

Touch Screen Avatar English Learning System For University Students Learning Simplicity

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ABSTRACT: This paper discusses on touch screen avatar for an English language learning application system. The system would be a combination of avatar as Animated Pedagogical Agent (APA) and a touch screen application that adapt the up to date gesture-based computing which is found as having potential to change the way how we learn as it could reduce the amount of Information Communication Technology (ICT) devices used during teaching and learning process. The key here is interaction between university students and touch screen avatar intelligent application system as well as learning resources that could be learned anytime anywhere twenty four hours in seven days 24/7 based on their study time preference where they could learn at their own comfort out of the tradition. The students would be provided with a learning tool that could help them learn interactively with the current trend which they might be interested with based on their own personalization. Apart from that, their performance shall be monitored from a distance and evaluated to avoid disturbing their learning process from working smoothly and getting rid of feeling of being controlled. Thus, the students are expected to have lower affective filter level that may enhance the way they learn unconsciously.

Keywords: Gesture-Based Computing, Avatar, Portable Learning Tool, Interactivity, Language Learning

1.0 INTRODUCTION

Years pass us by, but Information Communication Technology (ICT) technology has been there and yet still updating themselves with new and advanced technology that focus more on interactive aspects of any intelligent application systems or websites. We have not been there; nevertheless, we are watching them created and several people may feel isolated if they never have the desire to broaden their Information Communication Technology (ICT) skills and sharpen their knowledge in the particular field.

About two decades ago, in Malaysian context, Information Communication Technology (ICT) is still a new term, but now we have been provided with a lot of Internet application from social networking, podcasting, gesture-based computing, visual data analysis, simple augmented reality and most recently Natural User Interface (NUI) extending to Brain-Computer Interface (BCI) (Johnson et al. ; Yonck, 2010). These systems are predicted as the latest technology that is still in progress to be developed in less than a year to five years later (Johnson et al. 2010). Moreover, they are also expected to be fully used in many fields that surround us like business, social networking, education, entertainment and even military et cetera. For this research, to be specific the education field, the usage would focus on teaching and learning process to enhance students' comprehension as well as leading to an interesting way of attracting the students to not only focus on their social Internet usage, but also use the Internet as another method of learning. In addition, it is hoped that they would gain same satisfaction by the pervasive technology learning the same with their addiction to the Internet outside their schools. On the other hand, Yonck (2010) concludes that currently is interface era which moves from the usual Graphical User Interface (GUI) to Natural User

Interface (NUI) to the ultimate one such as Brain-Computer Interface (BCI). He is a foresight analyst for Intelligent Future LLC who also predicts that easy-to-use, intuitive and efficient handling interface which might give opportunity for us to learn more naturally which means by exploring and manipulating our mind's process of thinking outside our body (Yonck, 2010).

As a result, mobile learning has been called as ubiquitous learning where the Internet has emerged in our everyday life at present (Mason and Rennie, 2008). Ubiquitous learning is referred to effective usage of various educational technology tools applied in every classroom globally (Hooft and Swan, 2007). Additionally, Johnson et al. (2010) find that "in the developed world, mobile computing has become an indispensable part of day-to-day life in the workforce, and a key driver is the increasing ease and speed with which it is possible to access the Internet from virtually anywhere in the world via the ever-expanding cellular network". These statements are supported by the invention of iPhone and iPad by Apple that has proved the fact that we do not need to use keypad/keyboard and mouse any longer since Apple Company have brought an alternative way of using these Information Communication Technology (ICT) devices via touch screen substitute as initial door to connect the real world with the second digitized world (Wagner, 2008). Wagner (2008) also reports that it is like a reincarnation of the Information Communication Technology (ICT) era which brings a whole new perspective by combining the essential elements of using the "web 2.0 applications, traditional desktop applications, multimedia video, audio, and the cell phone" together as a 5 in 1 device.

In educational context, this new phenomenon would also be able to change how the way our students learn because it helps students in their learning process. However, there are many researches have been conducted on Information Communication Technology (ICT) usage in education, but the focus may be different between each other in terms of their scope and tools applied. Mobile computing is expected to expand the way how the students connect with their lessons beyond campus setting that they are able to discuss and give comments spontaneously to their lecturers or peers for a continuous learning. For example, in this study, they would be able to be more alert, critical and know how to respond candidly to academic news/updates in a positive way monitored by a learning agent acting as tutor which they find convenient or happy to be seen during their learning process. Swartout (2010) highlights that building virtual human components involve "autonomy, natural communication and sophisticated reasoning and behaviour."

2.0 ANIMATED PEDAGOGICAL AGENT (APA) AND GESTURE BASED COMPUTING MARRIAGE

Although some lecturers may still be reluctant to apply technology in their classroom due to certain problems like lack of access to the Internet in rural areas or technical problems like slowness of the Internet speed of computer hardware (Nuzulla Mamat, 2009). Nevertheless, some lecturers have been found to be very fond of it and eager to adapt it in their teaching process. This is not because lecturers think that the agent would replace their role, but the main purpose is to suit their students' experience and needs of Information Communication Technology (ICT) outside lecture halls or in their life privately or socially because it has been discovered to be thought as very enjoyable and fascinating environment for them especially for passive and/or shy students.

There are many Information Communication Technology (ICT) applications created to be tested on students. Some applications are successful, but some of them are found to be very dull and boring to the students since they cannot see the invisible lecturers which lead to

feeling of loneliness or overwhelmed especially in distance education. The students are also often left blurred and feel like they are just learning with the computer screen. We cannot deny the lecturer's role as a facilitator/mediator who can make it as an effective learning to ensure the students know that somebody is there to help them understand contents of any lesson should they encounter any problems related to their learning inside/outside the lecture hall especially during odd hours let's say 1 a.m. where schools/offices have been closed. So, an idea of what would happen if we combine Animated Pedagogical Agent (APA) with gesture-based computing arises. It is because we are often bombarded with a lot of questions when issuing about this matter to our classroom since we are not dealing only with our research but also our students which means real children, teenagers, young adults or even matured persons in real classroom. They are humans that need to be taken care of not only by the devices but also by the existence of subject that is hoped could ease their discomfort or difficulties in their learning.

Animated Pedagogical Agent (APA) refers to an educational live avatar or virtual human that involves in students learning on screen. It can be divided into three different categories like pedagogical agents, peer-learning agents and demonstrating agents (Richards and Sklar, 2010). This statement is supported by Viadero (2010) who finds that "human tutors are believed to be the highest form of instruction." In the mean time, Swartout (2010) discovers that "implementing a virtual human requires integrating a diverse range of AI (Artificial Intelligence) technologies including speech, recognition, natural language understanding, dialogue management, automated reasoning, speech and gesture generation and animation." In Tempe, researches in University of Massachusetts Amherst and Arizona State University are developing a virtual human that is hoped to be impressionable to students' emotion at the time they are using them in their learning based on detection and response techniques (Viadero, 2010). From their research, data obtained found that there are 10 percentage of improvement in state tests between students who spend time with an avatar named Jane than a group of students who learn in typical classroom after a week of lesson on geometry subject (Viadero, 2010).

Swartout (2010) refers computer interfaces as gaze-based interfaces and gesture interfaces as subject that would eliminate the wall between users and systems intuitively and naturally. In addition, Athitsos et al. (2010) finds that gesture recognition in computer invention may create essential elements that can build "intelligent homes, assistive environments and human-computer interfaces." It would be fun because now we are not just replacing the syllabus contents from hardcopy to softcopy but we have some sort of attraction for the students to access the system willingly because they want to interact with the avatar. According to Yonck (2010), despite of features like face and hand movement recognition in gesture technology, we can now identify posture, step and other activities done by us digitally or even send our thoughts via the gesture tools online.

Furthermore, this kind of personalized learning is also a good way to foster these students to use Information Communication Technology (ICT) in their works and also life because the students would be able to help themselves create their own environment that they favour. Therefore, the students tend to like whatever they are learning adapting to their own study time preference as Ahmed Ali (cited in Edmunson, 2007) states that Internet learning replaces school's learning because students would have access to many other additional resources formally or informally based on their own style and preferred time. In addition, Viadero (2010) also finds that students work harder when they think that they are not learning in a strict environment and feel enthusiastic during the process while Swartout (2010) believes that people would be contented if they find that they achieve their goal by judgement or comparison since virtual human also shows their emotion to alert them."

In spite of the fact of security and privacy issues faced by the students like uncomfortable feeling being watched online, that is why an avatar should be created as a substance for replacement for real tutors. For preventing any possible risks of interruption, any feedback provided by the avatar shall be monitored from time to time by a moderator.

3.0 LIVE AVATAR NATURAL SYSTEM

It is expected that students would be able to learn from their friends and also the contents itself directly or indirectly. A live avatar of a lecturer may also add some spices to their learning as they would be able to view the avatar teaching them and also the real lecturers to podcast the lectures on the Internet. These ways might enhance the teaching and learning methodology and the experience they share with each other where open content is considered as a whole new perspectives/alternatives that enable us to share our knowledge with others and corrected or commented by them either positively or negatively to ensure improvement/growth of the systems as well as the users just like yin and yang concept that makes up elements in our life. The method of learning may have some relation with blended learning where students' learning becomes more effective and personalized when they are provided with various pedagogical tools that would lead to a lifelong learning experience to them when they discover certain information (Pieri and Diamantini, 2009, cited in Mohamed Ally, 2009). Apart from that, interactions that occur in a synchronous way at the present immediate time could strengthen the students' bonds with their lecturers as well as their peers (Yanes et al. , 2006, cited in Wright et al. , 2006).

Avatar creation or even robot usage in English classroom may look too technological edgily but, it is somehow enjoyable and eye-catching to the students for the reason that they would not see the face of the teachers every so often since the existence of the avatar/robot would not be able to replace the real teachers to teach them. However, monitoring process or to be more practical a moderator need to be provided and an evaluation of the usage analysis need to be checked from time to time. The invention of Web 2.0 like all the social networking websites are already excellent because some students prefer to control their own learning from their own peers and private life with them without having anyone that they feel uncomfortable, but what could happen if the students do not even like to be monitored? Can we bring this method to be applied in class? It is because these days, some students dislike to be controlled by their own lecturers/teachers. Thus, a system which would not control the students is needed. Perhaps, we as researchers could evaluate the students from far as we do not want to disturb their learning process as well as their interest because this relates to their learning satisfaction and comfort based on low affective filter concept.

Interaction is also hoped to be enhanced whether it is synchronous or asynchronous since websites are now more to read/write websites since they appreciate, view comments on what readers/users might say on some issues and take them as a way to improve their contents delivery. It is like they have become like a reflection to both parties and inspire them to learn and collaborate with each other in sharing knowledge. According to Herron and Wright (cited in Wright et al. , 2006), interaction is seen as a valuable element of an online learning where it happens between students with the instructor, in students' circle which means students with their peers and students with contents. In addition, the existence of Web 2.0 that requires two ways of gaining knowledge and reflecting the knowledge leads to a rapid information exchange which could be retrieved by students through a sufficient observation and understanding (Mason and Rennie, 2008).

However, one issue that can be argued is would the usage abolish the conventional method of teaching in schools or colleges/universities? It is because students would not have to attend classes anymore since they could learn outside their classroom setting. Shall we put an end to our normal practice? or shall we design two approaches where students who are comfortable to learn on their own can be given option to stay at home learn and submit their assignments at the right time whereas students who prefer to stay with the conventional way of teaching method could attend the class based on typical schedule as usual? A whole system that can cater all these options is very essential so that students do not need to surf here and there to cater all the Multiple Intelligences (MI) that the students have within themselves naturally. Furthermore, knowledge and real experience are integrated and cannot be separated since students understand more when they used knowledge gained in their learning when applying it for real tasks in workplace.

For that reason, the researcher intends to build system where students can view all the learning resources online anywhere without having to carry too many gadgets with them as an adaptation of the gesture-based system presented by Pranav Mistry. As stated by Johnson et al. (2010), Pranav only uses markers to interact with daily data in an intuitive ways which he named as Sixth Sense. In addition, Yonck (2010) reports that Pranav conducts his experiment by contacting other persons via phone calls, e-mail, sees time on invisible but projected watch, captures real life objects on the spot and later reflects them anywhere either on hand palm or giant screen on the wall. To the researcher, it is a good application system where we would be able to learn, touch and feel ourselves the learning resources without having to be at the real place that could save lots of time and money as it is already duplicating the real scenario which could lead to a gadget-less world. Question on how to be able to recognize actions and gesture of users is still an ongoing research (Chu and Nevatia, 2008; Morency et al. , 2005; Morency et al. , 2008, cited in Swartout, 2010) to achieve real life human virtually (Alexander et al. , 2009, cited in Swartout, 2010). This relates to integration of physical and digital worlds as immersive technology that would bring comfort just by our movement recognition.

After all, we must not neglect the fact that students' learning must come sincerely from their heart because technology can only be the co-factor to their ways of learning things. Davies (cited in Wright et al. , 2006) assumes that learning may not occur unless students have the right intention to learn themselves as he view learning as a goal that could be improved by online instruction. Students can learn from anywhere anytime is the key without having to bring so many cables and wires which is quite troublesome. Consequently, personalized learning and content management system are suitable with the approach. On the other hand, evaluation system of the students is also needed to complete the system. The researcher also plans to conduct a study on avatar that can be reached using gesture-based computing where students can interact with it to learn a subject so that students would no longer have the problem to contact their lecturers during office hours and their learning would no longer be limited within their lecture halls only hence, the researcher hopes that this invention would bring a whole new perspective to our education field.

Two research questions on this topic would be (i) What are the criteria or specification needed for such a system like avatar gesture-based computing specifically related to enhance university students' performance in English language learning? and (ii) In what ways would the students benefit/learn using the avatar gesture-based computing? Furthermore, the researcher also plans to ensure that the integrated approach would be able to help solving the problem/dilemma faced by students. It is expected that students could refer to their new 'buddy' which means the avatar 24/7 to help them understand/learn contents of lesson more within classroom setting or when they are not there which can also be downloaded. Moreover, it is hoped that this research would also help students to perform better themselves without

having to force them to learn voluntarily. This is because, students would feel more connected with their real and second life inside the digital world which would scaffold their learning effectively. In this e-knowledge era, it is not a matter of searching for information anymore due to various sources we have nowadays for on the Internet; however, it is all about tacit knowledge. According to Sternberg (2000, cited in Swartout, 2010), tacit knowledge refers to human skills like, leadership, negotiation and cultural awareness which may not be acquired in campus but better be learned unconsciously indirectly. Thus, the touch screen virtual human would be able to help students perform better since it is all at our fingertips.

4.0 CONCLUSION

As a conclusion, this study attempts to build or at least shares understanding on several aspects in designing a touch screen avatar based on Animated Pedagogical Agent (APA) and also the potential of integrating it with gesture computing in educational context especially in Malaysia country. It is also supposed that students would no longer have to bring so many Information Communication Technology (ICT) gadgets to learn online anytime anywhere since everything would be touchable and mobile. Additionally, more studies on this area are needed to be conducted in this country to be not left behind by others around the world which are speeding up their pace and cooperating with everybody including stakeholders in many fields like entertainment, business, education, medicine and so forth to ensure people could learn more naturally outside schools, lecture halls, workplace one fine day in the future in this millennium.

REFERENCE

- Ahmed Ali (2007). Modern Technology and Mass Education: A Case Study of a Global Virtual Learning System. In Edmunson (Ed.). (2007). *Globalized E-Learning Cultural Challenges*. Hershey: Information Science Publishing.
- Alexander, O. Rogers, M. Lambeth, W. Chiang, M. and Debevec, P. (2009). Creating a Photoreal Digital Actor: The Digital Emily Project. *Sixth European Conference on Visual Media Production (CVMP)*, November 12–13, 2009. London, UK.
- Athitsos, V. , Wang, H. and Stefan, A. (2010). A Database-Based Framework for Gesture Recognition. *Personal and Ubiquitous Computing*, 14(6): 511.
- Chu, C.W. and Nevatia, R. (2008). Real-Time 3D Body Pose Tracking from Multiple 2D Images. In *Articulated Motion and Deformable Objects*, Lecture Notes in Computer Science 5098, 42–52. Berlin: Springer.
- Davies, R.S. (2006). Learner Intent and Online Learning. In Wright, V.H. , Sunal, C.S. and Wilson, E.K. (Ed.). (2006). *Research on Enhancing The Interactivity of Online Learning*. Connecticut: Age Publishing Inc.
- Edmunson (Ed.). (2007). *Globalized E-Learning Cultural Challenges*. Hershey: Information Science Publishing.
- Herron, J.F. and Wright, V.H. (2006). Assessment in Online Learning. Are Students Really Learning? In Wright, V.H. , Sunal, C.S. and Wilson, E.K. (Ed.). (2006). *Research on Enhancing The Interactivity of Online Learning*. Connecticut: Age Publishing Inc.
- Hooft, M.V. and Swan, K. (ed.) (2007). *Ubiquitous Computing in Education*. New Jersey: Lawrence Erlbaum Associates, Publishers.
- Johnson, L., Levine, A., Smith, R., & Stone, S. (2010). *The 2010 Horizon Report*.

- Austin, Texas: The New Media Consortium.
- Mason, R. and Rennie, F. (2008). *E-learning and Social Networking Handbook*. Oxon: Routledge.
- Mohamed Ali (Ed.). (2009). *Mobile Learning: Transforming the Delivery of Education and Training*. Edmonton: AU Press, Athabasca University.
- Morency, L. P. , Sidner, C. , Lee, C. and Darrell, T. (2005). Contextual Recognition of Head Gestures. *7th International Conference on Multimodal Interfaces*, October 4–6, 2005. Toronto, Italy.
- Morency, L. P. , de Kok, I. and Gratch, J. (2008). Context-Based Recognition during Human Interactions: Automatic Feature Selection and Encoding Dictionary. *10th International Conference on Multimodal Interfaces*, October 20–22, 2008. Chania, Greece.
- Nuzulla Mamat (2009). *Teacher Professional Development: ICT Practices And Constraints Among English as a Second Language (ESL) Teachers*. Master of Education, Universiti Teknologi Malaysia, Skudai.
- Pieri, M. and Diamantini, D. (2009). From E-Learning to Mobile Learning: New Opportunities. In Mohamed Ali (Ed.). (2009). *Mobile Learning: Transforming the Delivery of Education and Training*. Edmonton: AU Press, Athabasca University.
- Richards, D. and Sklar, E. (2010). Agent-Based Systems for Human Learners. *The Knowledge Engineering Review*, 25(2): 25-111.
- Sternberg, R. J. (2000). *Practical Intelligence in Everyday Life*. New York: Cambridge University Press.
- Swartout, W. (2010). Lessons Learned from Virtual Humans. *AI Magazine*, 31(1): 9-12.
- Viadero, D. (2010). Projects Build Social, Emotional Support Into Computer Tutoring; 'Intelligent' Systems Respond to Students' Cues. *Education Week*, 29(16): 1-6.
- Wagner, R. (2008). *Professional iPhone and iPod touch Programming: Building Applications for Mobile Safari*. Indianapolis: Wiley Publishing.
- Wright, V.H. , Sunal, C.S. and Wilson, E.K. (Ed.). (2006). *Research on Enhancing The Interactivity of Online Learning*. Connecticut: Age Publishing Inc.
- Yanes, M.J. , Pena, M.C. and Curts, J.B. (2006). An Emerging Hybrid Model For Intractive online Learning. In Wright, V.H. , Sunal, C.S. and Wilson, E.K. (Ed.). (2006). *Research on Enhancing The Interactivity of Online Learning*. Connecticut: Age Publishing Inc.
- Yonck, R. (2010). The Age of The Interface. *The Futurist*, 44(3): 14-19.