Using Apps in Learning Computer-based Subject with Metacognitive Scaffolding through Social Networking Tool

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Abstract. There are ongoing discussions over the potential of social networking tool (SNT) to support teaching and learning through socialization. Research conducted by Lucas and Moreira (2009), found that almost all students mentioned the openness of the learning environment based on social networking tools as one of the main reasons underlying their participation and their will in sharing knowledge. Facebook is one of the popular applications among university’s students that encourage informal dialogue and knowledge sharing between themselves (Ieda et al., 2009). In learning a computer-based subject that involves technical knowledge, students really need support when facing a difficult task and when appropriate support or guidance are not provided, they may go off task, lose interest or the worst is give up completely. The guidance actually is a part of scaffolding mechanisms. Scaffolding refers to the instructions that instructors or more skilful peers offer learners to bridge the gap between their current skill level and desired level. Metacognitive scaffolding seems the best way to guide and help students to learn computer-based subject because it guides the students to think technically during the learning process. This article will discuss a research framework of using apps in learning computer-based subject with Metacognitive Scaffolding through Social Networking Tool.

Abstrak. Potensi sesebuah alat rangkaian sosial dalam membantu pengajaran dan pembelajaran sering dibincangkan pada masa kini. Kajian yang telah dilaksanakan oleh Lucas dan Moreira (2009) mendapati setiap pelajar menyatakan bahawa penyertaan dan keinginan mereka untuk berkongsi ilmu pengetahuan adalah kerana keterbukaan dalam persekitaran pembelajaran yang ditawarkan di dalam alat rangkaian sosial. Facebook merupakan salah satu aplikasi alat rangkaian sosial yang popular di kalangan pelajar di mana ia menggalakkan komunikasi tidak rasmi dan perkongsian ilmu dikalangan mereka (Ieda et al., 2009). Dalam pembelajaran berasaskan komputer yang melibatkan pengetahuan teknikal, pelajar memerlukan bimbingan apabila mereka berhadapan dengan tugas yang sukar dan sekiranya tiada bimbingan diberikan, pelajar tersebut tidak dapat melaksanakan tugas, mereka akan hilang minat dan seterusnya mungkin mereka akan terus berputus-asa. Bimbingan yang diberikan merupakan sebahagian daripada mekanisme scaffolding. Scaffolding merupakan satu set arahan yang diberikan oleh instruktur atau rakan yang mempunyai kemahiran yang lebih tinggi untuk membolehkan pelajar merapatkan jurang antara tahap kemahiran kini dengan tahap kemahiran yang diingini. Scaffolding metakognitif merupakan cara terbaik dalam membimbing dan membantu pelajar untuk mempelajari subjek berasaskan komputer kerana ia membimbing pelajar untuk berfikir secara teknikal semasa proses pembelajaran. Artikel ini akan membincangkan satu kajian rangka kerja mengenai penggunaan apps dalam pembelajaran berasaskan komputer dengan scaffolding metakognitif melalui alat rangkaian sosial.
1.0 Introduction

The emergence of Web 2.0 has taken the world into a new era in which people are highly involved in interactive and knowledge-sharing environment. Web 2.0 is often associated with collaborative, user-generated content which is often open to the world, and normally free (Santos et al., 2009). The ‘products’ or the systems/services offered by Web 2.0 varied such as wikis, blogs, podcasts, RSS feeds, social networking sites etc., whereas it triggered a more socially interactive way where everyone are able to voice out their thoughts, knowledge, comments and share it with everyone as they are freely to add or edit the information space. In addition, according to Alexander (2006), the concept of Web 2.0 itself is about the interconnectivity and interactivity offered up by the Internet to the users.

Social Networking Sites (SNSs) nowadays, have attracted millions of users of all ages around the globe. Every day, there are thousands of new accounts are created on SNSs though many have a very short lifespan (Obrist et al., 2008). Other researcher mentioned that almost every student that discussed the openness of the learning environment based on social networking tools as one of the main reasons underlying their participation and their will in sharing knowledge (Lucas and Moreira, 2009). Moreover, according to Gunawardena et. al (2009), social networking technologies present a forum for discussion and interaction. The domain represents common ground where participants share their ideas, knowledge and stories. Anderson (2008) argues that SNSs can be used effectively to expand learning beyond course-based groups. Such expansion may include a network of peers, teachers, professional experts and other communities. Brandtzaeg & Heim (2009) do agreed that SNSs are also one type of online community that relies on user contributions. This raises a question of how people contribute in online interactions and how it motivates user’s participation for continuous usage.

Learning a computer-based subject is not just about a theory, it involved technical knowledge where the students need to have the support when facing a difficult task. They might go off task, bored, lose interest and the worst is they might easily gave up if there is no one to assist them or if they did not get an appropriate guidance while learning the subject. The guidance is actually a part of scaffolding mechanisms. In education, scaffolding is known as a tools, strategies, and guidance given by the teachers, instructors, tutors or peers that have more skills in assisting the learners in learning process as such, they will offers the learners to bridge gaps between current skill to desired skill (Kao & Lehman, 1997). Other researchers also agreed that scaffolding is a critical component in facilitating students’ learning (Azevedo & Hadwin 2005).

Metacognitive scaffolding (MS) is important as it aims to help students to adequately control and monitor their learning (Azevedo et al., 2008) and the concept of metacognition itself is often defined as “thinking about your own thinking”. Researcher believes that there is a need of guidelines that can support learners in their development of metacognition. This paper will propose a research framework of using apps in learning computer-based subject with metacognitive scaffolding through social networking tools. Later the research will develops a framework of MS in learning computer-based subject through SNT and by having the framework, researcher will study on student’s learning processes through SNT that is not only based on their communications but also on thinking about their own thinking. Interpreting MS will trigger different types of students’ online interactions and this interaction represents their learning process.
2.0 Learning Computer-based Subject

Discussions among the students and the teacher or instructor really help to get in depth understanding of computer-based subject. Discussions that take place without any guidance from the expertise such as teachers are also useless and wasting in time. According to Berent and Bugbee (1993), it has been shown that when students do not receive any external feedback regarding their progress from the course instructor, they fail to initiate metacognitive processes and their basic learning achievements in the course are low. The problem will occur among the novice students who do not have basic knowledge on technical applications. This is because the technical knowledge seems too complex and scares many people from developing their technical skills (Pavlina, 2006). As a result, the students cannot solve any problem related to technical even to make the application works. Thus, guidance is really helpful especially when it comes in learning computer-based subject which acquire technical skills and knowledge.

3.0 SNT in teaching and learning

For the last two decades, at the early stage of the Internet community, people used electronic mail (e-mail) as main communication medium. Although email is used as core way of communications, other facilities were introduced, such as Instant Messaging (IM), Skype and MSN which enable users to communicate in real-time mode. However, the communications between users are enhanced when SNSs came into the picture. People do not only communicate with others, but they also organized all kinds of interactions among them (Shiu, Fong & Lam, 2010).

Facebook is informal medium of communications where users are more willing to leave messages for others. It actually motivates students to share and discuss for peer-to-peer learning. In fact, there are many interactive applications offered by Facebook whereas it allows users to send emails, post-comments, build web content and take part on live chats (Bumgardner & Knestis, 2011). According to Shiu, Fong & Lam (2010), lecturers can make appropriate use of those interactivity functions on Facebook to facilitate interactions among students and lecturers.

4.0 Metacognitive Scaffolding

In education, scaffolding includes all tools, strategies, or guidance that makes learning easier for the students (Azevedo & Hadwin, 2005). It refers to the idea that specialized instructional supports need to be in place in order to best facilitate learning when students are first introduce to a new subject. There are four types of scaffolding that support learning: procedural, conceptual, strategic and metacognitive scaffolding (Hill & Hannifin, 2001). Procedural scaffolding assists on how to use the resource, so it focuses on using specific functions, procedures or navigations. Conceptual scaffolding assists in focusing thinking, prioritizing information, making connections between concepts or in simplifying complex concepts. It supplies a conceptual model or different
representations of a concept. Strategic scaffolding assists learners by directly or indirectly suggesting approaches, strategies or pathways to achieve in learning while the metacognitive scaffolding assists the learner to reflect on what they have learnt (self-assess), or reflect on how they are learning (awareness of processes). It may be in the form of a simple prompt to think about the goal or problem, or it may be more sophisticated guidance for organising or assessing knowledge.

Among those four types of scaffolding, metacognitive scaffolding seems to be the best way to assist students in learning computer-based subject. It guides the students to think technically during the learning process. According to Azevedo (2005), scaffolding students’ self regulated learning and metacognition in a computer-based learning environment can motivate students to learn the challenging tasks. Reingold, Rimor and Kalay (2008) described the metacognitive scaffolds provided by the instructor such as; presenting rationale for the task, fostering the integration across various course readings and course objective, differentiating between conclusions, facts and opinions, are the focal point of learning process and encourage interactions among the participants. As a result from their present study, they had found out that metacognitive scaffolds encouraged the students to reflect on the task given and at the same time contributed to their experience as a community of learners with a common task.

Furthermore, Charles (1999) has stated that metacognitive scaffolding supports the learning process by guiding the students and give ways to solve problems under possible strategies and framing the problem. This type of scaffolding suggesting students to plan ahead, evaluate progress and determine their needs. Moreover, metacognitive scaffolding might also remind the students to reflect on the goal in order to manipulate the problem in a hand. By using metacognitive scaffolding in learning process, it hopefully will help the novice students to learn in a better environment and with a good guidance by the expert. Topcu and Ubuz (2008) argued, for students to produce efficient participation and deeper levels of thought in online discussions, metacognitive strategies that regulate self-awareness, self-control, self-monitoring are necessary.

In this situation, the guidance given by the experts among the students or the lecturers themselves is actually reflected the zone of proximal development (ZPD) that also introduced by Vygotsky (1978). He also considered that students are ready to learn when they can be assisted through the dialogues with experts or knowledgeable person. He stated that students’ achievements are not based only on their current level skills but also the students’ potential development. In other words, the actual level of development of the students actually already developed but the student’s development in the future is developed with assistance. Thus the zone proximal development is the distance between what students can do with and without help. The term proximal (nearby) indicates that the assistance provided goes just slightly beyond the learners’ current competence complementing and building on their existing abilities (Cole & Cole, 2001). Figure 1.1 shows Zone of Proximal Development by Vygotsky.
5.0 Using Apps in Learning

Apple launched iPad on January 27, 2010 and it has drawn pretty much attention among users of all ages all around the globe. Apple iPad tablet is lighter and thinner than laptop and heavier than smartphones. Basically the size falls between the smartphones and laptop (Chang, 2011). This may be one of the factors that attract users to have this gadget. Other than that, iPad have longer battery life than most laptops and the battery usually last for more than 10 hours. Applications design for this tablet is known as “apps”. These include education applications designed for educational purposes. The apps for education often incorporate audio, video, animations and illustrations to make learning as fun and exciting.

Till today, only few researchers that discussed in integrating iPad in teaching and learning. An article wrote by Johnson (2011) mentioned that iPad will be the tool that transforms classroom practice. He mentioned iPad has a number of unique features that provide interesting possibilities in teaching & learning. A research study done by Pepperdine University towards the effectiveness of the iPad as a learning tool among students has shown that the iPad has the capacity to be a communication, productivity, and gaming device all in one convenient, mobile platform. Similar to mobile devices and smartphones, iPad has wide range of apps diverse from Games, Entertainments, Music, iBook and of course, Education. The mobility features provided by iPad allows learners to learn inside and outside the classroom and iPad’s wireless connection enable learners to have an access to the Internet whenever and wherever they want. So this will create learning environment that truly based on information on demand. In fact, learners can Google for clues, insights and information regarding their studies.

**Figure 1.1: Zone of Proximal Development by Vygotsky**

<table>
<thead>
<tr>
<th>What students can do by themselves</th>
<th>ZPD</th>
<th>What students can do with guidance from adults or more capable peers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spontaneous</td>
<td></td>
<td>Scientific Concept</td>
</tr>
</tbody>
</table>
Research Framework

This research will use a qualitative research design, which is adoption of Yin (1993) multiple-case study design. Figure 1.2 shows the overall process of this research.

Overall, this research will involve three phases as followings:

Phase 1: Define & Design

In this phase, previous research findings on the use of metacognitive scaffolding through Facebook between students and lecturers will be used as benchmark theory (pre-assumption) of this study. The mechanisms of metacognitive scaffolding suggested by Reingold, Rimor and Kalay (2008) which are Presenting rational for task and activities, Presenting a relationship between reading items, course objectives and tasks, Supporting Reflective Learning, Discriminating between conclusion, fact, opinion and hypothesis, Supervising text comprehension, Focussing on the process of learning and Encourage relationship among participants will be use in this study. This research plan to select 3 cases of study and each case will consist of 5 – 10 university students who register Authoring System subject. Two case studies will be conducted concurrently in one semester and the 3rd case study will be conducted in the following semester. If the research findings still did not saturate, the fourth case study and so on will be conducted.

Phase 2: Prepare, Collect, and Analyze

In this phase, the 1st Case study will be conducted independently together with the 2nd Case study. Every student in the case study group will be given an iPad to be used within the study duration approximately about 8 weeks. To assist the learning process, several iPad Apps will be developed for learning the Authoring System subject.

Technological collaborative scaffolding process that will be used in this research, whereas in phase 0 (Problem Statement) is the facilitator gives all the groups an activity to carry out, for instance a problem to solve, an iPad Apps to explore, a question to investigate and others. The task representation appears on every student's screen, and each student is asked to work individually on the job. Then, in phase 1 (Individual Response), each student is asked to work individually on the assigned job. Once the three group members submit their individual answers, the scaffolding starts in Phase 2a (Collective Decision) for that particular group. Each student in the group may select one of the answers that he or she believes better responds to the task. The three students in the groups must agree on the answer. If they disagree, the scaffolding does not allow them to proceed. If the students agree that none of the available options is an adequate answer, they will start Phase 2b (New Proposal) where they construct a new joint proposal. Considering that up to now students do not know if what they have done is adequate or correct, Phase 3 (Teacher Guided Classroom Mediation) starts whereby the teacher's task is more than coaching the answering process; it is giving the appropriate
guidance to achieve the students’ understanding (Nussbaum et al., 2008). Figure 1.2 shows a model of Technological Collaborative Scaffolding among teachers and students.

![Technological Collaborative Scaffolding Diagram](image)

**Figure 1.2:** Technological Collaborative Scaffolding (Nussbaum et al., 2008)

Through the technological collaborative scaffolding process, lecturer as a facilitator will use different mechanism metacognitive scaffolding as proposed by Reingold, Rimor and Kalay (2008) to trigger the online discussion through Facebook. Later students’ type of online interaction based on McKinnon will be identified through Facebook discussions. The coding outlines a scheme that encourages students to develop more analytical, critical & reflective argumentation patterns as they participate in substantive electronic discussion (McKinnon, 2000).

In learning the topics in Authoring System, the facilitator will follow the following process:

- Create a group in the Social Networking Site
- Students will use iPad Apps 1
  - Build and post Topic 1 in SN
- Students will use iPad Apps 2
  - Build and post Topic 2

8 weeks
Phase 3: Analyze & Conclude

In this phase, findings from case study 1 will be compared with findings from case study 2 to draw cross-case conclusions and reports. If required, the pre-assumption in Phase 1 will be modified. Findings from the third case study will be cross-case with findings from the 2 previous case studies. A cross-case conclusion and report will be produced and the pre-assumption will be modified if needed.

For identifying, how the metacognitive scaffolding helps students’ in learning, thematic analysis will be used based on qualitative data gathered from every student. Besides that, the types of online interactions that show by the students will be analyzed based on McKinnons and its coding technique.
6.0 Discussion and Conclusion

A research framework of using apps in learning computer-based subject with Metacognitive Scaffolding through Social Networking Tool will be develop at the end of this study. Moreover, researcher will look onto different types of online interactions among students when metacognitive scaffolding is infused through social networking tools that is upon creation of group page in Facebook. Researcher will once again study on student’s learning processes through SNT that is not just based on their communications but also on thinking about their own thinking. It is expected that interpreting metacognitive scaffolding will trigger different types of students’ online interactions and this interaction represents their learning process.
7.0 References


Reingold, R., Rimor, R., & Kalay, (2008). An Instructors’s Scaffolding in Support of Student’s Metacognition through a Teacher Education Online Course – A Case Study. *Journal of Interactive Online Learning*. 7(2) 139-151.


