A CONCEPTUAL MODEL OF UBIQUITOUS LANGUAGE LEARNING ENVIRONMENT (ULLE)

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ABSTRACT. Ubiquitous learning is a popular option amongst students and educators. The landscape of learning environments, however, has become blurry with the fusion of technology. Recent developments in ubiquitous technologies provide new learning paradigms for learning, which goes far beyond the traditional learning paradigms. This paper proposes a conceptual model for Ubiquitous Language Learning Environment (ULLE). It begins by briefly describing the definition and comparison of characteristics in ubiquitous learning followed by proposing the conceptual model of ULLE. ULLE is an integrated learning environment that combines technical, physical, informational and social settings. ULLE ensures more effective and efficient integration amongst school, home and surrounding environment. The essential elements of this model are the integration and coordination of language school, home and other places where learning can take place anywhere and anytime. The type of interaction in ULLE consists of three main subjects such as the people, the objects in the real world and the artifacts in virtual space. With the implementation of ULLE, anyone could benefit the access to the right language learning knowledge anywhere and anytime using any device at their own convenience.

Keywords: ubiquitous computing, ubiquitous learning environment, language learning

INTRODUCTION

Ubiquitous computing refers to a technology that can be used in anytime and at anywhere. The information in ubiquitous computing can be accessed by anyone through of some specific devices. Ubiquitous computing is a term introduced by Mark Weiser (1991), who described that the most profound technologies are those that cannot be seen and used by people continuously in their daily life to finish everyday tasks including in the working, education, medication and other that related to the technology. In an academic environment, ubiquitous computing can be considered as a new trend that can be applied by the educators and learners to accommodate the learning by employing ubiquitous technologies and devices in the classroom (Marinagi, Skourlas & Belsis, 2013).

Ubiquitous learning is supported by ubiquitous computing, where evolution has recently been accelerated by open networks, improved wireless telecommunications capabilities, improved battery technology, continuous increase in computing power, and the emergence of

flexible software architectures (Ogata & Yano, 2005). In this cyber world, ubiquitous computing facilitates people's life in terms of reducing the complexity of using the devices.

This paper presents a conceptual model of the ubiquitous language learning environment (ULLE). It begins by exploring the definition and describes the comparison of the characteristics in ubiquitous learning. Finally, this paper proposed the conceptual model of ULLE and the types of interaction in the ULLE. The next section of this paper will organized as follows. After a review on ubiquitous computing in section I, section II will discuss the background of studies, section III discuss literature background that consists of the definition and comparison of the characteristics in ubiquitous learning and also describe a brief overview of the ubiquitous learning environment. Section IV addressed a conceptual model of ULLE and the types of interaction that involves in ULLE. The last section will be some conclusions and directions of future work.

BACKGROUND OF STUDY

Ubiquitous learning environment focuses on the mission of the learning itself. Technology is the medium that ubiquitous learning depended on. Ubiquitous learning environments accommodate learners to retrieve the knowledge. A ubiquitous learning environment is integrated learning environment, which integrates many levels of learning paradigms, information and technology. According to Zhan & Yuan (2009), ubiquitous learning is depending on ubiquitous computing technology to convey the information to anyone in anytime and anywhere. In addition, Zhao, Wan & Okamoto (2010) shows that ubiquitous learning environment becomes important in education whereby information that can be assessed anywhere is compulsory in the education environment. In addition, good language learning should interact with others in order to mastery the languages (Ku & Chang, 2012).

To address this benefit in academic language learning environment, a research has been conducted in order to create a new platform of learning environment in a selected language school in Malaysia. The research aim is to model a ubiquitous learning environment that focusing on language learning. The research as reported in this paper intended to explore the dimension of ubiquitous language learning environment, and to propose a conceptual model of the type interaction in ubiquitous language learning environment.

LITERATURE BACKGROUND

Definition of ubiquitous learning

Ubiquitous learning is a new learning paradigm after the existence of e-learning and blended learning. Basically, the definitions of ubiquitous learning have been discussed in many literatures. Yang et al. (2008) defined the term ubiquitous learning by relying on ubiquitous computing technologies. However, the definition has been argued by Hwang, Tsai & Yang (2008) whereby ubiquitous learning that relying on ubiquitous computing is more appropriate for mobile learning. The researcher introduced the new definition whereby the term of context aware more appropriate for ubiquitous learning. On the other hand, according to Zhan & Yuan (2009), ubiquitous learning is a new learning paradigm that learners can learn anything, anytime and at anyplace by utilizing ubiquitous computing technologies. Furthermore, as classified by Hwang (2006), there is no clearly description of ubiquitous learning because of learning environment change quickly over the time. The assumption that can be made is many researchers have different views in defining the definition of ubiquitous learning. Therefore, the ubiquitous learning definition needs to be clarified before applying the terms into the research to avoid any misconception. In this research, the definition of ubiqui-

tous learning is the knowledge of language learning can be accessible in anytime and anywhere by anyone.

Characteristics of ubiquitous learning

Based on handheld computing, there have three characteristics of ubiquitous learning that can be identified. The characteristics are permanency, accessibility and immediacy (Curtis et al, 2002). However, the characteristics that introduced by them have been acknowledged by other researchers in their study (Ogata, 2004; Ogata & Yano, 2004; Bomsdorf, 2005). Furthermore, Ogata & Yano (2004) have expanded the characteristics of ubiquitous learning that been introduced by Curtis by proposing the new characteristics within the embedded computing environments by considering the learner mobility. The new additional characteristics are interactivity and situating of instructional activities. Therefore, Bomsdorf (2005) have again expanded the characteristics by proposing additionally characteristic that considering the function that the learners get the right knowledge at anywhere and anytime with their own convenience. The new characteristic is adaptability.

In previous research, Hwang, Tsai & Yang (2008) found that the characteristics of ubiquitous learning should focus more on context awareness and adaptation using mobile technologies. The characteristics must focus in context aware in ubiquitous learning such as the awareness of learner context. The context aware characteristics also have been supported by Chiu et al. (2008) when they proposed context awareness as part of the characteristics in ubiquitous learning. Finally, Yahya, Ahmad & Jalil (2010) proposed new characteristics of ubiquitous learning from the combination of the reference to another researcher's ideas. They found out that there have five major characteristics that consider the best to represent the ubiquitous learning. The characteristics are permanency, accessibility, immediacy, interactivity and context awareness. In an analysis that have been made, characteristics that been proposed by them is more comprehensive. In developing a model of the ubiquitous language learning environment (ULLE), the characteristics below will be a part of the conceptual models that focusing on language learning:

- Permanency: The information always remains there unless it is purposely deleted.
- Accessibility: The knowledge always provides anytime learners need it.
- Immediacy: Learners can get the knowledge immediately in anywhere.
- Interactivity: Learners can interact with experts, teachers and peers effectively and efficiently using technologies.
- Context awareness: The real world environment provides the seamless learning in the right way, right time and at the right place.

RESULT & DISCUSSION

A conceptual model of ubiquitous language learning environment (ULLE)

Based on literature background, the conceptual model for ubiquitous language learning known as ULLE model has been proposed. However, before formulating the model, it begins by exploring the definition and characteristics of the ubiquitous learning. As shown in figure 1, ULLE is an integrated learning environment, which is integrated from multi-dimensions such as technical, physical, informational and social settings (Zhan & Yuan, 2009). In ULLE, the integration and coordination among school, outside and home will be more effective and efficient. The four elements of this model are the integration and coordination of Academic Language Studies, home and other places among learner and educator. In this model, the learner and educator will communicate, collaborate and coordinate for educational efficiency and quality (Junqi, Yumei & Zhibin, 2010). Li et al. (2005) identified that ubiquitous learning

environment will become necessary in the future whereby it is offering easy access and use (see Figure 1).

In ULLE, anyone is able to access the right language learning knowledge at anywhere and anytime using any device with their own convenience. For example, educator can use a computer that has been provided in classroom to assign a new task or find more materials for language learning or otherwise using a mobile phone to assign homework and communicate with their students (AiHua, 2010). In ULLE, educators also can reach a better teaching experience (Joo & Kim, 2009). Meanwhile, a learner in a park may use their mobile phone to access language learning knowledge. Even not in the classroom, learners can browse their language learning to learn faster with anytime and anywhere using any device.

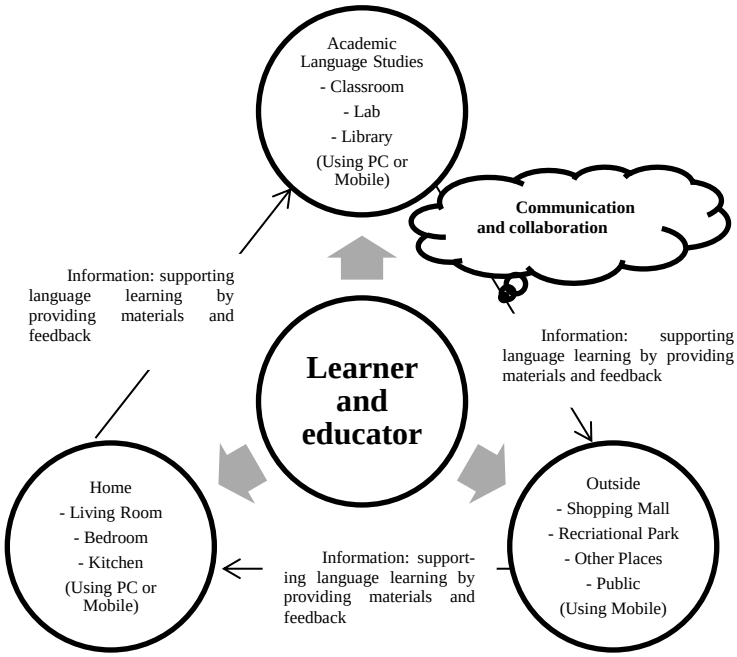

Figure 1. A Conceptual Model of Ubiquitous Language Learning Environment (ULLE)

Interaction in Ubiquitous Language Learning Environment (ULLE)

Ubiquitous language learning environment (ULLE) covers the communication and interaction between the real world and virtual world and at the same time can coordinate the existence of personal space and cyberspace. The integration between these two types of spaces allows the educator and learner to acquire language learning resources in a suitable ways. In ULLE conceptual model, there are three types of communication subjects that have been identified as shown in figure 3. The subjects are people, objects in the real world and artifacts in virtual worlds (Junqi, Yumei & Zhibin, 2010). Objects in real world consists from multiple types of devices and technical tools meanwhile artifacts in virtual world is information about language learning knowledge which is processed digitally and then transmitted and shared in a variety of learning information devices in the digital ways, such as images, text information,

video clips and so on. There are six kinds of interaction that successfully been identified, such as interaction among people, interaction between people and object, interaction between people and artifact, interaction between object, interaction between object and artifact and interaction among artifact (Li et al., 2005). Although the rapid changes in information technology can effectively support language learning in a ubiquitous learning environment, appropriate learning strategies and approaches can further enhance learning performance of Academic Language Studies. For example, interaction and communication between educator and learner are key elements in language learning. In ULLE, it consists of the three subsystems for supporting ubiquitous language learning such as sentences, expressions and vocabulary (Ogata & Yano, 2005). However, the most important elements that must have in the ULLE are the characteristics of the ubiquitous learning itself that consist of five. There are permanency, accessibility, immediacy, interactivity and context awareness (Yahya, Ahmad & Jalil, 2010).

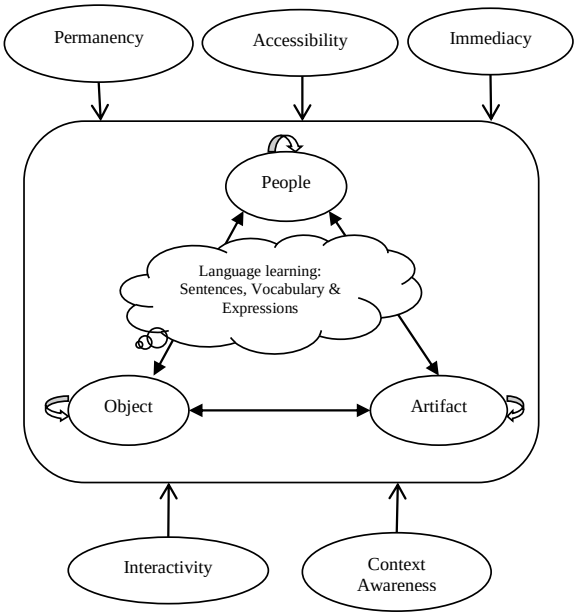

Figure 2. Type of Interaction in Ubiquitous Language Learning Environment (ULLE)

Themes

The key informant interview method was used as it represented as qualitative in-depth interviews to collect information from lecturers in Academic Language Studies that teach multiple types of languages. Two main themes emerged in this study and it is verifying the proposed conceptual model and types of interaction in ULLE. The themes are environment and interaction. As the two are the main themes so each of the themes has another subthemes in order to verify the conceptual model. Pseudonyms are used in the each quotation to maintain key informant's confidentiality. Since this research study is still in progress, only two main themes without the subthemes are discussed in this paper.

Themes 1: Environment

The first theme concerns in verifying the conceptual model of the ULLE. In ULLE, portable computer technology including mobile devices such as smartphones is essential elements by enabling learners using a variety of digital resources from anywhere in the world and in anytime. This opinion is being agreed by the all of the key informant in language learning. As

key informant 5 quote below, ubiquitous learning technology enabling learners to get information at anywhere and in anytime.

> *"I agree with the concept. Which means it's easy for students to find the information regarding the language learning faster using the technology. A long time ago to search for information we need to go to the library, meaning that it must be a place to find information by reading books, magazines or whatever written materials but with the advent of ubiquitous technology it is much easier for them to obtain infor mation other than information that been given in the classroom. Instead getting in formation in the class, for example, in midnight they also easy to get information by using ubiquitous technology."*
>
> (Key Informant 5)

Key informant 3 agreed that the ubiquitous learning environment will bring a benefit to the learners in learning the language. She also mentioned that the ubiquitous technology also can be applied in education especially in language learning.

> *"With the advent of smartphones or apps students can play with these gadgets any where they are. Students are exposed to JavaScript or games. So for example, they were at the bus stop or at anywhere and the students can play with their phones, it has no constraints and why we can't even do the same for learning. This technology is helping students. They may want to subscribe to language learning in anywhere."*
>
> (Key Informant 3)

Themes 2: Interaction

The second theme concerns in verifying the types of interaction in ULLE. In ULLE, the learners could communicate with the experts, peers or materials fast and effective in the form of synchronous and asynchronous communication. The integration of this ULLE into academic learning will further enhance interaction and communication between educators and learners. The key informant gives almost the same answer whereby ULLE can be a tool that so helpful for both of the students and also the educators.

> *"I agree so much, with the new model that more accurate it will help students and lecturers indirectly."*
>
> (Key Informant 3)

> *"Ermmm, in a way yes because as you can see in the classroom settings when you have 30 students in the class not everybody are willing to talk especially the quiet ones."*
>
> (Key Informant 4)

Somehow, key informant 1 quote below, she give some weaknesses in ubiquitous learning in terms of speaking and also translation that needs to improve whereby communication in verbal types is much important and more needed for succeeding in language learning.

> *"Yes, yes, I agree also except in language learning they might not be interactive in terms of speaking (you know) because when you use ubiquitous technology, or when you are having some form of communication is usually writing, like submission of writing, submission of reports, not so much on speaking, that is my reservation. When you talk about speaking it's about, you don't talk about chatting. In terms of lan guage, when you talk about language, there are four skills that they should enhance, reading, writing, listening, speaking. All these three are alright, but speaking may*

face some problems because we do not interact verbally, you know face to face. other than that , in terms of writing, yes, I think the interaction is good especially when you mentioned all those teachers, materials. In terms of that speaking part is lacking. If you talking about integrative communication, speaking may be a problem and I think that is also the (what you call that) ermm the set back in language learning because we don't have enough speaking opportunities on ubiquitous learning platform."

(Key Informant 1)

According to the interview, most of the key informants agreed that in ULLE, portable computer technology including mobile devices such as smartphones is essential elements by enabling learners using a variety of digital resources from anywhere in the world and in any-time. If ULLE implemented in the faculty, it will enhance the efficiency of the learners to learn because there is no limitation for learning. For the communication and interaction in ULLE, the integration of the model into academic learning will further enhance interaction and communication between educators and learners. However, verbal communication is still needed in language learning and it has been agreed by most of the key informant.

CONCLUSION

The ubiquitous learning environment will become a trend in future learning paradigm. It offers easy approach for learners to access learning system using any device at anytime and from everywhere at their own convenience. This paper proposed a conceptual model of ULLE, and discussed the definitions and characteristics that are required in ULLE and provide a design model for the types of interaction essential in ULLE. Further investigations of the ubiquitous learning environment with a possible focus to contents of language learning and technologies in ubiquitous learning environment are suggested, which could further enhance the operational part of the model.

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REFERENCES

AiHua, Z. (2010, July). Study of ubiquitous learning environment based on ubiquitous computing. *Proceedings of 3rd IEEE International Conference on Ubi-Media Computing (U-Media)*, 136-138.

Bomsdorf, B. (2005). Adaptation of learning spaces: supporting ubiquitous learning in higher distance education. *Proceedings of Mobile Computing and Ambient Intelligence*.

Casey, D. (2005). u-Learning= e-Learning+ m-Learning. *Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education*, 2005(1), 2864-2871.

Chiu, P. S., Kuo, Y. H., Huang, Y. M., & Chen, T. S. (2008, July). A meaningful learning based u-learning evaluation model. *Proceedings of Eighth IEEE International Conference on Advanced Learning Technologies*, 77-81.

Curtis, M., Luchini, K., Bobrowsky, W., Quintana, C., & Soloway, E. (2002). Handheld use in K-12: A descriptive account. *IEEE International Workshop on Wireless and Mobile Technologies in Education Proceedings*, 23-30.

Hwang, G. J. (2006, June). Criteria and strategies of ubiquitous learning. *Proceedings of IEEE International Conference on Sensor Networks, Ubiquitous, and Trustworthy Computing*, 2, 72-77.

Hwang, G. J., Tsai, C. C., & Yang, S. J. (2008). Criteria, Strategies and Research Issues of Context-Aware Ubiquitous Learning. *Educational Technology & Society*, 11(2), 81-91.

Joo, K. H., & Kim, S. H. (2009). Development and application of an efficient ubiquitous teaching and learning model. Proceedings of 11th International Conference on Advanced Communication Technology, 3, 2165-2168.

Junqi, W., Yumei, L., &Zhibin, L. (2010, March). Study of Instructional Design in Ubiquitous Learning. *Proceedings of Second International Workshop on Education Technology and Computer Science (ETCS)*, 3, 518-523.

Ku, D. T., & Chang, C. C. (2012). Development of Context Awareness Learning System for Elementary Chinese Language Learning. *Proceedings of Sixth International Conference on Genetic and Evolutionary Computing (ICGEC)*, 538-541.

Li, L., Zheng, Y., Ogata, H., & Yano, Y. (2005, February). A conceptual framework of computer-supported ubiquitous learning environment. *In Proc. of the IASTED International Conference WEB-BASED EDUCATION*, 243-248.

Marinagi, C., Skourlas, C., &Belsis, P. (2013). Employing Ubiquitous Computing Devices and Technologies in the Higher Education Classroom of the Future. Procedia-Social and Behavioral Sciences, 73, 487-494.

Ogata, H., & Yano, Y. (2004). Knowledge awareness map for computer-supported ubiquitous language-learning. *Proceedings of the 2nd IEEE International Workshop on Wireless and Mobile Technologies in Education*,19-26.

Ogata, H., & Yano, Y. (2004). Context-aware support for computer-supported ubiquitous learning. *Proceedings of the 2nd IEEE International Workshop on Wireless and Mobile Technologies in Education*, 27-34.

Ogata, H., & Yano, Y. (2005). How ubiquitous computing can support language learning. *Proceedings of KEST*, 1-6.

Yahya, S., Ahmad, E. A., Jalil, K. A., & Mara, U. T. (2010). The definition and characteristics of ubiquitous learning: A discussion. *International Journal of Education and Development using Information and Communication Technology (IJEDICT)*.

Yang, T. C., Kuo, F. R., Hwang, G. J., & Chu, H. C. (2008, June). A Computer-Assisted Approach for Designing Context-Aware Ubiquitous Learning Activities. *Proceedings of IEEE International Conference on Sensor Networks, Ubiquitous and Trustworthy Computing*, 524-530.

Weiser, M. (1991). The computer for the 21st century. *Scientific American*,265(3), 94-104.

Zhan, Q., & Yuan, M. (2009, May). The Design of a Ubiquitous Learning Environment from the Holistic View. *Proceedings of International Conference on Networking and Digital Society*, 1, 53-56.