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Paul Jackson
Edith Cowan University

Stuart Garner
Edith Cowan University

Jane Klobas

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Wiki Design for Student Assignments: Should it be Prescribed or Emergent?

Paul Jackson
School of Management,
Edith Cowan University,
Joondalup, Western Australia
p.jackson@ecu.edu.au

Stuart Garner
School of Management,
Edith Cowan University,
Joondalup, Western Australia
s.garner@ecu.edu.au

Jane Klobas
Business School, University of Western Australia, Crawley,
and Dondena Centre, Bocconi University, Milan, Italy
jane.klobas@uwa.edu.au

Abstract: In this paper we examine how to approach the question of information and site design in the use of wikis for student group assignments. The popular literature about Wikis proposes that they allow for “emergent, user-driven design”. We develop a model in order to analyse what approach to design might be appropriate in student group work. We gave one class of students a prescribed assignment layout with clear instructions regarding navigation menus and another group the same assignment with little or no guidance about how to design their site. Initial results show that prescribing the design increases perceptions of self-efficacy. Whilst self-efficacy is correlated with higher perceived quality of the site and with use of a greater range of wiki functions, there is no correlation with perceived usefulness of the wiki as a tool.

Introduction

Wikis allow users to directly design, link and edit web pages. They are very easy to use, highly participative and user-directed and allow users to create content and website layouts according to their own designs and judgments (Klobas, 2006). The co-creation of content, the formation of relationships and groups, and the ability for groups, rather than figures in authority, to determine matters of truth and make decisions, makes these tools ideal candidates for workplaces which are dynamic, unpredictable, demand innovation and flexibility. Our concern in this paper is in how best to teach students the use of these tools, such that they can be usefully applied in tertiary education and ultimately the workplace for which the students are being prepared. We look therefore at how students might best learn to apply wikis to forms of work that require planning, decision making, collaboration and production of high quality knowledge outcomes.

Research Question

Wikis are increasingly used in education. They provide many facilities which allow students to collaborate, negotiate, and collect material and write-up assignments and exercises without having to meet physically (Hazari, North, & Moreland, 2009; Tsai, Li, Elston, & Chen, 2011). Although many students use this software routinely as

part of their personal lives and expect to be able to use it to conduct their studies, such attempts at inducing collaboration are not always successful (Ebner, Kickmeier-Rust, & Holzinger, 2008). In setting assignments via a wiki, educators might aim for a range of outcomes depending upon what they teach and their own expertise. For example, the wiki might only function as a substitute for paper delivery and therefore be expected to more-or-less conform to good practice for an essay. The educator might expect the student to use the wiki to enhance the appearance and layout of the assignment, embed other media (videos and audio) and link to other Internet resources as source and supporting material, or the educator might wish that a group of students learn to use the wiki's capabilities and enhance their skills in collaborative writing, online discussion and user-design of layout.

Regardless of the educational uses to which wikis might be put, educators might take a range of approaches to introducing them to their students. Some educators some prior orientation to wikis (Raitman & Augar, 2004), but others might argue that social software should be entirely user-driven and that all aspects of application should be understood and learned by non-technical users. From this second point of view, making students do their own design would force them to consider the design required to meet course requirements explicitly and learn this particular skill. It would also force them to explore wiki capabilities further and discover and use more functions. These two opposing points of view give rise to the research question driving this paper: *Is it better to let students design their own wikis for assignments or to give them a predefined structure?* We define "better" in terms of the following desired set of outcomes:

- *Will students feel more empowered to use the wiki?*
- *Will they create a wiki of better quality?*
- *Will the wiki have been useful to them?*
- *Will they actually use the available functions more?*

As tools such as wikis are being increasingly applied in learning, the practical implications of positive answers to the above questions would suggest that although there might be greater uncertainty and self-doubt at the commencement of assignments that use wikis, it is better for student learning to let them develop their own design and layout than give them a predefined one. If, instead, student outcomes are worse, clearer guidance in the design and use of wikis is required. The results also have implications for the introduction of wikis in wider business contexts.

Model and hypotheses

Taking design autonomy as our point of departure, we advance a model for understanding the implication of making students responsible for the design of their assignment wikis. The model (Fig. 2) was derived from discussions between two of the researchers and complemented by an examination of the literature around the core constructs (e.g. (DeLone & McLean, 1992)).

Design Autonomy

"End user design" has been generally applied to systems development projects in which users have specified the user interface design of applications in workshops such as Joint Application Design (JAD) sessions and rapid prototyping. Development has been done by technical specialists. As software has become easier to use and domain experts have become more knowledgeable, the amount of design and development that can be done by users has grown substantially. When a wiki user confronts a design issue or notices that a new navigation hierarchy, tag sequence or page structure is required, that user can immediately implement such a change and other users can comment on it, revert to a previous version and so on. Therefore we define design *autonomy* as self-reliance in the creation of, navigation between and scope of content of wiki pages. We measure this in a binary form: either participants had design autonomy (they received no prior training in how to use wikis) or not (they received training).

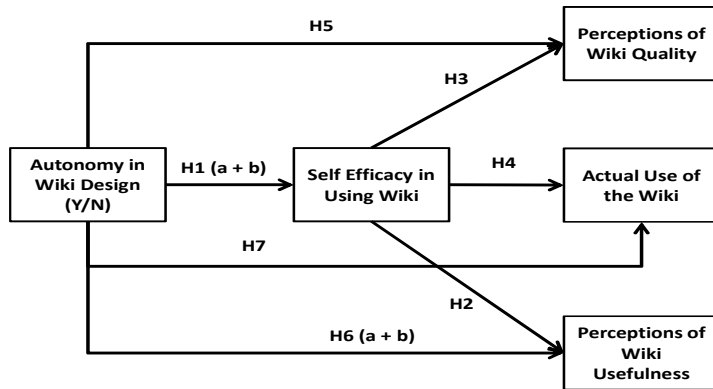


FIGURE 1: RESEARCH MODEL

Self-efficacy

Bandura (1997) defined self-efficacy as a belief in one's ability to succeed in specific situations. One's sense of self-efficacy can play a major role in how one approaches goals, tasks, and challenges. Where self-efficacy is high, it has the effect of transforming tasks into challenges to be mastered, and makes them interesting and engrossing rather than threatening. The agents are more likely to be committed and deliver a high level of effort. They will tend to remain task focused and see failure as a manifestation of insufficient effort rather than due to extrinsic causes. This orientates the agent towards a successful outcome and enables better recovery after setbacks. It has been found that higher self-efficacy is likely to result in higher levels of behavioral intentions and usage of technology. Irani et al (2009) confirmed that self-efficacy will have a positive influence on the behavioral intention to adopt broadband. Self-efficacy can be learned, through orientation or experience. Our survey instrument uses Bandura's (1997) principles: the scales measure the level of self-belief in being able to complete a task. The items are phrased in terms of 'can do' rather than 'will do', reflecting the fact that we are interested in capability not intention. The hypotheses related to self-efficacy and design autonomy are:

- H1 (a) – Design autonomy results in lower initial self efficacy
- H1 (b) – Design autonomy results in higher final self-efficacy

Perceptions of Usefulness

Perceived usefulness is the extent to which a user feels the technology would enhance his/her performance (Davis, Bagozzi, & Warshaw, 1989). Hartshorne et al (2009) found this influenced students' behavioral intention to use Web 2.0 for coursework. Assessing the student perceptions of the potential and actual usefulness of the wiki was done using questions pertaining to whether it would make work easier and quicker, increase efficiency, develop closer relationship among group members and so on. The hypotheses related to perceived usefulness of the wiki are:

- H2 – Higher self-efficacy results in higher perceptions of usefulness
- H6 (a) – Design autonomy is associated with lower initial perceptions of usefulness
- H6 (b) – Design autonomy is associated with higher final perceptions of usefulness

Perceptions of Quality

In this research, the quality of wiki is evaluated by the students themselves. Questions pertaining to quality include how well the (student-created) wiki supported group work, the ease of navigation both through the whole wiki and on each individual page, ease of information searching and a "mark out of 10" for the wiki design. The hypotheses related to changes in perceived quality of the wiki are:

- H3 – Higher self-efficacy results in higher perceived quality of site
- H5 – Design autonomy produces higher perceived site quality

Actual use of site

In our study, relevant actual use of the wiki included reading material added by other people, adding text, photos, audio files and other attachments to a wiki page, editing, creating new wiki page and so on. Use was measured in terms of the variety of functions used. The hypotheses related to actual use of the wiki are:

H4 – Higher self-efficacy results in more varied actual use of site

H7– Design autonomy results in more varied actual use of site

Methodology

We conducted the research as an experiment. Students taking the same unit of study were given an identical assignment and marking guide with which to direct their efforts. The unit is a conventional unit, introducing non-IS students to topics such as IT strategy, data management, applications, knowledge management and mobile computing. The assignment was a weekly portfolio. The objective of the assignment is to learn to use wikis to support the construction and delivery of the assignment, to allow the students to link in resources and supporting materials, and to educate the students in collaborative work. Google Sites was selected as the wiki due to its reliability, accessibility and the fact it is free. In order to “encourage” students to demonstrate their proficiency, the marking guide for the assignment was structured as shown in (Fig. 1).

Module		90	80	70	60	50	40
		Outstanding	Excellent	Very good	Good	Satisfactory	Inadequate
		100	90	80	70	60	50
Relevant and interesting	<i>The answers to the activities provide reflections which are relevant and address the business or social implications of the question</i>						
Professional	<i>The answers to the exercises are professionally presented, including a clear structure, an attractive layout and use of language.</i>						
Collaborative	<i>There is clear evidence in the <u>wiki</u> of group collaboration and discussion</i>						
Planning and co-ordination	<i>There is clear evidence in the website of activity planning and group coordination</i>						
Supporting resources	<i>Supporting resources have been made available as documents, links, images etc.</i>						
Length, scope and direction	<i>The answer meets the minimum length requirements</i>						
<i>Comments:</i>							

FIGURE 2: MBA ASSIGNMENT MARKING GUIDE

Both groups of students received the same wiki training materials (videos and documents) for self-study, but one class was given a predefined wiki layout and in the other class, wiki layout, navigation and structure was left completely up to the students. It is unlikely that students from one class influenced the other, as the classes are parts of different courses, run on different days and in different locations. Two surveys were administered to both classes, at the beginning and end of the unit.

Preliminary Data Analysis

Data analysis is only preliminary, but we have some results from analyses in which students in both conditions (with and without design autonomy) are pooled. Firstly, there were strong and significant differences in self-efficacy for wiki use between the beginning and the end of the unit. Self-efficacy for all wiki operations increased between 1 and 2 points on the 10 point scale, with the smallest increase seen in the simplest operation (editing a page) and the greatest increase in the most difficult task (designing a navigable site). Clearly, the students gained confidence as wiki users from their experience. There were also changes in perceptions of wiki usefulness. Although, even prior to the participating in the class, the students felt that using wikis would make completion of their work easier, they believed even more so (by a substantial increment of 1 on the 7 point scale) after completion of the assignment. They were also a little more likely to say that a wiki is an important aid for group work in similar

units to the one they had completed. On the other hand, they reversed their opinion about use of wikis to please the lecturer: before the assignment their main reason for using the wiki was to please the lecturer, but by the end of the assignment they realized using the wiki to please their lecturer was of less importance.

Table 1 shows the correlation between the four quantitative variables after completion of the assignment. These allow a preliminary test of the hypotheses about the effect of self-efficacy on wiki usefulness (H2), wiki quality (H3) and wiki use (H4). It shows that

H2: That self-efficacy results in higher perceived usefulness is **not supported**.

H3: That higher self-efficacy results in better (perceived) wiki quality is **probably supported**.

H4: That higher self-efficacy results in more varied use of wiki is **probably supported**.

TABLE 1: POST ASSIGNMENT CORRELATIONS

Letter name	Self-efficacy	Wiki Usefulness	Wiki Quality	Actual Wiki Use
Self-efficacy	1	.13	.53 ***	.33***
Wiki Usefulness		1	.38 ***	.05
Wiki Quality			1	.27
Wiki Use				1

Note. $N = 68$. *** $p < .001$

Conclusion

Although the results are preliminary, the model seems to offer a useful structure to understand and decide what is “better” in this case for student learning about using wikis and how to approach using a collaborative design and writing tool. If strong guidance regarding site design and layout is given, this tends to increase self-efficacy. Whilst this self-efficacy does not increase the perceptions of how useful the wiki is, it does appear to lead to a wiki that is perceived to be of a higher quality and encourage the students to use more of the functions. If these preliminary results are supported by further analysis, the implications for teaching and the workplace are interesting and useful. Namely, it is important not to rely entirely on emergent design forms, but to provide strong guidance in site structure, layout and information design to students and knowledge workers.

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