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AUTHOR	Crawford, Caroline M.; Willis, Jana
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ABSTRACT

The continual evolution of the national technology standards creates a continual state of flux within the world of instructional technology. However, this creative online environment offers the possibilities that may not be available within other specialization areas; namely, the opportunity to reinvent conceptual frameworks of understanding and creative endeavors. Innovative teacher education units across the United States are reaching for opportunities to maintain the bleeding edge of understanding and integrating technology in successful and appropriate manners, which may also lead to thoughtful reflection as to the state and reasoning behind "why we do what we do." Discussion includes: cognitive flexibility; instructional design; national standards integration into Web-based coursework; standards evaluation; and the Web-based teacher education technology course scope and sequence. (Author/AEF)

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Author: Caroline M. Crawford
University of Houston – Clear Lake
Houston, Texas, USA
crawford@cl.uh.edu

Jana Willis
University of Houston-Clear Lake
United States of America
willis@cl.uh.edu

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Can Standards be Met and Evaluated Through an Online Teacher Education Technology Course? A Case Study

Caroline M. Crawford

University of Houston-Clear Lake

United States of America

crawford@cl.uh.edu

Jana Willis

University of Houston-Clear Lake

United States of America

willis@cl.uh.edu

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successful and appropriate manners, which may also lead to thoughtful reflection as to the state and reasoning behind "why we do what we do".

Introduction

Web-basing coursework has been a major focus of universities around the world for the past five- to ten-year period and has resulted in a bell-curve fallout of subject-specific quality coursework. However, the teacher education units have more carefully begun to review the positive and negative aspects associated with the possibilities of Web-basing teacher education coursework. Can standards be met through Web-based teacher education coursework? Can standards be evaluated through Web-based teacher education coursework? The simplistic answer to such questions is, "Yes!" Standards can be met and evaluated through Web-based teacher education coursework.

Since Vannevar Bush (1945) first imagined an intelligent machine that could maintain the full knowledge of the world, man has been steadily moving towards the realization of the Information Age. With the rise of and open access to the World Wide Web since the early 1990s, insurmountable efforts towards communication and knowledge dispersal has been realized. As early as 1980, Seymour Papert envisioned a computer interface that would offer access to learning environments.

> I believe that the computer presence will enable us to so modify the learning environment outside the classrooms that much if not all the

knowledge schools presently try to teach with such pain and expense and such limited success will be learned, as the child learns to talk, painlessly, successfully, and without organized instruction. (Papert, 1980, p. 9)

With prophesies such as Papert's, the dawning of the Information Age, with the creation of numerous possibilities, has become a reality. However, the importance of learning environments, instructional design, learning environments and superior facilitators has become an area of utmost importance to the success of Bush's and Papert's visions. After all, "Computers are not an end in themselves. The goal of technology integration into the classroom and curriculum is not to expose students to computers and the Internet. Technology, by definition, is a tool" (Dockterman, 1998, p. 21). With such a tool in the hands of exceptional, creative persons, the ability to create learning opportunities has become a reality. Web-based courses are on the rise, with research results creating an intelligent conversation concerning both positive aspects and areas for improvement to the Web-based learning environments available today.

Cognitive Flexibility

Cognitive flexibility creates a theoretical view through which to create a conceptual understanding of the learning environment. The nature of learning is often environed within complex and ill-structured opportunities to obtain and understand knowledge. Spiro and Jeng state that, "By cognitive flexibility, we mean the ability to spontaneously restructure one's knowledge, in many ways, in adaptive response to

radically changing situational demands.... This is a function of both the way knowledge is represented (e.g., along multiple rather single conceptual dimensions) and the processes that operate on those mental representations (e.g., processes of schema assembly rather than intact schema retrieval)" (1990, page 165). Additionally, one may note that cognitive flexibility "is largely concerned with transfer of knowledge and skills beyond their initial learning situation" (Kearsley, http://tip.psychology.org/spiro.html, paragraph 2). As such, cognitive flexibility is delineated towards a conceptual understanding of Web-based learning environments to support the integration and success of interactive technologies, such as a Web-based teacher education technology course.

Through this complex and ill-structured domain, the creation of a conceptual framework of understanding must arise for each learner. This is where the instructional design element is of utmost importance. Only through the careful creation of a learning environment, with all activities created and implemented appropriately and successfully, will the learner's understanding of the information become successfully integrated into the learner's conceptual framework.

Instructional Design

The instructional design process offers the standardization of materials to each of the teacher education courses; therefore, the consideration of adjunct faculty dismissing imperative knowledge and activities is no longer a consideration due to the standardization of the Web-based courses that have been designed over an extended

period of time by faculty with numerous years of experience associated with the subject matter.

National Standards Integration into Web-based Coursework

As stated by the International Society for Technology in Education (ISTE), "Technology must become an integral part of the teaching and learning process in every setting supporting the preparation of teachers" (International Society for Technology in Education, 2001, paragraph 2). Further, "A combination of essential conditions is required for teachers to create learning environments conducive to powerful uses of technology. The most effective learning environments meld traditional approaches and new approaches to facilitate learning of relevant content while addressing individual needs" (International Society for Technology in Education, 2001, paragraph 1). Therefore, ISTE is one of the leading international associations that support the integration of technology into the learning environments. Taking such integration of technology a step further the learning environment may be mediated by the technology, as in the world of the Web-based course environment.

Specifically, the teacher education technology course offers the opportunity to focus upon ISTE standards for both the teachers (ISTE National Educational Technology Standards for Teachers, also referred to as NETS*T) and the learners (ISTE National Educational Technology Standards for Students, also referred to as NETS*S) so as to

emulate the importance of both ISTE standards. NETS*T offers 23 indicators which are organized into six umbrella categories:

I. Technology Operations and Concepts;

II. Planning and Designing Learning Environments and Experiences;

III. Teaching, Learning, and Curriculum;

IV. Assessment and Evaluation;

V. Productivity and Professional Practice; and,

VI. Social, Ethical, Legal, and Human Issues.

(International Society for Technology in Education, 2000, paragraph 6)

Standards Evaluation

An important aspect to any educational endeavor is the evaluation of the learning objectives. More clearly delineated, an assessment of the assignment(s) that exemplify the learner's grasp of the learning objectives for the unit of study. As numerous forms of assessment are appropriate and successful within a learning environment, following are the assessment formats currently integrated into the Web-based teacher education technology course. Each of these aspects are integrated into each unit of study within the course.

- Knowledge-based quizzes;

- Project-based assignments and products, with assessment rubrics available for review; and,
- Reflective journals.

For purposes of this course, there is also a capstone project that each learner must successfully design, develop, formatively and summatively evaluate. As well, a full project expectation description and an assessment rubric is available to the learner for purposes of guidance and self-assessment.

Web-based Teacher Education Technology Course

The Web-based teacher education technology course has been developed through which to exemplify and designate the ISTE NETS*T (International Society for Technology in Education, 2000) standards. As such, the following units of study have been integrated into the course:

- Internet
- Copyright/Ethics/Equity/Legal
- Hardware/Software/Networking Tools
- Software Tools/Emerging Technologies
- Software Evaluation
- Learning Theory/Assistive Technology
- Storyboarding/Project Management/Assessment
- Web Design

- Graphics
- Video/Audio/CD-Rom
- Word Processing/Desktop Publishing
- Spreadsheets
- Databases
- Presentations

Within each of the units, the following instructional design elements are implemented for purposes of flow and to develop a comfort level within the learner's conceptual framework of understanding:

- Objective
- Instructional Events
    - Readings
    - Best practice examples
    - Guided practice/tutorial
- Product Creation
- Peer Evaluation
- Discussion
    - Bulletin board
    - Chat room
- Reflection
    - Synthesis of skills and knowledge gained
    - Application of skills and knowledge gained in a learning environment

As may be concluded from the above Web-based teacher education technology course scope and sequence, the expectations for each learner to successfully complete the course are significant. As such, the teacher candidates maintain a level of technological understanding at both the theoretical and practical levels as they progress towards methods coursework within their specialization areas.

Conclusion

The continual evolution of the national technology standards creates a continual state of flux within the world of instructional technology. However, this creative environment offers the possibilities that may not be available within other specialization areas; namely, the opportunity to reinvent conceptual frameworks of understanding and creative endeavors. "The most obvious benefit of the electronic classroom is that it achieves what progressive educators could only dream of: a union of work and play.... There is no certainty that the electronic classroom will actually fulfill this promise, but it is this hope that makes the realization so attractive" (Ravitch, 1987, p. 28). Innovative teacher education units across the United States of America are reaching for opportunities to maintain the bleeding edge of understanding and integrating technology in successful and appropriate manners, which may also lead to thoughtful reflection as to the state and reasoning behind "why we do what we do".

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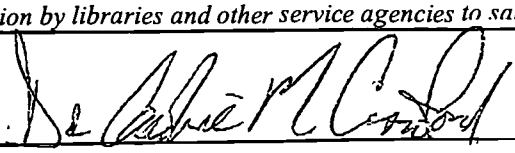
Signature: 	Printed Name/Position/Title: Dr. Caroline M. Crawford/Assistant Professor
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