Group: Team 7

Topic: Distributed Science Education via Video Conferencing

Target learners: Graduate students taking online class on technology in education, technology teachers/coordinators at K12

Time: one week

Learning platform: online

Goals:

Through the completion of this module, students will:

- Analyze a complex situation in a systematic manner.
- Identify environmental and instructional support needs.
- Investigate models for filling the identified needs.
- Evaluate the available models and make recommendations.
- Provide support and rationale for the recommendations made.

Script:

In this lesson you will work as a team, within a problem-based learning (PBL) structure, to analyze the scenario provided and propose solution(s) to the presented problem. The first phase will require some research on your part. Suggested readings are provided, but you are not limited to the provided resources. You may complete the phases in whatever environment (discussion board, wiki, edited documents, etc.) best suits the work style of your team, but the final products should be posted to the lesson discussion board.

This lesson has 2 phases to complete in 1 week. For the most part, the phases should be completed in order, but you should review all the instructions prior to beginning your work as a

team. You may wish to consider "electing" one team member as the "quarterback", who will determine (with group input) when each phase is complete and when the team should progress to the next phase. If for any reason, you fall behind or have schedule problems, please communicate with your team. Your team members depend on you to complete their own work.

Phase 1: Read the scenario and the suggested readings provided below. Then, participate in a Round-Robin activity in which, during the course of one day, one person on the team goes first and posts an Observation - Hypothesis - Reason from the scenario below to their team database. Then, the next person on the team posts a different Observation - Hypothesis - Reason and then the third person posts. Continue with this Round-Robin until all ideas are exhausted.

An example would be:" Observation: The schools want to use video conferencing to provide a science class not only for students in their school but students in the other schools. Hypothesis: Videoconferencing program XYZ is the perfect solution for all three schools in the consortia. Reason: Videoconferencing program XYZ is low cost, easy to install and supports collaborative learning." It is reasonable for one team member to post one idea for video conferencing software and another team member to post different software as a solution. The same could be said for the strategies to teach inquiry or collaboration.

Once you have exhausted all of your ideas in the Round-Robin, work together in your group to combine the ideas into a summary and post your summary by creating a thread in the lesson 5 Teaching Database. Please name the thread Phase 1 summary team #__. Lastly, please post by the evening of July 19th.

Background:

More and more K-12 schools are turning to online or e-education options to meet the needs of their students. Examples of reasons why schools from large urban to small rural are turning to online education are listed below:

- Offer AP classes to high school students when individual school enrollment numbers will not support one school offering the class
- Allow for advanced middle school students to take high school level classes when sending them to the high school is not feasible for social reasons.
- Overcome schedule issues where students want to take band and Chemistry, but the schedule has the two classes at the same time.
- Provide options for students who are not successful in the traditional classroom.
- Provide a means for students to continue their education during long suspensions.

- Allow smaller school districts to pool their teaching resources to offer advanced classes to students from all of the districts.

Problem:
At a state level superintendents meeting, three small school district superintendents were discussing their current woes at their local school districts. Each school had a few students that wished to take Physics, Advanced Chemistry, and Advanced Biology, but the current schedule did not allow for the high school science teacher to teach all three classes. Not only is the schedule an issue, but some of the science teachers admit their physics is rusty and are uncomfortable teaching it. After talking further, it was discovered that each one of the schools had a teacher that was certified and comfortable (actually thrilled at the opportunity) to have video conference class, where he/she can teach his/her usual students in normal classroom and at the same time interact with students from other schools via video conference. By doing this, students from one school can attend class in another school without having to travel far and students in the host school can enjoy interaction with interested students in other school.

Your team of technology coordinators met with the high school science teachers before beginning to collaborate. Each of the teachers expressed concern with the hands on nature of science how that was going to translate into a video-mediated environment. The teachers had some familiarity with ITV coursework as students, but were unsure what tools and features were available to compliment science teaching or exactly what equipment would be needed to facilitate this endeavor. Lastly, the teachers thought the opportunity to work with students from another school was great, but were concerned with how they interact with students in the class and via video conference at the same time.

As your team works toward the development of technology recommendations for this video-conferencing endeavor, much more communication with the science faculty will be required. Part of facilitating the development of this project is asking the right questions and directing the discussion in order to fully understand the needs and issues concerning the communities of interest. The following email has just been received:

Hello,

After many email exchanges, we have come up with a list of possible concerns that need to be addressed before moving forward with this project. Our first concern is how to foster

collaboration among students between school districts in this environment. We would like suggestions of proven strategies that work in an e-learning environment. Our second concern is that science can be taught as groups of facts, but that does not lend itself to deeper meaning. We would like to still retain an inquiry based teaching methodology even in the e-learning environment. What strategies and/or websites can you provide us that meet the idea of true scientifiic inquiry? And lastly, what will be the best platform for video conferencing? We think we need to be able to share documents, see and speak as if we are face to face, but we are also interested in knowing if there is something else possible that we have not thought about.

Thanks for your time.

The Science Gurus of Small Town High

Phase 2: Working from the summary you created in Phase 1, evaluate the options for addressing the science teachers' concerns. Compose an email to the science teachers, offering 2-3 solutions for each of the identified problems. Include rationale for your proposed solutions. Finally, identify 3-5 areas where more input from the communities of interest (science teachers) are needed and solicit that input in the email. Post this email by creating a thread in the discussion board, Lesson 5 Teaching Database named "Email-team#__" by the evening of July 23rd.

How the team develops the email will be left up to the team. Suggested interactions could be for each member of the team to divide the areas of concern to address equally among members, or one team member could write the first draft, the second team member edits and provides feedback, the third team member writes the final draft incorporating the edits and feedback from the second team member.

Scoring Guide:

CATEGORY	**4**	**3**	**2**	**1**
Contributions **(Phase 1 & 2)**	Routinely provides useful ideas when participating in the group discussion. A definite leader who contributes a lot of effort. Shares effort equally with others.	Usually provides useful ideas when participating in the group discussion. A strong group member who tries hard!	Sometimes provides useful ideas when participating in the group and in classroom discussion. A satisfactory group member who does what is required.	Rarely provides useful ideas when participating in the group and in classroom discussion. May refuse to participate. OR Dominates the discussion and does not consider the input of others.
Focus on the task **(Phase 1 & 2)**	Consistently stays focused on the task and what needs to be done. Very self-directed.	Focuses on the task and what needs to be done most of the time. Other group members can count on this person.	Focuses on the task and what needs to be done some of the time. Other group members must sometimes nag, prod, and remind to keep this person on-task.	Rarely focuses on the task and what needs to be done. Lets others do the work.
Monitors Group Effectiveness **(Phase 1 & 2)**	Routinely monitors the effectiveness of the group, and makes suggestions to make it more effective.	Routinely monitors the effectiveness of the group and works to make the group more effective.	Occasionally monitors the effectiveness of the group and works to make the group more effective.	Rarely monitors the effectiveness of the group and does not work to make it more effective.
Problem-solving **(Phase 1 & 2)**	Actively looks for and suggests solutions to problems.	Refines solutions suggested by others.	Does not suggest or refine solutions, but is willing to try out solutions suggested by others.	Does not try to solve problems or help others solve problems. Lets others do the work.
Rationale **(Phase 1)**	Clearly identifies reasoning to support hypothesis from identified observations.	Provides a hypothesis and reason for each observation.	Provides a hypothesis for each observation, but fails to provide reasoning.	Only provides observations.
Summary **(Phase 1)**	Summary is well organized and addresses all observations/hypotheses from group discussion.	Summary is well organized and addresses most observations/hypotheses from group discussion.	Summary is well organized and addresses some observations/hypotheses from group discussion.	Summary is not well organized.
Issue Identification **(Phase 1 & 2)**	Group identifies more than 3 major issues to address.	Group identifies 3 major issues to address.	Group identifies 2 major issues to address.	Group identifies only 1 major issue to address.
Evaluation and Recommendations **(Phase 2)**	Group proposes 2 options for addressing each identified issue. Rationale for selecting each option is provided.	Group proposes 2 options for addressing most identified issues. Rationale for selecting each option is provided.	Group proposes 2 options for addressing some identified issues. Rationale for selecting each option is provided.	Group proposes less than 2 options for addressing each identified issue. Rationale for selecting each option is not provided.
Audience Appropriateness **(Phase 2)**	Avoids technical jargon when possible and provides explanation of unfamiliar concepts.	Moderate use of technical jargon, but provides explanation of unfamiliar concepts.	Limits technical jargon, but does not explain as necessary.	Assumes a level of knowledge that non-technical personnel may not have.
Supporting Evidence **(Phase 2)**	Provides supporting documentation from 2 or more sources for each option presented.	Provides supporting documentation from 1 or 2 sources for each option presented.	Provides supporting documentation from 1 source for each option presented.	Does not provides supporting documentation for each option presented.
Information Solicitation **(Phase 2)**	Solicits further input on more than 3 additional issues regarding the development of this video course.	Solicits further input on 3 additional issues regarding the development of this video course.	Solicits further input on 2 additional issues regarding the development of this video course.	Solicits further input on 1 additional issue regarding the development of this video course.

Expected interactions

1. Students share and discuss ideas while participating in the Round-Robin during phase 1.
2. Students work together to compose an email to science teacher with problems and suggested solutions

Materials needed (attached in the appendix)

1. Recommended readings

Required technology

All of the activity can be done using what is provided to us by the Sakai platform, team discussion board, chat, wiki, private messages. If your group wishes to use other technology, do so with our blessing.

APPENDIX

Readings:

The first three resources below may be most useful in your investigation of video-mediated learning. We have provided other resources if you feel the need to further your knowledge. Feel free to use your own experiences and search services to locate additional resources or to just pick and choose needed resources. Supporting documentation of your information is important in lending credibility to your presentation. Be sure to cite your resources properly.

Highly Suggested Resources:

Creating K12 Video conference collaborative project, Ruth Block and Martha Bogart

http://www.slideshare.net/mbogart/creating-k12-videoconference-collaborative-projects/

Video Conferencing for teaching and learning, Digital Bridges

http://www.netc.org/digitalbridges/vc/

Video Conferencing Network, West Virginia - Department of Education

http://www.netc.org/digitalbridges/vc/

Resources for going further:

Systematic Use of Teleconferencing in Distance Education, Yusup Hashim and Ibrahim Jaafar

http://www.springerlink.com/content/r38w355m37153w7x/fulltext.pdf

Supporting Distributed Communities of Practice with Interactive Television; Kurt D, Squire

Christine B, Johnson

http://www.springerlink.com/content/jl265u715g482525/fulltext.pdf

The Nature of Science from *Science for All Americans* by AAAS.? You may want to only read the section about Scientific Inquiry, but reading the entire page will give you a better picture as to what science is.

http://www.project2061.org/publications/sfaa/online/chap1.htm

Science Inquiry Benchmarks from *Benchmarks for Scientific Literacy* by AAAS.? It is marked where you will see what students should be able to do by the end of grade 12.? These are grade span benchmarks which mean that students should be working toward these benchmarks during their high school career.

http://www.project2061.org/publications/bsl/online/index.php?chapter=1#B4

Doing CL from the National Institute for Science Education College Level One.? This website provides suggestions for collaborative learning in a face to face classroom. Some of these suggestions can be adapted for an e-learning environment.

http://www.wcer.wisc.edu/archive/cl1/CL/doingcl/DCL1.asp

Building Blocks for Teams from Penn State.? This website provides suggestions for students working in teams.? Some of the suggestions are for face to face classes, but there is also an online component.

http://tlt.its.psu.edu/suggestions/teams/

Active Learning from the Center for Teaching Excellence at University of Medicine and Dentistry of New Jersey.? This website provides links to several websites concerning collaborative and cooperative learning.

http://cte.umdnj.edu/active_learning/active_group.cfm

What does it mean?? Students? procedural and conceptual problem solving in a CSCL environment designed within the field of science education by Ingeborg Krang and Sten Ludvigsen.? You may need to use your MU pawprint and password to access it.

http://proxy.mul.missouri.edu:2292/content/83w585l5u442v287/fulltext.pdf

An Online Inquiry Instructional System for Environmental Issues by Meridian.? The website details how the Carolina Coastal Science Website tackled Scientific Inquiry in an online environment.

http://www.ncsu.edu/meridian/jul99/coastal/index.html