DEVELOPING E-ICT COURSES SPECIFICALLY FOR HEARING-IMPAIRED LEARNERS

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ABSTRACT

The emergence of Internet and computer science in general has established to have great roles in human's life through the World Wide Web. E-learning education is dependent on the web as an important advance in technology; therefore, it is crucial for the humans to access web applications. This applies to the learners with hearing problems as well. This study aims to investigate the deaf learners' level of interest and satisfaction towards a developed e-learning platform named *e-HearMe* (*http://www.e-hearme.net*), which offers e-ICT courses specially designed for deaf learners. To achieve the aim of the study, an interview protocol was used as a research instrument to interview teachers who were teaching in schools offering Hearing-Impaired Education Program. In total, 30 teachers were randomly selected from three schools which were executing the Hearing-Impaired Education Program in the whole Malaysia. The results of the interviews showed that the teachers were really satisfied with the existence of *e-HearMe* platform as a medium which offers e-ICT courses specifically developed for the deaf learners. The interviewed teachers also stated that they could share and exchange their knowledge with other teachers and students from all over Malaysia, regardless from educational or social purposes.

Keywords: *e-HearMe, ICT, E-Learning, e-ICT Courses, Deaf Learners, Hearing-Impaired Education Program Malaysia*

1. INTRODUCTION

The existence of computers and internet has opened a gateway for human beings and it has offered an entrance into the World Wide Web [1]. Electronic-learning (e-learning) education is dependent on the web as an important advance in technology; therefore, it is crucial for the humans to access web applications [2]-[4]. New legislation on web accessibility has also motivated academic teachers to address that in online courses. It is very critical that societies have the ability and right to use any hardware, software or any other assistive technology to comprehend and fully interact with the website content, regardless of geographical location, language barriers or disability [5]. To this end, the Ministry of Education in Malaysia has presented the notion of 'Education for All'; i.e. equal education services and opportunities for all students, without judging the aspects of the individual differences, race, religion and sex or deranging the individuals with normal and impaired hearing. This notion concentrated on the ability, power, skills, functions, development, and achievement of students in terms of the skill growth [6].

Learning online also known as electronic learning (e-learning) can be defined as the learning process conducted through the computer technology medium [7]. Since there is no face-to-face interaction in e-learning, learning can be carried out via electronic means in virtual learning spaces. These virtual learning environments (VLE), learning management systems (LMS), web-based trainings (WBT) and other e-learning applications and educational technologies should be accessible to all types of individuals. This study investigates the perceptions of the teachers who were teaching in schools offering Hearing-Impaired Education Program towards a developed e-learning platform named *e-HearMe* (*http://www.e-hearme.net*), which offers e-ICT courses specially designed for deaf learners. *e-HearMe* is an e-learning portal which is specially designed and developed for the hearing-impaired individuals in Malaysia, and is intended to improvise and establish the quality of education for such learners in Malaysia (see Figure 1). This portal offers various e-ICT courses to

assist them for their future careers and job opportunities. The objectives of this program can specifically be summarized as to (i) provide e-ICT courses of education online, (ii) provide additional information related to the hearing-impaired individuals, and (iii) assist deaf learners to gain additional information in their education and future careers.

Figure 1. The Developed E-learning Platform Named e-HearMe

2. LITERATURE REVIEW

In Malaysia, higher education of the deaf learners offers them opportunities to achieve valuable skills and knowledge for employment and social survival equal to the learners with normal hearing. As defined in "Education in a fully inclusive model", a disabled person is streamed into normal environment as much as possible [8]. However, this has impact on the ability of the deaf learners without the ability to distinguish sound to get and produce spoken language. Thus, these individuals use the Sign Language to interact with each other. Numerous institutions of higher education and universities recruit interpreters who are fluent both in speech and signing to support the teachers, students and staff in the process of education.

The use of ICT in education in Malaysia has progressively turned challenging in the higher education, both for the normal and the deaf learners [6]. Teaching computer courses for academic educators should enable the deaf learners to have full access to programming tools and computer applications, together with the current trend towards teaching Graphical User Interfaces. The popular courses are subjects such as multimedia, 3D-animation, computer graphics and web-design, as they fascinate the vision of learners with hearing disorders. The Sign Language also helps the teaching and learning of these subjects. Educational technology and ICT have gained more importance in education due to the unceasing development of computer technology. However,

subject to learning in an online-virtual environment, although academic educators play a primary role in the use of online learning environment by students, these students can only utilize those the educators make available to them in a specific learning context [9].

Field of the computer education provides challenging yet careers with high payment for the deaf learners. Computing jobs are potentially available to the disabled individuals due to the assistive technology developments through increased computer access [10]. Furthermore, ICT offers numerous opportunities for the individuals with hearing disorder as the majority of careers in ICT require computers due to the quality of being deaf-friendly. The deaf individuals have several career opportunities, such as web design development, data entry, computer technology, graphics animation, computer programming, software development and testing and computer operations. An extensive acknowledgment in computing novelty necessitates numerous staff including information professionals, qualified systems designers, technology teachers, computer scientists, software developers, computing faculty, and information systems analysts. The deaf learners require ICT Education using supported visual media aids (including tables, charts and graphs) and for computer education, as they rely more on vision [11]. As computers are adjustable to the learners with hearing disorder, computer education is suitable for them, primarily because it improves deaf creativity and requires minimal supervision. Since their hearing senses are missing,

the majority of these individuals are extremely competent in visual traits such as designing and drawing. They are highly skilled in areas such as graphics animation, visual arts and web design. Thus, the deaf individuals can be successful in computer courses, because it studies their interaction methods with the learning materials through online platforms.

3. METHODOLOGY

This part mainly deals with the methodology used in this study, which consists of the research design, research instrument and data collection procedures. This study is a qualitative research in nature as it employed a semi-structured interview protocol to investigate the teachers' perceptions on a newly developed e-learning platform named *e-HearMe*. This interview mainly seeks to explore the levels of knowledge, use, satisfaction, and most importantly the interests of the deaf learners towards the computer graphics course. The aspects of these questions were examined consistent with the problem specified previously. Simultaneously, this interview also focused on helping us in improving and upgrading the existing computer course that has already been offered in some selected schools for the Hearing-Impaired Education Program.

The use of interview questions offers a wider space for the respondents to voice-out their opinions. The interview questions were in open-ended format, which gave the respondents a space to answer them freely. All the questions were simple questions that do not involve many words other than necessary explanations needed. The study was carried out in 3 secondary schools offering Hearing Impaired Education Program throughout the whole of Peninsular Malaysia, Sabah and Sarawak. In total, 30 teachers were randomly selected from these three schools.

The required data was collected through the interviews with all 30 teachers (10 from each school). The interviewer did not like to interrupt the class learning and teaching so that each interview session was directed according to the teacher's convenience. All the interview sessions were recorded, and each interview session took around 20 to 30 minutes. All the interviews were conducted during the weekdays, and all 30 interview sessions were covered by the interviewer in about two months. The NVivo software (version 8) was used to analyze the obtained data. This software was chosen as it extracts the respondents' straightforward answers based on the themes, and hence it is easy for the analysis.

4. RESULTS

The interviewees were 30 teachers who had used the *e-HearMe* Portal for teaching e-ICT courses to the Hearing-Impaired Students in three secondary schools in Malaysia in which e-ICT courses were offered specially for deaf learners. Ten teachers were selected from each school. The respondents were 18 males and 12 females. The results showed the race of the teachers as follows: 4 Chinese (13.3%) and 26 Malay (86.7%).

When the respondents were asked whether the *e-HearMe* was useful for the teachers teaching the Hearing-Impaired students, all of them positively agreed and claimed that this platform assists the teachers and students to gain more information related to the deaf learners, especially helping the students for future further studies and job prospect areas. The answers to this question showed that almost all teachers have understood how to use the e-learning portal demonstrated to them, as they could easily understand the meaningful information embedded in *e-HearMe*. This is shown in Figure 2 below.

Figure 2. Links of Information Related to the Hearing-Impaired Individuals

However, some concerns were raised as well. For example, some teachers believed that *e-HearMe* still does not have enough information regarding the deaf learners, and it is hoped that more information would be continuously added into *e-HearMe*, so that it could be much more appreciated as a complete reliable source.

In terms of the *e-HearMe* online platform, the teachers were really satisfied with the existence of this medium. They stated that with the function of 'User Sign-Up', the users (whether it was the teachers or the students) can really exchange information with other teachers and students from all over Malaysia. This function is shown in Figure 3. Since this function has the ability to gather all the students, teachers, and parents to get to know each other, it really gives the option for knowledge-sharing among them. The collaborative learning theory is crucially applied here as students get to share information, work, and learning materials through *e-HearMe*. Hence, the concept of knowledge sharing is greatly shared.

Figure 3. Function of Sign up/Login to Access e-HearMe

During the interview, the teachers made various useful comments. For instance, they referred to some helpful information for the deaf learners, relating to the job scopes, further studies and much more information were really beneficial not only for such individuals, but also for the teachers and the parents. Moreover, the teachers pointed out that the e-dictionary embedded in *e-HearMe* was really useful, especially for the parents, as most do not really know how to converse with their own child. However, with the help of this e-dictionary, this issue can be resolved. The e-dictionary tool is shown in Figure 4.
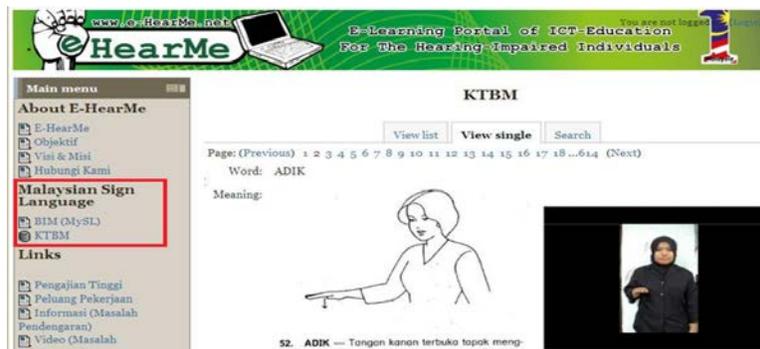

Figure 4. E-dictionary Tool Showing the Image and Video Interpretations of the Sign Language

For the category of interface criteria, when the respondents were asked whether *e-HearMe* was user-friendly in the sense whether it does provide an easy navigation and links, fulfilling the requirements and criteria for the deaf learners' vision, all 30 teachers claimed that this eases the users, especially the deaf learners to be interested in the *e-HearMe*, as the portal is not messy, and the limited-yet-concise menu was compatible with the hearing-impaired individuals'

needs. Even for the category of multimedia elements, on the question whether the *e-HearMe* was fully embedded with the multimedia elements of colors, texts, images, videos, (no audios required), fulfilling the requirements and criteria for the deaf learners' vision, all 30 teachers claimed that this comforts the deaf learners to be interested in the *e-HearMe*, as the portal catches the vision of the hearing-impaired individuals.

Although all the teachers expressed their positive attitude towards these two categories of *e-HearMe*, they raised some suggestions. They stated that they wish to see more colorful images inserted into the *e-HearMe* so that it could be much more attractive for the deaf learners. However, due to some limitations, the users can only choose a specific template design; hence, the ability to design the layout of the *e-HearMe* is hindered.

For the ICT courses, examples of the computer graphics notes were transformed from lengthy words to graphical images and visual forms as shown in Figure 5. When the teachers were asked whether the computer graphics notes provided were able to increase the deaf learners' performance in this course, they positively answered that this does assist the deaf learners in better understanding. With more visual graphics embedded in the learning materials, students could learn and perform better, compared to the lengthy notes. However, the teachers still feel that the students need minor assistance from the teachers in learning the course materials.
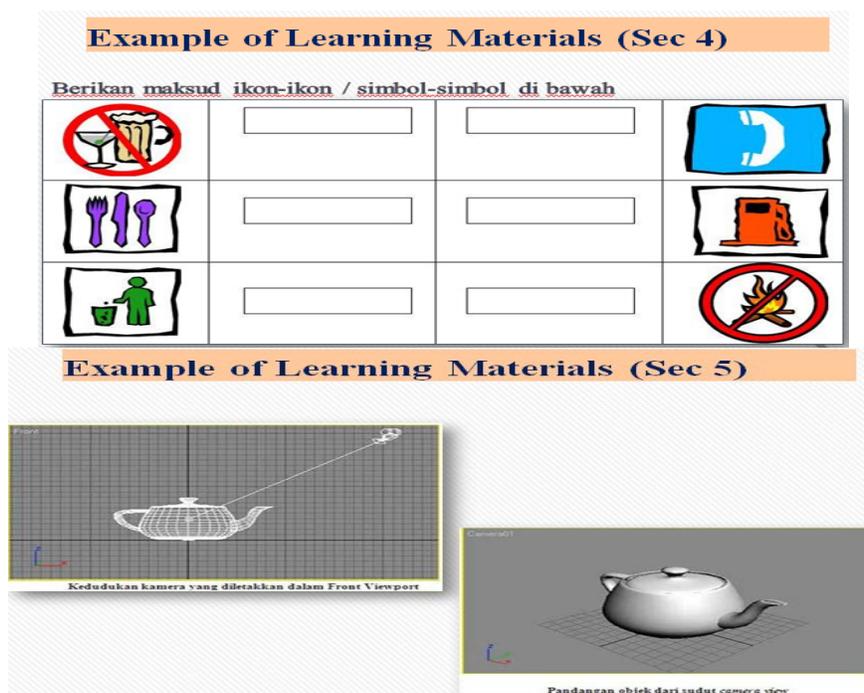

Figure 5: Examples of the Computer Graphics Learning Materials

On the question of whether the computer graphics learning materials provided in *e-HearMe* does help the teachers in preparing for their computer graphics teaching and learning class, the teachers were feeling glad that they now have a reliable platform for them to access their notes, share their learning materials, and an easier way to communicate with the students.

On the question of whether the computer graphics learning materials provided in *e-HearMe* does help the teachers to understand better in preparing for their computer graphics teaching and learning class, (with more graphical visual images), teachers answered positively and claimed that the learning materials were prepared following the syllabus set by the Ministry of Education. This shows that most teachers agree on the necessity to have these learning materials of computer graphics to be available online; hence, it was much easier to retrieve them wherever.

In terms of the ICT courses offered (with more graphical visual images), all 30 teachers were really satisfied with the computer graphics course embedded in *e-HearMe*, as they were specially designed for the deaf learners. Although more courses are added from time to time, the teachers were really contented with the availability for the courses to be offered for these individuals.

5.   DISCUSSION

The teachers teaching the computer graphics course to secondary school Hearing-Impaired Students gave positive feedbacks to the e-learning portal *e-HearMe*. They specifically gave very high interest in the online computer graphics course as they were really excited in using the portal. The computer graphics learning materials provided in *e-HearMe* does help the teachers in preparing for their computer graphics teaching and learning class, following the syllabus set by Ministry of Education.

As the teachers were going through the learning materials online and trying out the exercise given, the teachers feel that these learning materials were really challenging, as they have been shortened in comparison with the existing notes they teach in the traditional class. Moreover, it was converted from lengthy-words to be more graphical to ease the user's understanding [12]. However, the teachers claimed that the learning materials really did assist them to prepare their delivering course materials for the upcoming class at any given place.

When being asked whether the deaf learners would enjoy these online learning materials, the teachers claimed that it can help the students prepare for the next class, as they can have access to the learning materials prior to the actual class. It would be challenging for the students to learn the notes themselves; however, this did help the students to be more prepared for the next class, before the teacher starts the lesson. Moreover, the teachers stated that courses that contain more graphical elements in comparison to the graphic-less black and white courses would definitely attract the students to be interested in the class, as these graphical visual images do catch their attention fast.

On the question whether other non-ICT schools would benefit from this *e-HearMe* (mainly having the ICT courses online), most teachers find it really beneficial as this will give other deaf learners to learn ICT courses like computer graphics, at their own pace, since there were only 3 schools offering this course. By having these courses online, the deaf learners who were not given a chance to learn this course before can get access to the learning materials and self-learn them. Moreover, via e-learning, the teachers feel that anybody can learn this at any given time, at any given age, not necessarily for secondary school students, but for other learners who may advance into higher education or into the job employment era.

In agreement with the findings of this study, Cavender, Ladner & Roth (2009) alleged that a transition programs from high-school to college is a critical time for the deaf students because advanced level may require different accommodations compared to the previous level [13]. Students must now self-advocate for accommodations, and courses may be faster-paced and less accommodating. However, these transition programs are positively correlated with better academic and employment outcomes.

For the whole concept of satisfaction in having the e-learning portal *e-HearMe* which was especially designed for the deaf learners, the teachers were really contented. They believed that the information, links, videos and even the e-KTBM (online dictionary) can really help them, the students, and even the parents to gain more information. Moreover, fast information can be obtained, as *e-HearMe* is online and it is accessible anytime and anywhere. The hearing-impaired individuals in Malaysia would finally have this *e-HearMe* platform as their very own online dictionary that could help them with signing.

The teachers believe that *e-HearMe* accomplished their desire to have a portal like this to suit the requirements and criteria needed for teaching the hearing-impaired students. They claimed that this, *e-HearMe* assists the teachers and even the deaf learners to gain more information, especially in the further education, job prospect area, and other related links. Moreover, they still hope that the *e-HearMe* to be continuously having more information added so that it could be much more informative for all users' concerns.

The teachers were also happy to have an account signed up for each teacher from various different schools, claiming that they are now able to get to know other teachers from other schools all over Malaysia. This function not only benefits the teachers, but also assists the students. They can now expand the list of their friends' contacts and communicate with the whole community of the hearing-impaired individuals. Students can get to know other students, teachers can get to know other teachers, and even the parents can know other parents.

Overall, on the interview question on having various ICT courses available online via e-learning, most teachers optimistically agree that this can help the deaf-learners to access the tutorials, notes and slides anytime and anywhere.

Various answers were given by teachers as to why the deaf learners enjoy courses that contain more graphic elements. This is because these elements surround their activities while using a computer. These elements include playing games, drawings, watching 3D animation movies and cartoon, internet purposes like social networking sites (such as of Facebook, MySpace and Twitter) chatting, finding articles, and other internet purposes. Since the deaf learners' interest lean more towards the graphical elements, most teachers claim that an e-learning that offers these courses will surely attract them to learn positively.

6. CONCLUSION

The results of the interviews showed that most teachers teaching the computer graphics course were relieved to have an e-learning portal named *e-HearMe* (*http://www.e-hearme.net*) available and accessible to them. The teachers were satisfied to have a medium to access and upload notes, exchange information, and have an alternative way to communicate with all the students of their class as well as other teachers from all over Malaysia.

Having these online ICT courses available via *e-HearMe*, some schools that do not offer ICT courses can now learn that such courses can be taught to hearing-impaired students. Even the teachers who enjoy teaching this computer graphics course now are able to share the learning materials available in *e-HearMe* with other potential teachers. This not only works for the computer graphics course, it also works for other demanding computer courses.

In terms of ICT education, the teachers were really optimistic to have the extended level of these courses. An equal learning should exist for all the deaf learners in Malaysia, as this will give opportunities to the hearing-impaired individuals to enable them master the computer proficiency. ICT courses should not be divided unfairly to only certain schools, and not for the entire community of the hearing-impaired, as this will only affect the confidence and faith of other deaf learners that were not exposed to the ICT education.

Moreover, the Malaysia Ministry of Education has offered the notion of 'Education for All', according to which equal education services and opportunities should be accessible to all learners, without judging the features of the individual differences, sex, race and religion without disturbing the students with normal and the impaired hearing. This notion concentrated on the power, skills, ability, development, functions and achievement of the learners regarding the skill growth [6]. Many opinions were raised individually by the teachers, from the interview sessions conducted. In terms of ICT education, ICT courses are absolutely challenging and this study shows positive effect of e-learning [6].

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