

Assessments in Large- and Small-Scale Wiki Collaborative Learning Environments: Recommendations for Educators and Wiki Designers

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Abstract. This paper discusses assessment practice when wikis are used as learning environments in higher education. Wikis are simple online information systems which often serve user communities. In higher education, wikis have been used in a supporting function to traditional courses; however, there is little research on wikis taking on a larger role as learning environments and even less research on assessment practice for these learning environments. This paper reports on the assessment techniques for large- and small scale- learning environments. It explores the barriers to assessment described in the studies. The paper concludes with a proposal of five improvements to the wiki engine which could facilitate assessment when wikis are used as learning environments in higher education.

Keywords: Wiki, Wiki Learning, Wiki Learning Environment, Assessment.

1 Introduction

Theoretically, wikis have the potential to harness the benefits of Web 2.0 technology to support collaborative learning. While not specifically designed as a learning environment, a previous review of the literature revealed that wikis have many features which enable collaborative learning to occur [1]. However, since wikis are not designed as an educational tool, a repeated weakness reported in the literature is the inadequacy of the wiki to assist assessment.

Assessment is a critical part of the wiki learning process. Angelo and Cross [2] write that “the central purpose of Classroom Assessment is to empower both teachers and their students to improve the quality of learning in the classroom” (p. 4). This is because Classroom Assessment “provides faculty with feedback about their effectiveness as teachers, and it gives students a measure of their progress as learners” (p. xiv). The assessment process plays the same significant roles in wiki learning environments as in traditional learning environments – informing and improving

instruction and evaluating student growth. However, in wiki learning environments, assessment also serves to ensure students participate. This is because there is evidence that indicates that students will not contribute fully to the wiki learning experience if they are not being graded for their participation [3, 4, 5, 6, 7, 8, 9].

The authors of this work have taught five semesters in a mid-Atlantic college of education using wikis – in classes as small as 12 and combined groups as large as 180 students. They have used best practice for implementing wikis for instruction but continue to find assessment a time consuming process – this limitation of using wikis for instruction is an often reported barrier to implementation [5, 10, 11, 12, 13]. This work represents a synthesis of examples and recommendations from the literature of assessments used for wiki. Assessment has not been the focus of many research studies; however, many reports and studies mention the methods they used to evaluate student progress. After identifying these assessment methods, the barriers to effective assessments in wiki learning environments will be listed. Many of these barriers can be overcome with improvements to the wiki engine. Therefore, this work will conclude with recommendations to improve wiki engines to better support assessment practice.

2 Wiki Assessment in the Literature

Wikis are well suited to fulfill the needs of instructors looking for a collaborative, student-centered learning environment. They provide dynamic repositories that allow students to learn by constructing knowledge based on their experiences in a self-directing manner; becoming active contributors to each other's learning; and developing a sense of community ownership of this content [14, 15, 16]. However, wikis were not designed as learning environments for formal education. Therefore, instructors and wiki researchers have used traditional method of assessment to evaluate student work. Assessment methods have rarely been the focus of a research study so this list represents the types of assessment referred to in the studies on wikis published in peer review journals over the past 5 years. Many of the studies found in the body of literature on instructional wikis are qualitative; many of the journal articles included a reference to the type of assessment used. In the descriptive studies, traditional assessments using quizzes and rubrics were used; peer assessment also was frequently used by instructors. Another method that was evaluated quantitatively as well as qualitatively was the use of the wiki usage data. The qualitative studies explained methods instructors used to attribute an individual's contribution to group work. One of the qualitative studies attempted to automate the assessment process using the portfolio record kept in the wiki [11]. While there was no consensus in the literature about the best method to use, there was wide agreement that assessment in wiki learning environment remains a time consuming process.

2.1 Quizzes

Quizzes have also been used to assess knowledge gained from the creation and use of the wiki. Formats suggested by Hazipanagos & Warburton [17] include multiple choice, short answer, true/false, and matching. In many cases students created the quiz questions and answers [17, 18, 19]. In these studies, and in research by the

authors of this work, students write the questions and answers. They submit the questions and answers to the instructors who create an automated quiz using a quiz tool or course management system such as Blackboard. Quizzes can be taken without the aid of the wiki; or, when students can use the information in the wiki, we have called the “quiz” a scavenger hunt. Quizzes and scavenger hunts are tools that can be used formatively to improve or drive instruction. They are used summatively when the goal is to improve knowledge or awareness of the wiki content. The benefit to using a quiz, especially an online quiz, is that the feedback to the student can be immediate. However, wikis can be used for more than generating knowledge and awareness and at least one wiki researcher called for a change in practice away from summative, norm referenced tests to meet the demands of the authentic project-based learning that occurs online [20].

2.2 Rubrics

Several of the studies used rubrics to assess their students [4, 18, 21]. The use of rubrics to assess authentic activities reflects the evidence in the body of literature that rubrics are effective tools to assess complex authentic student work [22, 23,24 25, 26, 27].The use of rubrics to assess student work was recommended by one research because rubrics allow the instructor to set clear expectations up front [28]. Best practice on the use of rubrics underscore the rubrics’ ability to inform student work as it is being created when the rubric is given to students prior to instruction [29]. When rubrics are given to students when learning activities are assigned, students are able to review their own work for errors prior to submission for feedback or grading [30]. The authors have used rubrics to create an all-in-one assessment that not only assessed the content and quality of the student’s contribution but also the quantity and quality of their collaborative posts. Rubrics are used both summatively and formatively to assess multiple facets of a student project.

2.3 Peer Assessment

Since wiki is a social learning experience a social evaluation tool has been often used. Several studies reported using peer assessment [11, 18]. One study, which used several semesters and repeated measures, reported peer assessments to be equivalent to instructor assessments [19]. Irons [31] recommend using peer feedback as a way to improve student learning and reduce the time commitment on the part of the instructor. In one account, students completed the wiki learning activity over several class periods [18]. This study reported that students anonymously evaluated each team member’s, as well as their own, contribution to the work at the end of each day. The author reported that this self and peer rating system valued each students’ contribution. Peer assessment also can contribute to interaction between students. In a study that reported on 5 semesters of teaching with wikis in a college of education [11] this study suggested that peer assessment encouraged interaction between the author and the other students. In this study, feedback was provided to the authors by the other students in the class using the threaded discussion area of the page.

By participating in the conversations occurring in the threaded feedback the instructor has an opportunity to monitor and assess the learning as well as the

collaborative experience [12]. The authors also use the threaded discussion area as a formative feedback forum for students. In addition to the improved interaction/collaboration and improved student learning (evidenced in other studies) the authors also found the threaded feedback discussion a wealth of information about student learning and understandings about the content. Studies suggest that students may not be able to provide quality feedback without being trained to do so [22, 23, 24, 25, 26, 27]. So, a tutorial or practice is beneficial to be sure the peer assessment will reflect the instructor's expectations. Formative peer assessment when conducted in the threaded discussion, is more time consuming than if the instructor were to complete this evaluation herself. This is because the instructor not only needs to read and provide feedback to the author; the instructor also is assessing the student feedback to the author. However, the threaded discussions also allow the instructor the ability to participate in the discussions occurring among students and remediate any misconceptions and inaccuracies as they are occurring. Summative peer feedback, by well trained students, has been reported as an effective means to evaluate students while reducing instructor workload [28].

2.4 Wiki Usage Data

A final method of assessment, which is most frequently reported in the literature, is to use a student's quantity of work as part of his final grade. In most cases, studies report that students are not only graded on the quality of the content they are producing but on the quantity of their contribution to the end product. Wiki usage data has been used in several studies to provide the instructors with a portfolio of information that tracks posts to individual users [5, 11, 12, 28, 32, 33]. The literature on assessment for wikis used as learning environments suggests that while students should work collaboratively, they should be assessed individually [7]. Several studies reported higher student satisfaction and a perception of fairness in the assessment of group work because of the capability of individualized assessment in wiki learning [34, 35, 36, 37, 38, 39, 40, 41]. However, there are concerns that have surfaced in the literature that the usage data may not accurately reflect the group process [4, 42]. First, quantities of posts are not an indication of learning; and second, the quality of the post is a more important consideration as evidence of learning. Infrequent posts do not necessarily indicate that a student is not learning [3, 42]. Student teams may choose to collaborate face-to-face and designate one student to post their work. And qualitative studies have indicated that students read and re-read wiki content without contributing to the conversation [43]. Paradoxically, one study hypothesized that if more in class face-to-face time had been allocated to the wiki activity, perhaps greater evidence of collaboration would have been seen in the wiki learning environment [44]. Therefore, the recommendations found in the literature are that the usage data should only be used as a small part of the assessment process.

3 Recommendations for Practice

The authors of this work contend that the barriers to effective assessment stem from the fact that wikis were never designed to be used as a learning environment. Therefore, several changes to the wiki engine need to be considered before effective and efficient assessment can be designed and tested.

3.1 Facilitate Communication within the Wiki

Wikis offer several modes of communication – the threaded discussion associated with each content page, email, and direct edits to the content page. However, the only way to provide private feedback to students is to use email. The authors of this article have found that the email tool within some wikis often require several clicks to communicate directly with students. Furthermore, email communications within some wiki engines leaves no record of the private conversations. Therefore, creating a communication system within the wiki that allows for private conversations to occur would be helpful in building a virtual community [17].

An effective private way of communicating with students would also resolve some of the frustrations suggested by another study which reported student frustration and confusion because multiple learning platforms are used [5]. The students in this study used course management software for most tasks and used the wiki to communicate with their tutors. In order to encourage students to use the wiki platform, the authors of this study suggested that the instructor should refuse to answer questions by email [46]. However, improvements to the wiki email to link directly into the email systems that the instructors and students currently use would be a better solution.

3.2 Comment Tool

Learners benefit when they are provided frequent and detailed feedback [10, 40]. In one study English as a Second Language students required a large amount of immediate feedback [5]. Zorko [5] reported that the ability to react quickly when there was a problem and to provide guidance was motivating for his students. Furthermore, Zorko reports that students can respond to the comments more quickly and produce a better end product. Currently, all comments must be made to students using the threaded discussion, direct edits to the page, or in email. A comment tool, similar to the one used in popular word processing revision tools, would facilitate the feedback process. First, it would enable the instructor to provide targeted feedback directly linked to sentences, paragraphs, or words. Therefore, when the instructor is providing feedback they no longer need to identify where, in the text, the feedback is targeted. Second, it would enable peers to provide feedback without directly editing the page. Students don't like other students directly editing their pages [3, 4]. Formatting issues have occurred, and changes have been undone [43]. Furthermore, students have reported that they are reluctant to edit each other's work [9]. Therefore, a targeted comment --using a callout box or stickynote type tool – would allow students to suggest changes to the page without actually making them.

3.3 Colored Instructor Comments

The threaded discussion area is still a valuable source of evaluation data. By participating in the conversations occurring in the threaded feedback the instructor has an opportunity to monitor and assess the learning as well as the collaborative experience [12]. Several studies reported on the use of peer assessment in threaded discussions to help learners improve the content of their wiki page [17, 19]. Using the threaded discussion section is very helpful for students to provide feedback and to enable them to defend their suggestions [12]. However, one study reported the

concern that in the large body of information and threaded discussions it was feared that instructor comments would get lost and students would not see the feedback [32]. If the instructor comments appeared in a unique color they would be easily identifiable by the students and would not get lost.

3.4 Connections to Plagiarism Checking Software

It is easy for students to cut and paste content directly from their web browser into their wiki content pages. Several studies reminded students not to directly cut and paste into the wiki [3, 3]. In fact, in one study, students expressed concern about material copied directly from books and Internet sites [43]. With so much of wiki content being text-based, a tool that checked pages for plagiarism within the wiki would be ideal. Sites such as Turnitin are used by educational institutions to check their students work for originality (<http://turnitin.com/static/index.php>). As a first step, giving instructors the ability to test content pages with a single click of the button would help make the assessment process more efficient. However, providing students access to this tool would also serve as a metacognitive tool to improve their awareness of plagiarism and the need for proper citation.

3.5 Integrated Rating Tool

It has been suggested that when students have been properly trained to use the tools, peer assessment can be equivalent to instructor assessments and can improve end products [19, 22, 45, 46, 47]. Furthermore, peer feedback, especially formative feedback, can reduce the time commitment on the part of the instructor [31]. However, wikis only currently facilitate qualitative feedback. The qualitative feedback is an integral part in helping students improve their contributions to the wiki, however most grading systems are quantitative (A-F, 0-4, 25 points, etc.). Therefore, the addition of a flexible rating tool would aid in the assessment process.

The proposed tool would work similarly to the feedback systems in many online shopping and auction sites which use a star system to accumulate buyers' feedback into information about the reliability of the seller or product. The system would link directly to a rubric and accommodate multiple ratings based on the number of subtasks being assessed [29]. The rating scale should be flexible to accommodate local assessment scales – i.e. ranges of letters and numbers. Finally, to facilitate best practice for peer assessment the system should allow for anonymous ratings [27, 47, 48]. Of course, a reporting tool for the instructor, which would export the rating into a spreadsheet, would also be necessary.

4 Conclusion

This work is part of a larger study that evaluates the use of wikis to change attitudes in preservice teachers. It began in 2009 with a review of best practice for implementation of wiki as a learning environment [1]. After five semester of implementing wiki learning environments it was clear that the best practice found in the literature could help an instructor successfully facilitate collaborative work. However, the struggle to effectively and efficiently assess collaborative groups up to 180 students led these authors to the literature for answers.

Attempts have been made to automate the assessment process in a wiki but these attempts were not successful, therefore, the assessment process is still a labor-intensive process on the part of the instructor [4, 41]. The examples from the literature quizzes, rubrics and peer assessments are useful for effective formative and summative assessment but the processes are not efficient ones. Therefore, we suggest improvements to the wiki engine to better facilitate instructor and peer assessment. We suggest improved communication tools -- private conversations between instructors and students, colored instructor comments, and a commenting tool -- a flexible rating tool that directly connects to the assessment rubric and exports reports to spreadsheets; and plagiarism checking within the wiki. Whether these improvements to the wiki engine are ever implemented, future work should focus on empirical work that evaluates assessment practice so that instructors have complete body of work on best practice for implementing wikis as learning environments.

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