

Interactive Maps in Online Educational Technology Courses

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Abstract: The online courses discussed here used the visual medium of the interactive geographic map as a form of dialogue that was hypothesized to reduce students' sense of transactional distance during the course, build their skills with Web 2.0 media, and increase their motivation. In order to develop shared course maps, three components were needed: a tool that identified longitude and latitude, a shared spreadsheet for the longitude and latitude data, and the map that displayed the data. Using the dynamic map and the related online editable spreadsheet, the course instructors created digital maps where the students interacted spatially with other members of the course. The maps supported active participation in the course and put the students in control as they visualized the relationships between other course members' locations and themselves. Interactive course maps are recommended in online courses for reducing transactional distance and to support team building among the students.

As online courses become a preferred delivery format in teacher education, course designs need to evolve that address that specific needs of instructors and students who are located in far-ranging geographic locations. While students gravitate to online courses for convenience and for access to educational opportunity, they may feel uncomfortably removed and isolated from their peers and instructors. The theory of transactional distance describes the feeling of distance experienced by distance learners (Moore, 1980). Low transactional distance is the desired state in a distance course and it is achieved through increased dialogue and feedback as well as through the appropriate degree of control for the learners (Saba & Shearer, 1994). During dialogue, participants are active and focused on building on the contributions of others (Moore, 1993) and students find dialogue with their peers to be a motivational aspect of a course (Oblinger 2005). Using the current range of technologies, dialogue can take many forms and, given the human preference for novelty, in an online course dialogue should take multiple forms.

The study described in this paper took place in three online graduate educational technology courses in which an innovative form of dialogue was added to the forms of dialogue already supported by the course management system (CMS). The CMS supported asynchronous forms of dialogue including threaded discussion, blogging, a wiki, and it supported synchronous forms of dialogue including chat and shared applications in the virtual classroom. Most of the CMS-supported forms of dialogue rely on text, with the exception of shared applications. The recent ubiquity of web-based visual media and the preference of many learners for visual media have made rich online learning environments a preferred delivery format for many students (Dede, Dieterle, Clarke, Ketelhut & Nelson, 2007). Visual media also have the benefit of engaging the learner's attention (Reeves 1998). The courses discussed here used the visual medium of the geographic map as an added form of dialogue with which students communicated information that the authors hypothesized would reduce their sense of transactional distance during the course and increase their motivation to complete the course.

Analysis

Each online course section was offered for 15-20 students who were enrolled in a graduate Educational Technology degree program. All of the students were educators in K-adult organizations. Geographically, the students resided within the state in which the course originated. However, during the terms in which the courses were offered, some of the students traveled outside of the state and the country. These students were experienced users of media and web-based technology.

The Educational Technology students entered the online courses in order to achieve several career goals, among them becoming technology-using constructors of materials and media for their own and their students' learning. They embraced opportunities to practice these skills of constructing "content rather than just consuming it" (Miline 2006, 11.2). In addition to developing media skills through the use of the course map, the students learned a research-based teaching strategy. When students use geographic maps as adjuncts to text, they recall more text information than they would if they studied the text alone (Vekiri 2002; Schwartz et al. 1998).

Design

In each online course section, an interactive GIS-based map was used to build student media skills and reduce transactional distance. A GIS system is one in which data sets corresponding to geographic locations can be input, stored, retrieved, and analyze, often in the form of map-like spatial representations. Using Google Maps and related online editable database, the course instructors created interactive digital maps where the students interacted spatially with other members of the course. The interactive class maps supported active participation in the course and put the students in control as they visualized the relationships between other course members' locations and themselves. Figure 1 shows an example of an unpopulated map in the Blackboard CMS.

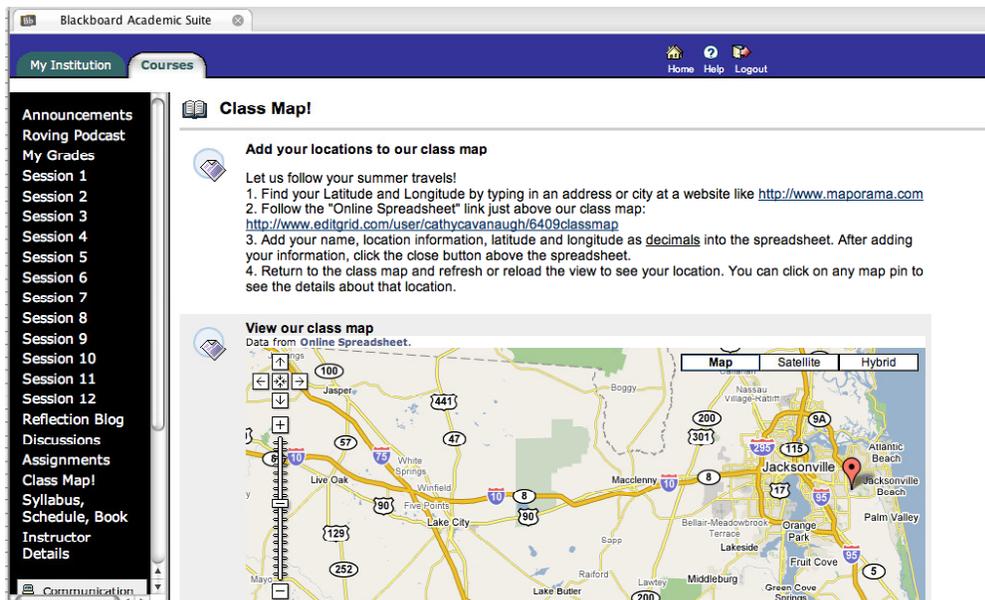


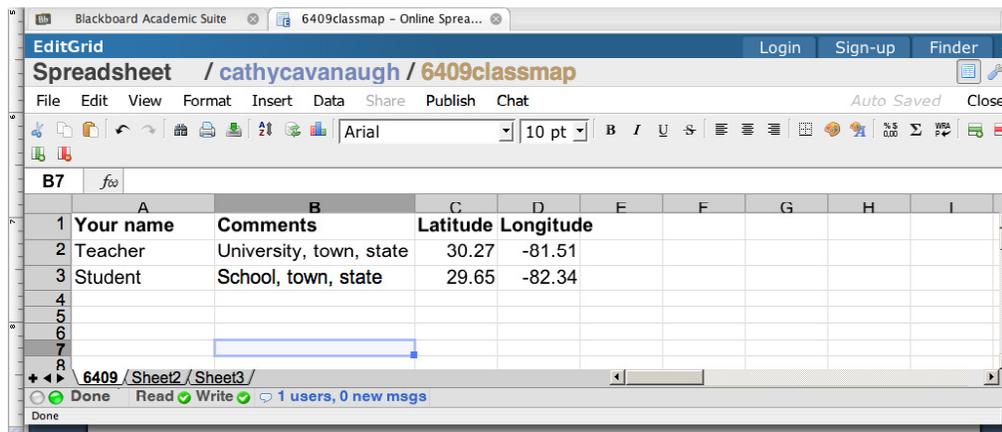
Figure 1. Unpopulated map in Blackboard

Development

In order to develop shared course maps, three components were needed: a tool that identified longitude and latitude, a shared spreadsheet for the longitude and latitude data, and the map that displayed the data. A number of GIS tools were evaluated for compatibility in a web delivered course, ease of use, usability of the graphical display, and whether the components could be used by the students directly. No single service was located that would handle the entire map process from start to finish. Several examples of each component were identified and evaluated.

Based on the evaluations, the first component that was adopted was the website *Maporama*, which returned a latitude and longitude for a street address. The site produced latitude and longitude in both degrees, minutes and seconds and in decimal form. Next, the online spreadsheet program, *EditGrid*, was selected as the shared application into which students entered their latitude and longitude in decimal form. *EditGrid* is a Web 2.0 tool that includes that add-on called *Grid2Map*. This add-on used information from the spreadsheet to create a keyhole markup

language (KML) data file that was plotted onto a digital map. *EditGrid* plotted GIS data on a *Google Map* that displayed at the scale to include the plotted points. Figure 2 shows the *EditGrid* spreadsheet.



The screenshot shows a web browser window with the EditGrid interface. The spreadsheet is titled '6409classmap' and is shared by 'cathycavanaugh'. The spreadsheet has the following data:

	A	B	C	D	E	F	G	H	I
1	Your name	Comments	Latitude	Longitude					
2	Teacher	University, town, state	30.27	-81.51					
3	Student	School, town, state	29.65	-82.34					
4									
5									
6									
7									
8									

Figure 2. *EditGrid* map generating shared spreadsheet

When the instructors created the add-on, the HTML code was provided for adding an *EditGrid*-generated map to either a web page or blog. At this point an initial map was created in a temporary folder within the CMS to test the functionality of all three map components together.

Implementation

Once the mapping tools were tested within the CMS, student instructions were developed and placed within the course. The *EditGrid* spreadsheet was set up to include the instructor's data as an example. When the students opened the CMS page that included the map, some browsers produced a Security Information pop-up stating that "this page contains both secure and non-secure items." Student needed to know to approve opening the page in order to proceed.

To facilitate the students' sense of connection with their peers in the course, the class map was posted in the opening "Announcements" section of the CMS. The announcements page appeared when students entered the course. By using this set-up, the map interfered with the ability to add more announcements for the course. This problem was solved by placing the map within it's own folder and creating a Course Map link in the course menu.

Students were instructed to add a location to that map to represent them. Some students chose to post their work locations, others posted their current home addresses, and others posted their previous hometowns. In each course section, several students and the instructors updated their location postings to indicate their travels during the course.

Evaluation

In order to assess the effectiveness of the interactive class map for reducing transactional distance in the online courses, the instructors used a survey that was deployed within the CMS at the completion of the course. The survey was a 10-item Likert instrument that listed ten components of the course and asked students to rate the extent to which each component reduced their sense of transactional distance. Students were knowledgeable about the concept of transactional distance from their work on the courses. All students indicated that the map reduced their sense of transactional distance at least slightly, while 25% of the students indicated that the map reduced their sense of transactional distance to a moderate or great extent. Assisting 25% of the students in the online courses with a map is a worthwhile return for a small investment of resources.

Other indicators of effectiveness were unsolicited comments from students about their experiences with the course map. Some students indicated that the map was their first use of a Web 2.0 application in an educational context.

Implications for Practice

Interactive course maps are recommended in online courses for reducing transactional distance and to support team building among the students. A pedagogical implication is that the interactive course map served to assist the instructors in their planning and teaching. For example, the maps reminded the instructors of the geographic scope covered by the students, thereby determining whether the scope of the discussions and examples should be regional, national, or international. A technical implication emerges from the limited capabilities of the CMS to support these interactive tools. This limitation would be overcome with the development of GIS plug-ins for the CMS.

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