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Constructivist Instructional Design Models for Web-Based Adult Education

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Background

Educators have long sought for ways to improve student learning. With the introduction of technology to the instructional setting, possibilities for finding new strategies to improve learning have been, and continue to be, explored. To make the leap to student-centered, technologically-mediated instruction requires exploration of both change in the teacher's understanding of how best to teach, as well as understanding the different dynamics of the technology-mediated learning setting. Learner-centered approaches to teaching, including situated or contextual learning, collaborative learning, and integrated theme-based instruction, are gaining advocates (Dirkx & Prenger, 1997; Imel, 1991; Slavin, 1981). However, discussions continue as educators strive to resolve the tensions presented by changes in teaching practice and learning environments. Constructivism, Objectivism, Integrated Thematic Curricula, and Cognitive Flexibility Theory present design and theory frameworks that can move technology-mediated teaching and learning into the non-linear environment of the Web-based.

Tensions of Paradigm

As technological tools move into the learning environment, or actually become the learning environment such as in distance education, tensions arise as teachers are asked to revisit traditional models for instruction in favor of new instructional design that maximizes potential for technology-mediated instruction (Gilbert, 1995). Gilbert reports that some faculty perceive that their teaching is not working as well as in the past (p. 2). The diffusion of innovation literature (Dirkx & Turner, 1993; Gilbert, 1995; Rogers, 1983, 1971, 1962) speaks to challenges experienced by educational institutions at all levels in the attempt to not only introduce change in practice into educational settings, but also to convince teachers to use instructional technology.

Constructivism

Many different learning theories and instructional design models are at work in education today. Some areas of adult education component embrace emancipatory, social action philosophy. Transformative adult education (Mezirow, 1991) is less about andragogy (Knowles, 1980)--methods and procedures to teach adults--and is more about the role of education to stimulate and facilitate social and personal change (Friere, 1995; Lindemann, 1961; Mezirow, 1991; Tisdell,

1993). Other models of design includes contextual, collaborative, and constructivist theory. Such learner-centered models are based on constructivism, which holds that knowledge is constructed within the consciousness of each individual, and the focus is on the process and reflexive awareness of the process (Bednar, Cunningham, Duffy, & Perry, 1992 p. 24).

Objectivism

On the other hand, current curricular frameworks embraced by schools tend to represent a competency-based, fragmented view of curriculum, driven by a static view of specific concepts that must be mastered at specific grade levels (Duffy & Jonassen, 1992; Freeman & Sokolof, 1995). Teachers identify themselves according to their area of specialty, such as math teachers, computer teachers, English teachers rather than facilitators of a student's learning. Traditional approaches focus on efficient processing of information and accurate retrieval (Bednar, Cunningham, Duffy, & Perry, 1992, p. 24). "Experience plays an insignificant role in the structuring of the world; meaning that exists in the world quite aside from experience: (Duffy & Jonassen, 1992, p. 2).

As seen in current workplace learning environments, this highly structured approach is described by Marsick (in Merriam & Caffarella, 1991) in part by the following characteristics:

- 1) behaviorally-oriented with performance outcomes;
- 2) deficit model that compares individual efforts against standards;
- 3) emphasizes step-by-step procedures, rationality, and objectivity;
- 4) formal group activities constitute the bulk of training.

Some would say that objectivism and constructivism are completely incompatible (Bednar, Cunningham, Duffy, & Perry, 1992, p. 21). Static, deficit-driven models of instructional design are resulting in passive, overwhelmed learners. Learners who emerge from such educational programs may find themselves at a disadvantage as learners engage in educational environments that are highly technology-mediated, such as the world wide web (Haugsjaa, 1996).

Theories and Models

Can existing theories of transformative, emancipatory or social learning, teacher-driven or learner-centered fully meet the needs and potential of the world wide web as an instructional setting or tool? Introducing different instructional models can be challenging because the different models approach learning from different viewpoints of what constitutes learning and what is a teacher's role in instruction. Basic assumptions about adult learners include the notion that adult learners make decisions about their learning experiences based upon factors such as changed life circumstances, learning environment, and having an active voice in direction the experience (Knowles, 1980; Merriam & Caffarella, 1991).

The role of the learner's experience is an important determining factor of a learner's understanding of course content. Contextual learning, organizing learning within the context of the learner's life situation, suits children and adults alike (Haugsjaa, 1996; Knowles, 1980). The context of the learner's life is a grounding for learning, a point of making meaning that is relevant and for departing into new areas (Knowles, 1980). The process of making meaning is a constructivist approach to education wherein the learner grapples with and reflects upon the content to create new insights about the material and how it fits into the larger environment which includes the learner's life-world.

To take the conversation further, how are existing approaches adapted to the new world of computer-assisted learning, specifically web-based learning? Are there new theories of learning or new instructional design models that alone serve the world wide web learning environment? The debate continues as Bednar, et al. suggest that constructivism challenges “the instructional design assumption that process can be separate from content” (Crotty, 1997, p. 2).

Integrated Thematic Curricula

Based in constructivist theory, thematically designed curriculum addresses “broad existential questions [that] transcend disciplines, allowing learners to integrate the information...within the full range of human experience” (Freeman & Sokolof, 1995, p. 1). The process of developing themes in a contextual model would be driven by the students. Reflecting their goals and interests. Required content would be blended in with the theme. The student participating in

thematic instruction would then study a theme directly relevant to the contextual life-world of that particular student.

Thematic instructional design requires that the student have opportunity to reflect and explore. From a distance using e-mail, the student has the built-in opportunity to reflect before participating in discussion. The teacher facilitates a thoughtful process to explore interrelationships or students engaged with each other. Themes are explored first, then the specific topics, then facts and information (Freeman & Sokolof, 1995). The most visible impact of technology on the thematic process is the increased access to information with which to explore the facts and information related to the theme.

Thematic instruction offers web-based instruction a powerful instructional process—that of multiple entry points (Freeman & Sokolof, 1995). The world wide web is a nonlinear environment. There is no beginning and no end, no top and no bottom. The web does not have a specific shape. It is not circular, square, or organized in an orderly manner. Linear instructional design cannot be successfully adapted to the web in a manner that maximizes the potential of the web as a learning environment. Traditional instructional design that uses drill and practice methodology does not have a functional home on the world wide web. In a theme-based curriculum, a theme can be entered at any place, whether it be the topic, the overarching existential idea that is the theme, or at the level of facts and information. This nonlinear design matches the potential of the web.

Cognitive Flexibility Theory

A theory of instructional design that takes into account a common basis for failure of instructional systems is a constructivist theory of learning that focuses on real-world complexity (Spiro, Feltovich, Jacobson, & Coulson, 1992, p. 57). Spiro, et al., hold that “effective approach to instruction must simultaneously consider several highly intertwined topics, [including] the constructive nature of understanding; the complex, ill-structured features of most knowledge domains; patterns of learning failure; and a theory of learning that addresses known patterns of learning failure” (p. 58). They developed five theory-based recommendations to promote successful learning. One recommendation holds that

for learners to develop cognitively flexible processing skills and to acquire contentive knowledge structures which can support flexible cognitive processing, flexible learning environments are required which permit the same items of knowledge to be presented and learned in a variety of different ways and for a variety of different purposes. (p. 58)

Spiro, et al. also suggest that the computer is the ideal medium to foster cognitive flexibility because of the flexibility inherent in its use (termed Random Access Instruction).

[M]ultidimensional and nonlinear hypertext systems, if appropriately designed...have the power to...promote features of cognitive flexibility in ways that traditional learning environments (textbooks, lectures, computer-based drill) could not (although such traditional media can be very successful in other contexts or for other purposes.) (p. 58)

The understanding of constructivism that has held for 25 years involves a combination of information from a text with information from outside of the text, including prior knowledge of the learner, to form meaning about the information presented in the text. Taking into account the problems posed by the ill-structured nature of knowledge domains and patterns of learning failure, Cognitive Flexibility Theory, a “new constructivism” is a double constructivism. Meanings are constructed by applying prior knowledge to the information given. However, rather than the prior knowledge being information retrieved intact from memory, the prior knowledge is itself constructed to meet the variability of the ill-structured domain (Spiro et al., 1992, p. 65). Thus, the learner makes meaning on multiple levels, promoting learning and successful transfer to new situations.

How this is accomplished requires multiple approaches to content. It is vitally important that students be active learners in this process. Cognitive Flexibility Theory has the student revisit material from different perspectives, rearranged and for different purposes. Content is addressed multiple times at multiple levels for the learner to gain full understanding of the content.

Conclusion

There are multiple levels of tensions brought about by the introduction of instructional technology to the educational setting. The introduction of the world wide web to instruction has opened immense opportunity to tap heretofore inaccessible resources. The recent dynamic growth of distance learning opportunities for students also presents a forum for tension as existing theory and design meets a new environment. This meeting and marriage tends to be an adaptation of existing theory and design to an unfamiliar forum. Objectivism meets constructivism in the web. Constructivism has evolved to take great advantage of the unstructured, nonlinear environment that is a good fit for the learning needs of students in web-based learning settings.

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