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Web 3.0 and its accompanying changes upon distance learning in universities

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Introduction

Web 3.0 is defined as the third generation of evolution of the web, regarding the way of organizing and retrieving data. Field of application of the Web 3.0 includes, among others, semantic web and open educational resources (Giustiani, 2007).

The important point of Web 3.0 is that it requires a more active student's participation. Students are involved in creating reusable learning materials which are shared in the web. Therefore, learning materials tend to be open source and exchanged freely across institutions, such as the open educational resources (OER). The openness may result in more collaboration among institutions, especially in open universities (Bidarra & Carlos, 2007).

The paper aims at exploring the theory of knowledge building (Scardamalia & Bereiter, 2006) and the theory of computer-supported collaborative learning (Stahl, 2006; Ma, 2008). Both theories relies on utilizing the online computer network as a media where the learning process takes place. Those are considered as relevant underlying learning theories that may serve as underlying foundation to the potential of the Web 3.0

In addition, there was an example of an experiment by Universitas Terbuka to utilize wiki in an online tutorial. Although it was not an ideal example of the Web 3.0, it required students to actively participate in jointly writing a paper, so that they build content together. However, students are not yet understand the advantages of the internet and also its requirements, to maximize the full potential of the technology.

As a result, some initiatives must be taken to ensure students preparedness to take part in the collaboration, and taking advantages of the online learning method. In addition, open source learning material may be modified by students. Thus, there should be some ways for overcoming the problems and improving learning process.

Theoretical Background

At present, the growing challenge for higher education establishment is to accommodate increasing number of college-aged population, beside the growing need of life-long enrollments. That challenge gives rise to the need of greater role of distance education (Koper, 2004). For instance, only 8.3 % of the 2,700,000 teachers in Indonesia have a bachelor degree (Department of National Education, 2007) . While the rest are required by law to earn the degree. These huge number are beyond the capacity of the entire universities in the country.

Since more than two decades in Indonesia, Universitas Terbuka (UT) has become the primary provider of distance education. With a coverage of almost every populated center throughout the archipelago, it enables higher education to be accessible to those in the remote areas. Its flexibility for enrollment allows more on those who has a job or other commitment to take part in higher education. The number of students grew from 250,821 in 2006 into 324,147 in 2007 (Universitas Terbuka, 2008).

Distance education owes a lot from the advancement of technology. Both learners and teachers should take advantage of the technology.

Such an application is e-learning, where students learn through internet. Therefore, there is a growing need for new learning and teaching strategies, that can take advantage of the technology.

The internet is becoming an important media in distance education. Though UT still depends on printed material as the primary material, the internet is increasingly applied as a learning media. UT has been conducting e-learning since 1999. At present, there are 507 subjects equipped by online tutorial, with more than 10.000 students participated in the online tutorials (Universitas Terbuka, 2008).

An advantage of e-learning was that students learn through the internet *by collaborating with other students*. The collaboration is mediated by the online computer. Hence, it is an application of computer-supported collaborative learning (CSCL). The CSCL is a study of joint learning process by means of computer (Stahl, 2006). Within the CSCL activity, students cooperate regardless time and space constraints (Ma, 2008). Therefore, CSCL is not merely searching and downloading through the web, but it means that student actively do a joint learning activity.

Beside being a media of learning, the internet application in learning activities gives rise to a paradigm of knowledge building. It is through the exchange of ideas mediated by the online computer, knowledge is created and shared among learners. Each student put his/her ideas into the forum, by uploading a written comments. As the uploaded writing is open for comments and critics from other students, the students who wrote it might have feedback from other students. It means that the student does not only improve the writing, but also have a better understanding of the subject being discussed online (Scardamalia & Bereiter, 2006).

Meanwhile, the internet is also evolving through improvement and innovation, especially with the recently coming paradigm of the Web 3.0. The paradigm puts emphasis on *collaboration among community* of learners. This paradigm was implemented through open education resources and semantic web, among others. The open education

resources are learning materials that are available on the web and can be used and reused without copy right. While the semantic web is a system that enable a software to search articles within the web by means of its meaning.

The definition of open education resources (OER) is the educational resources, openly distributed by information and communication technology, within a community of users, for non-commercial purposes (Ischinger, 2007). The OER become more popular, when universities upload their learning material online, that can be accessed by everybody. Those universities are the Open University from the UK (in <http://openlearn.open.ac.uk/>), and Massachusetts Institute of Technology (<http://ocw.mit.edu/OcwWeb/web/home/home/index.htm>). The uploaded learning materials were regarded as open educational resources (OER), as they are available freely on the web.

An OER consists of components, such as the information, tools and community. The information is the content that is provided to anybody interested in it. While the tools is meant to be software and hardware that enable the content to be presented in internet. Lastly, the community is a group of people who access the resources (Ischinger, 2007).

The participants in an educational application of OER are author, instructor, learner, community. The author is an expert of specific topic, who prepares the learning resources into an uploaded information. The instructor is the one who guides and facilitates discussion of the OER. The learners are customers of the material who learns through the OER. While the community is a group where those components interact (Ischinger, 2007).

The OER may expand the availability of education toward wider population (Ischinger, 2007). The user of the learning material are not only limited to the registered students, but also people beyond the institution. Thus, learning may involve people beyond the educational institution.

While the semantic web was created by a lack of capability of the web software to understand the text on the web. Thus, the software sorts information based on concepts, attributes, and relationship within a certain domain. The software select words by the semantic or meaning, instead of the similarity to those words (Reimann, 2005). In other words, human and software communicate on a semantic basis (Dutta, 2006).

Discussion

In UT, the student's efficacy of learning through internet was considered as moderate (Padmo & Julaeha, 2007). The authors also grouped students into several levels of apprehension toward e-learning. The lowest level was awareness, where students only knew that there was an innovation, with no or less interest toward the innovation. At the management level, student paid attention toward the activity, and were willing to apply the e-learning as a kind of innovation. At the informational level, students were aware of the innovation, and they were interested to learn more about it.

The higher level was considered personal, where students learn the effect of the innovation toward themselves. The next stage was consequence, where students cared about the effect of the innovation. While in the collaboration stage, students were eager to collaborate with others to implement the innovation. The highest level was the refocusing, where students focused on efforts to explore any possible benefit of the innovation. Data from the research showed that the distribution of students at the lowest level was 2,38 %, at the informational level was 11.9, at the at the informational level was 28.57 %, at the management level were 2,38 %, at the consequence level was 21,43%, at the collaboration level was 9.52 % and at the refocusing level was 21.43%. Those data showed that students who were ready to do a collaboration within the e-learning, such as proposed in the CSCL paradigm were almost one-third out of the student population of UT.

Another example of a collaboration among students in an e-learning activity was a wiki page in an online tutorial, which is the EKMA5102 Management Information System online tutorial, in the Master of Management in the Universitas Terbuka. The students registered in the online tutorial were 39 in the first semester of 2008. The use of wiki was intended that they might share their ideas by collaboratively writing an online paper. It was meant to motivate student to learn through actively share ideas.

Students participation in this wiki was mostly focused on submitting ideas to develop a paper about management information system, which is not an ideal application of a knowledge building process. However, it might be an introductory for a new learning method which is suitable with the Web 3.0. The wiki enables students to actively put ideas on a paper that everybody can access.

The lack of readiness for collaboration was also mentioned by Ischinger (2007), during the application of OER. Students were not the only participant who were less ready for the innovation, most teachers did not have adequate skill either to involve in the OER, let alone to take advantage of the new way of learning activity. There is also negative attitude toward willingness to share ideas invented by others.

The opportunity to get involved in contributing to the revision of the learning material and also to join a collaboration in a learning activity makes learning a group activity. Sawyer (2006) suggested that learning is not only an individual activity. It also involves social interaction with other students. Therefore, although students do not regularly meet other students and teacher in distance education, the online interaction may still take place.

Meanwhile, the availability of OER allows students to compare a curriculum of a certain institution to others. It urges students to be able to select suitable learning resources, based on their learning needs. It was supported by Darmayanti (2007), that in e-learning, students need

to identify any problems and make independent decision regarding their own specified learning goals. The learning process tends to be more learner-centered and self directed. Therefore, students urges more flexibility in terms of schedule and content (Koper,2004)

Bidara & Cardoso mentioned that apart from learning through reading the material, students might modify the OER for their own use. Later on, they might also share the modification through online communication. An example of the OER was the OpenLearn of the UK Open University.

The need of more collaborating way in learning through the OER was also suggested by Geser (2007). Both students and teachers should collaborate to adapt the existing learning resources into a new resources, which is more suitable for their learning needs. This result was not permanent, for it will be corrected and adapted again in the future, if there is a new need and/or a new development in the knowledge itself. Moreover, the author also mentioned the demand of organizing and selecting the enormous OER within the internet. The process of the organization and selection of the OER might be supported by the technology of semantic web. Thus, the semantic web would become interrelated to the OER within learning activity.

Meanwhile, the semantic web also increase a more collaborative learning. Reimann (2005) suggested an example of semantic web that was meant to develop a knowledge building environment. The semantic web was created by developing an ontology within a certain domain. The ontology was a collection of words, describing certain concepts each, that was related to other words within a certain relationship. The ontology might be built by means of a software tool, like the free Protégé (available for download from <http://protege.stanford.edu/>).

As each ontology has a specific concepts, properties and relationship between concepts, an ontology is specific for a certain area of interest. However, the more people or organization agree on a particular

ontology, the more useful it is. They can share knowledge within the ontology of similar semantic (Reimann, 2005). The experiment that was conducted by the author focused on building an ontology within a group of a master degree course. Students used Protégé, a graphical ontology language for the purpose. They jointly created an ontology about learning theories. The ontology was based on selection learning theories according to a particular relationships among them.

Students are becoming more independent by obtaining information from several sources, both from selectively browsed through the semantic web, and from collaborative work (Dutta, 2006). Nevertheless, despite its pull delivery during this learning method, students still need a teacher. According to Stahl (2006), the teacher is needed in a computer-supported collaborative learning, to motivate and guide students.

Semantic web enables students to assert more control over their own learning. They become more independent learners, by searching relevant learning material. It was possible as the semantic web provide metadata that enable indexing and selecting learning material. Hence, characteristics of learning through the semantic web are (Dutta, 2006):

1. pull delivery: students select and construct specific course material available on the web. The course material are those connected by to commonly agreed ontology.
2. interactive: student communicates with others to solve an actual problem
3. non linear: student does semantic querying based on specific needs, previous learning and goal of learning.

The idea of personalized learning and pull delivery is related to the suggestion of Bradford (2004). The author stated that learner should take control of the learning activity. He also mentioned an idea of metacognition, where students define their own learning goals and keep their effort in reaching it.

Both in using the OER and the semantic web, the students tend to learn

through interactions among students. It is conducted by submitting a question, answering a question, suggesting ideas, or observing other students learning activity, thus every student learns (Stahl, 2006). As previously mentioned by Darmayanti (2007) and the experiment of wiki in UT, students who had better skill in internet were more capable to do a collaboration within an online learning activity. A more experienced student, the more confident s/he is to participate actively within the online activity, as s/he is aware of his/her learning needs (Bradford, 2004). As a result, the online activity enable its participant to share ideas and feedback, and the resulting conclusion is beneficial for the participants (Scardamalia & Bereiter, 2006).

On the other hand, there are some impacts on increasing use of open educational resources, regarding the curriculum, learning style, and assessment. There is a growing need of assessment of knowledge and skill gained from the new method of learning (Ischinger, 2007, p21).

Conclusion

The Web 3.0 technology influences the students way of learning. The semantic web might give an opportunity for students to search appropriate online learning material that suits their specific learning needs. Accordingly, students have to identify clearly their own learning goal. While the open educational resources support collaborative learning. Students learn through participating in scientific discourse which is accessible to other learners.

The advantages of both system might only be optimized by students had they have the expertise and skills in using the online technology. Students having those requirements will be able to do a more collaborative, learning. In other words, they would also share and contribute their ideas to others.

To some extent, learning becomes more a group activity through online interaction. On the other hand, learning becomes adjustable to individual learning needs and prior learning experience. However a

more independent learner may be able to submit more ideas toward the web, and to create a discussion that bring about a knowledge among the participants.

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