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EDITORIAL

Constructivist theories of teaching and learning are receiving increasing attention in distance education literature. Constructivism, presented as an alternative to and an improvement on traditional approaches to teaching and learning, emphasizes the creation of collaborative, learner-centered environments that support and encourage reflective and experiential learning. In this article, Dr. Teri Crotty describes the use of constructivist principles in the design and development of a course for pre-service teachers. (For an earlier article on this subject, readers may want to see LeBaron, J. F., and C. A. Bragg. 1994. Practicing what we preach: Creating distance education models to prepare teachers for the twenty-first century. The American Journal of Distance Education 8(1):5-19.)

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CONSTRUCTIVIST THEORY UNITES DISTANCE LEARNING AND TEACHER EDUCATION

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THE CONSTRUCTIVIST PARADIGM

The work of developmental psychologists Piaget (1963) and Vygotsky (1978) set the precedent for questioning whether or not direct teaching methods were responsible for student learning. Preservice teachers are introduced to these researchers and their work early in the teacher education program during a required Educational Psychology course. As these college students are introduced to the notion that learners discover and construct meaning from their environments, they are encouraged to rethink their views of what it means to teach. This new role of the teacher does not depict one who transmits knowledge but rather one who designs experiences where learners are required to examine thinking and learning processes; collect, record, and analyze data; form and test hypotheses; reflect upon previous understandings; and thus construct their own meanings. In her Educational Psychology textbook, Woolfolk (1993, 485) describes the "constructivist view of learning" and the "cognitive mediational view" as follows:

> Whatever the name, the key idea is that students actively construct their own knowledge; the mind of the student mediates input from the outside world to determine what the student will learn.

Learning is active mental work, not passive reception of teaching. In this work other people play an important role by providing support, challenging thinking, and serving as coaches or models, but the student is the key to learning.

With this view of teaching and learning in mind, the challenge becomes one of designing course requirements which require the learner to mediate and construct with the help of others. Engaging preservice teachers in distance learning activities seemed to be a logical choice for encouraging students to seek the assistance of others yet take responsibility for constructing their own meaning.

CONSTRUCTIVISM AND INSTRUCTIONAL DESIGN:
SOME GUIDELINES

Instructional Systems Design experts have been engaged in a dialogue among themselves as to whether constructivism and instructional design are compatible. Reigeluth (1989) argues for a "new mindset" to combine constructivist elements in the instructional design models. Dick (1991) argues that constructivist interventions are different from instructional interventions and proposes a dual approach. A third position (Carroll 1990) argues that the fundamental view of learning from the constructivist view is simply incompatible with instructional design theory. Others have approached the new view of learning as challenging the instructional design assumption that process can be separate from content (Bednar et al. 1992). While the debate among instructional systems design professionals continues, those of us who value constructivist learning theory and are actively engaged in course design look for methods to enhance our instruction toward the constuctivist paradigm of teaching and learning.

In a recent review of the literature on the aforementioned debate, Lebow (1993) proposed "Five Principles Toward a New Mindset" as constructivist values which might influence instructional design. These principles also seem to support the use of opportunities for learners to engage in distance learning experiences as a means of challenging students to construct their own meaning with the help of others. Lebows work is repeated here in order to familiarize the reader with the principles and to provide an advance organizer for the subsequent course design and objectives.

Principle 1. Maintain a buffer between the learner and the potentially damaging effects of instructional practices.

* Increase emphasis on the affective domain of learning.
* Make instruction personally relevant to the learner.
* Help learners develop skills, attitudes, and beliefs that support self-regulation of the learning process.
* Balance the tendency to control the learning situation with a desire to promote personal autonomy.

Principle 2. Provide a context for learning that supports both autonomy and relatedness.

Principle 3. Embed the reasons for learning into the learning activity itself.

Principle 4. Support self-regulated learning by promoting skills and attitudes that enable the learner to assume increasing responsibility for the developmental restructuring process.

Principle 5. Strengthen the learner's tendency to engage in intentional learning processes, especially by encouraging the strategic exploration of errors (Lebow 1993, 5-6).

These principles served as the guidelines for the integration of distance learning opportunities in the capstone course "School and Society." For example, preservice teachers selected their own research topic and supported their thinking with the use of telecommunications. This provided a personally relevant context, promoted autonomy, and helped to develop skills that support the learning process. In addition, the use of telecommunications as a distance learning activity embedded the reason for learning into the activity itself and supported the learners as they restructured their view of teaching and learning.

COURSE AND LEARNER OBJECTIVES

The specified objectives for the preservice teachers enrolled in the School and Society course are discussed herein. Upon completion of the course students are expected to be able to:

1. demonstrate an understanding of the basic foundations for the uniqueness of American public schools.
2. communicate a familiarity with the philosophical systems and reform initiatives and describe their impact upon the evolution of the modern public school.
3. apply analytical skills relevant to evaluating the school in historical, social, and philosophical perspectives.
4. apply social, philosophical, and historical perspectives to ethical dilemmas and case based decision making.

Authentic learning toward these objectives was supported by providing opportunities for multiple telecommunications enhanced projects. For example, what better way to demonstrate the uniqueness of the American system of financing public education than to compare it to the financing system of another country? Or what better way to learn perspective taking for evaluative analysis than to engage in dialogues with teachers and educational experts at a distance? Preservice teachers also became more familiar with the potential uses of distance learning technologies for the K-12 classroom as a reform initiative in the modern public school.

COURSE DESIGN

After preservice teachers were introduced to ERIC as a means of researching a question they wished to answer, they were given hands-on workshops for developing telecommunications skills and an awareness of information exchanges (Internet, News Groups, Gopher) to support their research. During the course of lecture and discussion method of instruction where they had been introduced to the philosophical, historical, sociological, financial, legal, and ethical foundations of the American educational system, students simultaneously designed and initiated their own distance learning projects. It is this fluid and personalized curriculum which is of greatest interest to the constructivist model and the focus of analysis in this report.

Some ideas were introduced as examples of possible projects and students continued sharing their personal project descriptions with other members of the class as the projects took shape. Ideas for sample projects which were initially introduced by the instructor are listed below:

1. Supplement basic research from information sources in addition to ERIC such as Peacenet, Internet, Bitnet, etc.
2. Design a cooperative distance learning project for local fifth grade students.
3. Analyze the above school project for affective or cognitive outcomes.
4. Analyze curriculum issues by developing dialogues with teachers in content areas through e-mail.
5. Explore multi-media resource development in lieu of a textbook-driven curriculum with teachers in the field.
6. Self-reflect through exchange of ideologies between teachers and/or otherpreservice teachers at a distance.

Preservice teachers were instructed to design their own projects for authentic learning and assessment which met the aforementioned objectives. These projects were preserved from inception to completion through the use of portfolios. Each student was required to maintain a portfolio which included a journal of original ideas, thoughts, feelings, anxieties, and insightful experiences; a record of distance learning exchanges; documentation of information gathering, data collection, research, evaluation, or analysis; feedback from peer partners at various stages of project completion; a multimedia presentation of the project as a final exam; and a written summary of how this experience affected his or her philosophy of teaching. An analysis of the portfolios has indicated that the distance learning activities had some impact on the preservice teachers philosophical views and provided suggestions for the successful integration of distance learning activities in the face-to-face classroom. Positive experiences and an interesting array of topics were also gleaned from the collection of portfolios.

DISTANCE LEARNING PROJECTS

The following is a summary of research topics and accompanying telecommunications projects which students chose. Many students changed their selected areas of interest, and the topics listed below represent the final projects as presented at the end of the semester. The language of the students is preserved.

Research Paper Topic	Telecommunications Project
Year Round School	Collect Various School Calendars
Technology in European Schools	Survey Teachers and Students in exchange programs with UWRF & Poland
History & Finance of Head Start	Head Start programs in other states
Peer Support Programs	Practical Application of Peer Support Groups via Communication with Current Facilitators

Computers in Art Instruction	Examples of Computers in Art Curriculum, Talk to Art Teachers
Sex Education in the US	Sex, AIDS, and Comprehensive Health Education Curriculum Samples
Reading and Writing for the Future	Collect Activities for Process-Writing and Literature-based Reading
Discipline in US Schools	Discipline Problems in European Schools
The Language Arts Curriculum of England	Interview with English Head Master
K-12 Teachers' Attitudes Toward Telecommunications for students	Survey Local K-12 Teachers Using Telecommunications
Effects of Technology on Elementary Students	Observe and Interview Local Students Involved in Telecommunications Projects
How do Computers Effect the Classroom?	Develop Curriculum Project for Local Fifth-grade Students (and Implement)
The Social Studies Debate: What Should the Curriculum Be?	Engage in Discussion with Social Studies Teachers to Answer Question
Education and Native American Needs	Telecommunicate with Ojibwe School
The Ways the English Language Influences the Education of Spanish-speaking Students	Verify Research Findings with Teachers through E-mail
Effects of Calculator Use in Math	Survey Math Teachers on Use of Calculator in Math Class via Internet
Determining Factors for State Rankings of Student Achievement in Mathematics	Ask Teachers for Their Perspectives
Does Children's Literature Vary by State?	Talk to Teachers about Children's Literature in Different States
Home Schooling and State-Required Assessment	How Do Parents of Home Schools Evaluate Student Achievement?
Guidelines for Developing Telecommunications Projects in the Public Schools	Work with Local Fourth and Fifth Grade Teachers in Developing and Implementing Actic Trip, World
Should Physical Education be Required in Elementary?	Ask Teachers Through E-Mail
Making the Difficult Move from Elementary to Middle School	Telecommunicate with Middle School Teachers Group
Distance Education and Modern	E-Mail with Alaskan Educators

Technology in Rural Alaska

Using Technology in a Whole Language Classroom

Collect E-mail and NEWS Group Ideas

LEARNER FRUSTRATIONS

After students had an opportunity experiment with their telecommunications projects, they were asked to share their frustrations as well as any positive experiences they incurred. The following excerpts from this formative evaluation provided feedback for specific action to be taken by the instructor to support the students self-learning with the distance learning technology.

The overwhelming response from the students when asked to share their frustrations in working with telecommunications involved some sort of time variable. Students either complained that they did not have enough time in their schedule to access their e-mail, send a message, or search for an information locator which fit their topic. Others complained about the time between sending a message and receiving a message, or the fact that they could not just take a few minutes between classes to access the system but rather had to "dedicate 30 to 60 minutes to send/receive messages."

Most of the students in this course were employed part time, and none of them had the technology in their homes to support the activity. There was a minimal number of terminals available in campus housing, but because these were Juniors and Seniors, only a few of them lived in university housing. As a result of this learner feedback, one class period was set aside for students to contract for time with technology. Students were asked to write specific goals and objectives for their "Time with Technology Contract," and were asked to give themselves a grade which reflected their effort and accomplishment. Most of the students provided rich descriptions of their rationale for the grades. About half gave themselves an A, most others gave themselves a B because they had set their goals too high and were unable to meet their own expectations. Only two students gave themselves a failing grade for accomplishment, but countered with a passing grade for effort.

Another frustration commonly cited was that students were having difficulty with Gopher. Consequently, a workshop was arranged during class time so an expert could walk students through the Gopher menu system (for the second time) in an on-campus computer lab.

Four students (out of 24) stated that they had no success with the distance learning technology. A special assistant was made available to work with these students on a one-to-one basis during two class periods. These students never actually integrated telecommunications with their research, even though they stated a preferred topic.

POSITIVE EXPERIENCES

The positive experiences outweighed the frustrations and are far too numerous for an exhaustive list within the scope of this article. What follows is a concise list which represents the breadth of

responses:

* "It's fun to explore areas other than your topic, like sports letters."

* "I have received a chapter of a book on my topic from an expert in Canada."

* "Classroom teachers are very helpful, willing to share their personal experiences."

* "Received a reply from a school counselor in Virginia who offered all the help I need."

* "Found a pen-pal to write to in French."

* "I am amazed at the ease with which I am able to communicate with people I don't personally know but share a common interest with in Social Studies Education."

* "I am a little more excited about teaching and a little relieved because I know that there is help at the push of a button."

* "People are actually interested in my research topic."

* "Today I finally received my first messages, it was like a surprise gift!"

* "Telecommunications has changed my view of teaching by opening up new ways for students to learn through exploring and hands-on. Telecommunications brings the world closer to the classroom and lends itself to authentic learning."

IMPACT ON EDUCATIONAL PHILOSOPHY

Students were asked to write an educational philosophy essay before and after they had engaged in their distance learning projects. A pre and post comparison of essays indicated that the distance learning experience broadened the preservice teachers view of teaching and learning. While there were no students who expressed a negative view of technology or distance learning, more than half of the preservice teachers included both technology and constructivist-based concepts in their philosophical essays. What follows are a few sample statements:

* "Finally, attaining one's full potential must correlate with the demands of our global economy and the technological age of knowledge."

* "When the school fulfills its educational responsibility, the students become citizens who are actively engaged, knowledgeable participants, meaningful contributors, and thoughtful neighbors."

* "Learning should always occur in real-life context. Technology is a must when it comes to quality instruction. Our society is technologically oriented. Students should learn through and about technology."

* "I believe that it is the teacher's responsibility to help children

view technology in a positive manner. Children should be given the opportunity to use computers and any other media...available in order to become more familiar with the changing world around us."

* "Teachers need to prepare students to be lifelong learners....The teacher's role is one of facilitator or coach, not necessarily knowing all the answers, but how and where to find them."

* "Every effort should be made to incorporate computers and other technology in all aspects of the school."

In reviewing these and other comments, elements of a constructive classroom are self evident. Also evident is the preservice teachers awareness of the importance of technology and distance learning opportunities in K-12 classrooms.

CONCLUSIONS

The integration of distance learning opportunities in this face-to-face classroom truly supported the constructivist paradigm. Students were actively engaged in constructing their own knowledge and mediating input from the outside world. The preservice teachers demonstrated a willingness to share successes and failures during class, which encouraged and assisted others. Students appeared more excited and serious about their research papers and expressed concern that the selection of the topic should have some practical significance and meaning for their professional development. These college students demonstrated a sense of autonomy and initiative yet were encouraged by responses and interaction with a community of scholars. The preservice teachers learned the value of primary sources and identified teachers in the classroom as experts. Students engaged in dialogues with others and, as a result, felt empowered as they made meaning. This distance learning experience provided an opportunity for students to make the connection between theory and application, between research and real classrooms, between preservice and experienced teachers. Distance learning activities encouraged autonomy and independence as well as cooperation, support, self-regulated learning, and helped to make the instruction personally relevant. Students did indeed mediate input from the outside world, which broadened their philosophical perspectives and classroom paradigms.

Creating a real world curriculum which makes use of available distance learning technologies will be an integral component of the school of tomorrow. Teacher Educators must find ways to model this living curriculum for their preservice teachers so that, as K-12 teachers, they will be better prepared to engage their students in this active learning process. The fiber optics network proposed by the current administration will provide a "superhighway" for distance learning activities. Tapping into this technology will change the environment of learning from that of a classroom to that of an endless combination of resources and capabilities. By combining distance learning opportunities with a constructive-based learning environment, educators will be prepared for and involved in that opportunity as it unfolds.

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