Support System for Clinical Communications

The theoretical frameworks described above guided the design of the Clinical Communications Constructivist Learning Environment. Real-world cases, integrated with instructional strategies and supported with cognitive, conversational, and collaboration tools formed the core of the design. Figure 1.0 is a graphical representation of the web-based constructivist learning environment, which will be explained specifically below.

![Figure 1.0. Graphical Representation of the Web-Based Clinical Communications CLE](image)

Real-World Cases

**Related Cases.** In the constructivist learning environment, real-world problems drive the learning (Jonassen, 1999). Therefore, authentic cases contextualized in a real world pharmacy environment were developed to provide enabling contexts that allow students to interpret the contexts, generate sub-problems, and devise strategies (Hannafin, Land, & Oliver, 1999). Every case has an underlying instructional intention, and it requires students to manipulate the problem space, articulate their reasoning to the problem solutions, and develop a coherent argument to support that solution. The cases are designed to scaffold student memory and enhance cognitive flexibility (Jonassen, 1999). Students are asked to solve the problems presented by the cases before the lab session, where they will have further discussion and practice simulated clinical interviews.

**Case Library.** As students progress in their communication skills, they can select more challenging cases from the database-driven case library, which are indexed and organized into different themes, supported with the keyword search function. Cases with various situations and complexities will further enhance student reasoning skills to solve clinical communication problems.
Instructional Scaffolds and Cognitive Tools

As part of the instructional scaffolds and cognitive tools, question prompts, peer review, expert feedback, and self-reflection were developed, which were enabled by technology capabilities, particularly the web server and the database.

Question Prompts. On each case, students are prompted with questions, to which they are required to respond. The question prompts are designed to guide students through the problem analysis and solving process. The past research provides strong evidence on the positive effects of question prompts on helping students representing and solving problems in many different domains (e.g., Scardamalia et al., 1989). The question prompts strategy can engage learners in activities such as self-explanation, self-questioning (King 1991, 1992), and self-monitoring and reflection (Lin, 2001). It is expected that the questions will help learners to analyze the case, identify the problem, and generate appropriate solutions.

Peer Review and Self-Reflection. After students submit a response to a case, they are asked to review their peers’ solutions. At the same time, they can also access peer reviews to their own solutions, for which they are asked to write a reflection based on the peer review. The strategy of peer feedback allows students to see their peers’ responses to the cases and compare their perspective with those of their peers. Peer feedback has been found effective in helping learners internalize skills and build their confidence in performing tasks (Schunk, 1987).

Expert Feedback and Self-Reflection. After completing peer review and self-reflection, expert feedback (i.e., instructor’s solutions to a given case) will be made available to the students. Expert feedback is a powerful way of providing modeling to students. Experts notice features and meaningful patterns of information that are not noticed by novices, organize knowledge in ways that reflect a deeper understanding of their subject matter, and have varying levels of flexibility in their approach compared with novices (Bransford, Brown, & Cocking, 2000). Thus, expert feedback allows students to compare their solution with that of an expert and challenges them to find gaps between their thinking and expert thinking, which can impact the quality of their reasoning (Pedersen & Liu, 2002). Through experts’ feedback, learners are given an opportunity to compare their cognitive process with that of an expert, so that they become aware of their own performance, which helps them to self-reflect and improve their performance (Collins et al., 1989).

At this stage, students are prompted to reflect on what they have learned from the expert and their peers. Self-reflection allows students to actively engage in deeper thinking processes and examine their answers with expert responses (Scardamalia et al. 1984; King, 1991). In this design, reflective prompts are provided to encourage students to self-monitor their solution process and consider various perspectives and values regarding the selected solutions (Davis & Linn, 2000).

Conversation and Collaboration Tools

Communication and collaboration tools support efforts to initiate or sustain exchanges among learners, teachers, and experts, as well as encourage meaning negotiation, collaborative learning, and knowledge construction (Hannafin, Land, & Oliver, 1999; Jonassen, 1999). Thus, they are particularly important in designing a constructivist learning environment. In the Web-based support system for clinical communications, the weblog and discussion forum were identified as useful conversation and collaboration tools. The rationales and the benefits of the two tools are discussed briefly below.

Weblog. Weblog has a role of recording students’ process of learning. It provides a private space for individual students to reflect, monitor, and evaluate their learning process. It helps students to summarize what they have learned, to plan what to do next, and so on. It also allows them to add any comments or
question in their blogs. The blogs can be made available to the instructor, who can review the students’ thoughts and provide necessary comments. Students’ thinking are made easily visible to students themselves, which is an effective way to promote self-reflection (Bell & Linn, 2000). Weblogs can also be used to promote collaborative learning in the mode of indirect one-to-many communication. They are less structured than discussion forums. All students can share thoughts, web links and update the class without having to interrupt everyone by sending an e-mail.

**Discussion Forum.** Discussion forums are embedded in the learning environment to facilitate student-to-student interaction regarding the case studies and enhance understanding of the course materials. Students can exchange ideas, pose questions, articulate opinions, or share information through the forum. Instructors can initiate a discussion on the cases and moderate the process of the discussion. The purpose of the discussion forum is to engage student learning outside classroom hours, encourage self-regulated learning, and develop a learning community where students will negotiate meanings and construct knowledge collaboratively.

**Student Assessment Methods**

The greatest criticism toward using constructivist learning approach is that assessment is a difficult issue. Jonassen (1992) argued that individual learning outcomes in the CLEs could be measured by using a different set of criteria that represent the integral components of constructivism. These criteria include goal-free evaluation, authentic tasks, knowledge construction, experiential construction (process vs. product), context-driven and context-dependent evaluation, multiple perspectives, and socially negotiated meaning. To appropriately measure student learning outcomes in solving clinical communication problems, we developed student assessment method as an integral part of the constructivist learning environment. The assessment method described below represents the major assessment criteria for CLE as discussed by Jonassen and are paralleled with the ill-structured problem solving processes in the domain of clinical communication.

Two videotaping exercises (cases) are used to assess the extent to which students effectively communicate with simulated patient actors in order to identify and resolve a problem the patient is having with drug therapy. These actors receive patient roles and are trained in providing appropriate responses to students based on the type and content of their communication. Students receive patient information regarding medications, including dates of past prescriptions. They are permitted to review the patient information before entering a room to interview the patient.

Prior to each videotaping exercise, students receive an interview guide and evaluation tool. The major components of the guide/tool are as follows:

1. Introduction and purpose of interview
2. Assessments of potential problems: current medications, other health issues
3. Intervening to address problems
4. Arranging a follow-up to assess problem intervention
5. New medication: providing information, assisting adherence, assessment of understanding of new information
6. Ending the interview
7. Organization of interview
8. Education techniques
9. Questioning techniques
10. Listening to the patient
11. Conveying empathy
12. Nonverbal communication
13. Ending the interview

Patient interviews are captured and streamed on-demand via the Clinical Communications CLE. Students log on to watch and evaluate their own patient consultation as well as their lab group members’ patient consultations. They provide written self-reflections of their case performance, including strengths and areas for improvement. Students also formulate goals for improvement, plans of action to achieve goals, timelines to check progress toward goals, and evidence of achieving goals. They then discuss their self-reflections and goals with their lab group members during laboratory sessions. These videotaping exercises will be graded by respective lab instructors. The grading criteria used by the lab instructors are the same as the interview guide/evaluation tool used by students (listed above). Similarly, instructors will provide constructive feedback to each student.

Conclusion

Overall, the Web-based support system for Clinical Communications provides an opportunity for students to develop their problem solving and clinical communication skills as well as for instructors to monitor student performance in an efficient manner. However, to apply these skills in a real world, good and authentic cases are paramount. Therefore, a diverse variety of cases will be needed to further elicit student performance so as to establish a far transfer of learning in professional practice.

References


Biographical Sketches

**Xun Ge** is an Assistant Professor in the Instructional Psychology and Technology Program, Department of Educational Psychology, the University of Oklahoma. She received a Ph. D. in Instructional Systems from the Pennsylvania State University. She teaches a series of courses on designing and developing interactive multimedia instruction for both classroom and online instruction. Her research interest includes designing and developing instructional “scaffolds” and cognitive tools to support critical thinking, problem-solving, and metacognitive skills in computer-supported, online learning environment. She is also interested in the research on online learning communities and the dynamics of online collaborative learning environments.

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Fen-Lan Jen has a M.Ed. in Instructional Psychology and Technology from The University of Oklahoma. Her concentration is Design and Development of Instructional Software. With a variety of computer application knowledge and skills, she is developing computer-based training units for the KITE Project (Knowledge Innovation for Technology in Education Project; supported by PT3).

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