Chapter 19

Knowledge Management in Practice: Using Wikis to Facilitate Project-Based Learning

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ABSTRACT

Knowledge is created when individuals come together to solve a problem. Project-based learning focuses on solving problems. One aspect of the work of a 21st century design engineer is the requirement to work remotely on design projects. Engineers coming together to design a product face the problem of working remotely, collaborating, creating, and sharing knowledge. This chapter explores the use of wikis in a product design and development class at an Irish university. This chapter begins by giving an introduction to wikis and their use in education. The design project exercise and assessment process is described. The results of a study are provided that indicate that the vast majority of students found wikis to be a good tool for project collaboration. Wikis were found to be an excellent knowledge management tool that facilitates project-based learning.

INTRODUCTION

Project-based learning is regarded as the best pedagogical approach for teaching product design and development. Design education courses should prepare students for scenarios which mimic those faced by design engineers in industry (Clough, 2005). One aspect of the work of a 21st century design engineer is the requirement to work remotely on design projects (Gupta, Denny, O’Toole, & Bondade, 2011; Hertel, Geister, & Konradt, 2005; Jarvenpaa & Leidner, 1999; Martins, Gilson, & Maynard, 2004). Today’s design teams frequently consist of engineers who are not in the same building, country or perhaps continent (Jarvenpaa & Leidner, 1999; Martins, et al., 2004). They need...
therefore to have knowledge of technologies that facilitate collaborative work (Endean, et al., 2008). Organisations are using a number of Web 2.0 technologies, including wikis to facilitate this need for collaboration (Standing & Kiniti, 2011). To give students an opportunity to use such a technology a wiki was infused throughout a National University of Ireland, Galway engineering design project. The wiki was used to increase the emphasis on technological and “soft” skills, in addition to academic content (Blumenfeld, et al., 1991). The students in the product design and development class used the wiki to document the entire spectrum of the design process, from idea generation to prototype design. An investigation of the use of wikis in a product design and development class has not been published previously; this study aims to address this research gap.

The main objective of the chapter is to describe the use of wikis as a knowledge management tool in project-based learning. Additional objectives are to:

- Provide an introduction to the Web 2.0 technology wiki
- Describe the use of wikis as a knowledge management tool
- Describe the use of wikis in education
- Provide examples of studies that describe the use of wikis in engineering design education
- Outline some common problems experienced when using wikis in an education setting
- Describe how a wiki was used in a product design and development class in an Irish University
- Outline future research directions

To summarise, the wiki was chosen for the design class for two reasons; firstly to introduce the students to a technology that facilitates collaborative work and secondly to increase the emphasis on technological and “soft” skills, in addition to academic content. The remainder of this chapter gives the reader an understanding of a practitioner experience of using wikis in a classroom setting.

**BACKGROUND: WHAT IS A WIKI?**

Web 2.0 is the term used to describe a variety of websites and applications that allow users to create and share information or material. A central feature of the technology is that it allows people to create, share, communicate, and collaborate (Richardson, 2009). Web 2.0 differs from other types of websites, as it does not require any Web design or publishing skills to participate. Examples of Web 2.0 technologies include wikis, discussion forums, blogs, Twitter, and Facebook.

The first wiki, WikiWikiWeb, was developed by Ward Cunningham in 1994 (Leuf & Cunningham, 2001). Wiki is the Hawaiian word for “quick.” Cunningham’s objective was to develop a platform on the Internet for software programmers that could be used to share a program code easily and rapidly. It was hoped that this platform would enable the possibility for seamless collaborative work on program codes. Given that the same program code can be edited by many people, the software must automatically track changes made in documents as well as the complete history of a document (Ebersbach, Glaser, & Heigl, 2004).

From the initial use of a wiki by software programmers it is now used by anyone who wishes to work collaboratively on a website. Since the mid-1990s wikis have been used in businesses and educational institutions promote sharing and collaborative creation of Web content (Ebersbach, Glaser, & Heigl, 2005; Leuf & Cunningham, 2001). The popularity of wikis is largely due to the rise in popularity of Wikipedia, the well-known wiki-based on-line encyclopaedia.

Let us consider one of the most popular alternative Web 2.0 technologies, blogs, and see how they differ from wikis. Blogs allow an author to
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