Information Resources and Retrieval:
The Ways Technology Can Enhance Preparing Tomorrow's Teachers

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Abstract

In today's information society, we ask: will new teachers be prepared to teach in a digital age? We understand that information resources are vital. Knowing how to retrieve information is important but having the knowledge and skills to evaluate the information found is paramount. The relationship between students and teachers, which is fundamental to the learning process, still remains the same; however, the media between teaching and learning have been dramatically changed with technological development. The challenges are always there, we face the challenges by using technology to enhance preparation of tomorrow's teachers.

Background and Challenges

In today's information society, technology is widely used in teacher education to prepare future teachers. We understand that information resources are important. Not only is knowing how to retrieve information important but also having the knowledge and skills to evaluate the information found are even more important. There are some fairly new changes and challenges to us: Computers have replaced typewrite. Word processing is now the primary mechanism for documents – class assignments, institutional reports, and scholarly documents; E-mail has emerged as a major resource for scholarly communication. The transmission of ideas and documents via "the net" has contributed to new levels of scholarly access and dissemination in many fields; online information resources provide remote access to a rich array of content. World Wide Web resources bring distant data and archival material to individual desktops via the magic of the network; video conferencing type of distance learning transfers the content of one classroom to many. Using conventional telephone lines, fiber-optic networks, satellite down-links, and even standard VCR tapes, campus and departments are "broadcasting" classes and content to new clientele at new locations. Over the past few years, the volume of information available through the World Wide Web has been expanding exponentially. Never has so much information been so readily available and shared among so many people. Information and resources are seemingly easy to seek. Unfortunately, the unstructured nature and huge volume of information accessible over networks have made it hard for users to sift through and find relevant information. Obviously, making resources available for students is very urgent for teacher education; in the meantime, teaching future teachers how to retrieve information is also important work.

The Use of Information Resources and Retrieval

Like it or not, learning is taking a new form in the twenty-first century, and this new learning environment requires a new set of learning concepts and approaches. We, as educators, understand that the last decade has witnessed the growth of Information Retrieval from a boutique discipline in Information and Library Science, to an everyday experience for billions of people around the world. This revolution has been driven in large measure by the World Wide Web, with vendors focused on Web content management, search and taxonomy for the Web. There are many ways of searching information, many new systems are currently being developed with different aims from the systems developed some years ago. Current systems tend to be distributed, with huge storage needs and complex functional requirements. But these systems are also distributed via Internet so interface, information recovery, navigation and multimedia are all fundamental aspects. These new systems are known as Web Information Systems. With the enormous increase in recent years in the number of text databases available on-line, and the consequent need for better techniques to access this information, there has been a strong resurgence of interest in the research done in the area of information retrieval. Today, retrieval techniques have found their way into major information services and the World Wide Web. The emergence of new applications such as "digital libraries" is both an opportunity and a challenge. We now feel that too much information is around, and retrieval techniques and skills become very necessary. Multimedia indexing and retrieval refers to

techniques being developed to access image, video and sound databases without text descriptions. Information extraction techniques are designed to identify database entities, attributes and relationships in full text. With the advent of the World-Wide Web and the huge increase in the use of the Internet, there has been a corresponding increase in demand for text retrieval systems that can work in distributed, wide-area network environments. The use of high-speed, two-way, multimedia communication in education is here to stay. Learning retrieval technology becomes part of the class content. An electronic learning community emphasizes social interaction among participants while minimizing the function of the teacher as information transmitter.

The Ways That Can Enhance Teacher's Education

The information retrieval technology offers teacher education opportunities to help advance the learning process smoothly and successfully. First of all, it promotes active student engagement. The dominant model of learning in higher education has the student passively absorbing knowledge disseminated by professors and text-books. With the knowledge of information retrieval students are moving away from passive reception of information to active engagement in the construction of knowledge. It helps to relate knowledge from the classroom to the real world. Too often students walk out of class ill-equipped to apply their new knowledge to real-world situations and contexts. Conversely, too frequently the classroom examines ideas out of the context of gritty real-world considerations. Multimedia technology, however, is breaking down the walls between the classroom and the real world. It helps from text to multiple representations. We know that linguistic expression, whether text or speech, has a reserved place in the academy. Retrieval technology is expanding our ability to express, understand, and use ideas in other symbol systems. It helps progress from coverage to mastery. Expanding on their classic instructional use, computers can teach and drill students on a variety of rules and concepts essential to performance in a particular discipline. It helps from isolation to interconnection. Retrieval technology has helped us move from a view of learning as an individual act done in isolation toward learning as a collaborative activity. And we have moved from the consideration of ideas in isolation to an examination of their meaning in the context of other ideas and events. Finally, it helps from products to processes. With retrieval technology, we are moving past a concern with the products of academic work to the processes that create knowledge. Students learn how to use tools that facilitate the process of scholarship. Years of educational practice (Morrison, 1999) and research indicates that information retrieval technology is effective in education as phenomena to learn both from and with. Historically, the "learning from" or tutorial approaches have received the most attention and funding, but "learning with" or cognitive tool approaches are the focus of more interest and investment than ever before. Information retrieval technology has many other advantages in terms of repetition, transportability, and increased equity of access. In addition, although the research evidence is sparse, the cost-effectiveness of technology may be of great benefit under certain conditions.

References

Abiteboul, S., Buneman, P. & Suciu, D. Data on the Web: from Relations to Semi structured Data and XML, Morgan Kauffman, 2000.

Agosti, M. & Smeaton, A. (editors) Information Retrieval and Hypertext, Kluwer, 1996.

Baeza-Yates, R. & Ribeiro-Neto, B. Modern Information Retrieval, Addison-Wesley 1999.

Baeza-Yates, R. & Ribeiro-Neto, B. (Eds.). (1999). *Modern Information Retrieval*. MA: Addison-Wesley.

Card, S. K., Robertson, G. G., & Mackinlay, J. D. (1991). The information visualizer: An information workspace. *Proceedings of CHI'91* (New Orleans, Louisiana).

Morrison, J. L. (1999). Higher education in 2010: An interview with Rodney L.

Witten, I., Moffat, A. & Bell, T. Managing Gigabytes, Morgan Kauffman, 1999 (second edition).