Situative Study of the Interdisciplinary use of Technology in 9\textsuperscript{th} grade Core Teams

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Introduction of Learning Problem:

At Clemente High School in inner city Chicago, the principal has implemented many innovations to foster collaboration among teachers and between subject areas. In 1998 the principal introduced the concept of core teaching for the 9th grade. In this construct a set of four teachers work together with the same group of students during a school year. This structure was put in place in response to the statistic that 78% of 9th graders failed at least one class during the year and 53% did not earn enough credits to be considered sophomores the following year. The stated purpose for the teams is to allow teachers to collaborate on interdisciplinary lessons, share insights concerning students, and create a “school within a school atmosphere” where students and teachers would know each other well. After two years of teaching with the core team construct teachers are finding that students are not able to make links in understanding between subjects. They retain a domain specific knowledge even though teachers are teaching an interdisciplinary curriculum. In order to research this learning problem, we propose completing a needs analysis of the mental models students have concerning two of their core subjects: history and science.

Our interest lies in studying the mental models integration of technology into an environment that is constructed to foster collaboration. We propose to study the interactions and structures that are currently in place in order to understand what circumstances are impacting the effectiveness of using technology in the 9th grade teams. We plan to conduct this study for the duration of a semester, after which we will report to the principal about the evolution of the environment she has created.

Goal of this study:

There are many issues to be explored within this environment. Our goal is to study the current practices at Clemente in order to inform the design of new resources and activities to aid in the use of technology in interdisciplinary learning and enhance student achievement. We will look at many structures and interactions within the school
community in order to gain a broad understanding of the practices in place in the 9th grade teams. Questions we are interested in answering are: How are teachers interacting with each other concerning the topic of technology in their classrooms? Are teachers using the technology for interdisciplinary collaboration within their core teams? How are students interacting with each other in the use of technology? Are they working collaboratively on projects? Do they use the technology to participate in authentic activities related to the interdisciplinary lesson? What structures are in place that limit or enhance the ability to integrate the technology into the core curricular subjects? What are the perceptions of the students, teachers and administrators as related to technology in the classroom? At what comfort level are the students and teachers functioning after a year of having computer resources available? What resources are available to teachers and what do they need to teach more effectively? Do they feel supported in the process of integration? In order to answer these questions we propose the design of a needs analysis but first, we must look at what type of system is in place at Clemente High School.

**Description of Structure:**

As previously stated, in order to study how technology is being used to facilitate and enhance interdisciplinary learning within 9th grade core teams we have chosen to evaluate the interactions occurring in the 9th grade at Clemente High School. Clemente is an urban, low income, minority school. Enrollment in the 9th grade is approximately 400 students per year. The make-up of the student population is 75% Hispanic, 10% Caucasian, 10% African American and 5% other. The teacher population within the 9th grade is approximately 90% Caucasian, 10% Hispanic, 75% female and 25% male. The class day is structured on the alternating block schedule. Students attend 4 classes for 90 minutes each day alternating MW/TTH with 8 – 40 minute classes on Friday.

The 400 ninth graders in the school are divided into groups of 100 students and placed into “cores”. 9th graders are enrolled into a core team upon their arrival at Clemente. Each of the four core teams is designated as either Red, Blue, Green or Yellow. A core team consists of four teachers, one from each core curricular area: Math, English, Science, and History. Teachers within the core teams teach the same students and share a common planning period daily.
Funded through the Chicago Board of Education, technology resources have been in the classroom for one full school year. Teachers were required to attend teacher in-service training for four half-days in the area of technology usage. They received training on PCs and learned e-mail and web-searching techniques. Teachers received a PC teacher workstation and 8 iMac student workstations in each classroom. Teachers have access to Microsoft Office 97 and the Internet through their desktop computers.

**Design of Needs Analysis:**

The principal has made the assumption that the inclusion of technology has not been carried through effectively and therefore the failure rate has remained the same. We must make no such assumptions in identifying the learning problem(s). Careful measures will be taken to avoid impacting the learning environment and making conclusions until our analysis is complete. A needs analysis study is the primary step in the investigation of our questions. For purposes of this study our needs analysis will analyze the environment from a situative perspective. A situative perspective provides an analysis of the interactive school system relative to activity. It will help us gain a functional understanding of the learning practices already in place regarding technology use in interdisciplinary activities. Our purpose is to observe, record and study how the system is currently functioning. This study will be comprised of observations, surveys, and interviews.

**Observations:**

We suggest three types of observations concerning learning environment interaction: teacher to student (classroom), student to student, and teacher to teacher.

We are interested in observing interactions between students as they work together using technology. What is the group dynamic that is developed for working around the workstation? Has the teacher organized a system for interaction between students in the classroom, and does it cross over to their use of technology? The structures the teacher creates has the potential to foster collaboration or discourage it. Videotape would be helpful in analyzing these structures. The tape would display subtleties in interaction allowing us to review the system and recognize if there are norms for behavior that have developed.
Field notes and informal observation will be used to study the classroom interaction between teacher and students. This documentation would reveal the structure of the classroom environment and the activities employed on a daily basis. Daily field notes would also provide a look at the constraints under which a classroom is conducted. Do the classroom structures (rules, set-up, etc.) help or hinder interaction? In observing the classroom dynamic we would be able to see how the teacher integrates technology into the curriculum. Does he/she use the technology to engage students in authentic activities? Are students directed to construct interpretations and evaluate their conclusions using technology? Or is technology used only in a peripheral capacity, such as typing up a lab report.

Observations may also provide insights into the effectiveness of integration within and between teams. For example, the Red team may cooperate in a math/science activity where students perform an experiment, gather data, and construct a graph of their findings using technology. While the Yellow team participates in the same activity but unnecessarily constructs a paper version of the experiment, data and graph prior to entering the information into the computer. Our observations of the teams could inform us as to the structures that made the Red team more effective in their use of technology for interdisciplinary learning. Within teams it would be useful to observe the differences in integration and usage. For example, we might observe that the math teacher used technology in interdisciplinary lessons 3 times as often as the history teacher. We could then discuss with the teachers their perceptions of why the interaction is occurring more in math class than in history. Perhaps the math textbook sets up interdisciplinary technology activities while the history text addresses no such issues. Another possibility could be that the history teacher sees the use of technology as a burden and not vital to the learning in his classroom while the math teacher feels the interdisciplinary use of technology is vitally important to his curriculum.

Teacher to teacher interaction observation would be helpful in understanding how they discuss and collaborate in both the uses of technology and interdisciplinary teaching. Researchers would sit in on the daily “work” meetings for the teams. Are the teams meeting everyday as they are instructed? How often do they discuss technology usage in cooperative projects or lessons? Is it usually discussed in positive or negative terms? Do
teachers share information about technology and mentor each other in usage? What kinds of discussions and work occur in these team meetings? Answers to these questions would inform researchers as to how the structures developed between teachers are affecting the learning environment and the ability to integrate technology into interdisciplinary activities. For example, there may be problem with time allocation, where individual classroom issues and other responsibilities preclude meeting on a regular basis. Or teachers may use shared meeting time to discuss team issues not related to technology integration.

Interviews:

A second method of assessment we propose is the use of interviews. Interviews are to be conducted with teachers, students and administrators. Researchers must use caution in conducting interviews and discussions in order to prevent the perception of making value judgments. If the interviewees perceive opinions on the part of the researchers they may change their answers to suit the interviewer. The interviews would be used to assess teacher and student goals for the technology and the validity with which it is used in daily class activity. Interviews with administrators will give insight into their expectations for the integration of technology.

We suggest interviewing two groups of students as concerns use of technology in the classroom and their feelings about 9th grade as a whole. The two groups will be made up of students who just finished 9th and 10th grade. Both sets of students have had experience with interdisciplinary learning in core teams, but only the 9th graders have been introduced to the integration of technology into the curriculum. Interviews would be a helpful tool in understanding the perceptions of students as concerns the integration of technology in the classroom. Do they enjoy using the computers or would they prefer more traditional activities? Do they feel that technology and interdisciplinary activities are important in the learning process? What are the differences in perceptions as concerns the two groups? Through the interviews researchers could gain information concerning student opinions concerning the use of technology in interdisciplinary learning.
Interviews with teachers concerning their goals for interdisciplinary learning and technology use would give insight into motivation. Do they feel they would be able to better reach their goals through the use of technology? Important information could be gleaned by asking teachers to discuss the resources they have and feel they need, the support they receive from the administration, and the structural help or limits they feel have been placed on the process. Opinions from the teachers concerning the need and effectiveness of implementing the program for interdisciplinary learning with technology would be valuable to the research process.

**Surveys:**

Surveys are the final component of our needs analysis. They would be conducted in the class to assess students’ views of computer use and integration in curricular activities. The classroom environmental survey would ask questions to measure the use of the computers as well as student and teachers reactions to the amount and quality of use. An example of a survey question addressed to students could be:

**In my Red Team classes…**

<table>
<thead>
<tr>
<th></th>
<th>Always</th>
<th>Often</th>
<th>Sometimes</th>
<th>Seldom</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using technology helps me participate in group activities</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>I use technology to learn about the world outside of school.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>The use of technology does not help me in completing our projects</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
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A survey could also answer questions as to whether the teachers and students feel that the technology is being effectively integrated into their curriculum. Do they perceive a problem? What reasons do teachers give for the continued high failure rate? How do teachers describe their interactions with each other and students in regards to learning activities that use technology? What resources do teachers feel they need in order to integrate technology more effectively? It would be important to compare surveys, interviews and observations to see where they agree and disagree in information.
The duration of our work within the school would be a semester. It would be important to conduct interviews, observations and surveys throughout the entire time period. Understanding how the classroom structure changes over time would be important in assessing the usefulness of the integration of technology to aid in interdisciplinary learning. Do students become more or less interested in using the technology over time? Are teachers adapting their classroom activities to adjust to class success or failure?

**Conclusion:**

Through this needs analysis we hope to discover if the implementation of technology at Clemente High School is enhancing learning. If not, what are the factors contributing to the lack of success. The information taken from the interviews, observations and surveys will work together to create a picture of the present practices at Clemente High School. This information can then be used to inform the design of new resources or activities. The choice of what new resources or activities to implement must wait until the needs analysis is complete. The source of the problem may lie in one distinct area or more likely many small pieces that need to be addressed. The source may not be in interactions or structures at all and may lie in a skills or cognitive problem. We must understand the situation in place before we can propose a solution. This needs analysis is designed to help us gather information vital to the understanding the learning problem at Clemente High School and to the design of resources or activities to aid in improving learning.