Authentic Problem-based Collaborative Learning Practices for Professional Development in Teacher Education*

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Abstract

Higher learning organizations frequently offer courses isolated from other disciplines or areas of concentration. The intent of this study was to explore collaboration practices on authentic based projects involving two distinct courses from differing programs: Instructional Technology and Educational Leadership. This paper describes the strategies of designing effective learning environments for multidisciplinary collaboration and problem-based learning and reports the effectiveness of those strategies. The result of the collaboration was the production of various multimedia interactive professional development training materials developed by the technology students on various topics proposed by the school administrators. The collaborative learning practices provided the opportunity to not only give and receive knowledge among the participants but also view this exchange as a responsibility to create a collaborative culture within the university.

NOTE: This module has been peer-reviewed, accepted, and sanctioned by the National Council of Professors of Educational Administration (NCPEA) as a scholarly contribution to the knowledge base in educational administration.

Introduction

Traditionally, courses in higher education have been solely designed and implemented by the instructor. Although many work places in current society require collaborative and problem solving skills, multidisciplinary collaborative practices among college courses or between colleges and K-12 schools have occurred

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infrequently in higher education and students lack experiences to apply their learning to the real educational settings. Collaboration has been difficult to implement in higher education programs because it demands time and effort. Fortunately, newer technologies allow students' asynchronous and synchronous interactions which support collaborative learning. Students are provided with the opportunities to discuss, argue, negotiate, reflect, and construct their knowledge in an e-learning environment.

Harasim (1993) defines an "effective learning environment" as a learner involved in constructing knowledge through a process of discussion and interaction with learning peers and experts. Shamatha, Peressini, and Meymaris (2004) emphasize community, learner, knowledge, and assessment as fundamental components for the development of effective learning environments. McNeil (2003) states the constructivist approach attends to both the creative side of students and the "construction of knowledge" as students become active participants in group projects. E-learning environment enhances this pedagogy to reflect authentic learning emulating practical application through interactions with peers and experts.

Historically, the technology and educational leadership programs rarely collaborated in teacher education programs. This new venture was a pilot project to develop a multidisciplinary collaborative e-learning environment exemplifying the constructivist approach to curriculum development. This project focused on cooperative learning, discussion and evaluation of the practice and theory of the two program courses. This paper describes the strategies of designing effective learning environments for multidisciplinary collaboration using a problem-based learning approach in an authentic context. It discusses the advantages and disadvantages of learning through a multidisciplinary e-learning collaboration. The following section describes how the curriculum for a collaborative learning project was developed and implemented in two graduate courses.

Curriculum Planning for the Collaborative Learning

Henson (2006) defines the use of curriculum models as a means to help explain "various related concepts and the relationship among the parts." In designing this project, Tyler's Ends-Means Model was utilized for the development of the curriculum. As Tyler's model suggests, this project began by deciding what purpose the curriculum was to have (what we wanted the students to know) and then designing content and activities. Tyler's model is summarized in Figure 1.

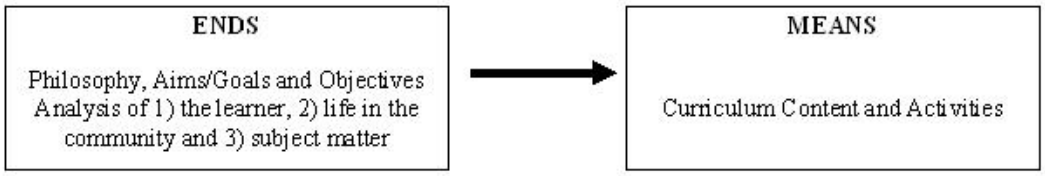

Figure1. Tyler's Ends-Means Model

In order to accomplish this task, Tyler (1949) stated the "ends" must be identified by examining three major sources: the learner, life in the community and subject matter. Tyler states the learners themselves become a source for educational objectives. Curriculum should be developed based on the learners' needs and abilities, creating motivation on the part of the learner. Next he discussed "life outside of school" or society and viewed the local community and society as the students' laboratories (Henson, 2006). Subject matter, philosophy and psychology are included as a source. He stated that subject specialists are needed to assist in developing the objectives as well as the development of a philosophy to guide the curriculum. Finally, psychology of learning is necessary to reflect on the learners' "levels of development" and the learning process (Henson, 2006).

Tyler's Ends-Means model provided the framework for the collaborative learning project. At the first step of the instruction, philosophy, standards, goals and objectives in two courses were reviewed and applied to the project. Focus began on curriculum contents and activities aligned with expectations. This collaborative learning project was correlated with the learning standards of the Educational Leadership Constituent Council (ELCC), the Illinois State Board of Education (ISBE), and the International Society for Technology in Education (ISTE). The following standards in Table 1 were applied:

ISBE	ELCC	ISTE
Standard 2: School culture and instructional program	**Standard 2** **2.2a** Candidates demonstrate the ability to facilitate activities that apply principles of effective instruction to improve instructional practices and curricular material.	**Standards for Technology Leaders**
Knowledge indicators: The competent principal…	**2.2c** Candidates demonstrate the ability to use and promote technology and information systems to enrich curriculum and instruction, to monitor instructional practices and provide staff the assistance needed for improvement.	**I-A.2** Offer a variety of professional development opportunities that facilitate the ongoing development of knowledge, skills, and understanding of concepts related to technology.
2G. Understands principles of effective instruction and best practices.		**V-D.** Use technology to communicate and collaborate with peers, parents, and the larger community in order to nurture student learning.
2L. Recognizes the role of technology in promoting students' learning and professional growth.		**VIII-A.** Identify and apply educational and technology related research, the psychology of learning, and instructional design principles in guiding the use of computers and technology in education. **VIII-B.** Apply strategies for and knowledge of issues related to managing the change process in schools. **VIII-C.** Apply effective group process skills.

Table 1. Learning standards sets correlated with the multidisciplinary collaborative project.

The learning environment supported the 1) authentic learning in a context meaningful to the learner, 2) student knowledge construction, 3) critical thinking skills, and 4) problem-based learning through group collaboration and the curriculum development project.

The following research questions provided a framework for conducting this study.

1. How does the collaborative learning environment affect the learning of students in graduate courses?
2. What are the advantages and disadvantages of the collaborative learning environment in graduate courses?
3. How were the students motivated in the collaborative learning environment?

Method

Implementation of the project included two graduate courses offered by the College of Education at a mid-size private university in the state of Illinois. Twenty six graduate students were enrolled in both the Instructional Technology and the Educational Leadership programs. The students consisted of 17 graduate students in the Instructional Technology program and 9 school administrators in the Educational Leadership course. Among 26 participants, 22 students participated in the study. The participants were 12 males and 10

females with ages ranging from 20 to over 55 years. Ten of the respondents had less than 5 years experience and four respondents were veteran teachers with more than 20 years experience (see Table 2).

Gender	Male 12 (55%)	Female 10 (45%)	Total 22		
Teaching Experience	1-2yr 5 (23%)	2-5 yr 5 (23%)	5-10yr 5 (23%)	10-20yr 3 (14%)	20yr + 4 (18%)
Teaching School	Elementary 2 (9%)	Middle 5 (23%)	High 5 (23%)	Admin. 9 (41%)	Other 1 (5%)
Teaching Subject	Math/Science 4 (18%)	English/Lang. 3 (14%)	Social Studies 3 (14%)	Art 3 (14%)	Other 9 (41%)

Table 2. The participants' demographic information

The instructors promoted collaborative learning using discussion and evaluation of the practice and theory of the college courses. Students were required to physically attend class to acquire the specific content knowledge. E-mail and discussion forum on Blackboard were used as communication tools for the collaborative project to exchange ideas and resources with their team members.

During the first two weeks of the semester, students in both fields of study created a collaborative working team and were introduced to each other through e-mail. The generic ADDIE (Analysis, Design, Development, Implementation and Evaluation) model as a systems approach was used for developing multimedia programs/applications. In addition, the students were encouraged to apply a variety of systematic design models emphasizing a holistic, approach to the development of training material. Each team designed, developed, and evaluated their project in the following steps (see Table 3). The students in the Instructional Technology program developed a product proposed by their team members in the Educational Leadership program. The students in the Educational Leadership program provided feedback to their team members through e-mail. Each group was required to submit a log of the interactions among members as a part of the project document.

Half-way through the semester, students in both classes had a meeting to discuss whether the contents and strategies for developing the product met the needs of the target users. During the semester, the instructors monitored each group's progress in the collaborative e-learning environment and provided feedback or direction. At the end of the semester, students in both classes were in attendance in the same classroom and presented their group project. Following the presentations, an evaluation of the project was completed.

Stage	Time	Task
Phase I: Analysis	Week 1-4	▪ Construct a collaborative team
		▪ Analyze the teacher training program and curriculum
		▪ Prioritize the particular needs of their specific school/district ▪ Identify the problems of teacher training program and curriculum in their school/district
Phase II: Design	Week 5-7	▪ Identify the target users, content, and design tools
		▪ Develop a proposal of multimedia teacher training program
Phase III: Development	Week 8-12	▪ Develop a storyboard/flow chart ▪ Gather material focusing the first audiences
		▪ Develop a prototype of the multimedia training program
		▪ Conduct formative evaluation
Phase IV: Implementation	Week 13-14	▪ Conduct training in a small or big group in schools/districts
Phase V: Evaluation	Week 15	▪ Collect feedback – Survey (teachers in K-12 schools)
		▪ Revise the project

Table 3. Stage of the Collaborative Group Work

The instructors developed and shared the performance criteria with the students and used this information to assess the students' curriculum development project. The students' group work was assessed by teams. In addition, self assessment and peer evaluation were used for their grade. At the end of the semester, a survey was conducted in both classes to determine whether the collaborative learning experience met the expectation of their learning and supported their professional growth as educational leaders.

The survey consisted of questions on the participant's demographic information and the efficacy, effectiveness, perception, usefulness, motivation and preference of collaborative project. The participants were asked to indicate agreement or disagreement of a 5-point Likert scale on each question and express their experiences in the collaborative project with the open-ended questions. The survey was created by two instructors in the Instructional Technology and the Educational Leadership programs and evaluated by a professor who teaches an educational research course in the Curriculum and Instruction discipline. This was to ensure that the survey correlates to the objectives of the research.

Results

As stated by Cardillo (2005), it is difficult to convince teachers of the relevance of standards in any given program. The multidisciplinary collaborative learning project allowed students in the Instructional Technology and the Educational Leadership programs to integrate standards into their disciplines. As projects were developed and completed, the students acquired the standards not only in content application but also in their practical application in a collaborative effort.

The results of the study indicated (see Table 4 and Figure 2), the majority of participants in collaborative learning expressed positive experiences in the categories of efficacy, effectiveness, perception, usefulness, motivation, and preference. The researchers noticed that the lowest point was in the area of preference as compared to the other categories. The responses on the preference indicated that the participants preferred to apply a collaborative approach for their students' learning (M=3.7) to their own learning (M=3.3).

	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree	Average(N=22)
Efficacy			1(5%)	14(64%)	7 (32%)	4.27
Effectiveness		1(5%)	4 (18%)	4 (18%)	13(59%)	4.32
Perception			3(14%)	10(45%)	9(41%)	4.27
Usefulness			3(14%)	5(23%)	14(64%)	4.50
Motivation		2(9%)	1(5%)	8(36%)	11(41%)	4.27
Preference	2(9%)	4(18%)	4 (18%)	5(23%)	7 (32%)	3.50

Table 1

Table 4. The result of survey about the effectiveness of collaborative learning strategies

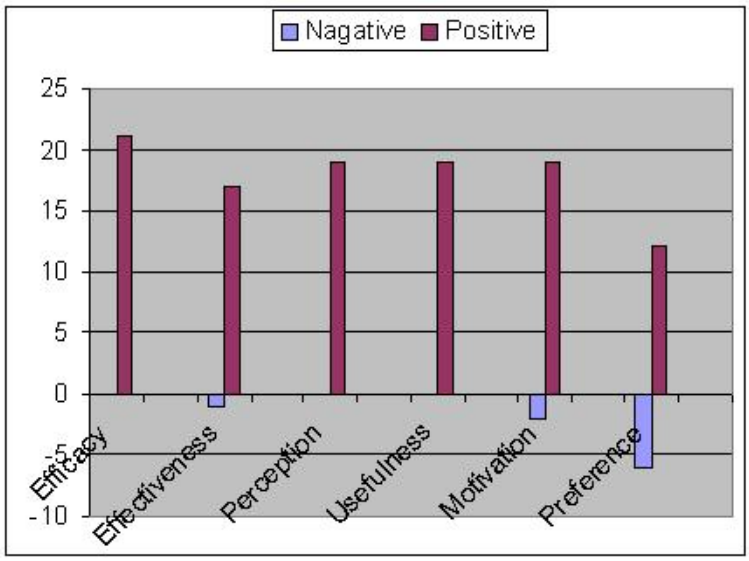

Figure 2. Comparison chart of positive and negative experiences

In response to the open-ended question, participants in both classes offered positive comments regarding their collaborative e-learning experience. They expressed the opinion that the instructors did an "excellent job of addressing the diverse needs" within the classes and the collaborations would be impossible without online interactions in their busy schedules. Although many of the educational leadership majors were prepared to develop the topics for the projects, the technology students had little background in relation to curriculum development. The same was true for the technological aspect for the educational leadership students. The overall response indicated that the final projects exceeded expectation by both groups and were found to be of great use in their respective districts. Students believed the sharing of skill sets was a great idea and the pairing of content knowledge and technology skills was a solid foundation for a collaborative project. One student stated, "ten heads are better than one." Another student wrote, "it is impossible for one person to be an expert on all topics." The peer learning made a successful result with the pairing of the technology and content knowledge project.

On the other hand, some participants offered suggestions based on collaborative e-learning experiences. Some students believed additional communication was necessary among the group members but did think the final project was of high quality. A few students indicated it was difficult to coordinate class working time and online interactions with team members. Overall, the students performed successfully and achieved their goals in a collaborative e-learning environment. Each group produced teacher training products which could be used in school environments.

Discussion

The intent of this study was to explore e-collaboration on authentic based projects involving two distinct courses from differing disciplines. The uniqueness of this project resulted in the authentic project outcomes of two distinct courses. In both courses, students applied their learning and practice to deliver a finished project that combined skill, knowledge and application. Both classes successfully used e-learning environment to

communicate and work collaboratively for the final project. The Internet used as a wonderful tool to facilitate to exchange all kinds of information among team members and offer the flexibility students need, but it also was not an effective delivery mean to share multimedia projects including a variety of sources such as movies, sounds, or animations. Therefore, blended learning which includes online interactions and face-to-face meetings would be a good option to meet the need of different type of learning contents or activities.

The experiences of this research suggest to review courses in which a collaborative activity can occur, share key concepts to better prepare students in higher learning and finally utilize e-learning between and among the various programs offered. It would be beneficial to conduct an audit of technology and educational leadership classes to determine if other concepts could be combined to provide additional collaboration. Further study can be conducted involving collaborative learning through online within other teacher education programs and disciplines. If technology equipment and personnel are available for use, teacher education programs would have endless opportunities for growth in this area.

Conclusion

Effective teachers and administrators are reflective practitioners who focus on student achievement and school improvement. A strategy to achieve this goal is the availability of effective professional development. Sparks and Hirsh (1997) discussed a paradigm shift in professional development envisioning a change from an "expert" guest speaker expounding their knowledge to the teachers to a more collaborative and active approach. Research on professional development relates the necessity to have topics which focus on meeting specific needs, training their employees to promote school wide effectiveness, fostering a shared goal and vision, and involving technology along with delivering authentic professional development (Richardson, 2003; Salpeter & Bray, 2003; Dickenson et al, 2003).

The result of collaborative learning project in two distinct master degree programs was the production of multimedia interactive professional development training materials on topics proposed by the school administrators. The teacher training materials were developed to meet the specific needs of the local school district while keeping the cost to a minimum. The elements of knowledge exchanged as defined by Fullan (2001) provided the opportunity to not only give and receive knowledge but also view this exchange as a responsibility to create a collaborative culture between higher education and K-12 schools and between teachers and administrators as well as among teacher education programs. This multidisciplinary project directed students to a paradigm shift in their sharing of knowledge with professionals outside of their specific discipline. It is the goal of higher education programs to provide the students with the knowledge and tools to allow them to become active contributors of change in their profession.

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