Self-Organizing Networked Learning Environments

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INTRODUCTION

The Internet has long been touted as an answer to the needs of adult learners, providing a wealth of resources and the means to communicate in many ways with many people. This promise rarely has been fulfilled, and often, when it is, by mimicking traditional instructor-led processes of education. As a large network, the Internet has characteristics that differentiate it from other learning environments. As Kelly (1998) puts it, “the sum of the value of a network increases as the square of the number of members.” Because these interactions are mediated through computers and may be with many users at once, this is a notable underestimate.

Churchill said, “We shape our dwellings and afterwards our dwellings shape us” (Churchill, 1943, p.23). If this is true of buildings, then it is even more applicable of the fluid and ever-changing virtual environments made possible by the Internet. Our dwellings are no longer fixed, but may be molded by the people that inhabit them. This article discusses a range of approaches that makes use of this facility to provide environments that support groups of adult learners by adapting to their learning needs using nothing more than their interactions to provide structure and shape to their learning.

BACKGROUND

Jonathan Darby (2003) identifies three generations of networked learning environments used in adult education. First generation systems are direct analogues of traditional courses, simply translating existing structures and course materials. Like their traditionally delivered forebears, they are dependent on individual authors. Second generation systems tend to be team-built and designed for the medium from pedagogical first principles, but still within a traditional course-based format. Third generation systems break away from such course-led conventions and provide such things as just-in-time learning, guided paths through knowledge management systems, and personalized curricula. This chapter is concerned primarily with third generation environments.

Saba’s interpretation of Moore’s theory of transactional distance predicts that in an educational system, as structure increases, dialogue decreases and vice versa (Moore & Kearsley, 1996; Saba & Shearer, 1994). What is significant in differentiating learning experiences is not the physical distance between learners and teachers, but the transactional distance, measured by the degree of interaction between them. Highly structured educational activities have a high transactional distance, while those involving much discussion have a lower transactional distance. This chapter is concerned with the structured variety of educational activity.

In a traditional learning environment, the structure of the experience is provided by the teacher or instructional designer. One of the few justifications for the lecture form is that it provides a framework for understanding a topic, emphasizing the important points and ordering them in a manner that is intended to be beneficial to learners. However, learners will not benefit equally from any given structure, as different learners learn differently (Kolb, 1984). It would be better if learners could select appropriate approaches for their needs. Without a teacher, help with this might be provided by the opinions of other learners. However, eliciting those opinions, assessing their reliability or relevance, actually finding the resources in the first place, and, once found, fitting them into a structured learning experience is difficult. Several approaches to these problems are available, but first it is necessary to introduce a few concepts of self-organization.

Self-Organizing Processes

Self-organization of the kind we are discussing is an emergent process in which the interactions of the participants and the software lead to organization that does not arise as an intentional, programmed, or planned process, but which arises from the nature of the system itself. Such processes are very common in nature and human social systems. Two in particular are of interest here—evolution and stigmergy.

Based primarily on work following that of Darwin (1872), evolution is one of the most powerful self-organiz-
Some Examples of Self-Organised Learning in Practice

For many seekers of knowledge today, the starting point is often Google (http://www.google.com). Google’s PageRank algorithms use as their basis a principle described by Kleinberg (1998) as Latent Human Annotation (LHA). The principle behind LHA is that most Web pages provide links to other sites if those sites are considered in some way “good.” A simplified formulation of this is that the more backlinks (links pointing into a site) that point to a given site, the higher its approval rating. Combined with a content-based search for keywords, documents returned often have a high degree of relevance and reliability. This approach is self-organized, incorporating evolution (unlinked sites “die”) and stigmergy (more-visited sites get more links pointing to them). It does not rely on a central controlling authority to provide decisions on a resource’s usefulness or give a structure to the content that is returned. However, the large number of results returned, problems with term ambiguity, and the lack of a means of identifying relevant resources for specific learner needs (beyond simple content-based searching) makes Google a relatively poor tool for finding resources from which to learn.

Wiki Wiki allows anyone in the whole world to edit any Wiki page. The potential for chaos is enormous, and yet Wikipedia (http://www.wikipedia.org), an encyclopedia generated by thousands of volunteers with no central authority, is not only possible, but hugely successful. In Wikipedia, self-organization largely occurs through the goodwill of the participants. Although anyone may vandalize a page, the community that creates it quickly removes such defacements, leading to a highly reliable and comprehensive source of knowledge. The success of Wikipedia may be ascribed to many factors, not least of which are its strong structure and simple policies. Interestingly, it makes use of a meta-wikipedia where Wikipedians may discuss issues relating to articles to be posted. This parcellation contributes greatly to the evolution of ideas.

Weblog communities form through links provided from one weblog (a kind of easy-to-edit interactive online diary) to another. Links pointing to a weblog may be discovered through Google (using the related: keyword) or explicitly through referrer logs and backlink tools. As links between weblogs grow, they start to form small, stigmergic clusters (Gregorio, 2003). This is in accordance with the principles of small world networks (Watts & Strogatz, 1998) whereby connections between a small number of nodes within a much larger network form...
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