The Evolution of Webscapes: A Theoretical Framework for the Collaborative Design and Development of Interactive Learning Environments

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Abstract: This paper presents a description of multimedia-enhanced educational projects developed using the Webscape design model. This model has evolved from an instructor-led experience to a more student-centered, collaborative approach. Currently, the Webscape model provides a structure for small teams of students to work with clients and content experts throughout the entire process of instructional design from brainstorming through evaluation. Critical components of the model are detailed in terms of rhizomatic theory, a means of understanding chaotic and dynamic social processes. The insights provided by this theoretical framework shed light on the equally important, yet under-emphasized, process involved in constructing Webscapes. An authentic project involving community organizations that are interested in creating multimedia resources to advance their educational mission is used as a case study for the exploration. Additionally, several of the representative projects based on the Webscape model are showcased.

Introduction

Two of the authors coined the term “Webscapes” several years ago (Robin & McNeil, 1998) in conjunction with a new model for designing Web-based, multimedia-enhanced educational environments. The word, “Webscapes” was based on “information landscapes,” a term first used by Florin (1990) who visualized “virtual towns” or “intellectual amusement parks” where abstract concepts could be brought together within a single metaphor. The Webscape was conceptualized as an information landscape delivered over the Web that included a rich variety of content; challenging, cognitive explorations; intuitive navigation structures and user-oriented interfaces. The goal of the Webscape model was twofold. First, the authors wanted to provide educators with a guide for using a multilayered approach to design their own course materials as well as develop useful online course resources with interactive components that included a variety of multimedia. The second goal was more theoretical in nature: to describe and clarify the collaborative process of design and development.
In the first iteration of the Webscape model, the authors created interactive experiences for their students and spent considerable time incorporating different interactive components into each course or technology-based project. These interactions ranged from simple point-and-click examples to more sophisticated ones such as games and simulations, problem-solving scenarios, and reflective discussions using online communication tools. As the use of technology resources has matured and grown, and the comfort level of both educators and students has increased, the Webscape model has evolved as well. The design and development of these materials has now shifted from being an instructor-led experience to a more student-centered, collaborative approach.

Currently, the Webscape model provides a structure for small teams of students to work with clients and content experts throughout the entire process of instructional design from brainstorming through evaluation. These authentic projects involve clients from various community organizations, such as museums, who are interested in having students help them integrate multimedia resources into projects that cover a variety of content areas. These learning environments are designed to take advantage of a rich variety of content, challenging, cognitive explorations for learners, and intuitive navigation structures and user-oriented interfaces that students with different backgrounds and multiple learning styles could use to actively explore multiple pathways through rich educational material. The Webscape model was based on a framework provided by Jonassen (1994) that proposed that a learning environment should provide multiple representations of reality, focus on knowledge construction, not reproduction, and support collaborative construction of knowledge.

**Critical Components of the Webscape Model**

The Webscape model consists of the following basic elements:

**Authentic Projects with a Research Focus**

The focus on real-world projects within the structure of courses allows students to increase their learning because of the authentic nature of the intellectual endeavors. Knowing that the research they conduct and the educational materials they develop will be used by both organizations and teachers, as well as web visitors from around the world, creates a level of motivation that is unmatched by traditional group projects or normal class assignments.

**Collaborative Development**

Students work in small design and development teams to create projects collaboratively. An important part of the Webscape model is that students from outside the Instructional Technology program are encouraged to enroll in courses and participate in these projects. Since several of the projects have focused on art and utilized the expertise of museum partners, students from both the College of Education’s Art Education program and the University’s Art Department have participated in the course. These students have been extremely helpful to the success of the projects. Even though they often do not possess the same level of technical skill as the Instructional Technology students, their knowledge of art and art education nicely complements the technology expertise of the other students. In future semesters, it is hoped that students from additional programs, such as history and social studies education, will also enroll in the course.

A variety of course facilitators work with student teams. The facilitators come from a variety of sources, including graduate students who previously took the courses and want to continue working on the projects, other faculty members who are interested in the content, and community partners. Facilitators are in charge of different components of the web projects and they provide guidance and continuity to the new student teams that continue the work that previous students began.

**Timeline for Development**

Because the Webscapes that students create are complex and multi-faceted, they cannot be completed in a single semester. Consequently, courses are offered in both fall and spring semesters to enable work to continue throughout the school year. This poses a considerable challenge as each new semester brings a fresh group of students into the course that must first investigate the work done in the previous classes and then devise strategies for building upon that work.
Variety of Multimedia and Technologies Used

While the model's namesake implies a web-based focus, the model has been used extensively in the Collaborative Design & Development of Multimedia course, a two-semester course sequence of planning and creating interactive multimedia resources. Much of the work of the students enrolled in this course centers on the development of multimedia materials that are destined to function in stand-alone multimedia kiosks or to be delivered by CD-ROM media. The deliberately interactive nature of this type of product requires a unique approach to content design, organization and delivery. The multimedia projects that have been developed to date have displayed a remarkable level of creativity, imagination, innovation, and mastery of both instructional design principles and application of technology for online learning.

Insights into the Webscape Model as revealed through Rhizomatic Theory

As one might expect, the historical focus of the Webscape model has centered on the resulting product, usually a web site. In the courses using the Webscape model, the authors take great care to ensure that all of the critical components of the Webscape model are present. However, simply delineating components of a model introduces the danger of simplifying the Webscape development process to a checklist approach and results in an incomplete understanding of the dynamics of Webscape creation. What is needed is to refocus on the model's secondary goal: to describe and clarify the collaborative process of design and development.

In theorizing exactly how Webscapes encourage students to explore multiple representations of reality and the process of collaborative knowledge construction, the rhizome, epitomized by crab grass growth, is an apt metaphor. The rhizome, a continuously differentiating yet connected root system, is contrasted by critical theorists Deleuze and Guattari (1983) with traditional hierarchical models epitomized by the tree. What does thinking in terms of connected systems that are resistant to blockages (rhizomes) offer to an understanding of instructional technology, and learning in general, that is frequently conceived of in terms of hierarchical systems (trees)?

Duffy and Cunningham (2001) have suggested the Mind as Rhizome model as a useful way to unpack the value of constructivist practices in teaching and learning, particularly through problem-based learning and collaborative strategies. For Duffy and Cunningham, “learning, then, is . . . a matter of constructing and navigating a local, situated path through a rhizomous labyrinth, a process of dialogue and negotiation with and within a local sociocultural context” as opposed to a singularly desired, imposed and predetermined outcome (2001, p. 2). Employing the lens of rhizomatic theory while looking at the Webscape process foregrounds the sociocultural context of the dynamic process involved.

Deleuze and Guattari (1983) have defined several principles that are useful in understanding the dynamics involved in the Webscape creation process.

Principle of Connection

“Any point on a rhizome can be connected with any other, and must be” (Deleuze & Guattari 1983, p. 11). This principle of the rhizome is about instituting what Deleuze & Guattari (1983) call the “logic of and” (p. 58), which is to say anding values defiance of definition and fixity. Hierarchical trees “impose the verb ‘to be,’ but the rhizome is woven together with conjunctions: ‘and …. and… and…’” (p. 57).

Through the development of Webscapes, anding occurs not only in the linking and connecting of content that can extend indefinitely, but also in terms of the social/political dynamics of the groups defining themselves and their purposes as connective with one another and with the larger educational missions of various community partners that are always in perpetual states of anding. Fixity and finality of the final website is not the goal, but rather the next connection, in whatever form it exists—be it through more content, additional links, or more likely, by how and by whom the website is used—is.

Principle of Heterogeneity

The principle of heterogeneity underscores the importance of difference in the rhizome. The rhizome continually differs from itself, thriving on moments of disparateness developing ways to connect through difference, rather than continually replicating the same.
Webscapes in their design engage group members in ways that reveal and require the very specific and embodied difference of students, replete with their ability to see from their very specific, differentiating positions within the rhizome. Webscapes, by their collaborative nature, depend on difference for their strength and cohesion—not by building the tallest and most firmly rooted tree, but by the intensity of the connective roots of the rhizome. A Webscape is a fusion of technology, science, art, politics, social philosophies and social forces brought together by the nature of the technology, the content area, and the students themselves.

**Principle of Multiplicity**

Connective differentiations require that the rhizome is conceived of as a series of multiplicities rather than a unified entity. Multiplicities encourage connections and acknowledge that the ability to make sense of those connections at any one time in whatever way seems consistent at the moment is indicative of the multiple entrances and perceived nature of the rhizome.

Teams engaged in the Webscape model may be picking up a project or collaborative work previously begun by another group that organized and structured their organization of ideas and connections in a particular way. The second team on the evolving process, will inevitably organize and value information in vastly different ways. Rather than this being a flaw in the Webscape process (which again, in working with real-world clients still actively balances process with product) is rather one of the defining strengths of the process. This reworking of the rhizome of the Webscape is not a total devaluing of what came before but rather a reworking and a gathering of multiplicities on a different plane of consistency. This critical filtering drives home the fact to students that any and all construction of knowledge is at all times only a perceived account of whatever subject is being explored, which very likely would benefit from being considered again through another configuration of the rhizome.

**Principle of A-signifying Rupture**

One of the characteristics of a rhizome is how it reacts to being broken. When a rhizome is severed, it does not cease to grow or cease to interact with its environment. Rather, it rebounds and will start to expand again along old pathways or create new ones. It abhors the implied extinction that severity would seemingly dictate.

In the collaborative development of Webscapes, every participant will encounter the issue of ownership of ideas. In deciding what course of action to pursue, such as deciding on the appropriate page layout, various competing ideas will be proposed. These ideas are discussed, debated and critiqued. They may be accepted, synthesized, or dismissed. The altered or dismissed ideas rarely disappear, especially if a participant felt acute ownership over the idea in question. Often, if feelings are strong, the rejected idea may lay dormant for a time, then take advantage of an initial failure of the current structure. For example, early on a student proposes the use of cascading style sheets, but the collaborative group decides against it. Later when the project hits an obstacle, the cascading style sheet idea experiences a resurgence and works its way back into the project.

**Principle of Cartography and Decalcomania**

The only way to map the rhizome is to “do” the rhizome. By “establishing contact with the real experimentally” (Deleuze & Guattari 1983, p. 25), participants construct the rhizome. In doing the rhizome, multiple entrances of engagement are mapped by the very performance of engagement. This kind of engagement, especially in terms of multiple entrances, requires that “dead ends should always be re-situated on the map, and in that way opened up to possible lines of flight” (p. 31).

Webscapes are informed by a process of critical feedback where clients are consulted and presented with options that require students to do the rhizome and then do it again, and again, and again. Being intimately involved with what works for both client and student team and what doesn’t in a very real way entails a kind of mapping of the process so much so that some groups view the various versions as maps. But the mapping extends beyond these obvious forms of mapping by personally extending into each participant’s individual world as well. Casual conversation and personal construction of meaning about the project further extends the map in the multiple ways the rhizome is encouraged to go.
A Case Study of an Evolving Webscape through Rhizomatic Theory: John Biggers’ Murals in Houston

What follows is a discussion of four iterations of a Webscape (http://www.coe.uh.edu/webscapes) that did not originally begin as such. This Webscape, centers on the murals of Dr. John Biggers, a nationally recognized artist and educator, who created a number of murals in various locations throughout Houston. While Biggers passed away in 2001, his legacy, particularly in the African American community, is actively being preserved and passed on in a variety of ways. The four iterations demonstrate the rhizomatic ways legacies of this artist are constructed, overlap and change through the Webscape model.

The first iteration occurred during the summer of 2002 when students in a course entitled Issues and Trends in Art Education explored the eleven local murals of Dr. Biggers while investigating the process and meaning-making associated with mural-making. During the intense three-week course, students engaged genuinely with Biggers’ murals, visited with his widow and former students, learned the process of mural-making on the campus of Texas Southern University, and developed a first attempt at a website for educational resources to share the local works of Dr. Biggers with others.

The students worked both individually and collectively connecting their own personal experiences, stories of injustice, and creative ways to share information about Dr. Biggers’ work. Students, mostly graduate students seeking art teaching certification, brought their variety of teaching experiences and their personal aesthetic views to the project. Connective ideas abounded and in a very short period of time, the students created a solid and meaningful piece, albeit incredibly flawed from a web-design standpoint.

The second and third iterations occurred simultaneously in the Fall of 2002. The local connection fit nicely with the theoretical framework of the Webscape model, which seeks to take advantage of community-based content as part of the curricula. As such, the Project-Based Web Design course adopted the previous attempt of the art educators to overhaul the structure and improve upon the content simultaneously.

As it happened two of the students (two of three on the design team) had also participated in the summer experience described above. In this course, one more focused on the technological tools and possibilities of the project, unlimited possibilities and stymied realities plagued participants. Students from the summer course felt deeply invested in the process and resented the team member who did not share a similar zeal for the topic. Additionally, each member’s personal connective text took off in the construction of this iteration only to be half realized for various and sundry reasons, most notably that ideas and connections are much easier to do and trace than it is to actually map (do) them. The result, however, was productive given the tense environment, but students brought a sense of urgency and accuracy to the project that typically is concomitant with valuable, meaningful work.

Simultaneously, a group of middle school students were introduced to the work of Dr. Biggers, corresponding with our strong desire to find a multi-layered topic that younger students could use in the research, design and development of their multimedia projects. Our challenge to the Multimedia Media Masters students was to have them use a variety of technology tools to investigate the many layers of Dr. Biggers’ life, his art and the impact of his work on the Houston community and its inhabitants as they focused on content rather than just the use of technology.

While the students were engaged and interested in Biggers’ work at various stages of the 6-day experience, the most incredible moments with regards to the topic occurred in discussions with the students in front of the murals, and unfortunately many of these ideas were hard-pressed to be translated into the multimedia PowerPoint presentations the students created. There is no doubt that the students were engaged in the process, but the process was not mapped by the technology.

The fourth iteration of the project was a second semester of the Project-Based Web Design with entirely different students in the Spring of 2003. In this project, the student team was committed to using the technology possibilities to the fullest, but there was a sense from the first team in the Fall that the students had started over, de-valued their work, or simply not understood Dr. Biggers’ work. The content was augmented and the design went in a totally different direction as this new group of students applied their own aesthetics to the project.
What is interesting about these four iterations is that all of them in their disparate, yet collective, connective forms, are the rhizome. Each rendition, each nodule of connections sprouting from the diverse points of view and experiences of the students in their own way authentically map the rhizome. It is when the cumulative work of these four iterations is unified, massaged to flow one to the other, that the Webscape model broadens.

Advantages of the Webscape Model & Lessons Learned

One of the interesting effects of working with partners such as the Museum of Fine Arts is that students who help design and develop a Webscape project, by necessity, participate in a cross-disciplinary exploration of such topics as history, geography, religion, economics, politics, and other cultural influences associated with works of art and artifacts, not the typical type of exploration normally found in a web design course. We feel that this occurrence has had a significant effect on our own teaching and learning and the community organizations that agree to work with our students.

The Webscape model has been replicated across the curriculum and across age groups. Based on our experiences with the Webscape model, the following recommendations are suggested for educators and students who would like to create similar collaborative interactive learning environments utilizing community resources and partners.

• **Alignment with the Program Goals**
  The development of the Webscape must be aligned with the goals of the program in which the course is based. The Instructional Technology Program is based on the concept that our community provides a rich context and resource from which our students and faculty can build authentic learning tasks, work with real clients, contribute new perspectives, and design and develop meaningful products. Students develop an extensive knowledge of the technologies of instruction as well as relevant scholarly and professional skills.

• **Preparation and Shaping Expectations**
  Students need to completely comprehend the steps of the process before they begin the actual design phase. The process of designing and developing multimedia resources is complex and often difficult to understand when it is built only on a theoretical and technical framework. If both the students and client understand that there are often periods of indecision and questioning and possibly redesign, then perhaps the process would proceed more smoothly. Students should also realize that every team is different and that flexibility is a critical factor for success.

• **Dedicated Clients**
  The client must be willing to work with students in a variety of roles from content matter expert to the user of the materials and must become active participants in the process. The client must be accessible at times other than class periods and flexible in their thinking about the possibilities for design.

• **Time to Build the Large Community with Adequate Time for Reflection and Meetings**
  The teams and the learning community in which they function, need to be established as quickly as possible. Other opportunities for developing team skills and communication should also be provided throughout the design and development process. Teams should have time during class to meet, but should also expect to communicate either face-to-face or in person between classes.

• **Good Problem and a Variety of Approaches**
  The instructional problem should create a balance between challenge and frustration for the teams. The process should support a variety of solutions and opportunities for creative and original discoveries.

• **Make Sure the Students Understand the Expectations for their Work.**
  Working with real clients with actual deadlines gives students an understanding of what they will face when they complete their education. In these courses, we do not operate under the philosophy that "this is only a school project." Clear expectations about the quality and specifics of student work should be articulated by the client and the faculty members. In this collaborative setting, students learn to critique their own and other
students’ work in a non-personal, non-threatening manner. Through a series of such critiques, not only will the quality of the work usually improve, but the students’ understanding of the design process will be strengthened.

• **Use Faculty and Community Experts as Project Facilitators.**
  We have learned that in large-scale projects, student teams benefit from a university or community expert who is willing to spend time working on the projects. These individuals provide valuable guidance and expertise and help the teams determine which parts of their design and development meet the needs of the client.

• **Recruit Students from Other Disciplines Outside of the Instructional Technology Program.**
  We have also found that the course can be strengthened by having students from other programs besides IT enroll in the course. Students with backgrounds in other areas such as history, communications, art, art history, and social studies can add depth and meaning to the projects that are created. Since there will almost certainly be other team members who possess technology skills, not every student in this technology course needs to start off as a technology expert.

• **Provide Opportunities for In-Depth Research.**
  Students interested in using these projects as the basis for thesis or dissertation work find a great opportunity for research. The community partner benefits from scholarly research that focuses on their educational mission and students benefit from a wide array of possible research topics and a large population of potential participants.

• **Prepare for Changing Expectations of the Clients.**
  Finally, be aware that as design and development of technology-based resources progresses, the client’s expectations may change. Rather than treat this as a negative occurrence, we view this as a predictable and necessary consequence of such a partnership. Students learn first-hand that no matter how meticulously they plan their projects, modification of their work will be needed as their clients see their work and begin to adjust their expectations of what is possible.

**Additional Representative Projects Using the Webscape Model**

**The Bayou Bend Project**
http://www.coe.uh.edu/webscapes

The first project undertaken using the Webscape model was the development of a website for Bayou Bend, the American decorative arts wing of the Museum of Fine Arts, Houston. In this project, student teams worked with faculty members, graduate assistants and museum educators to develop site navigation, page design, educational materials and multimedia resources that would showcase the Bayou Bend museum and its collection of Colonial American art, furniture, ceramics, and glassware. Student teams created searchable databases, produced virtual room tours, and integrated streaming media content into the site. From this experience, we learned that the success of the project was due to the commitment of course facilitators and museum staff who worked closely with student teams.

**The Grandeur of Viceregal Mexico Project**
http://www.coe.uh.edu/webscapes

Based on the success of the Bayou Bend project, a new group of students worked with faculty, facilitators and museum staff to develop a more ambitious Webscape for The Grandeur of Viceregal Mexico: Treasures from the Museo Franz Mayer. This Mexico City museum sent a traveling exhibition from its collection to the United States, and as its first stop, to the Museum of Fine Arts, Houston in the spring of 2002. In addition to basic information about the exhibition, the web project contained in-depth information about featured selections from the exhibition, activities for families, such as interactive...
games, quizzes, animations, and maps, an historical-cultural timeline explaining the confluence of cultures represented in the exhibition, lesson plans for teachers of art, social studies, language arts, and early childhood, and a detailed description of a cultural exchange program that allowed art students from Mexico City and Houston to visit both cities and explore art related to the exhibition. New multimedia components that were added in this project included the interactive games and simulations created with Macromedia’s Authorware software. From this project, we learned to respect museum policies and deadlines, two areas that were new for most graduate students and faculty members.

The Blaffer Gallery Project
http://www.coe.uh.edu/webscapes

The lessons learned from the Grandeur of Viceregal Mexico project taught us to think carefully about the size and scope of student projects. This led to collaboration with the Blaffer Gallery to design educational technology components for an exhibition by American artist, Chuck Close, as well as have student teams meet with gallery staff to brainstorm innovative ideas for new ways to use multimedia technology as a communication tool. These student teams will focus on innovative ways to integrate technology into the Blaffer experience, from creating a wireless network within the museum that will allow visitors to interact with “digital docents” to stretching the limits of traditional website development by creating online communities that invite participation from Internet users throughout the world. These learning communities will be used to host online discussions by artists, art educators, students and members of the public that are interested in exploring art topics through new uses of digital media and communication devices.

Conclusion

In this paper, we have described the Webscape development model. The critical components that have made the model so successful in our Instructional Technology program were delineated. It is important to reassert the danger in considering the Webscape model as a simple guide or checklist-approach. To do so results in an oversimplification of the model and a risk of considering the interpersonal dynamics of the individual who design the end product as trivial. The Webscape design process was explored using rhizomatic theory and the preliminary insights were discussed. Additionally, the John Biggers murals project was explored in reference to the concept of the rhizome. Finally, the advantages of the model and the valuable lessons learned were presented along with a showcase of Webscape-based projects.

References


