Chapter LVI
The Future of Learning with Digital Libraries

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ABSTRACT

While the prospect of using digital libraries for learning becomes more appealing with growing repositories of resources, it is not clear what factors other than the use of technology, determine the learning outcome for an individual. The focus of research on using digital libraries for learning has been on the richness of information that digital libraries afford and on the ability of digital libraries to organize information for information query and research. Any meaningful learning activity using digital libraries must therefore utilize their features for exploration and information gathering around a well designed task or inquiry, to result in effective higher order learning outcomes. The design of the inquiry task is provided by a teacher or even devised by the student, but it is not necessarily inherent within the digital library. However, digital libraries have the capabilities to be more supportive of student learning by providing tools that support processes such as investigation, analysis, transduction of information and scaffolding of inquiry process. Often, students use the digital library for information gathering but turn to other software applications for organizing information and constructing the arguments and learning artifacts for the learning task. While it requires the teachers'—and maybe students'—resourcefulness to choose the right type of tool for the activity, the future of learning with digital libraries rests on integrating supportive tools into a seamless learning environment.

INTRODUCTION

As educators explore the application of new technologies, often they grope towards an effective understanding of how they might be best employed in learning contexts. Researchers have compared one medium with or against other media for decades. Such media comparisons have regularly come under criticism. Indeed, a typical study of the influence of one medium on learning has focused on comparing the "relative achievement of groups who have received similar subject matter from different media presentations" (Clark, 1983, p. 445). Consequently, "media selection" or the establishment of the best medium or a best mix of media becomes the main objective of such studies. However, learning involves a complicated process of interaction between specific tasks, particular learner traits, various components of representation and pedagogical strategy (Clark & Salomon, 1986). In fact, Clark (1983) argued that most summaries and meta-analyses of media comparison studies "clearly suggest that media do not influence learning under any conditions" (Clark, 1983, p. 445).

Indeed Clark (1983) used the analogy of a truck delivering groceries to illustrate that the role of media in learning was less impactful than the content being delivered. Thus it is not just the vehicle of delivering content that is consequential for learning outcomes. To quote:

... media are mere vehicles that deliver instruction but do not influence student achievement any more than the truck that delivers our groceries causes changes in our nutrition. Basically, the choice of vehicle might influence the cost and extent of distributing instruction, but only the content of the vehicle can influence achievement. (Clark, 1983, p. 445)

Nowadays we have a range of delivery options that can be more responsive to the consumer needs. With electronic delivery we can be more responsive to the consumers' needs and at the same time cost only what the consumer would like to pay. Suppose the consumer only wants one packet of milk. Delivery with a truck may be fast but certainly not cost effective. Some types of learning outcomes might be better achieved with delivery through alternative media. Indeed, the focus should be on affordances rather than conveyances and the inherent abilities of the consumer to "drive" effective use of what is being accessed. It is not what the technology can do but what the user can use technology for that should drive the issue of how learning can be enhanced by technology. To take this proposition one step further, it is important to consider how technology use should be responsive to effective learning.

OUR PROPOSITION

Marchionini and Maurer (1995) propose that digital libraries play crucial roles in learning in that they provide a platform for sharing, serve as a reservoir of information sources and "serve a social and intellectual role by bringing people and ideas together" (Jayawardana, Hewagamage, & Hirakawa, 2001). While existing digital libraries such as the Digital Library for Earth System Education (DLESE), Artemis digital library and the Alexandria digital library have developed with education as their aim, these libraries replicate traditional library roles and consequently support traditional modes of learning. Scholars such as Kuhlthau (1997) examined relationships of information-seeking behaviour in school students using digital libraries. Kuhlthau's work focuses on an information search process model related to the cognitive, affective states and search activities of the users, including task initiation, topic selection, prefocus exploration, focus formulation, information collection and search closure. Indeed, she posits that information seeking is a holistic process over time, of seeking meaning rather than simply answering questions. Thus