



2005-01-01

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## Recommended Citation

Liqiang, Pan and Duggan, Bryan and Fitzpatrick, Ronan: Experiences teaching website engagibility to computer science students. 3rd. China-Europe International Symposium on Software Industry-Oriented Education (CEIS-SIOE), Dublin Castle, Dublin, Ireland, February 6-7, 2007.

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# Experiences Teaching Website Engagibility to Computer Science Students

Pan Liqiang, Bryan Duggan, Ronan Fitzpatrick

**Abstract**— In the second year of our degree program, DT228 students study a subject called Web Development. In this paper we describe our *studio classroom* based teaching approach to this subject and explain how using this approach has enabled us to expand the scope of the course to include the important concept of *website engagibility*. We present a summary of current theories on website engagibility and explain how we incorporated these theories into the course. We further describe an experiment which we carried out in order to encourage students to reflect on website engagibility and incorporate it into their continuous assessments.

**Index Terms**—Ecommerce, Engagibility, Education, DIT, HIT, Studio Classroom, Website

## I. INTRODUCTION

In the second year of our degree program DT228, students study a subject called Web Development 1 [DIT, 2004]. The syllabus for this subject is introductory and introduces the students to a range of internet technologies such as client server architecture, IP addresses, protocols and markup languages. The course also aims to enable students to develop content for the web using XHTML, CSS and JavaScript. The subject is a foundation for the subject Web Development 2 in third year. In Web Development 2, students learn server side programming with Java which enables them to develop 3-tier web applications. In order to keep the subject practical and skills orientated, contact time for these subjects is typically split between lectures and labs. Lectures are typically held in class rooms and are used to introduce students to the concepts while labs involve having students work through practical problems, individually.

Our degree program is franchised to our partner institute HIT in China and as part of this franchise, lecturers from the DIT teach a two semester subject such as Web Development 1 intensively over a four week period, (split into two, two week blocks). Teaching is through English is with the aid of a teaching assistant from HIT. Classes are entirely carried out in computer labs and so we have adopted the *studio classroom* model in our teaching. The studio classroom model removes the traditional split between lectures and labs. Instead, all classes consist of theory explanation, instruction by the lecturer and immediate application by the student [Mahar & Lahart 2004]. This removes the traditional “delay” between

learning something in a class and trying it out in a lab. The studio classroom model has been proven to encourage active experimentation, increased motivation, collaborative learning and the increased potential for maximum participation. The studio classroom model emphasises teamwork and so students are encouraged to work in teams of two on practical work instead of individually [Carbone & Sheard, 2002] [Mahar & Lahart 2004].

Using the studio classroom model has enabled us to develop a new approach to teaching the subject of web development which emphasises practical, industry oriented skills and endeavours to enable students to develop complete, useful web applications after completing this subject. To achieve this aim, we have expanded the breath of the course to include two important areas - website engagibility and server side scripting.

The concept of website engagibility is proposed in [Fitzpatrick, 2000; 2002]. [Fitzpatrick *et al*, 2005] explain that it is a step beyond website usability and it describes the extent to which a user has a complete experience when interacting with a website. Website engagibility requires that interaction is *two way* and is enhanced by providing a diversity of activities for a user to engage in.

In order to enable students to create engagible websites, it is necessary for them to learn some server side scripting techniques. PHP and MySQL were chosen as a framework for students to learn due to their prevalence in industry and also the ease at which students can become productive using these technologies [Ge & Sun, 2004]. Using PHP, students learn how to connect their applications to a database and how to implement sessions [Williams & Lane, 2004; Duggan, 2006].

Section 2 of this paper summarises Fitzpatrick’s theories on website engagibility which were presented to students on the course and outlines a number of simple suggestions that were proposed to students as methods to enhance the engagibility of the assignments they produced. Section 3 of the paper outlines a three part experiment that we carried out with the class to encourage students to reflect on the concept of engagibility and incorporate these ideas into their practice. Section 4 of the paper presents the results of this experiment and section 5 presents conclusions and future work.

## II. WEBSITE ENGAGIBILITY

Engagibility is one of five website quality factors identified by [Fitzpatrick, 2000] and is defined as the extent to which a

website can fully engage a visitor by providing a complete and comprehensive website experience. It includes three characteristics - *navigability*, *interactivity* and *appeal*. *Navigability* is the ability of website visitors to access any part of the website or to link to other websites. *Interactivity* addresses the engagement of site visitors and enables them to complete whatever activity, process or experience is offered by the site. *Appeal* can be achieved under the headings, relevant high-quality content, easy-of-use, an experience unique to the medium, and evoking emotion. These three characteristics are divided into eight sub-characteristics as shown in Figure 1.

Characteristics of Engagibility	Sub-characteristics
<b>Navigability</b> The ability of website visitors to access any part of the website or to link to other websites.	<b>Navigation ratio</b> The degree of a website's support for sitebound hyperlinking.
	<b>Surf ratio</b> The degree of a website's support for outbound hyperlinking.
<b>Interactivity</b> Support for website visitors to engage in meaningful activity during a website visit.	<b>Activities ratio</b> The degree that a website implements activity components.
	<b>Contribution ratio</b> The degree that a website implements visitor contribution functionality.
	<b>Commerce ratio</b> The degree that a website implements mature eCommerce functionality.
<b>Appeal</b> An experience unique to the website.	<b>Assistive ratio (special needs)</b> The degree that a website implements functionality to support the special needs of visitors.
	<b>Community ratio</b> The degree that a website implements functionality to support common interest visitors.
	<b>Competitive ratio</b> The degree that a website supports a unique visitor perspective.

Figure 1: Website engagibility definitions [Fitzpatrick et al., 2005]

Engagibility is a significant contributor to eCommerce websites in the context of empowering website visitors. It supports the website owner's need to retain hard earned visitors and to provide them with a full and comprehensive website experience. Including meaningful eCommerce activity supports this visitor engagement. Typical activities include contact us, site search, newsletter and email this page. Special activities include visitor contribution to website content, archived mailing list content, product configurators, support for survey/feedback contribution and a comments forum, mature eCommerce functionality, and community activities that empower website visitors to communicate with the website and with other website visitors [Fitzpatrick *et al.*, 2005]. The authors explain that in the same way that usability is a significant issue of software quality, engagibility is a

significant issue of website quality. A full discussion of engagibility as a step beyond usability is given in [Fitzpatrick *et al.*, 2005]. While the theory underpinning website engagibility applies to all websites, its current study is focused on eCommerce applications which are the focus of the assignments undertaken by students on this course.

A measurement approach for benchmark comparing eCommerce websites has also been developed. However, measurement is not part of our curriculum at this time.

In order to develop quality websites it is essential that website design and development professionals be introduced to appropriate website quality factors. Engagibility is one of these quality factors and it is desirable that through the undergraduate curriculum, computing students who are preparing to work in industry should learn about it.

### III. TEACHING WEBSITE ENGAGIBILITY

To learn about website engagibility first hand we had the students participate in an experiment. The aim of the experiment was to have the students identify the methods employed by commercial websites to enhance the engagibility of their sites and then for the students to incorporate these features into their own practical work on the course. The experiment consisted of three parts:

1. Research
2. Reflection
3. Implementation

For the first part of the experiment, students were invited to do primary research on engagibility by analysing their favourite websites and identifying the characteristics of those websites that made the students want to engage with them. The students picked a range of websites spanning genres including news, portals, music, social and eCommerce sites.

Students worked on this task individually and then for the second part of the experiment, came together as a class to reflect on each others insights and agree a common set of engagibility features.

- Useful
- Simple
- Fast
- Appearance
- Good content
- Functionality
- Layout
- Customizability
- Personalization
- Local content
- Collaboration/community
- Easy of buying
- Ease of navigation
- Clarity

Figure 2: Engagibility features identified by students

The students proved particularly insightful at this task and clearly demonstrated an understanding of how the sites they had chosen had implemented features to make the sites more engaging. The features agreed by students in the group reflection session are presented in Figure 2.

For the third part of the experiment, students were required to individually implement an engaging website. The task was split into two examinable components - a static website delivered after week two and a dynamic website delivered at the end of week four. This task contributed to the student's continuous assessment grade for the course. A sample eCommerce website was suggested comprising at core the following features:

- The ability to browse a product catalogue.
- The ability to search for a product.
- The ability to order products and have them stored in a shopping cart.

Students were encouraged to reflect on what they had discovered about engagement and on the sites they had analysed in the first part of the experiment, and go beyond these parameters to implement something totally different. Suggestions included a site search, online forum, live chat, email this page, a blog, an online survey, one click purchase, photo-sharing and peer recommendations. Critically, the marking scheme for the assignment emphasised creativity and awarded marks for functionality, interface quality and complexity rather for specific tasks achieved.

#### IV. RESULTS

The research part of the experiment was very successful and the engagement characteristics identified by students were insightful proving that the concept of website engagement was well understood by students. Some students made a creditable attempt at making an engaging website although most students took the easy option and implemented the eCommerce site suggested. This can be attributed however to the short time allowed to the students to complete the assignment. Figure 3 presents a screenshot from an eCommerce assignment submitted by a student on the course.



Figure 3: An eCommerce site developed submitted as an assignment by a student

In the screenshot, the student has implemented an eCommerce site for purchasing books. The student has implemented a site search, user logins and a shopping cart. Additionally the application selects the book from the catalogue with the highest sales and displays it on the home page.

Figure 4 presents another eCommerce assignment submitted by a student. For her assignment, the student added one-click purchasing similar to Amazon.com and a user forum where users could post ratings for the products on the site.

Figure 5 presents a screenshot from another assignment submitted by a student. In this case the student has implemented an online auction. The site offers users the capability of searching by title or category of product, logging in and placing a bid for an item for sale on the site.

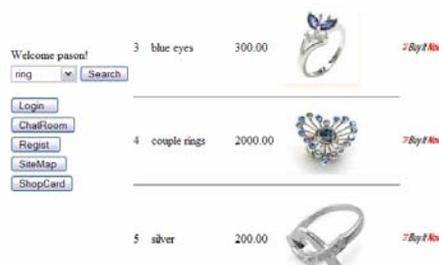


Figure 4: An eCommerce site submitted by a student that supports one-click buying similar to Amazon.com



Figure 5: An auction site submitted by a student with functionality similar to eBay

We are satisfied that as a result of the experiment, students are more aware of the issues involved in and the importance of creating engaging websites.

#### V. CONCLUSIONS & FUTURE WORK

In this paper we outlined our experiences teaching the concept of website engagement to computer science students in a studio classroom environment. We conclude from our experiences that students understand the concepts well and are very insightful at identifying the techniques used to make sites engaging. We further conclude that to make a website engaging requires significant time for planning and

development and it is challenging for students to implement engagible websites unless significant time is available to them.

Metric Ratio Analysis (MRA) is an approach for measuring the

Metric Ratio Analysis (MRA) is an approach for measuring the engagibility of an eCommerce website [Fitzpatrick et al., 2005]. MRA calculates an engagibility value for each sub-characteristic using a set of values from 67 criteria such as the number of activities in the website, number of sitebound hyperlinks and number of horizontal and vertical menu items in a website. In future work we hope to introduce this measurement approach into the assessment strategy for the course in order to gain a more accurate picture of the engagibility of the website development assessments produced by students on the course.

#### REFERENCES

- [Fitzpatrick, 2000] Ronan Fitzpatrick, Additional Quality Factors for the World Wide Web, Proceedings of the Second World Congress for Software Quality, Yokohama; Union of Japanese Scientists and Engineers, Tokyo, Japan
- [Fitzpatrick, 2003] Ronan Fitzpatrick, Quality Challenges in E-Commerce Web sites, Workshop paper for Exploring the Total Customer Experience: Usability Evaluations of (B2C) E-Commerce Environments at INTERACT 2003: Ninth IFIP TC 13 International Conference on Human-Computer Interaction, September 2003, Zurich, Switzerland
- [Fitzpatrick *et al.*, 2005] Ronan Fitzpatrick, Peter Smith, Brendan O'Shea, Website Engagibility: A Step Beyond Usability, Proceedings of parallel session "Quality models for Human Computer Interaction" in the context of the 3rd international conference on Universal Access in Human-Computer Interaction, HCI International 2005, Las Vegas, Lawrence Erlbaum Associates, New Jersey, USA
- [Ge & Sun, 2004] Yuzhen Ge, Jiangeng Sun: E-commerce and computer science education, Technical Symposium on Computer Science Education, Proceedings of the thirty-first SIGCSE technical symposium on Computer science education table of contents, Austin, Texas, United States
- [DIT, 2004] FT228 Course Document Part B, DIT School of Computing, Kevin St., Dublin 8, September 2004
- [Carbone & Sheard, 2002] A. Carbone, & J. Sheard: Developing a Model of Student Learning in a Studio-Based Teaching Environment, Informing Science & IT Education Conference, Cork, Ireland, June 2002
- [Mahar & Lahart 2004] E. Mahar, & O. Lahart: Student Centered Learning in a Studio Classroom Environment, EdTech, Tralee, Ireland, June 2004
- [Duggan, 2006] Bryan Duggan, Web Development Course Notes, <http://www.comp.dit.ie/bduggan/Courses/web/web.htm>, Accessed October 2006
- [Williams & Lane, 2004] Hugh E. Williams, David Lane

Web Database Applications with PHP and MySQL  
O'Reilly (27 May 2004)