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Modeling Ubiquitous Language Learning Environment

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Abstract: Various studies have investigated ubiquitous learning towards multiple aspects. Most of these researches mainly focus on the study of ubiquitous learning environment. Only little effort has touched on the configuration and elements of ubiquitous learning that focusing on language learning. Hence, this research was performed to describe and compare characteristics in ubiquitous learning followed by proposing the conceptual model for Ubiquitous Language Learning Environment (ULLE). The research performed literature analysis to ULLE and then qualitative data collection was conducted to 5 key informants to obtain data using semi structured interview to verify the usefulness of ULLE. The result showed that technology usage is vital within learners and educators in language learning. Therefore, it is important to have a medium that can be used to improve language learning process to be more effective and interactive. The results also suggested that the readiness of the infrastructure is the most important part to take a look for before implementing new technology into academic learning. The integration of the model into academic learning will further enhance interaction and communication between educators and learners. With the usage of ULLE into academic learning, it will increase vocabulary acquisition, sentences and expressions of the learners. The result will also become a reference point to assist development of ubiquitous language learning applications.

Key words: Ubiquitous computing, ubiquitous learning environment, language learning, ubiquitous learning, U-learning, assist

INTRODUCTION

A ubiquitous learning environment is integrated learning environment which integrates many levels of learning paradigms, information and technology. Ubiquitous learning is depending on ubiquitous computing technology to convey the information to anyone in anytime and at anywhere (Zhan and Yuan, 2009). Using the ubiquitous learning environment, anyone that consists of learners, educators and parents will have more efficient and effective medium of technology in the new learning environment (Junqi *et al*., 2010). Furthermore, ubiquitous learning environment becomes important in education whereby information that can be assessed anywhere have been a compulsory in the education environment (Zhao *et al*., 2010).

Communication and interaction are key elements to success in language learning. Thus, we need to allow students to be in an interactive and effective environment that is useful for language learning. Nevertheless, this kind of new environment is difficult to implement without having a proper technology to obtain language learning information. Hence with the rapid changes in ubiquitous computing technology, the process of language learning becomes easier. This is happening when the technology allows the process of knowledge sharing to happen efficiently and effectively in anytime and at anywhere. For instance, by using wireless communication technologies, a student that is equipped with a mobile device can connect to other mobile devices and access the network.

Various studies have investigated ubiquitous learning towards the learning content management, mobility, technology, user interface and language learning for academic purpose. Most of these researches mainly focus on the study of ubiquitous learning environment. However, only little effort has touched on the configuration and elements of ubiquitous learning that focusing on language learning. As the trends go by the technology has emerged in the student's life and it is important criteria that need to be focused on. Therefore, the research is carried out in academic language studies to address the benefit of ubiquitous learning environment that focusing on language learning. Thus, this study creates a better platform of identifying the elements that

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needed for ubiquitous learning environment that focusing on language learning. Hence, this research was performed to propose a conceptual model for Ubiquitous Language Learning Environment (ULLE). It begins with description and definition of ubiquitous learning and then 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. On technology perspectives, ULLE integrating multiple types of ubiquitous devices that using wireless communication as a tool. 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.

Literature review

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. In the past research has defined the term ubiquitous learning by relying on ubiquitous computing technologies (Yang *et al*., 2008). However, the definition has been argued by Hwang *et al*. (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, ubiquitous learning is a new learning paradigm that learners can learn anything, anytime and at anyplace by utilizing ubiquitous computing technologies (Zhan and Yuan, 2009). 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 ubiquitous learning is the knowledge of language learning can be accessible in anytime and anywhere by anyone (Zolkefley *et al*., 2015).

Evolution of ubiquitous learning: The revolution of technology has lead to convergence of handheld devices to gradually become individual knowledge sources. Inevitably, ubiquitous learning has become an important learning channel that would fit the living style of today's learners. The landscape of the learning environment has become blurry with the fusion of technology. Recent developments in mobile and ubiquitous technologies provide new learning environments for language learning which goes far beyond the traditional learning paradigms such as classroom teaching. Previous literature has raised several issues in the implementation of ubiquitous learning. It includes issues on learning content management, mobility and context, technologies, user interface and language learning (Su *et al*., 2008; Chin and Chen, 2013; Xu and Hu, 2008; Fallahkhair *et al*., 2005; Ogata and Yano, 2004a, b; Liu, 2009).

MATERIALS AND METHODS

The research adopts interpretive research approach to derive what are acceptable forms of environment, interaction and technology in ULLE through the voices of the key informant. Qualitative data collection was conducted involving the employment of 5 key informants among language experts using semi-structured interview technique. Each key informant was engaged in semi-structured interviews separately to allow them to give their own ideas during the interview in order to discover richer and better context in the data.

The data were then analyzed using thematic analysis which provides an opportunity for the researcher to code and categorize the data into themes. For example, how technologies influence key informant perceptions towards the ULLE. By using thematic analysis, the whole process of the data can be classified and displayed according to the data differences and similarities. In order to classify and display the data, the process must begin step by step from data familiarisation until report writing. Nvivo was used to assist the research to make data familiarisation, initial coding, theme identification, reviewing themes, defining and naming themes and report writing.

RESULTS AND DISCUSSION

Characteristics of ubiquitous learning: Previous research has identified the characteristic of conceptual models that focusing on language learning (Zolkefley *et al*., 2015). The characteristics are:

- Permanency, the information always remains there unless it is purposely deleted

Table 1: Comparison of ubiquitous learning characteristics

Characteristics	Curtis *et al.* (2002)	Chen *et al.* (2002)	Ogata and Yano (2004a, b)	Bomsdorf (2005)	Hwang *et al.* (2008)	Chiu *et al.* (2008)	Yahya *et al.* (2010)
Permanency	•	-	•	•	-	-	•
Accessibility	•	-	•	•	-	-	•
Immediacy	•	-	•	•	-	-	•
Urgency of learning needs	-	•	-	-	-	•	-
Initiative of knowledge acquisition	-	•	-	-	-	•	-
Mobility of learning setting	-	•	-	-	-	-	-
Interactivity of learning process	-	•	•	•	-	•	•
Situating of instructional activity	-	•	•	•	-	•	-
Integration of instructional content	-	•	-	-	-	-	-
Adaptability	-	-	-	•	•	•	-
Context awareness	-	-	-	-	•	•	•
Actively provides personalization	-	-	-	-	•	•	-
Learning community	-	-	-	-	-	•	-
Seamless learning	-	-	-	-	-	•	-

- 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

In addition, based on several characteristics from several researchers, a comparison of ubiquitous learning characteristics is given in Table 1.

A conceptual Model of Ubiquitous Language Learning Environment (ULLE): Based on literature analysis that was done to explore the definition and characteristics of the ubiquitous learning, a conceptual model for Ubiquitous Language Learning known as ULLE Model has been proposed. Detail result of this conceptual model can be found by Zolkefley *et al.* (2015). As shown in Fig. 1, ULLE is an integrated learning environment which is integrated from multi-dimensions such as technical, physical, informational and social settings (Zhan and 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 *et al.*, 2010). Ubiquitous learning environment will become necessary in the future whereby it is offering easy access and use (Chiou and Tseng, 2012) (Fig. 1).

Interaction in Ubiquitous Language Learning Environment (ULLE): In ULLE conceptual model, there are three types of communication subjects that have been identified as shown in Fig. 2. There are 5 most important

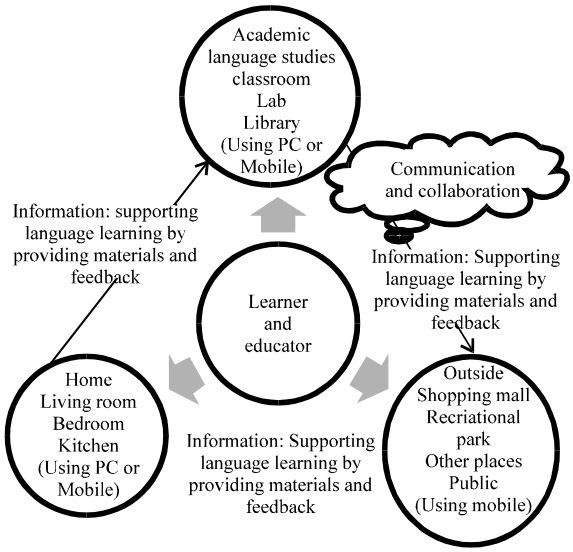

Fig. 1: A Conceptual Model of Ubiquitous Language Learning Environment (ULLE) (Zolkefley *et al.*, 2015)

elements in ULLE are the characteristics of the ubiquitous learning. They are permanency, accessibility, immediacy, interactivity and context awareness (Fig. 2). Detail description of these interaction elements can be found in our previous research (Zolkefley *et al.*, 2015).

Ubiquitous Technologies Devices in Ubiquitous Language Learning Environment (ULLE): In the educational environment nowadays, educators and learners can take the benefit of the new trends in ubiquitous computing by employing ubiquitous devices and technologies in the learning environment. ULLE act as a platform of the new learning paradigm that offering varied types of technology and become an important channel to the learning environment. ULLE also shared the same characteristics as mobile learning environment (Chin and Chen, 2013). The characteristics that have been

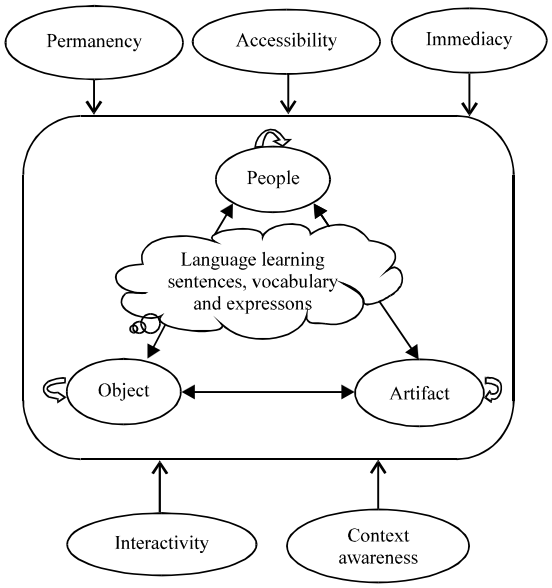

Fig. 2: Type of Interaction in Ubiquitous Language Learning Environment (ULLE) (Zolkefley *et al*., 2015)

shared is permanency, accessibility, interactivity and immediacy. However, ULLE has additional characteristic which is context awareness. In context awareness, ULLE can sense the learners personal, environment situations and locations and understand the learner's environment through the database (Ogata and Yano, 2004a, b). In order to fulfill the requirements, ULLE integrates mobile devices and embedded computer devices using several types of network connections. ULLE is supported by mobile devices such as smartphones and PDAs. These varying types of devices that supported ULLE connect to the internet using multiple network connections such WiFi, Wireless Local Area Network (WLAN), Bluetooth and Near Field Communication (NFC). ULLE also supported by embedded computer devices such as GPS and radio RFID.

Thematic analysis: 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. Three main themes emerged in this study and it is verifying the proposed conceptual model and the types of interaction in ULLE. The themes are environment, interaction and technology. As the three are the main themes so each of the themes has other subtheme in order to verify the conceptual model. Pseudonyms are used in the each quotation to maintain key informant's confidentiality.

Theme 1; environment: The first theme concerned with verifying the conceptual model of the ULLE. It consists of 4 subthemes (Table 2-4). 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. 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, anytime in the world.

Theme 2: Interaction: The second theme is about verifying the types of interaction in ULLE. It consists 6 subthemes (Table 3). The integration of this ULLE into academic learning will further enhance interaction and communication between educators and learners. However, verbal communication is still needed in language learning, especially for the translation part and it has been agreed by most of the key informant. According to the data analysis below, the major types of devices that have been identified as the popular devices being used by the learners is the smartphones that offer the permanency, accessibility, immediacy and interactivity characteristics. All of key informant agreed that with the usage of the new technology, including smartphones will increase vocabulary acquisition, sentences and expressions of the learners. From the findings, they also agreed that sensor technology based on context awareness would accommodate both of educators and learners as long as their position is still relevant and are not obsolete.

Theme 3; technology: The third theme is to verify the multiple ubiquitous devices in ULLE. It consists 4 subthemes (Table 4). ULLE act as a platform of the new learning paradigm that offering varied types of technology and become an important channel to the learning environment. This new type of environment is supported by ubiquitous computing technologies, including mobile devices, wireless sensor network and embedded computer devices. From the interview, there are several features of new technologies, including handheld devices such as smartphones that are not used in the classroom, they would like to use in the process of teaching. However, they are facing several restrictions in order to use these types of new technology. According to the interview, key informant agrees that they are having restrictions in a limited time in class and they cannot use the ease of using technology because the time constraint. However, they still use applications outside the classroom

Table 2: Summary of thematic analysis for theme 1 (Environment)

Subtheme	Ki1	Ki2	Ki3	Ki4	Ki5
Benefit	"I agree to that concept very much"	"Yes, I agree" so much	"I agree that it	"Yes, it very helpful" will help"	"It is more appropriate for practical"
Concept of changing	"This concept of changing is very important"	None	None	"We have very senior lecturers and their willing to learn"	"I actually need to change to use the new software"
Infrastructure	"The only problem that I see if whether the infrastructure"	"Problem in infrastructure that needs more improvement"	"For example i-Learn"	"All sort of technical problem"	"The infrastructure problem for example"
Guidelines	none	"Technology helps but there must be a guide"	None	"We need to set a clear guideline for the students"	None

Table 3: Summary of thematic analysis for theme 2 (interaction)

Subtheme	Ki1	Ki2	Ki3	Ki4	Ki5
Benefit	None	none	"This technology is helping students"	"In a way yes"	"I agree with the concept"
Context awareness	"I think I'm willing to use the system"	"I agree also"	"I agree it can help the students"	"That will be good"	"I agree to it"
Readiness	"We have to move forward"	"in between"	"We should always be ready"	"their ever ready"	"We are not ready yet"
Language learning	"That's one way enhancing their vocabulary"	"I agree it will help"	"they want to learn pronunciation"	"To help the students to learn vocabulary"	"It helps students in terms of pronunciation"
Interactive	"They might not be interactive in terms of speaking"	none	"No software can be the most accurate translation"	none	"It is more appropriate language learning face to face"
Device	"I think about 80% of them holding a smartphones"	"I think a smartphones"	"Using smartphones"	"It can be a tablet or smartphones"	"to the students now a days is smartphones"

Table 4: Sum/mary of thematic analysis for theme 3 (technology)

Subtheme	Ki1	Ki2	Ki3	Ki4	Ki5
Benefit	None	"Good but there are also disadvantages in other aspects"	"Yes, it will enhance the skills and information of the lecturers"	"Yes, it helps."	"The technology is just facilitating only"
Blended	"Yes, i-learn is doing good"	"Yes, I'm using i-learn and it help me a lot"	"Yes, it is"	"i-Learn is not that attractive."	"Yes, I use I-learn" learning
Restrictions	"the restrictions that we are facing"	"I have limited time in class"	"But not all students have a smartphones"	None	None
Mobile and Web applications	None	"For example Whatsapp"	"Yes, the Blendspace"	"As simple as Whatsapp, Wechat"	"e-dictionary"

for teaching. Among the most popular applications that been used by them are WhatsApp, Edmodo, JA Sensei, Facebook, Twitter and BlendSpace as a medium to teach outside the classroom. From the findings, learners are more comfortable to use these types of the applications because that is their comfort zone and learners more prefer to communicate using these applications. In addition, WhatsApp is the most popular applications among the key informants. As the Asian concept face, reputation and prestige are involved, WhatsApp identities are constructed to enhance the language learning between the educators and learners.

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 study 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.

As a conclusion, the research found that technology usage is vital within learners and educators in language learning. Therefore, it is important to have a medium that can be used to improve language learning process to be more effective and interactive. Furthermore, technology has become an important channel that demand by people in order to facilitate their daily task.

SUGGESTIONS

The results of this study also suggested that the readiness of the infrastructure is the most important part to take a look for before implementing new technology into academic learning. Further investigations of the ubiquitous learning environment with a possible focus to contents of language learning and requirements platform of technologies in ubiquitous learning environment are suggested which could further enhance the operational part of the model.

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