Experiment of the Prototype of Online Learning Resources on Massive Open Online Course (MOOC) to Develop Life Skills in Using Technology Media for Hearing Impaired Students

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Abstract—This research aimed to experiment the prototype of online learning resources on Massive Open Online Course (MOOC) to develop life skills in using technology media for hearing impaired students. The research sample were 33 hearing impaired students from Thungmahamek School for the Deaf in secondary school level. Tools included pre-test, post-test, and satisfaction assessment form. Data analysis was done by average statistics, standard deviation, and content analysis.

The research found that academic achievement scores after the experiment were higher than the scores before the experiment with statistical significance at the level of .05 (t = -12.14, p = .00). The overall students' satisfaction was at the highest level ($\overline{X}$= 4.53, SD = 0.67). Considering each item, it was found that the up-to-date content has the highest mean ($\overline{X}$= 4.77, SD = 0.48), followed by MOOC learning allowing freedom of study ($\overline{X}$= 4.64, SD = 0.58), the clarity of sign language to describe the content ($\overline{X}$= 4.62, SD = 0.67), and the ease of online access ($\overline{X}$= 4.62, SD = 0.63).

1 Introduction

Nowadays, the learning styles of students have changed due to technology. Several online courses are provided free of charge. However, the production of courses for people with special needs, especially people with disabilities which are a group of people who have limitations in receiving information and communicating with others, causing an impact on daily life requires special education, as well as, educational media and technology to enhance learning in various ways. This will fulfill each type of disability appropriately and truly match the conditions and needs of the target group [1]. In particular, hearing impaired students need to be encouraged to learn the use of technology media which is an essential skill for communication, learning, searching for knowledge. Therefore, it is important to be aware of and know how to choose various technology

media to be used for the most benefit in communicating and working with other people. Massive Open Online Course (MOOC) which combines technology and modern teaching methods together can be used for this purpose. MOOC allows people all over the world to access education online anytime. Videos, still and motion images, and audios can be provided in MOOC. A variety of courses and self-assessments can be created. It supports online collaboration and knowledge sharing of open educational sources in the form of text that makes student understand the content quickly. Streaming media that includes both videos and audios, making the content more concrete is also available. The content can be related to everyday life. There are example situations that make students think how to solve the problem. There is a sign language interpreter for those who are unable to fully communicate by writing or speaking, allowing hearing impaired people to communicate clearly according to their needs. Learning of life skills via online before meeting other people will make hearing impaired people become more confident in developing their potential, especially learning and problem-solving skills. This will make them feel confident and live happily with other people in the society.

2 Review of The Literature

From the study of various concepts, the design of media and the selection of appropriate technology that helps develop life skills in the use of technology media for hearing impaired children with found that:

Media for hearing impaired people: Media design for hearing impaired students should include various media options and multimedia presentations. The use of text-only media contributes to low understanding. Multimedia that includes text, images, and sign language will help to understand the content better than the text-only or text with sign language media. Media with text and images help to understand the content better than text-only or text with sign language media [2].

Massive Open Online Course (MOOC): Is an online instruction that focuses on interaction and a large group of learners. It employs both Open Courseware (OCW) and Open Educational Resource (OER). Most used media include text, still image, animation, and sign language. Activities and assessments focus on challenging students to learn about everyday life, learning self-regulation, and interaction in both activities and assessments [3] [4] [5].

Life skills in using technology media: Life skills for hearing impaired children to enable them to learn, find the information they need, and create works from technology media with regard to ethics in using technology media.

3 Research Methodology

3.1 Design

The content to develop life skills in technology media use for hearing impaired children consists of 2 modules:

Module 1: **Keep up with technology**

- Subject 1: How important is technology in everyday life?
- Subject 2: The world of Social Media and Social Network
- Subject 3: Facebook knows the world knows
- Subject 4: Communicating without boundaries with Line.

Module 2: **Ethics and technology use**

- Subject 1: Use of images, video, and audio without violating copyright
- Subject 2: Rights in the social world that we have forgotten
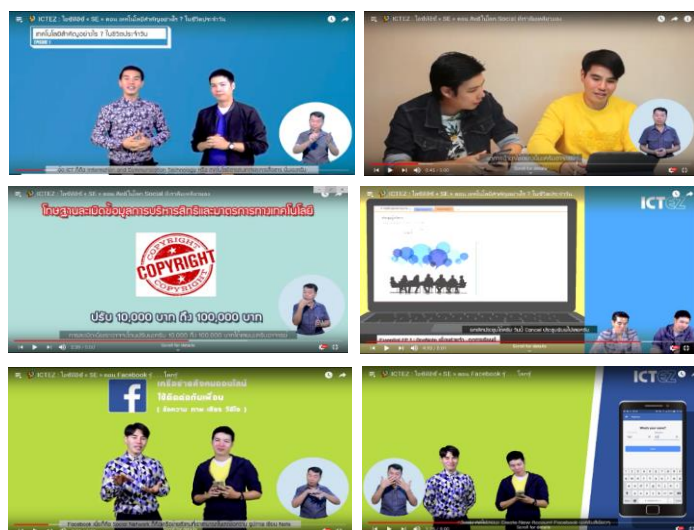- Subject 3: How to share posts with good manners.

Fig. 1. Sample of the content in ICT EZ program

The components of the online learning resources in MOOC for the hearing-impaired students consist of 5 components.

i) The content of the lesson should not be longer than 5 minutes and allows students to interact with the lesson every 3-5 minutes. It should be in the form of streaming media with text, images, sign language interpreters that are clear, concise, and easy to understand. Vocabulary used should be easy to understand and have important keywords to create more understanding. There should be examples or situations that are consistent with everyday life that can be applied. Images that are consistent with the content and various situations should be used to make it easier to understand.

ii) Learning and teaching through technology by online lessons and open learning resources. Hearing impaired students can study free of charge and choose to use technology that they are familiar with and not complicated, such as Facebook, Google, etc.

iii) Activity emphasizes on the situation or case in which students are asked to analyze and solve the problem. Students can apply their learning to everyday life and develop self-regulated learning.

iv) Measurement and evaluation should be consistent with the content by considering the development of assignments and activities. Giving suggestions during activities will encourage learners to become confident in learning and taking test.

v) Interaction and communication must be continuous throughout the activity. This will enable teachers to know children development and the part that should be promoted or improved by using existing technology such as Facebook, Messenger, which are free of charge and students can use well.

3.2   Research sample

The researcher conducted an experiment with 50 hearing impaired students in lower secondary school level. However, during the experiment there were some students who were unable to continue learning due to their disabilities and other obstacles. Therefore, this group of students was unable to complete the learning process. Some students could read very slowly. They required a sign language interpreter all the time to explain each part of the content. Some students have short concentration on activities so they were unable to watch the video clip until the end. Therefore, they were unable to do online activities based on the content learned. This group of students was excluded from the experiment. There were 33 students participating until the end of the experiment.

3.3   Research instruments

Pre-test and post-test were four-multiple-choice tests: They were divided into 2 parallel pre-test and post-test. The test was analyzed by Item Difficulty and Power of Discrimination. The results of the analysis of the pre-test and post-test after quality after testing with 20 students, found that the 15 items of pre-test had the difficulty index between .33 - .75, the power discrimination between .24 - .79, and the reliability value by using the Kuder–Richardson formula 20 at .86. The 15 items of post-test had the difficulty index between .38 -.75, the power discrimination between .20 - .69, and the reliability value by using the Kuder–Richardson formula 20 at .78.

Satisfaction questionnaire: Was a 5-level rating scale, consisting of the evaluation for the content, media, and utilization. The 5-level rating scale was highest, high, average, low, and lowest.

3.4   Research method

Research participants received an orientation at the school computer lab. They were trained to use the tools available in MOOC on the website https://www.smart-mooc.org/courses/basic-courses/ictez-2019/ by an instructor and sign language interpreter. Then, the participants read the pre-test which contained 15 items. This online test had a sign language interpreter to help translate the questions and answers. The

research sample studied the prototype of online learning resources on MOOC in the computer lab, one student per one computer. The instructor and sign language interpreter provided advice and explained each step of learning process throughout the experiment. During learning period, encouragement, compliment, and advice were given to motivate students. At the end of the learning process, students did the post-test and satisfaction evaluation form and gave suggestions for the improvement.

3.5   Data analysis

Pre-test and post-test scores were analyzed by using t-test for dependent. The level of satisfaction with online learning resources was analyzed by using average statistics standard deviation.

4   Research Findings

Pretest and posttest scores: The researcher conducted the research with 33 students. The research sample learned in the computer lab, with a lecturer and sign language interpreter providing advice. The experiment found that the students spent a lot of time to do the pre-test because they were not familiar with online learning. Also, they had to watch the sign language interpreter to understand questions and answers. Comparing pretest and posttest scores as shown in table 1.

Table 1. Comparison of average academic achievement scores of the research sample Pretest and Posttest (n=33)

	Evaluation	Total scores	$\overline{X}$	S.D.	t
Module 1	Pretest	8	2.76	1.30	-8.34
	Posttest	8	4.73	.91	
Module 2	Pretest	7	2.03	1.33	-7.58
	Posttest	7	4.55	1.72	
Total	Pretest	15	4.82	2.19	-12.14
	Posttest	15	9.27	1.97	

From table 1 the comparison results of academic achievement scores found that academic achievement scores after the experiment were higher than the scores before the experiment with statistical significance at the level of .05 (t = -12.14, p = .00).

After finish learning, satisfaction survey was conducted by a sign language interpreter explaining questions to students: The survey was 5-level based on Linkert concept. The overall students' satisfaction was at the highest level ($\overline{X}$= 4.53, SD = 0.67). Considering each item, it was found that the up-to-date content has the highest mean ($\overline{X}$= 4.77, SD = 0.48), followed by MOOC learning allowing freedom of study ($\overline{X}$= 4.64, SD = 0.58), the clarity of sign language to describe the content ($\overline{X}$= 4.62, SD = 0.67), and the ease of online access ($\overline{X}$= 4.62, SD = 0.63) as shown in table 2.

Table 2. Satisfaction survey from research sample (n = 33)

Items	$\overline{\text{X}}$	S.D.	Meaning
1. The content is up-to-date	4.77	0.48	Highest
2. The content meets your need	4.59	0.55	Highest
3. Each part of the content is consistent with each other	4.56	0.55	Highest
4. The content is clearly and easy to understand	4.54	0.76	Highest
5. The clarity of sign language to describe the content	4.62	0.67	Highest
6. Illustrations attract attention	4.46	0.64	High
7. Subtitles help to understand the content better	4.54	0.55	Highest
8. The ease of online access	4.62	0.63	Highest
9. Learning process is not complicated	4.21	0.80	High
10. You can learn how to use learning tools by yourself	4.44	0.75	High
11. Quick display	4.41	0.79	High
12. You can learn anywhere and anytime	4.49	0.72	High
13. Learning via MOOCs make it easy to learn.	4.56	0.64	Highest
14. MOOC learning allowing freedom of study	4.64	0.58	Highest
15. Lesson can be applied in real life	4.51	0.72	Highest
Mean	4.53	0.67	Highest

5   Discussion and Conclusion

The experiment in using online learning resources on MOOC with lower secondary school students were observed as follows.

- **Access to learning via Facebook:** Students can login to Facebook by themselves without any explanation because they are using Facebook regularly. Therefore, students can access the content easily and quickly. Also, students can easily contact instructors via Messenger. Choosing technology media that students are familiar with will make them learn faster. In addition, during the experiment, some students studied the content and broadcasted their study via Facebook which made their friends become interested in learning.

- **The content:** Students understood the content slowly because they did not understand some vocabulary and technical terms. However, students can solve problems by themselves by searching the word in Google and choosing 'Image', making it easier to understand. In addition, students spend a lot of time on spelling and reading. The researcher solved the problem by using a sign language interpreter to help explain the content in the classroom. The interpreter used vocabulary which was easier to understand, such as "safe" described as "harmless", "illegal" described as "police arrest", "obscene" described as "pornographic", etc., allowing students to learn faster.

- **Video clips:** The use of video clips as learning media attracted students' interest because it contained both picture and sound. They were a new form of learning media for students. The video clips were modern and interesting, presented in conversational style. Sometimes students focused on the presentation more than the content.

Therefore, the researcher moved the test to be right after each module to make students focus more on the content. When student answers correctly, they were given a compliment in sign language, making students enjoy learning.

- **Assignment activities**: It was found that most students were able to search for information through Google to perform the tasks assigned. Students searched for images to understand what they needed to do for the assignment correctly. For example, the activity was to make Songkran Day cards by using images that do not violate copyrights. Students can choose images by searching for the word "Songkran Day" from Google quickly. This showed their efficiency in computer skills. They could make Songkran Day cards quickly. This demonstrated that hearing impaired learners learn from images better than from text. However, some students still had problems with spelling mistakes and word positions. Therefore, they were given additional explanation to use the word correctly.
- **An instructor explained the content in the experiment:** When students saw the instructor, they feel excited and glad to see a real person. In addition, when students answered the question correctly, there would be a compliment by the instructor in sign language and smiling faces. Students felt that the instructor was friendly, making them cooperate well in the experiment.

Most students were interested and enthusiastic in learning, probably because students realized the benefits from learning which can develop and increase knowledge. Also, the content was close to students' everyday life; therefore, they became very interested. The presentation media was easy to understand and modern. There was a sign language interpreter to explain the content. [6] which stated that awareness of usability affected student's learning in MOOC. Learning in MOOC was the use of free time for real benefits and could really help develop and increase knowledge. Also, learning can be done anywhere and anytime. [7] developed lessons based on e-Learning environments found that this type of teaching encouraged learners to be independent, made students feel proud of their work, and became responsible for their assigned duties. Students were very enthusiastic and energetic. They were impressed by the instruction and feel that they had good opportunity to learn. Students made comments on new teaching and learning media. There was a sign language interpreter and subtitles to enable students to understand better. Learning activities were interesting. Also, there were opportunities to help other learners on the internet. This made students feel satisfied at the high level. [8] developed electronic books. The content was divided and organized to suit learners by using computers as teaching materials. The media included images and text that emphasized the attractiveness and matched the objective. An activity during the study was a quiz from exercises with images and vocabulary to help students gain more knowledge and understanding of the content. This made the students have higher scores after studying than before studying.

6 Acknowledgement

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