

Examination of Implicit Interactivity in Wiki-based Learning in University

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● Abstract ●

The arrival of the Web 2.0 age, which is characterized by such key words as participation, sharing and openness, provides a learning environment in which both instructors and students can experience interactivity. In the educational area, we are particularly witnessing a growing interest in the social software like Wiki as one of the communication tools that reflects the characteristics of Web 2.0 and focuses on the interactivity with others. Based on this background, this study aims to examine into the meanings of interactivity inherent in the Wiki-based learning by studying such cases where Wiki is being used as a learning tool. For the purpose of our study, we practiced the Wiki-based learning method on the study subjects of the 17 junior students from U- University and 18 junior students from K- University during their 2009 fall semester teacher training courses. Through a comprehensive analysis of the questionnaires, interviews, Interactivity Measurement Diagram, examinations on the Wiki uses, Daily Self-reflection Records, and any other materials collected throughout the program, we could garner the following results: First, most of the students acknowledged that the use of Wiki was a useful communication means and helped promote their interactivity during their learning activities. Second, the interactivity of the Wiki-based learning was found to be more dynamic in the team-based projects or the community-based Wiki uses than in the instructor-oriented cases. Third, the Wiki-based learning is judged effective in expanding the scope of thinking and improving the learning capabilities through the collaborative knowledge-building process. The educational employment of the social software like Wiki in this web 2.0 age has great potentials for the true establishment of the learner-oriented learning environment, which has long remained at a standstill.

키워드: Web2.0, Wiki-based learning, Interactivity

1. Introduction

The Web may be one of the things that most influenced the digital age. The emergence of the Web in the late 20th century led to the introduction of the concept of 'interactivity' to the learning scenes (Rafaeli, 1988). The technical aspects of interactivity of the Web have been converted into the educational concepts and values, ushering in a number of changes in the educational scenes including the relationship between instructors and students. Such concepts as participation, sharing and collaboration began to establish themselves as major classroom strategies and environments (Riffkin, 2000). The rapid development of the information technologies during the early 21st century brought a more advanced type of Web, that is, Web 2.0. Web 2.0 helped further develop the concepts of participation and sharing proposed in the previous Web age in a more detailed and expanded manner,

and even added a brand-new concept of openness to the existing ones. As Bryant (2003) put it, the advent of Web 2.0 is helping realize a new environment that is 'smarter', 'simpler' and 'more social'. Web 2.0 puts so great an emphasis on interactivity and sociality that it can readily be called 'social software.' The two major types of social software that are based on the technical properties of Web 2.0 are Wiki and blogs. Now that these tools are being briskly employed as the means for the basic environments in a variety of community activities, the efficacy of the interactivity and sociality they hold may also be realized in the educational arena. While the e-Learning during the past Web 1.0 age mostly focused on the use of the existing contents than on interactivity, the Web 2.0-based learning concentrates on the interactivity among students or between instructors and students, and is even expanding to such extent that it now accommodates or helps organize new contents. In this regard, this study aims to interpret the

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implications of interactivity inherent in the Wiki-based learning, or in the entire Web 2.0, within the framework of diverse analytical tools, by analyzing the research materials from the two types of college class where they used Wiki as a learning tool.

The tools employed for this study include questionnaires and the semi-structured interviews with the students on the subject of the Wiki-based classes, Interactivity Measurement Diagram aimed at surveying the status of interactivity found during the Wiki classes, analysis of the Wiki uses by participating teams, and Daily Self-reflection Records. The authors hereof hope the results of this study testify to the significance of the educational use of Wiki in a specific and practical manner.

II. Theoretical Background

Educational approaches to Wiki

Now that new technologies and sciences for collaborative work are emerging, Wiki is being used not only as a simple type of word software enabling joint editing within a web site but also as a metaphor for the new age with such characteristics of collaboration and participation (Don Tapscott & Anthony, 2007). In the aspect of its educational applications, it should also on the creative work that can be implemented in it, rather than its role as a space for any assisting or simple editing work. By applying Wiki to the classroom teaching, collaborative works occurring in the real life can be further promoted and the process of individual as well as group participation during discussions and collaborative learning can be readily monitored. It can also provide more effective on-line learning environment than any collaborative writing activities conducted face-to-face. The classroom teaching that applied Wiki actually promoted collaborative work between the teacher and students, which was hardly possible in such environment. Collaborative writing activities leads to the evolution of texts, by which every learner can modify or make additions regarding a specific writing, and this amounts to a more advanced type of texts made possible through repetitive collaborative work. Therefore, the characteristics of Wiki include participation and sharing, open-type editing, links, creation and storage of knowledge, list of the replaced writings, history editing, evolution of the documents (Lee Jae-Hak, 2008). Thanks to these properties, Wiki can make a learning tool than encourages voluntary participation by the learners, and enable the learners to experience a collaborative knowledge building process to make common knowledge and information through participation and also can be used as a teaching tool that readily supports

collaborative projects (Korea Education & Research Information Service, 2006). In the actual classrooms, Wiki is being utilized a type of online software for the typical classroom units and group projects. More practical cases of such employment may include the language education aimed at promoting writing skills, the on-line encyclopedia (Wikipedia.org) that provides latest information, project-based classes requiring collaborative activities, discussion classes designed to encourage voluntary participation and agreement.

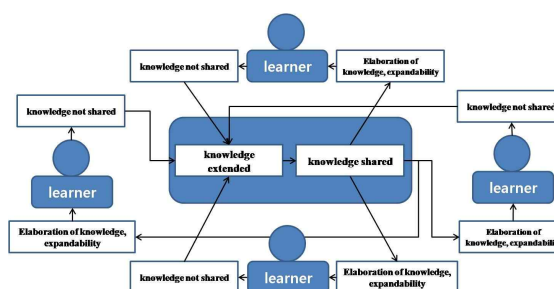


Figure 1. Process of knowledge building and sharing

These Wiki-based classes aimed at promoting collaborative learning require the interactive activities that can help identify the opinions and thoughts of the participants and the errors inherent in them, which can be called the process for the negotiations of meaning (Kim Dong-Shik et al., 2008).

The process for the negotiations of meaning is a collaborative knowledge building process for expanding the knowledge shared among the team members by reviewing the others' knowledge and narrowing the gaps in recognition through active communication (Stahl & Hermann, 1999), and the negotiations of meaning through the collaborative knowledge building process can be explained as the Figure 1 shows.

III. Methods

Subjects

The subjects for our study were 17 junior students (Group A) from U-University in Seoul and 18 junior (group B) students from K-University in the same city during their 2009 fall semester teacher training courses, and we conducted the Wiki-based classed for both groups. The study period ran for a total of 12 weeks from September to November, 2009.

Procedures

The two subject classes were Educational Philosophy and Educational Technology, and they proceeded in the problem-based learning and individual team learning method,

respectively. Both classes adopted the Wiki software called the ‘Spring Note.’ However, the way the Spring Note was used in each of the two classes was different. In the group A, the students were provided the folders for personal learning which were used for the undertaking of individual assignments and the class focused on the interactivity between instructor and students and feedbacks. In the group B, on the while, it was used as a space for collaborative learning among the team members, and the instructor created Wiki for the class and also provided Wiki for each of the individual teams. We created a free atmosphere in both of the classes so that the students can further interchanges, and also operated the Assessment Message Board and the Materials-Sharing Message Board to help the students voluntarily participate and share in the interchanges.

Research Questions

This study aims to examine into the meanings of interactivity inherent in the Wiki-based learning by analyzing the two research classes that used Wiki in the two subject universities

Data collection and analysis

Based on the results collected from the Wiki-based subject classes that ran for 12 weeks, we employed the following analytical tools(Table 1) to conduct a comprehensive analysis on the potential interactivity, knowledge structuring and sharing process, and individual learning patterns among the subject learners.

As part of the efforts to collect research materials, we collected questionnaires and conducted interviews upon the completion of each class, and also had the students fill out and submit the Self-reflection Record and the individual Interactivity Measurement Diagram.

Table 1. Analytical tools and findings

Analytical tools	Findings	Subjects
Questionnaires & interviews	Learners' recognition of the Wiki-based class	All
Interactivity Measurement Diagram ¹⁾	Degree of interactivity	All
Analysis of the Wiki Message Board by team	Collaborative knowledge-building process by team	Two teams per group
Daily Self-reflection Record ²⁾	Individual learning patterns appearing during the Wiki-based classes	All

IV. Results

This study intended to look into the meanings of the interactivity inherent in the Wiki-based learning through the sample classes undertaken in the subject universities. The results of this study were collected throughout a number of analytical tools that included the questionnaires, interviews, the Interactivity Measurement Diagram, and the Daily Self-reflection Record, and the followings are a description of the results produced from each tool.

Survey & Interviews

For the examination of the learner' recognition on the Wiki-based classes, we used the questionnaires and also conducted the semi-structured interviews. Most of the students in both the A and B groups were aware of Wiki being used as a learning tool in their classes, and 81% of them said it was useful in their learning. As many as 72% out of the entire 35 students said that Wiki was helpful in their interactivity with the instructor or other students, and, as for the advantages of Wiki, they said it enabled them to do a collaborative writing together with others and share the opinions of others, and it also made them effectively manage time for information sharing and assignments. Overall, the subject learners in the study agreed that the use of Wiki was appropriate in the project-based classes, and were also aware of its effectiveness in communication with the instructor or other learners.

Interactivity Measurement Diagram

Below are the results of the analysis of the Interactivity Measurement Diagram that was conducted to examine the interactivity in each subject group.

As shown in the Figure 2, the learners in the group A appear to be more focused on the instructor. However, their individual interactivity was relatively low, and the partially high cases were in proportion to the degree of personal closeness. The instructor for the group A used the created Wiki Message Board as his learning management tool, and

- 1) Three options were selected for the Interactivity Measurement Criteria: at least 6 times a week (thick solid lines), 3~5 times a week (solid lines), and 1~2 times a week (dotted lines). The number of the visits by each individual to the Wiki Notice Board of other learners and the Wiki space of the instructor were put into a diagram in order to identify the interactivity in the 3-months long Wiki-based classes.
- 2) The Daily Self-reflection Record used in this study was designed to have the learners describe what they experienced during the class in detail.

posted his assignment for the individual students on his Message Board. Such a community as focused on the instructor in the Wiki-based learning environment can render some of the students (S9, S8, S11, S16, etc.) isolated, and the Wiki Message Board (W3, W4) of some of the teams failed to secure the communication channels among the teams. Some students isolated from the community group showed a negative attitude toward the Wiki-based learning, and said that it was not as much convenient in access and interactivity as the general web pages or blogs. In the meantime, all the students in the group B demonstrated an active community structure around the Wiki Message Board(Figure 3). This result seems to derive from the fact that, rather than simply focusing on the learning management for the students, the instructor in the group B allowed a great deal of discretion to his students in relation to the implementation of the project of each team and for the community. The subject learners in the group B were shown to have secure diverse channels for communication and were actively conducting collaborative learning around the Wiki Message Board of each team. Each of the students also participated in the Wiki Message Board of other teams than that of his/her own Board, and this community pattern continued to be maintained in the results of the learning in the form of active participation or the feedback among the students.

Analysis of the Daily Self-reflection Records

Lastly, we conducted an analysis of the Daily Self-reflection Records the students provided during their 12-week long Wiki-based classes. For the analysis, our four researchers performed the Cross-tabulation Analysis on the frequency of the overlapping elements and finally came up with the following results (ref. Table 2).

The analysis of the Daily Self-reflection Records demonstrated the Wiki-based learning positively influences the expansion of thoughts and the improvement of collaborative learning capabilities. As the Table 3 shows, the students, rather than simply acquiring fragmentary knowledge, approached and think about the given tasks in a diverse way, share what they know with their fellow students, acquire new information and experiences, and even undertake self-reflections (ref. Table 3).

Together with the expansion of thoughts, the students, through the team activities, exchanged opinions with others, adjusted them, chose new ideas and had the opportunities to present them to others, and throughout the process of solving the difficult tasks with their friends, they appeared to gradually approach the solving of their given tasks (ref. Table 4).

The above-mentioned results of this study can be summarized as follows:

First, most of the subject learners recognized the usefulness of the Wiki-based learning in their classes, and the effectiveness in the inactivity among learners and between the instructor and learners.

Second, the interactivity in the Wiki-based learning was more dynamic in the team-based projects or its application as a community than in the instructor-oriented application of Wiki.

Third, through the collaborative knowledge-building process, the Wiki-based learning was judged to be particularly effective in the expansion of thoughts or the improvement of collaborative learning capabilities.

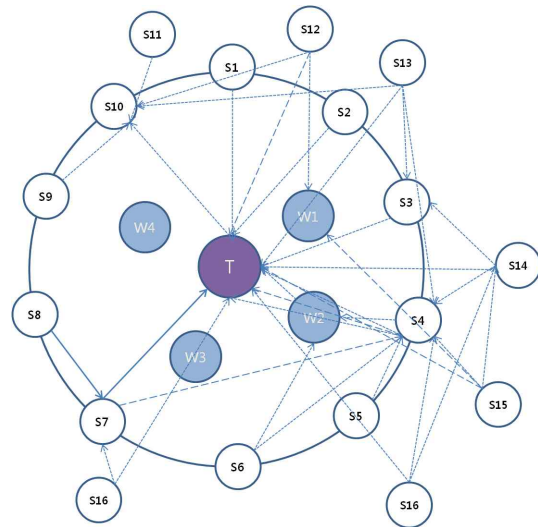


Figure 2. the Diagram for the group A

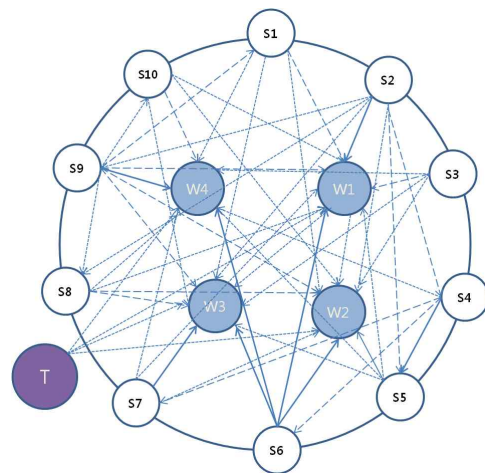


Figure 3. the Diagram for the group B

Table 2. Results of the Analysis of the Daily Self-reflection Records

Group	Elements derived	Frequency
A (N=17)	Expansion of thoughts	16
	Improvement of collaborative learning capabilities	14
	Self-reflection	11
	Self-initiated learning	8
	Active participation	8
	Application to everyday life	7
B (N=18)	Improvement of collaborative learning capabilities	18
	Expansion of thoughts	17
	Problem-solving capabilities	13
	Self-confidence in learning	11
	Active participation	8
	Application to everyday life	6

Table 3. Self-reflections on the expansion of thoughts

Group A	<p>"Through the classes, I could experience newness that I've never thought about and through the Spring Note, I could share the thoughts of my friends."</p> <p>"I could expand my perspective while having discussions and exchanging my thoughts with friends based on what I thought about."</p> <p>"Thinking about the new topics the professor provided us each class, I could approach and think about them in a diverse way."</p> <p>"This provided me with an opportunity to think in a new way than passively taking classes and giving the answers in a fix way."</p> <p>"Beyond what is in the textbooks, I wish the class gave me more in-depth knowledge related with it."</p>
Group B	<p>"We identified what our team did wrong, and corrected the mistakes to prepare for a new framework for this task."</p> <p>"As we do not want to make such mistakes as in the last class again, we identified the essence of the problem and conducted the tasks. This influenced the assessment of other team to a great deal, and we could clearly see the merits and demerits."</p> <p>"We found ourselves asking many more questions than before. We were not be able to solve questions if we did not think about them ourselves. We identified through questions, and could think about better solutions."</p>

Table 4. Self-reflections on the Improvement of collaborative learning capabilities

Group A	<p>"As my friends made up for what I could not think about alone and I exchanged my thoughts with them, I found myself gradually improving my capabilities of thinking in a big way."</p> <p>"Unlike doing the common tasks, this process of finding the points of agreement among many opinions and discussing them gave me the opportunities to learn a lot about the basic attitudes about discussions, like proposing my thoughts and listening to those of others."</p> <p>"It was hard for me to understand and organize all of it and present them in the class and to know they are graded. But I did it all with friends. I surely could not have completed the task alone."</p>
Group B	<p>"I thought my role in the team was important. I organized the opinions of others and mine to prepare for the presentation. During the process, our team tried to organize them all to fit with the intention of the problem."</p> <p>"In order to make our presentation better and its time precise, our team did a rehearsal. An to show the professor our process of solving the problem, we worked on the Powerpoint document together."</p> <p>"As I had to take the class, discuss, make assessments.. I thought if I could ever do that all. And taking the History of Education seemed to be a bit boring. But the way the professor lectured made the class much more interesting. And his way of linking today's education to its historical background made my understanding deeper. We actually seldom had the opportunities to do discussions with friends, but while exchanging our thoughts with friends, I could share those of each other, and it sometimes made me feel like Plato."</p>

V. Conclusions

In this age of participation, sharing and openness, such social software as blogs or Wiki is universally settling in our daily lives. These social changes provide the learners with a community space where they can discover new learning opportunities, share opinions and information with others, and participate in a number of types of learning. In an effort to examine the educational meanings of interactivity inherent in the Wiki-based learning, we practiced the Wiki-based learning method on the subjects of the 17 junior students from U-University and 18 junior students from K- University during their 2009 fall semester teacher training courses, and, based on the results collected from a variety of the research materials including the questionnaires, semi-structured interviews, and the Daily Self-reflection Records, we performed a comprehensive analysis of the specific cases related with the

knowledge-building process, interactivity and the negotiations of meaning. The results of the analysis showed that Wiki, as a useful community tool, can promote the interactivity between instructors and students and among students, and, through a collaborative knowledge-building process, can also positively influence the expansion of thoughts and the improvement of collaborative learning capabilities. In drawing a more dynamic interactivity, the use of Wiki in the team-based project learning or as a free community was found to be more effective.

The learning media for the learners has traditionally been controlled and resisted by the instructors. The reasons for this may be that, rather than being proposed a means supporting the educational environment for the students and instructors, such media have been focused on their roles of replacing and supplementing the instructors. In addition, the past learning media have not been so much influential or functional as to bring changes to the learning environments. In fact, their existence has made no difference.

However, in this age represented by Web 2.0, the IT-based education does make a big difference as an essential element, and is required to be proactively employed in the real educational arena. As we have already reviewed in this study, such social software as the Web 2.0-based Wiki comes to us not as one of the methods or a strategy but as a learning environment, while maintaining its conventional functions and roles as a type of media. It is conducting a decisive role in providing an environment in which we can put the learner-oriented education, which has been stressed since the late 20th century, into practice in a more specific way, and we actually witness such learner-oriented education being practiced in the real scenes. As such, the social software like Wiki is offering a learning space where the individual learners can identify themselves as learners, and actively form the learning communities with their fellow learners in the context of social relationship.

While Wiki is defined as a type of social software, its interactivity is educationally meaningful in that it is not the one in which the individuality and identity of its constituents are sunk in social relationships, but the one that, as this study showed, also accommodates their individuality.

All in all, as much as the e-Learning is called for in the Web 2.0 age, the changes in the recognition of the instructors toward learning and students, and their attitude toward the acceptance, supporting and employment of such changes are also keenly required.

In other words, we eagerly need the expanding of the classroom environment that could have almost been deserted

into an infinite space through the effective support by the instructors, the establishing of a learning atmosphere in which we have a creative and dynamic interactivity functioning based on social relationships, and the creating of the learner-oriented educational environment, which has long remained at a standstill.

Reference

- [1] Kang In-Ae (2006). The learning technologies in the digital age, Moonumsa Publishing Co.
- [2] Kim Dong-Shik, Sun Jong-Sam, Kim Soo-Hyun (2008). The development of knowledge-expanding tools for the negotiations of meaning & analysis of effects in the Wiki-based collaborative learning environment, Educational Information Media Research
- [3] An Moon-Suk (Feb.25, 2009) Shared use of information & national competitiveness. Sep.1997. From: http://www.nia.or.kr/open_content/board/boardView.jsp?id=49003&search=title&keyword=%C0%FC%C0%DA%BB%F3%B0%C5%B7%A1%C0%C7+%B5%B5%C0%D4%B0%FA+%BD%C3%C0%E5%B1%B8%C1%B6&tn=QX_0000193
- [4] Lee Jae-Hak (2008) A study on development of learning model for Wiki-based collaborative writing. Master's thesis, Pusan Univ.
- [5] Korea Education & Research Information Service (2006). The latest trends in the overseas e-Learning for higher education. KERIS RM 2006-92.
- [6] Bryant, L. (2003). Smarter, simpler, social : An introduction to online social software methodology. Retrieved May 14 from <http://www.headshift.com/moments.archive/sss2.html>.
- [7] Clark, R. (1994). Media will never influence learning. Educational Technology Research and Development 42(2), 21-29.
- [8] Fletcher-Flinn, C. & Gravatt, B. (1995). The efficacy of computer assisted instruction(CAI): A meta-analysis. Journal of Educational Computing Research, 12(3).
- [9] Koumi, J. (2006). Media comparison & deployment: A practitioner's view. British Journal of Educational Technology 25(1) 41-57
- [10] Levey, P. & Bonono, R.(2000). Collective Intelligence: Mankinds Emerging World in Cyberspace, LaVergne, TN: Lightning Source Inc.
- [11] McLuhan, M. (1964). Understanding Media: The Extensions of Man. New York: McGraw-Hill.
- [12] Tim O'Reilly (2005). What is Web 2.0 Design Patterns

- and Business Models for the Next Generation of Software. Retrieved May 13 from <http://www.oreillynet.com/pub/a/oreilly/tim/news/2005/09/30/what-is-Web-2.0.html>
- [13] Valdes, R., Smith, D. (2005). Web 2.0 : Get Ready for the Next Old Thing. Gartner Research.
- [14] Anderson, L.W., and D. Krathwohl (Eds.) (2001). A Taxonomy for Learning, Teaching and Assessing: a Revision of Bloom's Taxonomy of Educational Objectives. Longman, New York.
- [15] Don Tapscott · Anthony D. Williams(2007). Wikinomics: 21st Century Books
- [16] Ralf Klamma, Mohamed Amine Chatti, Erik Duval, Hans Hummel, Ebba Thora Hvannberg, Milos Kravcik, Effie Law, Ambjorn Naeve and Peter Scott(2007). Social software for life-long learning.
- [17] Lori Bell, Kitty Pope, Tom Peters, Barbara Galik(2007). Whos on Third in Second Life.
- [18] Lombard, M., & Snyder-Duch, J.(2001). Interactive advertising and presence: A framework. Journal of Interactive Advertising, 1(2), Retrieve Jan. 19, 2005, from <http://www.jiad.org/>
- [19] Jason de Nys(2008). Two ways to integrate technology in our teaching.
- [20] Jeffrey P. Felix, Ed. D(2008). Edublogging: Instruction for the Digital Age Learner. Superintendent of Bonsall Union School District, Bonsall, CA.
- [21] Peter Morbille(2007). Evolution of the 2.0 discoveries: Hanbit Media Inc.