

Effects of Assessment on Wiki Activities during Group Work

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Abstract

Wiki has been embedded within various applications that support collaborative work and communication especially in teaching and learning environment. This study investigates the implementation of wiki in Computer Supported Collaborative Learning environment. Many research works have proceeded to identifying the appropriate assessment methods in wiki and have compared the computed grades with the assessments of other activities within the course or program to measure its reliability. However, research from the aspect of effects of assessment on wiki contribution is limited especially in understanding how the participation in the various wiki group activities varies when assessment is introduced. In this study, the perception of students towards wiki and the effects of assessment on the wiki activities during group work were explored. A mix of quantitative and qualitative approach was used in the experiments. Observation of student's participation in wiki was done using the wiki platform: *Moodle system*. From the study it was found that students' activities in wiki as a group increased when they were informed that their participation in wiki would be assessed. Students were found engaged in creating more sub-topics for group discussion besides being engaged actively in commenting on other posts.

Keywords: wiki; collaborative learning; group work; student assessment

1. INTRODUCTION

This study aims to examine students' experiences and perceptions associated with the use of wiki in the context of collaborative learning in higher education with focus given to student assessment. Assessment is based on the contributions to wiki during group work. Findings indicate that wikis without any assessment being conducted on student contribution will not attract students to participate in wikis. On the other hand, with assessment the number of activities in wikis increased and students were more committed and motivated. Peer evaluation in wikis has been identified as one of the motivating factor for students to contribute in wikis.

This study provides insights that may inform the decisions of educators who are considering the use of wiki in their courses as a platform to enhance collaborative learning during group work. Previous research has shown that wikis can be effectively used in education. However, research from the aspect of assessment of wiki contribution is limited (on both the methods of assessments and also impact of assessment on wiki contributions).

This study will explore the perceptions of students towards wiki and the effects of assessment on the wiki contribution, which may provide some insights to lecturers who are in the process of selecting an appropriate method to assess students for their course. Besides that, the findings could highlight the activities that students get involved most in a group work using wiki when assessment is carried out. Educators could then assign weightage to each activity based on the frequency of participation.

On top of that, the behavior pattern of students in carrying out the group work will be able to give some insights to educator to design their assessment method and identify which activity should be stressed upon to encourage collaborative learning and avoid every group member from just getting involved in one type of activity. The findings also would be able to provide a platform for furthering our research to investigate if there is a relationship between the quality of the wiki content and the frequency of participation in wiki.

A. Wiki as a Collaborative Learning Tool

Collaborative learning refers to the tasks that require joint intellectual efforts among students or between students and teachers (Chu & Kennedy, 2011). It is basically dealing with how students can learn together with the help of computer technology. In collaboration, learning occurs socially as a collaborative construction of knowledge. This is not done individually but involve group work such negotiation and sharing knowledge (Samur, April 2011). The students are responsible for one another's learning as well as their own. Thus, the success of one student helps other students to be successful (Gokhale, 1995).

Wiki is a tool that supports collaborative learning. This has been proved by several researches where it is a tool that provides medium of communications between wiki

users. According to (Popescu & Manafu, 2009), (Su & Beaumont, 2010) and (Hadjerrouit, 2012) they agree that wiki allows participants to generate discussion and conclusions in learning activities collaboratively. Some of the collaborative activities in wiki such as adding contents, deleting, moving the contents, formatting the words or sentences, checking grammatical error, linking and sharing of images (Chu & King, 2012) which is done in group of participants in wiki. By using wiki in education, research has shown that it has improved the students' and lecturers' perception, expectation and motivation in collaborative learning (Thomas, King, & Minocha, 2009). Key factor to a successful wiki-enabled collaborative activity is to manage the students' expectation and motivation in using wiki.

A sizable amount of research has been done in order to identify the perceptions towards wiki in education. The perception almost comes from interviews, surveys and observations in wiki. Findings show students' experience in using wikis as positive (Chu & Kennedy, 2011). The positive perceptions towards wiki criteria are such as ease of use, user friendly layout and collaboration improvement between group members. Wiki has also been accepted as an effective knowledge management medium in term of knowledge creation tools, knowledge capturing tools and knowledge sharing tools. Based on the experiments done in previous studies, students in majority feel that wiki assignments promote their critical thinking process and they agree it contribute to easy collaboration with their peers (Gehring, 2008).

Furthermore, the rating relates to the perceived severity of problems faced by students shows they faced low rating problems towards wiki such as privacy issues in posting items, limited functionality in wiki platform and less support for thread discussion platform (Chu & Kennedy, 2011). Whereas based on (Chu et al, 2012), the students and teachers' attitudes and perceptions towards collaborative writing process in wiki found to be more positive where the paper is focusing on the student-centered collaborative process, underpinned by social-constructivist (Hadjerrouit, 2012) paradigm and social view of writing process theory.

The literature has found that the students' background and experience contribute to the students' motivation in using the wiki effectively. From the literature, this key factor can be easily found from Computer Science discipline than other field because students' experience in using computer technology is more than other fields (Cubric, 2007) (Thomas, King, & Minocha, 2009). Some research found the indicator of the extent to which the students collaborated with each other is by measuring the mean of their comments in wiki (Chu & King, 2012). This was supported by the finding from (Chu et al, in press), which it illustrates that wiki is suitable for collaborative group work because it broadens the students option in contributing their work output. The advantage highlighted in this was wiki breaking temporal and geographical barrier.

B. Assessment in Wiki Collaborative Learning Environments

Assessment factor does motivate a student to successfully collaborate their tasks in wiki. Several papers have proved this by stating their findings. They have proved that

by implementing the described wiki based process and assessment strategy has lead to increase the students' engagement and self-confidence in learning (Cubric, 2007) (Judd et al, 2010). However, assessment is still a challenge in evaluation of the performance and contribution of the wikis author. This supported by paper (Grant, 2006) where it focuses on enhancing an existing wiki platform with some functionality, which is tailored to the educational context. These features provide support to instructor in managing and evaluating grading process.

Currently, several assessment issues are found in wiki evaluation process. The fluidity of wiki found assessment process difficult, where the issues falls on when the assessment should be taken and the issue on deciding which contributions should be attribute to the students because it involve many contributors in the wiki pages (Terry et al, 2010). Another issue raised by (Gehringer, 2008) is it is difficult to grasp how much an individual contributes in the wiki.

Based on the revealed issues regarding assessment in wiki, several papers have suggested proper assessment strategies in order to adopt assessment factors in wiki contributions. The suggested assessment strategies can be categorized into five types (Gehringer, 2008):

1. **Self-assessment:** Students write up summaries of their contributions to the wiki and submit them to the instructor.
2. **Group-based assessment:** Students work in groups, and rate the contributions of each group member, as well as suggesting a grade for the group as a whole.
3. **Instructor/TA assessment:** The instructor or searching assistant assigns a grade and gives feedback without any outside assistance.
4. **Expert assessment:** Links to the wiki pages are provided to outside experts, who assess the contributions.
5. **Peer review:** Each student is assigned two or three other students' contributions to assess, based on a rubric.

The evaluation criteria that can be used as scoring parameter in wikis' contribution are such as *peer evaluation support*, *observation of students activity on wikis*, *automatic evaluation by wiki system* and *instructor evaluation support* (Grant, 2006). A wiki assessment also based on the level of students' contributions in wiki and to verify this most assessments using a series of wiki log activities (Judd et al, 2010). Palomo-Duarte et al, 2012 has proposed wiki assessment is based on the graphical representations of students' contribution which consider *the overall effort of students*, *distribution of effort*, *work organizations and transferable skills*. These aspects were used to identify students' skill from their contribution in wiki.

However, Rodriguez-Posada et al, 2011 has presented the main needs for a correct assessment in wiki's contribution. In collaborative and cooperative learning process, there are several usual skill can be assess like work effort, distribution and collaboration of work, authority or conflict. The recommended features to support assessment in wiki system are (Rodriguez-Posada et al, 2011):

- Provide graphical representation of differences in sentences from wiki history pages
- Quantitative analysis of public database in the wiki website.
- Collect and aggregates information which help to analyze the status and development of wiki.

A variety of different approaches used to design marking criteria. In order to understand the evaluation criteria in wiki, the prescribe wiki activities or learning activities should be clearly defined such (Cubric, 2007):

- ‘add contribution to topic analysis’,
- ‘add definition to module’,
- ‘review articles / website relatively to the topic’
- ‘compile practical tasks’
- ‘develop essay and review colleague works’

This will guide the evaluation process whether using rubric or designing marking scheme.

In peer assessment, the type of marking criteria can be specific or more holistic general rating criteria. Some of the suggested criteria has been used by several peer assessment systems such *instructor designed marking form*, which allows instructors to design their own rubric of marking. Some systems provide flexible design that can accommodate a range of assessment activities such ‘selection of marking’, ‘assigning numeric values’ and ‘free text comments’. Other paper suggests meta-analysis to investigate the validity of peer assessment marks which is comparing between peers marks with teachers’ marks. However from the students’ feedbacks, they preferred both writing and receiving the holistic feedback (Luxten-R, 2009).

C. Research Gap

A great deal of research has been done on social technologies in education including wiki in education. Many research works have proceeded to identifying the appropriate assessment methods in wiki and have compared these assessments with the assessments of other activities within the course or program. However, research from the aspect of effects of assessment on wiki contribution is limited especially in understanding how the participation in the various wiki group activities varies when assessment is practiced. In this study, the perception of students towards wiki and the effects of assessment on the wiki activities during group work were explored.

2. METHODOLOGY

A. Research Questions

The purpose of this study is to examine the students’ pattern of behavior in using the wiki during group work, and also to compare the effectiveness of wiki in encouraging

participation in wiki, with and without the presence of assessment. The following research questions were addressed:

RQ1: What are the students' patterns of participation in wiki during group work when their contribution in wiki is not assessed?

RQ2: What are the students' patterns of participation in wiki during group work when their contribution in wiki is assessed?

B. Participants and Procedures

The study participants consist of two groups of students (n=44) from the Diploma of Information Technology (DIT) program. The first group of DIT students (n=24) and the second group of DIT students (n=20), both enrolled for the course Internet Application. Within each groups, six (6) sub-groups were created which consists of 3 to 4 students in each subgroup. These students are from the 2013 cohort.

Both groups of students were given similar instruction (except for the assessment part) on how to engage in the wiki as part of their collaborative learning for their course. However, the main difference between the groups is, the first group was not informed that their participation will be assessed since no assessment of student participation in wiki was involved. On the other hand, the second group was informed that their participation in wiki would be assessed.

Both groups of students were required to use the Moodle system for the enrolled course Internet Application. Students are required to participate in collaborative learning either through contributing to the wiki page by creating new pages/topics of discussion, editing existing pages/topic of discussion, commenting on posts, editing profiles, correcting formats or correcting grammar/spellings mistakes. To initiate the participation in Wiki, the course instructor assigned unique topics for each of the subgroups.

3. RESULTS AND DISCUSSION

A. Pattern of participation in Wiki when contribution is not assessed (n = 20)

In exploring the participation of students in Wiki when they were not assessed, out of the 20 students 30% were involved in creating of wiki pages for example creating of new subtopics for discussion purpose (see Figure 1.0). Meanwhile, 45% of the students were actively involved in editing the pages which is the highest portion in the wiki activities. The rest of the 25% were passive users and were basically involved in modifying their user profiles.

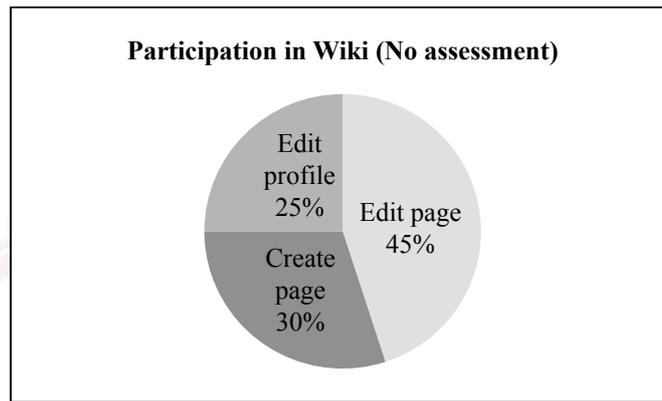


Figure 1.0: Percentage of participation in some wiki activities

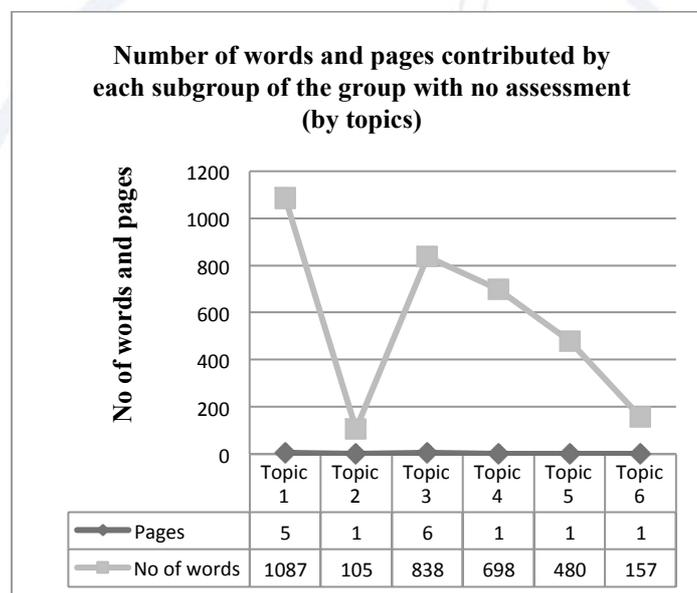


Figure 2.0: Number of words and pages contributed by each subgroup of the group with no assessment (by topics).

Based on the observations on students enrolled to the Internet Application course whose contributions to the wiki were not assessed, the below findings were perceived:

- Most of the page creators edited their own page rather than their peers' page or work. This scenario was shown by Group 1, Group 3, Group 5 and Group 6 (4 out of 6 subgroups). However, result also show that only participants from Group 4 (1 out of 6 subgroups) actively worked together in order to complete their page, where all 3 participants collaboratively edited the page by adding words, formatting the page and commenting on peers post. In overall, finding shows students preferred working individually rather than collaboratively in the wiki platform.
- Figure 2.0 shows Group 1 was actively involved in the creation of wiki pages where it consists of 5 subpages and contain 1087 number of words.

On the other hand, Group 2 can be considered as very passive in terms of contribution to the wiki because only one student (1 out of 4 students) participated and created only one subpage. This outcome was also seen in Group 4, Group 5 and group 6 (which means 4 out of 6 subgroups were generally passive users of wiki). This passiveness can be supported by several factors as stated below:

1. Students' were still relying on other group members' to participate and contribute in the wiki instead of involving and contributing on their own.
 2. Students' were inactive since there were no rewards or evaluation done on their wiki contributions.
- There were other factors that effected students' participation in the wiki such as Internet connection and prior experience in using wiki. The slow Internet connection and no prior experience in using wiki did effect the participation in terms of students' being not comfortable in assessing and contributing to wiki as they did not know how to use it. Besides that, the slow Internet speed caused the students to lose interest in working with wiki. This shows that previous experience or training in using wiki and good ICT facilities are essential to ensure the consistent participation in wiki by students.
 - The nature of the wiki which is text based content did give impact to the wiki contribution. Students preferred if the wiki could include other media such as video, audio and images rather than only text.

Based on the observed passive roles in wiki participation, the next question was how to increase the level of contribution and participation in wiki. The following section discusses Based on this results, an experiment was conducted on the other group of Internet Application's course students. In this experiment, assessment was included as part of the course evaluation. The assessment was based on students' contribution in wiki and this was clearly informed to students.

B. Pattern of participation in Wiki when contribution was assessed (n = 24)

All the 24 students were informed about the evaluation of their participation in the wiki. The evaluation was categorized into three categories as stated below:

1. Peer assessment

Students were evaluated by their peers in terms of their participations in group project, cooperation with group members, time management in wiki activities, ability to provide good feedback and listening consideration to others' opinion.

2. Group work evaluation

Students were evaluated based on the quality of the contents, reliability of the references, layout, tidiness of the information and the relevancy or accuracy of information.

3. Individual evaluation based on rubrics

Activity log of each student were referred to monitor individual activities in the wiki. The evaluation criteria considered were the frequency of contributions in wiki such as commenting, editing, creating page and sharing of images, file or other elements in the wiki.

The purpose of this approach was to observe the pattern of participation in wiki when evaluation of wiki participation is introduced as part of their grade for the course. Figure 3.0 shows several subtopics (pages) have been created by members of each group. The average number of pages created by the groups is 15 pages with the minimum being 8 pages and the maximum being 28 pages. Among all the six groups, Group 3 was the most active in terms of contribution to the wiki pages. Some of the observation made from this experiment is described below:

- In total 91 pages have been created by the six groups of students. This shows an increase in number of pages created compared to the students in the previous experiment (without assessments) where only a total of 15 pages were created. On top of that, each group had more than one page created when assessment was introduced. The comparison between the two groups (group with assessment and without assessment) will be explained in the following section.
- Students were more confident in commenting and viewing their peers' work. This was based on the observation of students' wiki log activity. From the wiki log activity, it was observed that most students were actively participating in viewing other member's pages, however this activity cannot be consider as a wiki contribution because no direct contribution to the wiki was involved.

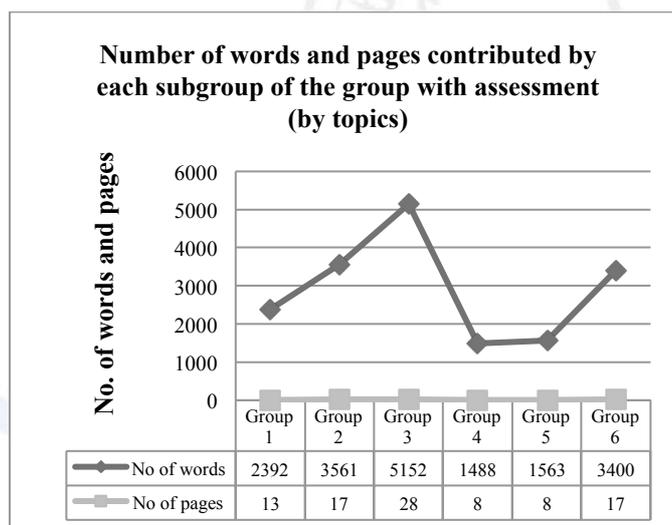


Figure 3.0: Number of words and pages contributed by each subgroup of the group with assessment (by topics).

C. Impact of assessment in wiki participation – Comparison of experiment with and without student assessment

In order to investigate the difference in the pattern of students’ contributions to the wiki in both the approaches discussed in section IV(A) and section IV(B), a comparison between these two were done based on various elements of wiki contributions such as the *add page*, *commenting*, *edit page*, *view pages* and *view history* activities. Figure 4.0 shows a significant difference in the pattern of behavior of the students when assessment was introduced. With assessment, students tend to participate and contribute more to the wiki.

Referring back to Figure 2.0 and Figure 3.0, the total number of words contributed when assessment was implemented was 12,919 words while 3,365 when no assessment was conducted. Figure 4.0 shows that more students were involved in editing pages and commenting on pages when assessment was done. Figure 5.0 clearly shows the difference in number of pages added by wiki participants between sub-groups that were assessed and not assessed. Generally, the number of new pages created by wiki contributors is much higher when the students were assessed.

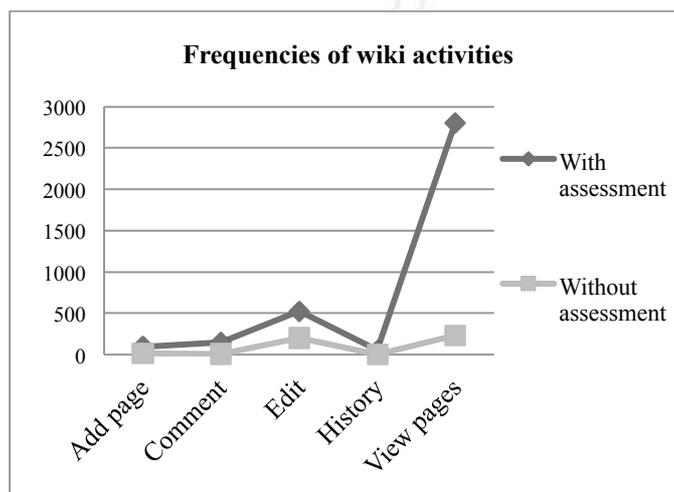


Figure 4.0: Frequency comparison between two different approaches to wiki contributions; with assessment and without assessment.

Table 1.0 shows the results of independent sample t-test for comparing two approaches used in measuring the wiki contributions. The activities’ include *add page*, *commenting*, *edit page*, *view pages* and *view history*. The involvement of students in these mentioned activities represents the students’ participation in wiki. The difference between the two groups (group with assessment and group without assessment) was significant with $p < 0.05$ ($p = 0.0013$), which shows the assessment factor did effect the involvement of students in the wiki activities.

Groups	Involvement in wiki activity (frequency)		Significant (2-tailed)
	Without assessment	With assessment	
Group 1	209	312	0.0013*
Group 2	29	674	
Group 3	115	966	
Group 4	54	525	
Group 5	23	539	
Group 6	22	599	

Notes: Activities include add page, comment, edit, view and add image; $p < 0.05$; * Significant at $p < 0.05$

Table 1.0: Independent sample t-test between two approaches on the wiki contributions (focusing on the assessment factor).

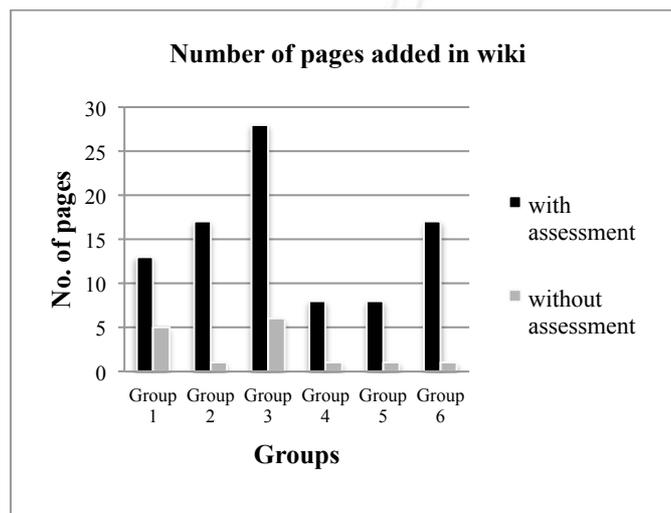


Figure 5.0: Number of pages added in wiki using two different approaches.

Figure 6.0 shows, after have been evaluated by their peers about 92% of students (out of $n=24$) agree peer assessment is one of the motivation factor to encourage them participate in wiki. This shows the commitment and engagement in the group work was the major element to be considered in order to ensure collaboration learning between the members of the group in wiki. They were also interested to involve in wiki for other subject or course in future session. However, only 61% agreed to continue contributing to the wiki if their peers or lecturers do not assess them.

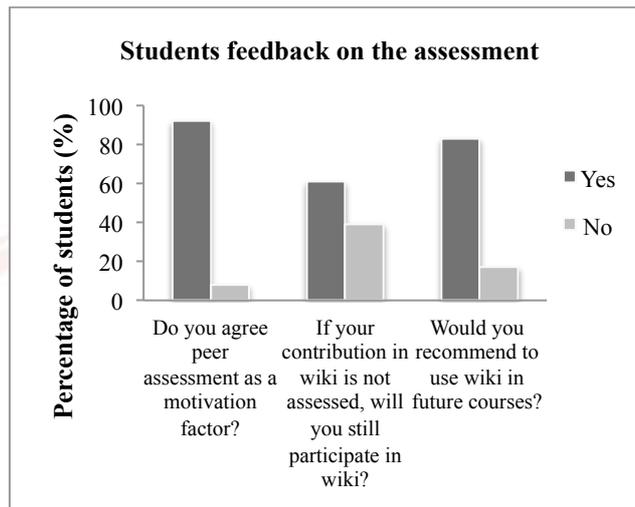


Figure 6.0: Students' feedback on wiki assessments.

4. CONCLUSION

In this study it was found that assessment did affect the pattern of student participation in wiki group work. These effects were seen in various wiki activities such as in creating pages, editing pages, commenting and viewing. It was found that most of the students were involved in viewing pages followed by editing pages. The numbers who were involved in commenting were low and this is rather interesting and requires further research to investigate why such scenario occur in collaborative groups and how students can be encouraged to participate more in commenting (e.g. enhancement of existing features of wiki system). The identified wiki activities with most involvement from students may be explored further to understand if these activities need to be given higher or lower weight during assessment.

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