The MapBlog – Blending Visual Pedagogy of GIS with the Interactive Sharing of Blogs.

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Abstract: Current advances in Geographical Information Systems (GIS) has allowed for the exploration of using maps to create informative online learning activities. These activities allow for visual representations of information that further student understanding. Likewise, blogging can allow for an interactive environment in online learning where students can share with and learn from each other. We took the advantages of both to create the Mapblog. This tool can create highly interactive learning objects that focus on emphasizing visual representations of information within its structure.

I Introduction

With only a decade of serious development, distance and E-learning is in its infancy. As any new field, often it looks to its predecessors for its development. For example, when film was still new, it was treated as a simple recording device of shows and events. With dance, numbers were recorded from one angle with only one take. This practice later ever became a signature of Fred Astaire who would often have to do hundreds of takes in order to get the perfect shot. However, pioneers like Busby Berkeley showed that film does not merely archive a single viewing of a performance. He used film to show dance in a way that is impossible to experience without film. Using multiple cameras and angles, Berkeley explored the new area of dance choreography and experience that the new media offered. We would like to use this model, and suggest that on-line and computer environments offer us rich environment for education that is just currently being explored. To do this, we hope to embrace learning methods that foster successful knowledge acquisition, and to avoid the pitfalls that have in the past been associated with learning and high education. This requires first identifying and examining what learning theories develop the most successful pedagogical frameworks for on-line learning.

Current development in on-line interaction has resulted in vast improvements with Geographical Information Systems (GIS) and improving information sharing with the use of Blogs. GIS allows information to be represented visually, often employing most recent satellite mapping. While blogs were first associated with journaling and political reporting, their applications for spreading information soon became apparent as well. We took both of these new information tools and created a hybrid that employs the visual pedagogical advantages of GIS Mapping tools with the information sharing advantages of blogs. This Mapblog hybrid allows a myriad of possibilities to create engaging learning activities that encourage interactivity and visual pedagogy.

II Learning Approaches and Learning Theories

There are several different learning methods and theories that can offer frameworks for developing online learning strategies. Before course model development, there is a meta-model question about the theory underlying the means for learning within that model. When one teaches, one needs to both have knowledge of the content and an effective delivery system for students to acquire this knowledge. In the past, more traditional 'brick and mortar' teaching institutions would hire based on content knowledge and not investigate their delivery, or teaching skills. After all, most universities make their money and prestige from the grants they receive from their research. It is well documented that no attention is given to the quality of teaching at research institutions (Wilson, 1998; Ramsey, 1995). Given that online learning offers clearer distinction between content and content delivery, the later often determined by the design of the

media used for the course, we have a great opportunity to select and track what learning model offers the best results for our students.

Maron and Salja (1976) propose that we can approach can approach teaching by fostering either surface or deep learning. These are ways of learning with characteristically unique goals and foci (Ramsden, 1992). Surface learning focuses on memorizing information instead of assessing it. Facts area associated unreflectively and area used for recall instead of being assessed for pertinent relationships. Meanwhile, deep learning relates theoretical ideas with everyday experiences, evidence and arguments, as well as organizes and structures the content as a whole (Biggs, 1987). Surface learning is often experience as a struggle and boring while deep learning often invigorates the student and is gratifying (Ramsden, Beswick, and Bowden, 1989).

In many ways there are two competing models about the nature of learning and instruction; the objectivist and the constructivist views (Byrnes, 1996). The objectivist view, and more tradition practice, suggests that learning is successful when students can repeat what they are taught. To this extent students are receptacles of knowledge they read or hear from their instructors. The use of this model often fosters surface learning. Students are quick to learn meta-learning skills and adopt them to pass competency exams and yet have no ability to demonstrate their knowledge outside of test taking. In many ways learning is often thought as wrote memorization and the knowledge quickly fades after the students have 'crammed' for their test. Later, the student has no retention of the area of study and this is so commonly known, that comedic figure Father Guido Sarducci created the sarcastic and memorable "Five Minute University" skit.

The second model would be the constructivist view. It proposes that learning occurs when students can demonstrate understanding at a conceptual level. This occurs generally when the knowledge is created by the student through reflect on their experience, what they interpret from what they read, hear and experience based on their previous learning and habits (Arseneau and Rodenburg, 1998). A constructivist approach seems most effective at fostering the goals of imparting deep learning in adults (Kearsley, 2002).

When a constructive methodology is adopted by our online learning environment we have discovered that adopting the approach results with adult learners excelling. In general, adult learners learn best when the courses were designed to: allow students to learn experientially, approach learning as problem solving, show the students why they need to learn this information, apply case based problem solving for better understanding, and to show students why they area learning what they are learning (Kearsley, 2002). Our students' motivation is often intrinsic and they bring their past knowledge and experience into the learning process. This often entails relating the theoretical ideas of the course to their everyday experiences. Their internal motivation is often not out of fear of failure, but instead is a desire for self-betterment. (Entwistle, 1981). This of course may be a factor of their average age, which is thirty-seven at Empire State College, however for us it is prudent to develop learning theories that focus on these factors. Since our younger students also excel, we are confident that this approach is successful for most all on-line learning.

III Our Goal

We wish to develop focused classes that effectively reach our students and develop skills that are productive. We do not take an objectivist approach to learning because it can offer students access to web-based materials that are less expensive and allow more people to access and read them and then didactically measure their retention with simple tests. Our goal is to develop deep learning within our students. To this extent we have moved away from traditional objectivist models, and adopted a constructivist approach. We have found that adult learners excel with this approach (Chacon, 2007; Chacon, Wolf, & Chen, 2007).

Our constructivist approach and success at creating environments that allows learning by constructing knowledge in active environments that foster reflection and participation won us Science and Math (SMP) grant to further explore new ways to teach these topics. The grant gave us the charge to inspire students in the sciences while:

- Emphasizing problem solving through case base studies,

- Promoting active experimentation through virtual labs.
- Engage in a variety of learning styles, including audio, visual and text.
- Develop transferable tool/learning objects

In the past, we have developed simulations of environments to better explore and explain scientific theories using case base studies and GIS technology from Google Maps. For example, the *Voyage of the Beagle* was a simulation using case based reasoning that illustrated definitively both the principles of the theory of evolution and how Darwin arrived at his theory (Guba and Wolf, 2007). Using our past work, we decided to explore most general applications of this work, and what can be done with it to better develop learning on-line.

A common obstacle we encounter when designing new learning tools is a key misunderstanding about what a learning object is and can be. Often we face the attitude that such an object is an accessory to learning. This approach is best characterized by Laurel description of the interactive learning objects as 'chocolate-covered-broccoli' (2001). The object was intended to make the dull content more 'palatable'. However, we believe this erroneously assumes that online learning objects must be simple and not encourage much fun.

Instead, this overlooks that any learning object that supplies a learning environment through visual, interactive and textual presentations to engage the students in active learning (Clark and Mayer, 2002). Further, this can be done successfully and enjoyably (Wolf, 2007). It is these learning objects that are most effective. These become tools that encourage creativity and multiply productivity.

IV What are Learning Objects?

The concept of learning objects lies with taking the object-oriented aspects from computer science and applying the concept to computer based instruction. Object-orientation is based upon the creation of components and objects that can be reused in multiple contexts, mainly in computer programs (Wiley 2000).

The first theoretical underpinnings on the use of individual resources as a basis for use in instructional materials began with Merrill and his colleagues on the TICCIT project at Brigham Young University in the early 1970s. Their Component Display Theory evolved into Instructional Design Theory in the early 1990s. Wayne Hodgins coined the term 'learning objects' in a report in 1992 (Wiley 2002). There have been many people who have sought to create a definition for learning objects. This includes the Learning Technology Standards Committee (LTSC) of the Institute of Electrical and Electronics Engineers (IEEE) founded in 1996 (2001), Wiley (2001), the Wisconsin Online Resource Center, L'Allier (Polsani 2003), as well as others.

A Learning object is any entity, digital or non-digital, which can be used, re-used or referenced during technology supported learning (LOM, 2000). Begin more geared to an online environment, Wiley felt that "non-digital" and "non-reusable" should be removed from the definition and that "during" should be replaced by "to support" (Wiley 2000).

To be affective the elements of the object need to be placed in order and context to be meaningful. How they are structured is an important aspect of creating understanding and perspective. Instructional design is an important key of "learning object use and implementation in an instructional context" (Bannan-Ritland, Dabbagh & Murphy, 2000).

The composition of the learning objects can be referred to as the "scope." This is a representation of what individual elements make up the learning object or discrete portion thereof. In this case the discrete portion may be a web page consisting of multiple items to making this a single element following Wiley's assertion that "larger reusable digital resources include entire web pages that combine text, images and other media or applications to deliver complete experiences, such as a complete instructional event" (2000).

The elements of the learning object (images, quotes, text, links, etc.) represent the bits that make up the atom. The atom is the element that can be considered the smallest useable element. Although the bits can

be interesting in and of themselves, it is not until they are combined that they create a learning tool in the larger context (Wiley 2000). Consequently the atoms, web pages, provide internal context for the portions that make up the crystal in which the learning objects are combined into a structure. Constructivist learning activities are not devoid of structure. No matter what the approach, there must be some organization of materials to foster true learning (Bannan-Ritland, et al, 2000). One thing to remember is that on their own, learning objects do not necessarily create or represent learning. "there *must* be concentrated effort made to understand the instructional issues inherent in the learning objects notion… There must be a balance between the technology and instructional design (Wiley 2000).

Some important considerations in a constructivist environment is that the learning materials be: "flexible, dynamic and highly engaging technology-based environments"; "capitualize on the goal-orientated nature of human learning processes"; and allow "learners to associate instructional content with their prior knowledge and individual experiences" (Wiley 2000).

We found that Cognitive Flexibility Theory (CFT) serves to address these areas and meet our learning goals for the learning object.

- Use of multiple knowledge representations (e.g. multiple themes, analogies, case examples, lines of argument);
- Explicitly linking and tailoring concepts to practice and case examples (i.e. situating conceptual knowledge in contexts that are similar to those required for the application of the knowledge);
- Incrementally introducing complexity in small, cognitively manageable units;
- Stressing the interrelatedness and web-like nature of knowledge (instead of isolated and compartmentalized knowledge); and
- Encouraging the assembly of appropriate knowledge from various conceptual and case resources (rather than the intact retrieval of previously memorized information) (Jacobson & Spiro 1991, p. 4).

Further, Collis et al (1997) set of "key principles for good teaching and learning in higher education" as a foundational philosophy.

- Scaffold the learner's increased self-responsibility for learning.
- Stimulate active engagement.
- Elicit articulation and reflection.
- Lecture less and give feedback more.
- Encourage more-frequent and targeted communication (Collis et al 1997)

We kept these principles in mind while developing our materials for the learning object.

V Exploring the Mapblog

Discussion can be one of the best forms of learning in an online environment. Good discussion the focus on reflection with open-ended questions that encourage academic responses reflecting understanding of key course concepts is a cornerstone of a pedagogical rubric. While we have augmented our discussions with images it was only until recently that we have merged our visual pedagogy with discussion by immersing students into a simulation and engaging them with discussions about case studies (Guba & Wolf, 2007). This simulation allowed the students to interact with a learning object and discuss their findings in a posting area. However, we wished to engage the students more with the learning object and have direct knowledge and information sharing with the learning object.

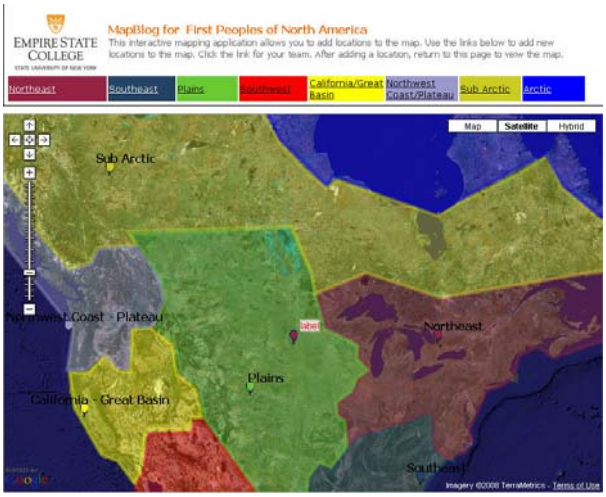
Using Good Maps, based off of the Google Earth architecture, we created a visual map as a focus for our learning activities. Students could post blog/assignments anywhere on the map. This was easily accomplished by creating a tool that allows the students to easily identify the coordinates for the 'pin' representing the posting on the map. After this, the students have access to an editor that allows the creation of a page that can include text, images, links and embedding video. Thus, the students could create informative web pages illustrating content that can be expanded or collapsed and represented on a map. This allowed all those interacting with the learning object the ability to be capable of sharing information

and graphically representing special and geographical relationships. This fosters a visual understanding that is often lost when merely represented textually.

After developing this MapBlog tool, we discovered that it was rich with possibilities. A simple use of the learning object was to have students choose to geographically represent their assignment and use the MapBlog to post their work. Students would have access to other students work, and discover geographical relationships of the work. Augmenting this interactive assignment was a discussion forum asking questions about the information within the learning object, and encouraging students to reflect on its relationship to the overall course.

The format allows for posting geographically relevant information. As such, biology labs and fieldwork by students can have their specific observations documents and revealed. This can be helpful for group assignments or comparing finds from multiple locations. Likewise, courses about GPS could have a graphical and interactive lab forum.

With the Mapblog tool, it was very easy to make threaded assignments. By changing the color of the posting 'pin' for each new unit/module/group, posts could be categorized. This could allow for students to identify more recent posts when modules or units were designed linearly. For example, we had students in a course on the Middle East posting current events. As the students progressed throughout the course, the map was filled with information for the students to view, and the different color of the posting 'pins' would allows students to have a grasp of when the pin was posted.



Taking the concept or threaded assignments and further, we used the Mapblog for a continue assignment in a course First Peoples of North America (to the right). By imposing borders to created thematic zones to represent the major native cultures of the area, the Mapblog defined areas where student groups could post about their specific research. Student groups could collectively share their information on the blog and see how other groups are working on their projects as well. In many ways, this encouraged collaboration and inspired students. The assignment continued for several modules culminating in large group projects and an educational area where all students were interacting.

Finally, by closing off the submission feature for students, the Mapblog can be a tool for instructors to create content and reveal geographical relevance (see right). While the students do post on the Mapblog, they still can access the posts. This way, they can visually understand geographical relationships of the information, as well as interact with the map – as they have to expand the posts to get the content. This was very successful when we made a dance library documenting dances from various cultures around the world. Students could access styles of dance, textual information, as well as graphics and embedded video, while also being able to reflect on the geographical similarities of the dances.

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