DOCUMENT RESUME

ED 432 276 IR 019 646

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TITLE	Disseminating Engaged Learning Strategies in the Middle School through Technology.
SPONS AGENCY	Corporation for Public Broadcasting, Washington, DC.
PUB DATE	1999-03-00
NOTE	7p.; In: SITE 99: Society for Information Technology & Teacher Education International Conference (10th, San Antonio, TX, February 28-March 4, 1999); see IR 019 584.
PUB TYPE	Reports - Evaluative (142) -- Speeches/Meeting Papers (150)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	College School Cooperation; *Computer Uses in Education; Constructivism (Learning); Cooperative Programs; Faculty Development; Grants; Higher Education; Inservice Teacher Education; *Learning Strategies; Listservs; Middle Schools; Teaching Methods; World Wide Web
IDENTIFIERS	*Engaged Style; Media Literacy; Southern Illinois University Edwardsville; *Technology Integration

ABSTRACT

This paper reports on the results of a grant to disseminate engaged learning strategies in the middle school. Three university instructors at Southern Illinois University at Edwardsville worked with eight middle school teachers to integrate Webquests, the Journey North Project, STELLA software, and media literacy into the curriculum. A general process is described, along with three differing approaches for disseminating engaged learning strategies. Some results of the three interventions are given, and a listserv-based process for a final reflection is described. (Author/AEF)

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Disseminating Engaged learning Strategies in the Middle School through Technology[1]

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Abstract: This paper is a report on the results of a small grant from the Corporation for Public Broadcast to disseminate engaged learning strategies in the middle school. Three university instructors worked with eight middle school teachers to integrate webquests, the Journey North Project, STELLA software and media literacy into the curriculum. A general process is described, along with three differing approaches for disseminating engaged learning strategies. Some results of the three interventions are given and a listserv-based process for a final reflection is described.

Introduction

In September of 1997, three faculty members at Southern Illinois University at Edwardsville (SIUE) attended the 4th Ernest L. Boyer Technology Summit that was held in Dallas.[2] At this conference we saw many new and exciting ways that technology is being integrated into K-12 education. Each of us was struck by different applications. However, all of us noticed an emphasis on an educational approach variously known as constructivism, active learning and engaged learning. We applied for and received a Next Step Grant[3] of $5000 from the Corporation for Public Broadcast the purpose of which was to explore different ways of effectively disseminating effective technology mediated constructivist practices at area middle schools.

Two of the faculty members already were well connected with North Middle School[4] in Godfrey, Illinois. SIUE's School of Education has sponsored an existing two-year project, known as the Bridges Project, which established and maintains a full professional development site at North. We, along with several other faculty members at Southern Illinois University at Edwardsville, have worked with both the preservice teacher/administrator cohort and with the North staff in a variety of ways. A third faculty member worked with two middle school teachers enrolled in classes he taught.

All three investigators committed to following a general process as described below. Later, when it was realized that the timeline was unrealistic, an extension of the Next Step Grant to the end of the year 1998 was asked for and granted.

1. Introduce different constructivist tools and approaches into three middle school settings, including a professional development school setting. (November, 1997-January, 1998)

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2. Give professionals and preprofessionals an opportunity to explore the fit between these tools and approaches and the curriculum for which they are responsible. (November,1997-January, 1998)
3. Facilitate a process of curriculum augmentation, including coaching, training and group process, based on these tools and approaches. (February, 1998)
4. Facilitate setting up a workable system for evaluation and reflection. (February, 1998)
5. Monitor and facilitate the implementation of the curriculum augmentation. (March-May,1998)
6. Monitor and facilitate the evaluation and reflection. (March-May, 1998)
7. Write a paper for a professional conference. (June, 1998)

The Three Approaches.

Each investigator worked with a different medium. Investigator 1 worked with three middle school science teachers to integrate constructivist models for using the Internet and multimedia tools. Investigator 2 worked with 2 middle school teachers interested in applying modeling and simulation software to help students develop an in-depth understanding of the dynamic interrelationships within biological, social, and physical systems. Investigator 3 worked with two seventh grade teams consisting of teachers, preservice teachers and a preservice administrator to integrate constructivist models for multimedia literacy through the creation of webquests, web publishing lesson plans on media literacy, and the use of video in the classroom (Education and the Power of Public TV). A school-wide media literacy fair evolved during the exploration of this approach.

The first approach used the fact that two middle school instructors were also completing their final masters project under instructor one. One was a middle school home economics teacher and the other was an 8th grade science teacher. The home economics teacher wanted to disseminate Bernie Dodge's concept of a webquest[5], which is an on-line lesson or unit structured according to certain constructivist principles, to the North Middle School staff. Instructor 1 and the teacher conducted three training workshops, and on-site coaching followed this. The 10 participants included North teachers and several preservice teachers and administrators in training there. They learned the components of a webquest, and seven useful webquests resulted from the process including a Baroque music webquest and an Iditerod webquest. The home economics teacher made the learning environment pleasant by providing lunch and a boost of enthusiasm.

The 8th grade science teacher worked directly with instructor one to complete the project titled "Enhancing 8th Grade Students' Self-Directed Learning through the Journey North Project.[6] After reviewing the Journey North site, the science teacher formulated several objectives for his gifted class including identification of cities by longitude and latitude, scientifically identifying migratory paths of selected animals, determining the photoperiod for a Mystery class, and submitting researched questions to Journey North's Expert. The dominant instructional modality was small group instruction encouraging active learning, open-ended discussion, deductive reasoning, and peer interaction

regarding relevant issues within the project. Since Internet access was a problem at this school, the teacher seeded each small group with at least one student with home Internet access.

It is interesting to note that instructor 1 contacted, offered assistance to and provided materials to three other middle school teachers. These contacts have not proven to be fruitful for a number of reasons.

The second approach used was to present the tool, STELLA, to participants in a problem-based learning seminar offered at the university. STELLA is a modeling and simulation software package designed to help students build an understanding of the dynamic interrelationships within biological, social, and physical systems. Students and teachers can use the software to model virtually any system of interest by manipulating a few icons. Once the model is constructed, simulations provide the opportunity for students to test theories, observe results, and modify assumptions, thereby increasing their understanding of how things really work and how to make them work better.

STELLA is based upon the philosophy of systems thinking which emphasizes an understanding of how complex systems change over time and the interdependent nature of real life events and experiences. In an age when researchers, teachers, parents, and politicians are concerned with the need for active or engaged learning practices, systems thinking concepts have much to offer the educational world. The STELLA software program provides a practical way to operationalize these concepts in the classroom.

The CPB grant provided funds for us to purchase three copies of the STELLA software program. Two students within the Instructional Technology program at SIUE were in a class where the STELLA software was demonstrated. They volunteered to use the software in their middle school classrooms with the understanding that they would design an engaged learning lesson and report on its effectiveness. One of the teachers taught 7th grade mathematics and the other taught 7th grade science. Neither of the teachers received formal training in the use of the software.

The math teacher used STELLA to help his students understand the concept of at a deeper level than students were typically taught. To accomplish this, he used the software to develop a model that simulated the effects of medicine dosage and its effects upon animals. The teacher demonstrated the simulation to the whole class by asking the students to estimate the amount of medicine that needed to be given to a very sick animal. Small concentrations of the drug had no therapeutic value. Larger concentrations in the bloodstream had great therapeutic value. However, if too much medicine was administered, it became toxic. The students, task was to maintain therapeutic concentrations for as long as possible during a 48-hour period without killing the patient.

After the demonstration, ratios were integrated into the lesson as the teacher let the students work in groups of three. They were given roles as veterinarians and told to determine the optimal ratio of drips to seconds (i.e. a drip every X seconds) that needed to come out of the drip chamber to save the animal from dying. Several different animals with different dosage needs were presented to the children. The teacher reported that the students were completely enthralled with this activity. Many students requested use of the software to play with the simulation during free time.

The science teacher used a STELLA model to simulate Hooke's Law, which concerns the force and elasticity of a spring. The model simulated the relationship between weight, platform height, and the elasticity of a bungee cord. To demonstrate the model, the teacher asked her students to imagine they were bungee jumping off a 100-meter bridge. They were asked to determine whether they would be able to bungee jump off the bridge without touching the water, given their weight and the Hooke's constant (a numerical figure related to the elasticity of the bungee cord). The simulation graphically displayed the results of their decisions. After the demonstration, the students worked in small groups to determine the proper bungee cord elasticity for each person on a list of thrill seekers wanting to bungee jump. The students were asked to try the simulation for each person. If their calculations were wrong they could be the disastrous results.

This teacher also reported very positive results with the simulation. The students learned the concepts related to Hooke's law and enjoyed the process.

The third approach focused primarily on the area of media literacy. As a result of a series of discussions facilitated by investigator 3 on ways of helping middle school students to become media literate, teachers and their preservice Bridge students declared the month of April as a school wide "Media Focus Month". Teachers were asked to explore ways of using media within existing curriculum. Coaching was provided on why and how media literacy can be taught, the stages of media literacy, approaches to media literacy and ways of deconstructing media. Media was defined as that which transmits messages to large audiences, primarily print, radio, television, and Internet. Meetings were held to share ideas and lesson plans. Ideas, websites, and television programming schedules were posted on listservs for both practicing teachers and preservice teachers.

Rationale for this school-wide interdisciplinary unit included the fact that media is a "real world" resource to help middle school students make connections to a variety of content areas, a way of making learning meaningful for kids, and a tool for hands on classroom experiences. It also proved to be a link between schools and community.

An Internet site was posted and used as a reference, a resource, and an agenda for a series of training sessions. Teachers collected ideas were posted on the site and or made available to teachers on a disk.[7]

The culminating event of the month long media focus was a Media Fair held on April 16. Celebrities from KETC, PBS, and KMOV spoke to North Middle School students at 3 school-wide assemblies. Professionals from area newspapers, radio stations, advertising agencies, and universities conducted breakout sessions for smaller groups of students and teachers. All 450 students attended 1 breakout session on print, television, radio, and Internet media in addition to their participation in the 3 assemblies. Press coverage can be viewed at http://www.siue.edu/~ghawkin/mediafairpress.html

Data was collected from all teachers, 450 students, 13 preservice teachers, school administrators, and 23 presenters. Feedback was overwhelmingly positive with many unintended positive outcomes. The feedback is presently being used to plan another similar interdisciplinary unit in another middle school within the same school district.

The event optimized the constructivist approach to learning in that it evolved over time, and provided opportunities for both hands on and engaged learning experiences.

Presenters for breakout sessions were encouraged to involve students in hands-on activities. Simultaneous learning occurred as university students, school staff, and middle school students explored and learned together about the stages of media, approaches to media literacy, ways of teaching media literacy and media resources. Internet media resources are now being utilized on a regular basis in classrooms. More teachers are familiar with and utilizing PBS resources. The event also resulted in multiple staff development workshops in the region with similar events in area schools presently being planned.

Though the event was intended to promote media literacy among middle students, middle school teachers have become more aware and better informed about the power of media as a resource for classroom learning experiences.

A Reflection on the Three Approaches

Our reflection is still in process because the grant was extended to December 31, 1998. Some reflection is offered now but we are also putting into place a process that will result in a final evaluation.

The investigators tried a range of dissemination structures: 1) a formal process of curriculum development by two masters students completing their final process, 2) a college class demonstration of a product leading to volunteer teachers using that product in their teaching and 3) school-wide involvement in a day-long event involving assemblies and break-out sessions given by 28 media professional volunteers. In addition (4) two products were simply given to classroom teachers without much condition or prior agreement.

Here are some initial observations. We used a variety of tools and resources to help teachers do their job differently to engage students, but at no time did we ask them to add specific curricular objectives. The focus of the resources we introduced was on new things that are available today. We all facilitated the exploration of these tools with a minimum of direct instruction.

Instructor 1 selected five teachers who he knew from previous courses and contacts were "self-starters" and hard workers. With two of these teachers he used the final project process to effectively stimulate curriculum development. He required a three-page proposal with a timeline for turning in the project at various stages of development. Using face-to-face conferences and e-mail, he was able to coach and shape the project in helpful ways. In both cases, this lead to a meaningful dialog between teachers and this supervisor over and a deepened understanding of the nature of a constructivist environment and philosophy. He also used this process to conduct the summative evaluation. Since the other three teachers also met the self-starter qualification, it is likely that the lack of a formal structure and a requirement for doing the work resulted in their not following up on the lead.

Instructor 2 is well known for his interest and expertise in problem-based learning and his sensitive and effective coaching of students through a series of masters courses. In this case, the volunteers happened to be highly competent professionals with a deep interest in trying out current new learning strategies with their students. He is still in the process of reflecting on this process.

Instructor 3, a former middle school teacher designed activities involved students in real world. She used and modeled a team approach. She gave a questionnaire to students, teachers and presenters. From the analysis of these results she drew a number of conclusions. Teachers following students to media literacy sessions for a whole day gave these teachers an entry point for conversation with students that had not previously occurred, especially with the advisory classes that the day starts with. Kids who had learning disabilities did surprisingly well this was good information for the teachers. She will do a second day long media even with the following additions: give specific directions to presenters to have hands-on activities and to bring things to feel, see and touch, give presenters examples of engaged learning activities, and give kids and teachers input into selecting presenters. Two other conclusions were that the grant lent credibility to the event and that the children learned things that they'll remember forever.

Since our grant has not yet concluded, we have decided to institute the following formal process for completing our final reflection on our work. We will start a listserv called engaged for the three grant facilitators and their six middle school colleagues. We will seed this discussion with questions designed to provoke reflective thought on both the process and results of our interventions during the preceding year. Following discussions in January, the three facilitators will meet to write a final evaluation based on the listserv and our individual experience.

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[1] Updates to this project may be found at http://www.siue.edu/~jandris/boyer.html.

[2] The Ernest L. Boyer Technology Summits for Educators [http://ready.cpb.org/edtech/summits/index.html]

[3] Three Approaches to Engaged Learning in the Middle School via Technology [http://www.siue.edu/~jandris/boyer.html]

[4] North Middle School [http://www.siue.edu/~ghawkin/North.html]

[5] The Webquest Page [http://edweb.sdsu.edu/webquest/webquest.html]

[6] The Journey North Project [http://www.learner.org/jnorth/jnorth.html]

[77] Media in the Middle [http://www.siue.edu/~ghawkin/medialiteracy.html]

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