

Learners on the Back End: Students Contributing to Web-based Information Systems

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ABSTRACT

What happens when students, instead of merely drawing from online information resources, organize and populate such resources? In this paper we discuss how collaboratively creating web-based information resources might contribute to learning. We are currently studying two communities that are creating such resources using a prototype system we've designed.

Keywords

Learning, communities, database, facets, CSCL, knowledge-building, authentic learning

INTRODUCTION

Research on web-based information systems often focuses on how to make large amounts of information more accessible to users, and how users access that information. Typically, content in these systems is created by subject matter experts and administered by information managers. Learning is assumed to take place by users as they explore the information system.

Our focus is different. We are interested in how people might learn by participating in the *creation* of collaboratively constructed web-based information systems. Recent research on learning and educational technology suggests that learning is maximized when technology is used as a tool to *think with*, and when it supports students' participation/apprenticeship in a community of practice [1, 2]. As a design group, we are using participatory design methods to develop a tool that will enable university students to contribute content to a publicly-accessible, web-based information system. We call this tool "zBento". We are currently developing two prototypes of zBento and studying how different communities of learners contribute to and use the tool.

In this paper, we share our initial findings and discuss their implications for learning. We conclude by explaining how our exploratory work will inform the zBento design.

ORIGINS AND DESIGN

Our initial ideas for zBento grew out of earlier work in our research group on a tool called the Arthritis Source [3]. The Arthritis Source is a database-driven informational website providing learners-at-large with information about

arthritis. The information is authored by domain experts who use templates to write articles that reside in the database. Each template consists of a series of questions that helps the author organize knowledge in a way that will be useful to users of the site. These templates are entirely web-based, allowing for distributed content creation.

To date, our research on the Arthritis Source has focused on how users learn from *browsing* information on the site. We are now interested in how students might learn from *creating* the content and structure for similar systems. We are currently exploring our ideas with two communities of learners.

THE TWO LEARNING COMMUNITIES

University of Washington BaSiC Initiative Program

The UW BaSiC Initiative is a multidisciplinary program engaged in researching sustainable building methods. Students from architecture and engineering participate in the program by taking part in design/build projects in different parts of the world. The BaSiC Initiative is using a prototype of our web-based information system to serve as pedagogical tool, institutional memory bank, and resource for professionals around the world.

LawForWA

In the LawForWA project, law students are using another prototype of the system to create a "Legal Gateway" for the Washington state public. Citizens can log on to the gateway for information about state and federal law.

ZBENTO AS A TOOL FOR LEARNING

We are especially interested in how two features of our system—templates and facets---might contribute to learning in these communities. Like the Arthritis Source, the zBento prototypes use templates for distributed content creation and a faceted classification scheme [4] for categorizing and organizing content. Below we discuss three types of learning opportunities we observed in our study.

Databases as Cognitive Tools

Research suggests that database construction contributes to learning by requiring learners to analyze and organize their knowledge [5]. In our work, students developed structures for categorizing knowledge, and created or selected

ideas, and constructing relations between concepts—the kind of thinking that experts employ when constructing knowledge about their domains [1].

We found that the prototype systems facilitated this type of thinking through two different uses of the templates. In the BaSiC program, the instructor designed the templates to scaffold student research and writing about sustainable building materials and methods. Students in the program reported that the templates forced them to be especially thorough and detailed in their research, and that the template's framework presented a solid base for cross-comparison between technologies and strategies.

In contrast, each student working on the LawForWA project researched and evaluated *existing* content related to a single law topic. In this instance, students learned by selecting reliable sources, designing template questions to describe the content, and suggesting search and thesaurus terms. As the information they gathered grew more complex, students defined subcategories within their topics. This was not an easy task—one student commented that she had to “exhaust a topic” in order to understand the boundaries of a subtopic. Students learned about the structure of the law and about how someone outside the field might make sense of that structure.

Authentic Learning Environments

Authentic learning environments are structured around problems that are meaningful to learners and that represent real-world practice [1, 2]. Such learning environments rarely exist in classrooms, however, where students typically create artifacts that are shared only with the instructor or classmates. This is not the case when students are creating a publicly accessible database. Whether writing or reviewing content, students had to think about how to communicate to people beyond the classroom, both inside and outside of their community of practice. One student working on the LawForWA database, for example, reported that he had to “learn and think the language of clients,” in order to consider their perspective. Another law student said she had to “unlearn indoctrinated terms.”

Students in the BaSiC program felt that their work was especially meaningful because they were creating a much-needed resource for their community of practice—no such resource currently exists. As one student put it, “Many professionals don't have the time to be researching sustainable technologies or strategies. These articles provide a good overview [and] point them in the direction for more information.”

Knowledge-Building Communities

In many classrooms individual students investigate the same problems year after year. In contrast, our prototype systems encourage students to learn from and add to a continually evolving knowledge base. In this way, students participate in a knowledge-building community—a community in which members collaborate to build a

resource of sustainable building materials and methods. In addition, the flexible structure of zBento (facets and templates) can be changed to reflect the growing complexity of an evolving knowledge base.

CONCLUSIONS AND FUTURE WORK

Our current investigation suggests that contributing to databases can facilitate powerful learning experiences. We are still collecting data, but we plan to use the feedback we've gathered to date to help us design a tool that supports learning as well as ease-of-use.

As we use the prototypes/zBento with other student communities, we hope to address design features which would support instructor scaffolding of learning. Instructors would be able to control the degree to which students participate in the design of the database structure (i.e. students might identify new facets, create subfacets, or simply categorize content). In addition, many students reported a desire to manipulate the templates—to add, delete, or change questions—as a result of working with the system.

Finally we're intrigued by the enthusiasm students showed when given the opportunity to participate on the back end of database design. As one student said, "Having a say in the shaping/designing of something gets you more involved in the process—it puts a whole different spin on things."

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