Using Web 2.0 as a Motivating Theme for an IT Fluency Course

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Abstract - Some of the challenges of an IT fluency course are to effectively engage students with diverse backgrounds and demonstrate the relevance of the subject matter. In this paper, we describe our experience with a course that uses Web 2.0 as an underlying theme to motivate the students, most of whom are non-majors. Students chose applications that they used on a daily basis and conducted research under the instructor's guidance to discover and then discuss IT fundamentals themselves. This approach was introduced as a pilot in spring 2009 semester and is a part of an ongoing study.

Keywords: Web 2.0, IT Fluency, themes

1 Introduction

The following subsections discuss IT fluency and Web 2.0 concepts along with the motivation for this theme.

1.1 IT Fluency

As technology is changing rapidly, today's students not only require IT skills, but also need intellectual capabilities for critical thinking, analysis and ability to master this ever-changing technology. Accordingly, the focus of computing courses offered at most colleges and universities has shifted from providing IT literacy to IT fluency.

The National Research Council report outlines IT fluency as consisting of capabilities, concepts and skills [1]. While capabilities allow students to work effectively with IT and handle unforeseen problems, concepts introduce the students to fundamentals of IT and computing and skills provide the necessary hands-on experience.

Many colleges and universities today offer a fluency course for all students. A range of approaches have been used at various campuses, including specialized courses, project-based courses, case studies based courses, etc. [2].

At Georgia Gwinnett College (GGC), a new liberal arts institution, three fluency courses were designed, of which the students have to take two to achieve fluency. Our operating definition of fluency states that students be able to use IT effectively as a tool and be able to adapt to rapidly changing technology. The first course of these three provides a basic introduction to IT principles including but not limited to computers and hardware, software, networking, security, privacy and ethics, media, etc.

A major challenge in delivering this course is the diversity of students who take this course. At GGC all students, majors and non-majors take this course. Even among non-majors the traditional freshmen and the non-traditional students have different levels of computing skills and knowledge coming in the course. This wide range of knowledge of concepts and skills along with the students' perception of their knowledge and skills makes it a challenge to effectively engage the students. Many students understand the importance of skills that they need to achieve, but have a hard time realizing the relevance of fundamental concepts.

1.2 Motivation

The motivation for this approach came from one of the author's classes. While discussing Internet and Web, the students were asked what their favorite websites were that they visited most frequently in a day. Then they were asked what they used those web sites for. Most responses mentioned social networking web sites used for communication and gossiping. This was followed by an exercise to research different ways in which others have used these web sites for more productive purposes and have benefited from them. This activity resulted in many students realizing that individuals used these social networking sites for many purposes other than just making friends. A couple of such exercises will be discussed in later sections. This in-class activity aimed at realizing the applications and implications of IT in daily life was further extended to use Web 2.0 as an underlying theme used to introduce IT concepts to students.

Themes have been used in several disciplines to motivate students and to encourage inquiry-based or problem-based learning [4], [5], [9] and [10]. Mumford, D. et.al. describe a framework for designing a theme based course [7]. This work is a pilot study aimed at leveraging students' interest in Web 2.0 applications to introduce them to IT fundamental concepts.

1.3 Web 2.0

Web has come a long way from the publishing architecture in early 1900s to the more recent participation architecture. Tim O'Reilly explains the following 8 characteristics of Web 2.0 applications [8]:

1. Services, not packaged software, with cost-effective scalability.
2. Control over unique, hard-to-recreate data sources that get richer as more people use them.
3. Trusting users as co-developers.
5. Leveraging the long tail through customer self-service.
6. Software above the level of a single device.
7. Lightweight user interfaces, development models and business models.

Most Web2.0 applications possess some of these characteristics and not necessarily all. According to Nazli, et.al. the factors that contribute to the popularity of Web2.0 are [6]:

1. Ownership
2. Unique and customizable content
3. Mashups
4. Momentum
5. Applications/widgets/gadgets
6. The common man syndrome
7. Accessibility
8. Fun and
9. Specialized interest

2 Using Web 2.0 in the Classroom

There are numerous applications that can be discussed in the classroom. The students are familiar with some (Facebook and MySpace) but don’t necessarily know what Web2.0 is and are unaware about many other applications (delicious or eyeOS) that could be useful to them. We used a project-based approach in our classroom to introduce various concepts. We used a few select applications that the students were familiar with and some that they were not aware of. The students worked in teams and conducted research under the instructor’s guidance. The students were required to demonstrate how the application worked and find answers to some technical questions regarding the application. These questions were strategically designed to introduce fundamental concepts. Some Web2.0 applications were used for in-class activities where once again students worked in teams to either figure out how the application worked, or how it could be classified or compare and contrast it with other similar applications. All of these activities facilitate student engagement and encourage learning by research and discovery. For example, a discussion on different types of software, specifically open source software leads to questions from students regarding revenue generation. Such questions can be used to further guide the students into discovering answers themselves. Following are examples of applications that can be used to introduce some fundamentals.

<table>
<thead>
<tr>
<th>Application</th>
<th>Topics Introduced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flickr and Youtube</td>
<td>Media, formats, compression</td>
</tr>
<tr>
<td>BitTorrent and Napster</td>
<td>Networking basics and architectures, legal issues, piracy</td>
</tr>
<tr>
<td>Wikipedia and Synthasite</td>
<td>Web authoring, collaborative tools, evaluation of web sites</td>
</tr>
<tr>
<td>eBay and AdSense</td>
<td>E-commerce, spam, banner ads</td>
</tr>
<tr>
<td>Delicious and Google</td>
<td>Tagging, searching</td>
</tr>
<tr>
<td>Kayak</td>
<td>Web services</td>
</tr>
<tr>
<td>EyeOS</td>
<td>Operating systems</td>
</tr>
<tr>
<td>Google maps</td>
<td>Databases</td>
</tr>
<tr>
<td>Housingmaps</td>
<td>Mashups, databases, types of web sites</td>
</tr>
<tr>
<td>Cloudmark</td>
<td>Security and privacy (collaborative spam filtering)</td>
</tr>
<tr>
<td>Sourceforge</td>
<td>Types of software (open source)</td>
</tr>
<tr>
<td>Blogging</td>
<td>RSS, impact of technology on society</td>
</tr>
<tr>
<td>Creative Commons</td>
<td>Searching, intellectual property, copyright, plagiarism, ethics</td>
</tr>
<tr>
<td>iTunes and podcasting</td>
<td>Media management, types of software, streaming audio</td>
</tr>
<tr>
<td>Googledocs</td>
<td>Types of application software</td>
</tr>
<tr>
<td>Salesforce.com</td>
<td>Business application software</td>
</tr>
<tr>
<td>Moodle, Blackboard, MyITLab</td>
<td>Types of software, security (content filtering, authentication)</td>
</tr>
<tr>
<td>Twitter, Facebook</td>
<td>Privacy</td>
</tr>
<tr>
<td>Amazon and</td>
<td>Technology and other disciplines</td>
</tr>
</tbody>
</table>
These are a few examples of mapping applications to topics. Many more applications can be used to introduce any of these topics or even other topics, based on the course goals. Many of these applications can be compared with similar older applications to study the history and evolution of technology and how that has affected society.

### 2.1 Sample Projects and Activities

In our classroom, the project-based approach was used out of class to introduce new concepts, to encourage students to become independent learners and activity-based approach was used in-class to reinforce concepts already covered in class. Following are sample questions that can be used with a Web 2.0 application:

1. Study how Skype/BitTorrent is used and demonstrate its features.
2. Find out what type of architecture it has.
3. Compare this architecture with other architectures.
4. What makes it a Web 2.0 application?
5. Discuss legal issues with the use of this application (if BitTorrent).
6. Why did Napster have to face legal issues but not BitTorrent?
7. Discuss ethical issues. Does this affect the music/movie/software industry? Who is responsible?
8. Discuss performance issues. If your computer is being used as a server, will you see a drop in performance?

The students may or may not know answers to these questions. And this will allow them to find answers on their own (preferably in a team), can be used to encourage discussions in the classroom or can also be used to assess if students can apply the knowledge gained from a lecture to other problems or situations. The students found questions 6, 7, and 8 relevant and something that they were interested in knowing. Questions 2 and 3 required them to dig deeper and work harder, but we observed that mixing these questions together got us more positive and enthusiastic participation.

An activity-based approach can require students to visit eyeos.org and explore the application. The students can then be asked to classify the application based on the information gathered from the website, by exploring the application and prior class discussion on categories of software. This can be used to reinforce the concepts discussed in class or to assess students’ understanding of concepts discussed in class.

Another class activity can require students to search for educational applications on Facebook. This can be used to demonstrate some searching techniques and explain collaboration tools. Most of our students had never explored or expected to use Facebook for academic purposes and found this assignment useful. An educational application may be used to provide students a forum to collaborate. Plenty of educational applications are available on Facebook, examples include: Courses, Study Groups, My Office, etc.

### 2.2 Assessment and Evaluation

For assessing this course, lesson objectives for each course goal were identified and core questions for each of the lesson objectives were designed. In fall 2008 56 students took this course and in spring 2009 38 students took this course. These activities and projects were used in spring 2009 as a pilot. Course goals related to personal productivity skills and hardware components are not considered here due to their irrelevance in this context. The course assessment results for various course goals in fall 2008 and spring 2009 are listed below:

<table>
<thead>
<tr>
<th>Course Goals</th>
<th>Fall 08</th>
<th>Spring 09</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Evolution of IT and future trends)</td>
<td>68.08</td>
<td>63.62</td>
</tr>
<tr>
<td>2 (Ethical issues surrounding digital information)</td>
<td>74.76</td>
<td>97.21</td>
</tr>
<tr>
<td>5 (Computer security, protection mechanisms and privacy threats on Internet)</td>
<td>60.31</td>
<td>81.89</td>
</tr>
<tr>
<td>6 (Role of computing tools in supporting collaborative projects)</td>
<td>90.10</td>
<td>81.22</td>
</tr>
<tr>
<td>7 (Principles of computer networking)</td>
<td>86.99</td>
<td>68.42</td>
</tr>
<tr>
<td>8 (Different types of system and application software)</td>
<td>70.57</td>
<td>77.63</td>
</tr>
</tbody>
</table>

For most part the course goal assessments show an improvement from fall 2008. In-class activities for
networking combined with a hardware lab may be more useful in improving students’ performance on course goal 7 and more relevant activities are needed to cover course goal 1. Student performance on other course goals is satisfactory.

The main purpose behind using Web 2.0 as an underlying theme is to demonstrate the relevance of these concepts and increase student engagement. Hence, it is necessary to assess if the students realize the relevance of IT concepts to their daily life. Accordingly evaluations were designed in Spring 2009 to gather student feedback related to team work, research, self-learning, interaction with others, relevance of activities, relevance of concepts, need for the course, etc.

Student response in general was satisfactory. 89.47% of the students liked working in teams and said they interacted with their class-mates more. 52.63% of the students thought that using Facebook application in class during the first week was a good way to get to know their class-mates. 78.94% of the students said they did not know Facebook applications could be useful for academic purposes and 26.31% of students said they were planning on using one of those applications. These responses indicate increased student engagement and interest in classroom activities and the course in general.

Very few students did not like working in teams, complained of scheduling and/or communication problems with team-mates or would have liked traditional lectures. While, 85% of students said the projects and in-class activities helped them understand the material better, 65.78% of students also said that the questions on exam did not seem to relate to these activities. This indicates that the assessments need a second look along with developing some more activities targeted to improve the students’ critical thinking skills. 34.21% of students said that too many applications were used and they found it hard to keep track of all of them to be able to use them. 78.94% of students said they understood the relevance of this course to their daily lives and careers.

3 Conclusions

This pilot work shows that student interest in Web 2.0 applications can be leveraged to demonstrate relevance of fundamental concepts to students in an IT fluency course. The project and activities based learning can be used to effectively engage students in class and improve their critical thinking skills. Our assessments and student evaluations show a general satisfaction and at the same time provide information to refine the assessment and evaluation plan. As technology advances more and more interesting applications will become available and this theme will never be repetitive. The students will dictate or limit how interesting this course gets. There is a danger of the student getting too involved in the applications themselves while forgetting to concentrate on the basics and the instructor should take care that this does not happen.

Certainly in future, more data needs to be collected to track the trends in student performance and satisfaction. Continued assessment and evaluation is absolutely necessary to understand the effect of this approach completely. Also this theme is not limited to this course. Web 2.0 can be used as a theme in other IT courses too, including but not limited to Information Systems, Programming, Web Development, Software Engineering, Networks, etc.

4 References


