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Understanding Learners' Technology Adoption Behavior for English language learning in Ubiquitous Environments

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Abstract: As ubiquitous technologies gain their popularity among learners, many new applications and services for English learning have been developed. This paper aims to understand learners' adoption behavior and identify factors that impact their intention to use technology for language learning in ubiquitous environments. Six in-depth expert interviews were conducted to shed light on learners' perception and adoption of technology for English language learning in ubiquitous environments. This paper classified four types of possible technology usage and four-scale model to characterize learners' technology adoption behaviors. The results show that interviewed learners have difficulties in finding appropriate learning community and educational platform. Moreover, it is important to equip learners with learning strategies and modern ubiquitous technologies to support their learning process.

Keywords: Ubiquitous environment, technology adoption , learner support

1. Introduction

As at the beginning of 21st century, ubiquitous environment (UE) provides a wide range of modern technologies, learners face the problems of choosing appropriate ways of learning that can suit their personal expectations. The European Lifelong Learning Initiative develops learner's potential through a continuous process of education. It motivates learners to acquire new knowledge, obtain new skills and deepen their understanding, stimulate self-confidence and creativity. To reach these goals, it is important to provide learners with a dynamic UE where they could have free access to learning materials anywhere, anytime and using any suitable device. A successful UE is determined by the extent to which users can adopt technologies and essentially live their lives unaware of the existence of IT (Pennings, Veugen, & de Korte, 2010). Therefore, learners' interactions with the different environments have been changed radically compared to the usage of a single application, service or device (Walldén & Mäkinen, 2012).

In order to understand learners' technology adoption behavior, this paper investigates adoption behavior and usage patterns in language learning. It is important to mark the internal and external factors that affect learners' adoption behavior and usage patterns for language learning in UEs. In-depth interviews have been used to collect information on adult learners' adoption behavior for English learning in UEs. Therefore, the results of this study can shed light on adoption behaviors and usage patterns of learners while they learn English with ubiquitous technologies; identify the antecedents of why certain adoption behavior is observed; and to provide constructive suggestions of language learning strategies to better support the adoption of technology in UEs.

2. Literature review

2.1 The concept of ubiquitous environment

Learning is ubiquitous by its nature. In terms of ubiquitous education anyone is able to learn anything, anywhere, anytime and using any device. It provides flexibility and opens new horizons for learning. That is the reason why Ubiquitous learning is considered a main stream in future educational process. Many researchers believe that in the nearest future smart technologies, like smartphones,

tablets, Smart Interactive Television, Smart Apps (as Smart Tutor), Smart White Boards and Smart Houses will be primary personal tools for business, pleasure, work and entertainment (Bacow, Bowen, Guthrie, Lack, & Long, 2012; Fallahkhair & Pemberton, 2004; Kukuls ka-Hulme 2009; Nikou & Bouwman, 2014). In addition, the increasing use of ubiquitous technologies, especially smartphones, has led to the development of various services that provide new opportunities for end-users, help them to perform different activities or to collaborate with others (*Facebook, Twitter, Instagram, VKontakte* etc). As for China, the most popular SNS (social networking services) are *Tencent QQ*, *Weibo* and *Weixin*. The number of their users increases every day; now it's 281 million users for *Weibo* and near 600 million for *Weixin*. One of the main functions of SNS and Apps is that they allow learners to use network as a platform for information sharing, user-centered content generation and interoperability. Apart from that, there are many web-based services designed especially for language learning. The most famous online English learning platform in China is *Hujiang Net*.

2.2 Adoption of technology in UEs

Straub (2009) conducted an in-depth review of technology adoption literature and concluded that "technology adoption is a complex, inherently social, developmental process [… and] successfully facilitating a technology adoption needs to address cognitive, emotional, and contextual concerns" (p. 645). As UEs become an integral part of modern life, more attention is paid to users' perception and the process of adopting these technologies for personal needs. To understand better such concepts as individual technology acceptance, behavioral intention and actual use, the current research used and combined several theories as Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT), Theory of Reasoned Action (TRA) and Theory of Planned Behavior (TPB). The most common and widespread of the theories mentioned above is TAM (Technology Acceptance Model) developed by Fred Davis and Richard Bagozzi (Bagozzi, Davis, & Warshaw, 1992; Davis, 1989) in terms of their research on TRA (Theory of Reasoned Action). This model suggests that while choosing, experiencing, evaluating and adapting new technologies, the user is influenced by a wide range of factors, especially the Perceived Usefulness – "the degree to which a person believes that using a particular system would enhance his or her performance" - and Perceived Ease-Of-Use – "the degree to which a person believes that using a particular system would be free from effort" (Fred Davis, 1989). Later this theory has been enhanced by many researchers (Adams, Nelson, & Todd, 1992; Hendrickson, Massey, & Cronan, 1993; Segars & Grover, 1993; Subramanian, 1994; Szajna, 1994; Venkatesh & Bala, 2008; Workman, 2007). At the beginning of the 21st century, the Technology Acceptance Model has been expended by Venkatesh (2003) who has expended it for four key constructs: performance expectancy, effort expectancy, social influence and facilitating conditions. These concepts have been unified under the new model – Unified Theory of Acceptance and Use of Technology (UTAUT).

Having analysed the use of ubiquitous technology among ICT undergraduates, Sedek, Muhmud, Ab. Jalil, and Daud (2012) classify four main types of learners' technology awareness and adoption: (1) technology for inquiry and general use; (2) technology for communication use; (3) technology for expression use; (4) technology for construction use. Based on Sedek et al.'s work, this paper proposes a four-staged model that revises and broadens previous norms and theoretical frameworks: (1) technology for general use; (2) mobility-based technology; (3) social technology (that synthesizes both – communicational and expressive purposes); (4) technology for constructional use.

Loucks-Horsley (1996) investigates the problem of technology awareness and adoption from her own point of view and proposes an eight-level model to describe the depth of learner`s involvement: (1) non-use level – person does not accept any interaction with the new materials; (2) orientation level – person seeks information; (3) preoperational level - person has decided to use new technology and is currently thinking over the ways of its implementing; (4) mechanical level – person demonstrates active attempts to use new strategies or technologies; (5) routine level – learner has established satisfactory pattern of behaviour that controls the involvement of the technology; (6) refinement level – person goes beyond the routine by assessing the impact of his efforts and making changes to increase this impact; (7) integrational level – person actively coordinates and collaborates with others in order to use the innovations as effective as possible; (8) renewal level – person seeks more effective alternatives to the technology (so that he runs these levels in circles). Based on these concepts, the current study develops new vision of different types and levels of technology awareness and adoption among adult language learners' and propose such scale: (1) Basic level – learner

has a little awareness of new technologies; (2) Intermediate level – learner knows about new technologies, implements at least few of them for learning activities; (3) Upper-intermediate level – learner is acquainted with many new technologies, , can specify what effects they have on the learning results, commonly use few or more of them, but usually has simple, short-term or indistinct learning goals; (4) Advanced level - learner is aware of new technologies, has a long-term experience of their implementation, can state learning goals for both short-term and long-term activities.

2.3 Analysis on typical adult language learner

Although conventional technology acceptance theories (e.g. TAM, UTAUT, TRA and TPB) could shed some light on the individual technology acceptance, behavioral intention to adopt technology, there are still many gaps concerning sufficient understanding of their actual usage. Since UEs consist of a range of applications, services and systems, this paper investigates learners' adoption of multiple technologies. Therefore, it is important to find out additional indicators with regard to the adoption and use of technology in UEs (e.g. social and habitual behavior, psychological features and personal characteristics). The information presented in Table 1 sheds light on the indicators that describe learners' characteristics in terms of traditional learning.

Table 1: Learner's characteristics: 4-scale model DSMS

Model	Characteristics
Demographic features (D)	Physiological characteristics; social characteristics; personal experience; geographical features
Supporting system (S)	Learning facilities; feedback; educational time-management; educational resources.
Motivation (M)	Lerner motivation; efficacy; self-confidence; inner motivational factors.
Strategy usage (S)	Cognitive strategies; metacognitive strategies; memory strategies; compensation strategies; affective strategies; social strategies.

Furthermore, the effectiveness of the learning process is closely related to the strategy usage. Oxford (1990) defines Language learning strategies (LLSs) as specific methods/techniques employed by individual learners to facilitate their comprehension, retention, retrieval and application of information in a second or foreign language. In other words, learning strategies are actions that learners take to accomplish their learning goals. According to Oxford (1990), there are six types of learning strategies: cognitive strategies, metacognitive strategies, memory strategies, compensation strategies, affective strategies and social strategies.

Earlier mentioned demographical peculiarities are common for both traditional and e-learning environments. Physiological characteristics include three main aspects: gender, age and health state. Social characteristics correspond with learner's ethnic group peculiarities, religion, family wealth and educational environment. As for the geographical location and surroundings: urban, rural and wild nature conditions obviously influence the ways, tools and educational strategies, as well. In terms of modern e-learning, learning supporting systems are caused by internal (level of Internet literacy, experience, adaptability, social network psychological principles and behavior tendencies) and external (accessibility of the educational tools and resources, constant high-quality feedback, educator's level of technological awareness etc.). Moreover, learners' readiness to use modern technologies depends on previous learner`s background (personal experience and skills) as well as on the level of motivation.

2.4 Research questions

Compared with the considerable amount of studies on the icon of language learner in terms of traditional educational system, research that describes the same question in ubiquitous learning is still limited. For that purpose, our research aims to answer the following questions:

1) What are the main types of learners' adoption behaviors of language learners in UEs?

2) What are the levels of technology adoption behaviours among learners in UEs?

3. Methodology

The participants are six adult English learners from China, aged from 20 to 35 years old. All of them learned English in school and passed an English level tests (level 4-6). As all of them combine the language education with their job and previous educational experience, all participants underline that learning anxiety and pressure always influence their learning process, and occur not only during tests and examinations.

4. Results

The results show that adult language learners use new ubiquitous technologies for many purposes. That is why we attempted to classify these reasons and give a clear vision of different types of technology awareness and adoption.

4.1 Purposes of Technology Usage

When talking about the term "general use of technology", Sedek et al (2012) refers to a common use for certain technology - the user does not modify it for some particular purpose or function. Taking into account the ideas mentioned above, the results show that practically all respondents (83% or Five out of Six Respondents – all except Respondent D) use this type of technology adoption to search for different educational platforms and Apps that can support their language learning process. These results correlates with those of Sedek et al (2012).

Technology for mobile-based using is closely related to the concepts of MALL (mobile-assisted language learning). The results show that 50 % (Respondents A, B & C) are constantly using such portable devices as phones/smartphones (further research can be conducted to find out the differences in using smartphones and phones in opposite to other portable devices, like Pads, iWatches etc). In addition, two out of three participants (Respondent B & C) appeared to use mobile devices to access new technologies designed and developed especially for smartphones – different Apps and mobile Dictionaries.

The results show that four participants (Respondents A, B, C & E) have an experience of social communication through different forums and online learning platforms that provide group-based learning activities. Moreover, Respondent B appears to join special language learning group proposed by *Hujiang Net* – one of the biggest and most popular online English learning platform among English language learners in China. In addition, it is worth mentioning that even though non of our respondents appeared to use modern technologies for expressive purposes, one of them (Respondent A) mentions what type of person can create such kind of posts: "*I just look through the groups created by professionals and look for some information I could be interested in".* Besides, Respondent F states that he "*did not create posts as the proficiency level is too low"* and he is *"afraid to be ashamed".*

One of the most advanced levels of using modern ubiquitous technologies is implementing them for creating and developing something new – ideas, projects, products etc. As all of our recipients are adult language learners who learn English for their carrier development, personal interest or as a leisure-time activity that is why our research does not detected any examples of such technology usage. Besides, it is very important to take into account that this way of implementing new technologies still exists and can be mainly investigated among the professionals or language teachers, who use different software in their learning and teaching practice.

4.2 Types of Technology Awareness and Adoption

After having implemented our four-staged model of common adult learners, we can classify the participants according to their level of technology awareness and adoption. We use descriptive methods to distinguish how they use and what they know about modern technologies that can support their English language learning. The results are given in the Table 2 below.

Table 2: Four-stage model of technology awareness and adoption of adult language learner

Proficiency level	Participants	Distinguishing features
Basic level	Respondent D, Respondent F	● Little awareness of new technologies ● Any, or little, experience of technology implementation
Intermediate level	Respondent C	● Sufficient level of technology awareness ● Conscious implementation of few technology-based learning strategies or tools
Upper-intermediate level	Respondent A, Respondent E	● Acquaintance with many new technologies ● Constant usage of modern technologies ● Ability to evaluate the impacts of technologies ● Simple short-term learning goals
Advanced level	Respondent B	● Awareness of great number of modern technologies ● Long-term experience of technology adoption and usage ● Clear learning goals for short- and long-term activities ● Ability to evaluate the impacts of technologies ● Willingness to help others in their choice of technology

We have used a descriptive method to analyse the results of the in-depth interview and found out that two of our respondents (Respondent D & Respondent F) can be classified as Basic-level learners. Respondent D has some general understanding of how modern technologies (for instance, use online Dictionaries for translation). As for some educational platforms, respondent does not even understand the question from the first time and the interviewer needs to explain what it means. But after the explanation, respondent seems to come up with the topic, but it is obvious that he does not know much about it. And as for learning communities, it appears that the respondent does not know nothing, even about their existence. Respondent F also can be classified as a basic-level user. He pays more attention to old-style paper materials than to new technologies, but still he uses them a little to support the learning process and has a basic understanding of Apps and online learning platforms.

Intermediate-level user knows more about new technologies and their usage and consciously implement at least few of them to support learning process. One of our participants appears to have this proficiency level. As Respondent C states: *"it [learning process] is not as productive as it could be, results are not so good, because of the lack of motivation and suitable learning strategy*". The respondent use some modern technologies (e-books) to support the learning process, but he adopts it to the old-style paper-based ways of learning. In the other hand, Respondent C shows a good awareness of different supporting Apps (*Happy Daily English*) and learning forums (*ShangYou, TaiSha, Xiao Ma Guo He*).

Upper-intermediate user should not only be acquainted with many new technologies and the ways of their implementation to the learning process, but constantly use them and be able to evaluate their influence of the learning process and results. Two of respondents (Respondent A & Respondent E) seems to be able to do that.

The most developed proficiency level of technology awareness and adoption of adult language learner is an Advanced level. Only one of our respondents (Respondent B) belongs to that type. Its representatives are characterised by an awareness of great number of modern technologies, long-term experience in their usage. They can not only evaluate the value and reasonability of using different strategies and tools, but also help others, share their knowledge etc.

5. Discussion

At the beginning of the 21st century, modern ubiquitous technologies are undergoing significant changes that speed up their implementation and penetration in all spheres of human life, especially teaching and learning. Based on the results of in-depth interview, current research classified four types of possible technology usage and four-scale model to define the adult learner`s technology awareness and adoption. Despite that fact, still there are some limitation especially connected with relatively small number of respondents (just six of them). Moreover, many questions are still worth discussing.

On the one hand there are problems connected with the technologies themselves. Even though learners spent time on the learning process quite randomly, they did not think that influenced their learning process. Otherwise, the other problem exists: as there are a lot of different educational platforms that lack professional insight and are made by unqualified users; the language learners can feel frustrated and lonely while looking for an appropriate learning community and educational platform. In addition, it is quite difficult to support their learning process and motivate them. On the other hand, the question how to direct learner and show him a right way to implement modern ubiquitous technologies to support their learning process. The technology awareness and adoption depends on many factors and it is important to investigate them during the further research.

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