PREPARING STUDENT TEACHERS TO INTEGRATE WEB 2.0 TECHNOLOGY IN THEIR T&L THROUGH MEANINGFUL LEARNING

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ABSTRACT

Web 2.0 technology is gaining its reputation in the education context and seen as an important approach for teaching and learning in the 21st century. Teachers in the developed countries such as UK and US have been using Web 2.0 in their teaching and learning practice for nearly a decade. Yet, in Malaysia, the integration of Web 2.0 technology is still in its infancy. Teachers and students are using Web 2.0 tools in their daily life such as Facebook, Twitter and Instagram, but it is more for social networking. Considering these issues, it is crucial to prepare our student teachers with the necessary technology and pedagogical skills to successfully integrate Web 2.0 tools in their future teaching practice. Through the Scholarship of Teaching and Learning (SoTL), underpinned by meaningful learning theory, this paper shares on student teachers' reflection towards their exploration and experience with Web 2.0 technology.

Keywords: technology integration; Web 2.0 teaching and learning; student teachers; meaningful learning, SoTL.

1.0 INTRODUCTION

Education system all around the world is rapidly changing to be on pace with the latest technology and pedagogical innovation. As we are currently in the 21st century, teaching and learning (T&L) process shall shift from conventional teacher-centered approach, in which the T&L process is controlled by the teacher and students are told what to learn. Instead, we should strengthen constructivist learner-centered approach in which knowledge is actively constructed through meaningful learning experience and students should be made responsible for their own learning.

Meaningful learning may occur through active, constructive, intentional, authentic, and cooperative learning (Jonassen, Howland, Moore, and Marra, 2003). These attributes of active learning may be integrated in the T&L process through active engagement with technology. Inlign with the current technology development, Web 2.0 technology has become one of the major interests for technology and pedagogical innovation. One of the potential benefits of Web 2.0 to support meaningful learning is that through participation in collaborative environment such as blogs and wikis, students have the opportunity to become owner, creator and contributor of the web content and knowledge.

Researchers in the field of educational technology advocates that teachers should consider Web 2.0 tools to be integrated into their T&L to support constructivist and meaningful learning. For the teacher to be able to integrate Web 2.0 technology in their teaching practice however, they themselves need knowledge, skills and experience on using these technologies. For example, Yuen, Yaoyuneyong & Yuen (2011), findings on teachers' perceptions, interest and use of Web 2.0 conclude that even teachers have a positive perceptions and interest to integrate Web 2.0, they need more experience that focused on the use of Web 2.0 tools in the classroom.

Therefore, this study is designed in response to the needs of teachers having necessary experience with Web 2.0 in order to be able to integrate Web 2.0 successfully. In this study, I argue that for the student-teachers, it would be valuable for them to be involved in meaningful learning activities with Web 2.0 not only for them to construct their own knowledge and understanding about Web 2.0 but to be able to integrate Web 2.0 technology in their future teaching practice through authentic learning experience.

2.0 LITERATURE REVIEW

Web 2.0 for teaching and learning

Web 2.0 technologies such as social networking application, blog, wikis, web-based presentation tools and online mind mapping tools are gaining its reputation in the education context. These applications and tools have become an important approach in the T&L due to its potential to improve learning. As asserted by Richardson (2009), Web 2.0 has the potential to create more interactive and responsive learning environments in which learners actively engage in the learning process through knowledge creations and evaluations.

Realising that today's students are "digital natives" who have constant interaction of technology and better access to the Internet and are in control of their learning process (Presnky, 2001), teachers have a bigger responsible and challenge to engage their students in the T&L process inlign with the current trends. In this regard, teachers have to constantly improve their technology and pedagogical knowledge to be on par with the latest technology and pedagogical innovation. The integration of Web 2.0 tools in the T&L is an example of such pedagogical innovation as it allows for knowledge construction through creation, collaboration and sharing (Jimoyiannis, et al. 2013; Hamdan, et al. 2015).

According to Jimoyiannis, et al., (2013),

> The Web has been transformed from a space where users passively retrieve information, delivered by a small group of experts (Web 1.0), to a participatory, read/write platform (Web 2.0) which broadens users' communication capabilities and enables content distribution, sharing, co-creation, and remixing through participatory practices. (p. 248)

This participatory capabilities of Web 2.0 has the potential to stimulate learners' critical thinking skills, as learners has the ability to regularly compare and respond to their own contributions or ideas to those of their peers. For example, Davies and Merchant (2007), identify the following learning potential through blogging,

> New affordances include textual connections with others on and offline; the facility to comment on others' blog posts and the possibility of replying to comments on one's own; hyperlinks to information sources; site meters which monitor visits from others; RSS feeds which alert subscribed readers to other newly updated sites; the facility to embed

> other texts within one's own and the possibility of including a range of modalities from audio podcasts to video streams. (p. 168)

The use of Web 2.0 technologies in teaching and learning also has the ability to support active learning through interactions and collaboration (An et al., 2009; Polin & Light, 2010), and provide opportunities to scaffold learning that is crucial for critical and higher order thinking (McLoughlin & Lee, 2010). These pedagogical benefits of Web 2.0 have been widely discussed in the literature. However, in Malaysia, the integration of Web 2.0 technology is still in its infancy (Ismail & Harun, 2010). Teachers and students are using Web 2.0 tools in their daily life such as Facebook, Twitter and Instagram, but it is more for social networking (Yuen, Yaoyuneyong & Yuen, 2011). Considering this issue and realizing that Web 2.0 has the potential to provide more interactive and customized learning environments where students could actively create their own knowledge, rather than passively receive information from the teachers, it is important to prepare our student teachers with the necessary technology and pedagogical knowledge related to Web 2.0 for their future teaching practice. This study therefore is designed within the context of Scholarship of Teaching and Learning (SoTL) underpinned by meaningful learning theory as to prepare our student teachers to successfully integrate Web 2.0 technology in their future teaching practice.

3.0 THEORETICAL FRAMEWORK

Meaningful learning

This study is designed within the constructivist perspective of meaningful learning. Fundamentally, constructivist asserts that people construct their own understanding and knowledge of the world through experiencing things and reflecting on those experiences. Jonassen, Howland, Moore, and Marra (2003, p. 9) postulate that:

> Learning and instructional activities should engage and support combinations of active, constructive, intentional, authentic, and cooperative learning. … Learning activities that represent a combination of these characteristics result in even more meaningful learning than the individual characteristics would in isolation.

Importantly, from the constructivist perspective, meaningful learning occurs with "knowledge construction, not reproduction; conversation, not reception; articulation, not repetition; collaboration, not competition; reflection, not prescription" (Jonassen et al., 2003, p.15). In addition, it has been argued that meaningful learning occurs when learners are active, constructive, intentional, cooperative, and working on authentic tasks with technology (Jonassen et al., 2003), including the Web 2.0 tools (Howland, Jonassen & Marra., 2012). The five attributes of meaningful learning are illustrated in the following figure:

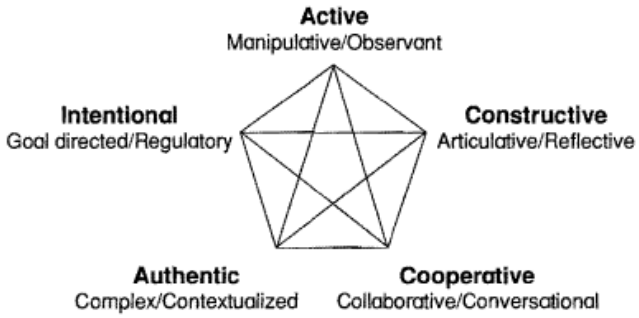

Figure 1: Characteristics of Meaningful Learning as in Howland, Jonassen & Marra (2012). Meaningful learning with technology.

The brief description of each attribute is as follows:

i. Active – Students are dynamics. They are not passive listeners but plays active roles in learning activities, actively manipulating objects and information, and observing results from the learning activities.
ii. Constructive – Students construct their own understanding and knowledge, reflect and articulate their personal understandings of phenomenon / activities observed.
iii. Authentic – Students engage in an authentics task and problems rather than memorizing abstract concept and ideas; solving real-life problems.
iv. Intentional – Students set their learning goals and planned their learning pathways; and
v. Cooperative – Students work with peers to solve the problems/tasks through collaborative activities and discussion to better learn and apply their knowledge.

It has been argued that Web 2.0 technologies may be integrated in the T&L process to support meaningful learning (Howland, Jonassen & Marra, 2012; Hamdan et al., 2015; Jimoyiannis et al., 2013). Hamdan et al. (2015), study found that there are positive relationships between the uses of Web 2.0 tools in the T&L with cooperative learning, intentional learning, authentic learning and active learning. Whereas, Jimoyiannis et al. (2013), found that the application of Web 2.0 TPCK (technological pedagogical content knowledge) provides authentic learning experience for student teachers in their preparation to integrate technology in their future practice.

Also, it has been suggested that "the best way for teachers to learn about Web 2.0 may be through learning with Web 2.0 as authentic practice that can inform their planning and implementation of learning activities" (Albion, 2008, p. 21). This study therefore, designed within the SoTL context, cultivates meaningful and active learning with 2.0 technologies throughout the course, as to prepare our student teachers with technological and pedagogical knowledge of Web 2.0 to be integrated in their future teaching practice.

4.0 RESEARCH DESIGN AND METHODOLOGY

Scholarship of Teaching and Learning (SoTL)

This study is designed within the principle of Scholarship of Teaching and Learning (SoTL) which encourages systematic academic inquiry into teaching and learning practices within the classrooms, and sharing the findings with other academicians and practitioners for wider benefits (Felton, 2013). According to Caroll (2004), SoTL is a systematic research approach that analyzes the teaching and learning process.

Through SoTL, practitioners "consciously reflect on the goals, methods and strategies of teaching… and strive continuously to refine their teaching methods and effectiveness and explore new methods" (Belmont University, 2006, p. 57-58). Reflecting on teaching and trying to understand how students learn is crucial to SoTL research. In addition, through the SoTL process, "the participants have to articulate what the students do and what they do and the outcome as it relates to the teaching that makes the learning happen" (Raja Hussain, 2015, p. 32).

Qualitative case study

There is a wide range of methodological approaches for conducting SoTL, and it can be quantitative or qualitative in nature, or mixed (Hudball and Clarke, 2010). In this study, I adopted a qualitative case study to explore how meaningful learning activities may help student teachers to learn on how to integrate Web 2.0 technology in their future teaching practice. Qualitative methodology is chosen because it is suitable to conduct an in-depth exploration of a central phenomenon (Creswell, 2005). As in this study, Web 2.0 technology integration is the contemporary phenomenon which exists within the real-life context of teachers.

The case study - Participants and the instructional design of the course

The participants for this study were 24 student teachers from Universiti Utara Malaysia. Through the SoTL, they were exposed to and experienced in using Web 2.0 technology in a 14 weeks course namely Web Based Instruction. The course was carried out based on ADDIE instructional design model (see Figure 2), underpinned by meaningful learning theory.

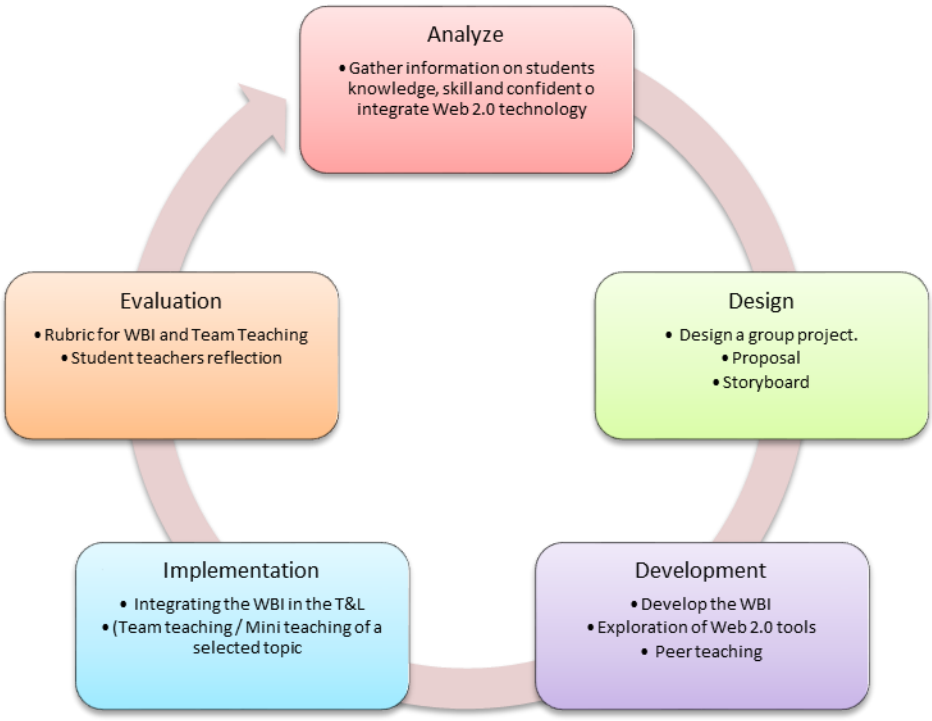

Figure 2: The instructional design of the SoTL project.

As to cultivate meaningful and active learning, during the course, students learn and explore several Web 2.0 tools that are suitable to be integrated in the teaching and learning. Students also were asked to take part in an online discussion set up in the lecturer's blog. As part of the coursework, students were assigned to develop an Educational Website using Web 2.0 application namely Weebly in a group of 5-6 people. Students also required to incorporate other Web 2.0 tools in the development of the website contents and for web-based teaching and learning activities. To see whether students were able to integrate the Web 2.0 tools in their teaching practice, each group conducted one hour team teaching session of their own selected topic, in which each student took part. At the end of the course, students were reflecting on their experience of learning and integrating Web 2.0 technology. As the SoTL practitioner, I also reflecting on my teaching approach and collected evidence of my students' learning.

Data collection and analysis

The data sources used for this study include student's reflective writing, the lecturer's (my own) reflective writing and observation notes, that include rubric for the team teaching presentation, photos and video recording of student's presentation. The collection of data was carried out several times during the course. The photos and video recording captured during student's team teaching presentation were captured with the student's concern. Thematic approach (Braun & Clarke, 2006), was adopted to analyze the data. The findings are presented and discussed in the appropriate themes emerged from the data. Data from several sources were triangulated to validate the findings.

5.0 THE FINDINGS

Through the exploration of data from student's reflection of the learning process of this course, triangulated with data gathered from classroom observations (mini teaching, photos and video recording), and my own reflection, it was found that through the meaningful learning process, there are some improvement in student teachers' knowledge and skills of Web 2.0 technology which consequently contribute to student teachers' confident to integrate Web 2.0 technology in their future teaching practice.

Improvement in knowledge and skills

At the beginning of the course, I gathered information on students' knowledge and skills of Web 2.0 tools and applications. It was not surprising that most of my student teachers only mentioned popular social media applications such as Facebook, Twitter and Instagram, as previous literature reported students are using Web 2.0 tools in their daily life for social networking (Yuen, Yaoyuneyong & Yuen, 2011). When I asked them further about Web 2.0 tools for teaching and learning that they knew and have experienced with, they mentioned a few tools such as Emaze, Prezi, Padlet and Weebly.

Throughout the course, as the student teachers were exploring more Web 2.0 tools for designing their WBI project, I could see that students' are developing their knowledge and skill about Web 2.0. Through collaborative learning for accomplishing their group project they started to think of, discuss and explore which Web 2.0 tools that is suitable to be integrated in their WBI project. Towards the end, students managed to come up with an informative and interactive WBI site using Weebly as the main platform for their group. This improvement was also evidence during the team teaching presentation in which students were able to integrate various Web 2.0 tools in the T&L process.

My observation, assessment and reflection were triangulated with the student teacher's reflection at the end of the course. Most of the students valued the their involvement in the meaningful learning process, particularly through the exploratory learning to improve their Web 2.0 knowledge and skills.

Through the exploratory learning, it helps me to improve my knowledge and skills to use Web 2.0 applications. Now I know many Web 2.0 tools that I never know before such as Visme, Lenoit and various Quizzes applications. (ST#9)

In this course I gain new knowledge and experience. I explore many Web 2.0 tools. Honestly, before this I only knew few common tools such as Dropbox, Prezi and Blogspot. But now, I hev explore other tools and platforms such as Wordpress, Weebly and Wix. I've explored almost 40 tools in this course. (ST#18)

Student teachers confident to integrate Web 2.0 technology

Consequently, the knowledge and skills about Web 2.0 tools that the student teachers developed throughout this course has contributed to their confident to integrate these technologies in their future teaching. These are evident during their team teaching presentation in which students were able to integrate various Web 2.0 tools. Several Web 2.0 toold were demonstrated and integrated during the team teaching such as Emaze, Powtoon, Popplet, Padlet, Cogongc, and many more.

In the student teacher's reflections at the end of the course, they valued the meaningful learning activities they have been experiencing in this course such as the exploratory approach, collaborative group work, discussion and team teaching.

After attending this course, I'm confident that I can vary my teaching pedagogy using Web 2.0. The experience that I gain through this course has opened my mind on how to integrate technology in different ways. (ST#2)

There are many new tools that I learn from this course… eventhough I have to explore them myself to improve my skills… I can now figure out which Web 2.0 that is suitable to be integrated in my future T&L because I've knew the advantage and disadvantages of the tools. ***(ST #8)***

At first I feel like I know nothing about Web 2.0. I've heard about Weebly before but I never used it. But in this course, I've to explore Weebly and other Web 2.0 tools and collaborate with my groupmate to come up with the WBI project. Now, I feel so passionate to integrate Web 2.0 tools such as Padlet, Powtoon, Emaze and others. (ST#15)

Importantly, during the team teaching presentation, students were able to demonstrate their ability to choose what and which Web 2.0 tools that are suitable for different teaching and learning process that is the technological pedagocical knowledge.

The team teaching increases my confident to teach, and how to manage the use of Web 2.0 in the classroom. Any challenges in using Web 2.0 during the team teaching can be solve with proper planning. So if we face the same problem in our (future) class, we know how to manage it. (ST#8)

This finding indicates that student teachers gain confident to integrate Web 2.0 their future teaching practice as they improve their technological pedagocical knowledge through involvement in meaningful learning process such as the team teaching.

Challenges for integrating Web 2.0 technology

Despite student teachers' improvement in knowledge and skills and confident to integrate Web 2.0 technology, there were several concern raised by student teachers that they felt might be constraining them from integrating the Web 2.0 in the future teaching.

All of the student teachers were mainly concern about not able to integrate Web 2.0 in their future teaching due to limited Internet and technology access at school.

> *I'm afraid I may not be able to integrate Web 2.0 in my T&L if the school has no Internet access. As we know, many schools especially rural schools has limited technology and Internet infrastructure. (ST#1)*

> *Web 2.0 tools are mostly online applications, but if there is limited Internet access at school, I wonder how I may integrate this technology in my T&L. (ST#20)*

Nonetheless, despite the concern raised, they demonstrated changes in their beliefs and confidence towards integrating Web 2.0 tools, essential for their professional development. Students are prepared with the necessary skills to overcome the challenges. They always have back-up plan (non-technology T&L approaches) to ensure that the T&L process run smoothly. These are evident during the mini teaching sessions in which students used non-web technology based teaching aids and activities such as using the whiteboard and papers.


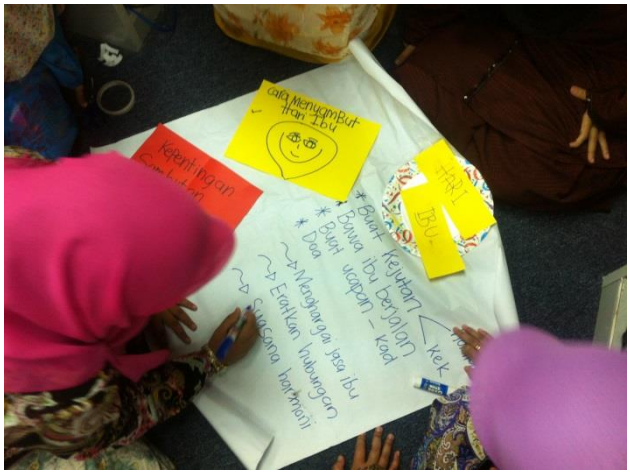

Photo 1 & 2: Student integrated non-web based technology teaching aids and activities.

6.0 DISCUSSION

The finding of this study corresponds to the theory of meaningful learning, which asserts that through engagement and participation in active learning process students may enhance their knowledge and skills. In this study, the active learning process that include exploration, team teaching, and learning by doing that students went through in this course has provide a meaningful experience for students to be able to integrate Web 2.0 technology in their future teaching practice. This is consistent with Albion (2008), who suggested that "the best way for teachers to learn about Web 2.0 may be through learning with Web 2.0 as authentic practice that can inform their planning and implementation of learning activities" (p. 21) . This finding also corroborates previous study that found teachers need guidance and experience in order to be able to integrate Web 2.0 tools into their teaching (Ajjan & Hartshorne, 2008).

The findings of this study also inlign with the constructivist conception of learning, in which the experience gained by learners through active and meaningful learning leads to knowledge construction (Jonassen, 2003), in this case the pedagocical knowledge to integrate Web 2.0 technologies. In this study, the authentic tasks to collaboratively developed WBI site that integrate Web 2.0 tools has rouse student teachers confident to facilitate their students learning using Web 2.0 technology in their future teaching. In addition, the teaching practice sessions that integrate the use of Web 2.0 technology (team teaching) was particularly important in developing

students confident in integrating technology as student teachers were able to experience conducting a lesson that integrate Web 2.0 technology and also observe what their peers did.

Importantly, the meaningful learning activities experienced by student teachers in this course such as through exploration and learning by doing has also cultivated independent learning skills. This is important as scaffolding for learner reflection and the development of generic technology integration competencies (McLoughlin & Lee, 2010).

7.0 CONCLUSION

This study indicated that the student teachers gained confidence to integrate Web 2.0 technology through the meaningful learning process. Student also acquired knowledge and skills necessary to support their technology integration practice. The SoTL project as a whole has also contributed to my understanding on how student teachers may best learn to integrate technology. Some consideration and improvement has been outlined based on the finding of this study to be implemented in the next phase of the SoTL project such as to focus on improving student's technological pedagogical content knowledge (TPCK).

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