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ABSTRACT

This paper describes how Open Source philosophy, a movement that has developed in opposition to the proprietary software industry, has influenced educational practice in the pursuit of scholarly freedom and authentic learning activities for students and educators. This paper provides a brief overview of the Open Source movement, and describes three Open Source-inspired Web-based tools/environments developed to promote open sharing and constructing of scholarly work on the Web: self-publishing, knowledge sharing and peer-to-peer networking. Includes three color figures. (Author/AEF)

Xtreme Learning Control: Examples of the Open Source Movement's Impact on Our Educational Practice in a University Setting

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G.H. Marks

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

Abstract: This paper describes how Open Source philosophy – a movement that has developed in opposition to the proprietary software industry – has influenced our educational practice in the pursuit of scholarly freedom and authentic learning activities for our students and ourselves. This paper provides a brief overview of the Open Source movement, and describes three Open Source-inspired Web-based tools/environments developed to promote open sharing and constructing of scholarly work on the Web.

Overview

Do you know the story about the discovery of the structure of DNA? Or, the discovery of the Rosetta Stone cipher? Both are stories of not only brilliance, but also competition. Relying on the foundational work of Linus Pauling, Francis Crick and James Watson discovered the double helix. Then separately, relying on the foundational work of Thomas Young, Jean Francois Champollion deciphered the Stone's script. However, due to competition and secrecy, which kept all parties from openly sharing their findings (and possibly sharing the rewards of discovery...after all, whose name do you remember?), the progress of science may have been delayed. This type of competition is in direct conflict with the nature of science and discovery – a process of evolving exploration founded on the work of others.

Educators are concerned with the impact this type of competition and secrecy can have on their practice as well; educational innovation can be stymied by industry and individuals that perpetuate the politics and control over professional sharing and advancement – such as the publishing industry or the proprietary communication and collaboration software industry. Although some educators may hold secret the work they are doing to advance knowledge and practice around good teaching and learning, most are interested in advancing the collective understanding – in sharing insights, ideas, solutions, and materials that can help us all do our work more effectively. Educators are also interested in creating tools and structures that support the type of learner-centered, collaborative knowledge sharing that can lead to discovery and innovation. Often, educators are stymied in these pursuits due to excessive proprietary software costs and dwindling institutional budgets.

This paper describes how Open Source philosophy – a movement that has developed in opposition to the proprietary software industry – has influenced our educational practice in the pursuit of scholarly freedom and authentic learning activities for our students and ourselves. This paper provides a brief overview of the Open Source movement, and describes three Open Source-inspired Web-based tools/environments we have developed with our students and colleagues to promote open sharing and constructing of scholarly work on the Web.

Open Source Movement

Encouraging innovation through open sharing to facilitate replication and discovery, the Open Source movement is a grassroots revolution that has taken shape in the world of information technology. The Open Source movement is challenging the commercial model of technology advancement, exemplified in the software industry by Microsoft. Linux, an operating system whose source code is open for the world to see and costs nothing to download and use, has become a significant force for change in the software development world. Other information technology products emerging from the movement include Netscape/Mozilla, Apache, Perl, and GIMP. Open Source advocates are trying to create a world where software is openly

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available and a living is made through continuing relationships of service and support. These same Open Source ideas are influencing our teaching and learning practice. The following are three examples of how Open Source has impacted our work with students at the University of Colorado at Denver.

Self-Publishing: *NOVA*tions Online Journal [in Joni's voice]

A year ago, I was informed that it was my turn to teach a doctoral course focused on instructional technology during the up-coming fall semester. This course is part of a doctoral program in educational leadership and innovation, and – as such – the participating doctoral students were interested in a wide range of educational foci: teacher education, paraprofessional preparation, teaching and learning in K12 and adult settings, and technology-enhanced learning. In preparing for the course I anticipated insightful, yet challenging, discussions and collaborations given the diverse backgrounds and interests of the students. I realized that there was no way for me to be the “expert” in all of their interest areas during our experience together, and that I didn’t need to be because the students were emerging experts in the topic foci they were studying. So, I looked for a way to create a unifying theme and project while at the same time taking advantage of the developing expertise of the students to create a valuable learning experience for everyone – including myself. To this end, we built a grassroots online professional journal.

*NOVA*tions is an online journal for emerging scholars built using the Slashdot.org Open Source code (see <http://novations.opencentric.com>). Slashdot.org is an online self-organizing social system (OSOSS) (Wiley & Edwards, 2002) that is a Web-based news source in which the readership contributes and reviews news items, and has significant influence and control over the direction of and themes covered by the site. Our *NOVA*tions journal is designed to provide a forum for a community of practice – scholars interested in educational innovation in teaching and learning. Contributors to the journal also function as the editorial review board, in much the same as Amazon and Barnes and Noble enable the book buying public to serve as reviewers.

The doctoral students in my course built the *NOVA*tions journal from scratch (see Figure 1). Self-publishing the online journal provides the doctoral students with an authentic, enculturating leadership experience in which they:

- publish articles and collaborative book reviews to learn more about the process of sharing scholarly ideas with others and publishing ideas in a journal, and
- serve as the editorial review board to learn about the editing process and improve their own writing.

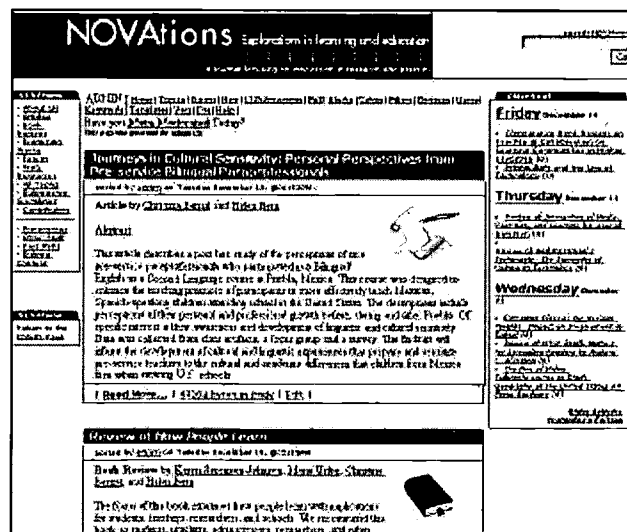


Figure 1: Students self-publishing in *NOVA*tions online journal

This fledgling journal was launched in December 2001, and plans are now in the works to extend the journal participation to the larger community of practice in educational leadership and innovation.

Knowledge Sharing: *Web Resource Collaboration Center (WRCC) [in Joni's voice]*

The Web Resource Collaboration Center (WRCC) (Dunlap, 1999) is a Web-based tool which empowers learners to build their own Web-based resource centers – using the Web to provide on-demand access to integrated information, guidance, advice, assistance, training, and tools – to support their learning, professional development, and performance.

A few years ago, I was hired by an information technology organization to “get to the bottom” of why its elaborate electronic performance support system (EPSS) which was available on the company’s intranet was not being utilized by employees. The company had used its training and development resources to build this EPSS to help employees keep up with all of the new technologies they were expected to master for the various contractual projects of the organization. Since a front-end analysis was not actually conducted before the development of the EPSS, this is where I started. The employees were pleased that the EPSS provided a variety of resources (e.g., tutorials, white papers, job aids, business cases, etc.) to support their various learning needs and preferences. Instead of conventional training, they wanted access to learning and professional development resources that would help them keep their knowledge and skills “cutting edge”.

Although they were not against the idea of an EPSS, the employees did not believe that the developers of the EPSS understood what resources they needed. In addition, they certainly believed that developers did not know how to present them in contextualized ways (e.g., resources that would help with one type of project vs. another type of project). They were also concerned that there was no way to capture the “here’s how I did it” expertise of the people in the organization, and in the external community of practice. Finally, the EPSS was static. This was in sharp contrast to the constantly evolving information and tools these employees were using. The most up-to-date information was being distributed on the Web. The EPSS was not dynamic enough to capture those changes, so the employees were using the Web to support their learning and professional development – albeit not very efficiently which led to frustration. Bottom line, the employees had been cut out of the process, and believed that they were better judges of what was needed to support their learning and work.

This consultation led to my interest in developing a tool that would (1) take advantage of some of the structural qualities of EPSS, (2) harness the resources on the Web (since it was a distribution source for some of the most up-to-date information and tools), and (3) provide a structure for learning communities and communities of practice to build their own unique content to support both lifelong learning and professional development activities. To meet this challenge, we created a Web-based development tool called the Web Resource Collaboration Center (WRCC).

By creating a structure that supports individualized and collaborative knowledge building by the people who will actually be using the knowledge, the higher-order thinking, problem-solving, and decision-making involved in the selection and utilization of appropriate learning materials and performance support is done by those who can get the most out of the process. Additionally, because these activities occur in the workplace and are driven by the needs of the job at hand, the learning activities are contextualized, authentic, and meaningful. The WRCC meets the following goals:

- The users learn about the domain while they are locating, evaluating (which requires utilization of resources), organizing, and creating resources to support their learning and job performance activities – making the process relevant and productive;
- The content of the WRCC is information that has been applied/articulated from the perspective of reflective practice, making the WRCC a knowledge management forum;
- The WRCC is developed by and for the people involved in the project, challenge, or domain; and
- The WRCC can change and adapt based on the changing organizational and learning/performance needs because the end-users control the content.

In this way, the WRCC not only enables learners to build a learning and performance resource that will provide them with immediate support and guidance, but also helps them develop structure, strategies, and skills for subsequent learning activities.

To provide a structure for these activities, the WRCC is broken into three functional areas: the Discussion Forum, the Link Manager, and the Resource Construction System (see Figure 2). These tools – written entirely in Perl – are not unique – there are similar tools available from a variety of sources. The impact is in the use and integration of the tools, and the fact that they are Open Source and support learner-centered knowledge sharing.

Technology for K-12 Classrooms

- African American Studies
- Art Lessons (K-12)
- Art Lessons (3-12)
- Art Lessons (K-6)
- Art Projects
- Art Projects (K-6)
- Business
- Children's Authors
- Children's Resources
- ESL
- Foreign Languages
- General Study & Self
- General Teaching
- Geography
- History
- How To Use WRCC

Geography

Resources, maps, articles, standards, forums, and links.

[Comments]

Grade level: K-3

Description: Provides interactive activities for kids. Includes over 600 maps, and a forum for sharing exercises, classroom ideas and teaching experiences.

Standards: Includes IS U.S. National Geography Standards.

Strengths: For use with data, easy navigation, interactive graphics.

Weaknesses: Trouble connecting to interactive activities from Microsoft Explorer. You will need a Macromedia web player to access this area.

By: [User], 10-Jun-2001
 Comments: [User] 6 Jun 2001
 [User] 12 Jun 2001

JavaScript and PHP Programming

- GUI - Web GUI
- Text GUI
- W01 Questions
- W01 Solutions
- W02 Questions
- W02 Solutions
- W03 Questions
- W03 Solutions
- W04 Questions
- W04 Solutions
- W05 Questions
- W05 Solutions
- W06 Questions
- W06 Solutions
- W07 Questions
- W07 Solutions
- W08 Questions
- W08 Solutions
- W09 Questions
- W09 Solutions
- W10 Questions
- W10 Solutions
- W11 Questions
- W11 Solutions

W07 Questions

Post any questions you have on W07. If there is a link to a selected item, Post: [User], [Date]

It depends... [User], [Date]

Post: [User], [Date]

> In my DELETE FROM Query, how do I refer to the items selected from the selected table? By the name of the array I want to use selected table? If so, give me a sample array.

I think it will depend on how you're having the administrator identify the course or courses they want to delete.

I'm using a group of many buttons - so the value of the group's query is the course they selected and I just feed the name of the group back to the query statement.

OK, if you're using a multiple select box, you're going to have to build a loop that goes through the array and processes the delete query once for each value in the array.

[User], [Date]

[User], [Date]

[User], [Date]

[User], [Date]

[User], [Date]

[User], [Date]

Software Design Project

- Search Item
- Use Cases
 - Use Case 1
 - Use Case 2
 - Use Case 3
 - Use Case 4
- Project Page
- Project File
- Design
- Sample Exam, Court
- Application Framework

Use Cases, Section 3, submitted by [User]

Document Description:

Sample Use Cases, Court

Related Use Cases, Court, Design, Use Case, Application Framework

The Use Cases:

A. From the home page

1. Select a project.
2. Create a new project.

B. Create a new project

1. Set the name of the project.
2. Set the ID number of the project.
3. Set the start date of the project.

C. Add a task to the project

- a. Set the ID number of the task.
- b. Set the name of the task.
- c. Set the duration of the project or task.
- d. Set the start date of the task.
- e. Assign resources to the task, indicating where FT or PT, if needed.

D. Add resources to the project

- a. Set the name of the resource.

Figure 2: Examples of WRCC's Link Manager, Discussion Forum, and Resource Construction System

Once built, I recognized the value of this type of tool for learning communities in general, including the students I work with at the university. The WRCC is being used to support instructional activity in both face-to-face and online courses, and as a performance support and knowledge management tool by self-organizing learning communities (see <http://carbon.cudenver.edu/public/wle/wrcc/techfork12/> for an example of a WRCC).

Self-Organized Learning and Performance Support Groups: *Electronic Knowledge Base (EKB)*

In our Information and Learning Technologies (ILT) Master's program, we organize students into cohorts. As a cohort, students progress through the program together, and quickly develop of professional bond that lasts beyond the program. One ILT Master's cohort of 20 K-12 teachers shared a common purpose of learning how to best integrate technology into their instruction, classrooms and schools. This group was constantly sharing their views, understandings, and opinions, as well as information and research they unearthed. This collective base of knowledge was the lifeblood of their common endeavor, and they wanted to "capture" the knowledge they were discovering and constructing with each other.

Inspired by Jonassen, Peck, and Wilson's (1997) note that "learning and knowledge-building communities depend heavily on ... a rich collection of information and learning resources to support them," this cohort designed and developed Electronic Knowledge Bases (EKBs) using adapted Perl scripts available at no charge to educational institutions (Young, 2000; see <http://carbon.cudenver.edu/public/ilt/pages/>). They used the EKBs as a way to formalize the process of collecting a rich source of knowledge resources. These databases served as an easily accessible and amendable repository of knowledge assisting them in their search for specific information and research related to teaching and learning. The EKBs supported their efforts as a dynamic learning community, and became a source of knowledge for other educators not participating in the ILT Master's program (see Figure 3). Dave Young, then a student and more recently a faculty colleague and co-author, was the primary developer of the resource.

UCD ILT Electronic Knowledge Base

Welcome to the K-12 ILT Cohort Electronic Knowledge Base. Feel free to add your own resource or just look around! The EKB site administrator has to manually update the pages before any additions, changes and ratings you make now will appear. Updates usually occur once a day. Please be patient!

Categories:

- Big Ideas (14)**
Learning Theory, Issues in Education, Pedagogy
- Research Says (7)**
Action Research, Case Studies, Observational Studies, Ethnographic Research, Surveys and Questionnaires
- How To (1)**
Instructional Practices, Advice, Useful Tips and Hints, Job Aids, Tutorials
- Sharing Stories (1)**
Vignettes, Quotes, Metaphor, Interview

There are 64 resources from which you can choose!

Search:
Looking for something in particular?

http://www.ilt.ucdenver.edu

UCD ILT Electronic Knowledge Base: Detailed View

Title: Accordion Paragraphs
Category: Big_Ideas
Short Description: Accordion paragraphs are a writing strategy to help students organize their writing. It is a set format and structure that students follow to organize their ideas and thoughts.
Main Point: Accordion paragraphs follow a simple format. Students create paragraphs with one sentence on different colored strips of paper. Students create a topic sentence on a green strip of paper. The reason for the green color is green symbolizes go. The second sentence is on a yellow strip of paper. This is a reason, detail or fact. Yellow helps the student slow down and give details supporting their topic sentence. The third sentence is on a red strip of paper, the point being to stop and explain the reason, detail or fact. Students can make as many yellow and red strips as necessary to support their topic sentence. The concluding sentence is written on green to go back to the topic sentence and tie the whole paragraph together.
Value: The value is that students must be able to create a complete coherent paragraph on CEAP. Standardized testing seem to be here to stay. This strategy helps students to become better writers.
URL:
Source(s): Luman, Maureen. (1994) Step Up to Writing. Longmont, Colorado: Sopris West.
Contributor Name: Patty Ferguson
Contributor Title/ Organization: 6th grade teacher

Resources:

- Interviews with Educators and Students Involved in Distance Education** - This was a project for Introduction to Distance Education taught by Patty Shank at the University of Colorado at Denver. [View](#)
(Added: 14-Mar-2009 | Hits: 26 | Rating: 5.00 out of 5.00 | View: 10) [Rate It](#)
- Create A Brain Quest in Your Classroom** - Allowing students go on a Brain Quest once a week, motivates them to turn in their work the rest of the week.
(Added: 3-Mar-2009 | Hits: 15 | Rating: 5.00 out of 5.00 | View: 4) [Rate It](#)
- Integrating Curriculum with Cub Scout Activities** - A cub scout pack needed my help in earning that weather badge, so I combined a short weather unit with the cub scout weather activities from their handbook.

Figure 3: EKB Homepage, Detailed View of Contribution, and Resource Review Feature

Peer-to-peer networking: *Our Next Adventure*

Although we haven't implemented peer-to-peer networking in our environment, we are very intrigued by the possibilities and planning it as a next step in our adventure in reclaiming learner control. Peer-to-peer networking refers to individual users sharing resources by opening up their hard drives to each other – a group of computers communicate directly with each other, rather than through a central server. Besides potentially having a positive impact on collaboration and knowledge sharing, it can also make good technical, infrastructure sense – if computing power and resources are distributed then no one server or network connection is over-taxed.

The Napster phenomenon taught us that downloading from central servers is not the only way to perpetuate an online enterprise. The core concept is even more radical than Napster's, because once out of the bag and in the hands of end users, true peer-to-peer usage cannot be controlled. In this way peer-to-peer networking constitutes a classic form of self-organizing system, using the technology to bypass every form of central control and put the control in the hands of learners.

Conclusion

The Open Source movement is a reenergizing catalyst for our reclamation of *learner control*. Influencing how we think about supporting collaboration, knowledge sharing, and teaching and learning in general, we are embracing the message of Open Source with open arms. The three examples described above – as well as the work being done by colleagues at other institutions, such as Utah State University's SlashLEARN project (Irving, 2001; see <http://www.slashlearn.org/>) and StorageTek's COSS project (Ryder & Wilson, 1997) – have inspired us to continue to enrich our practice and our students' learning experiences through the integration of Open Source-inspired tools and environments. We look forward to sharing our projects and implementation results with our ED-MEDIA colleagues.

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