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Instructional Media for the Deaf: A Prototype for Self Study

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บทคัดย่อ

บทความนี้นำเสนอสื่อการสอนระบบมัลติมีเดียสำหรับคนหูหนวก สื่อถูกออกแบบและพัฒนาโดยอาศัยองค์ความรู้จากงานวิจัยเกี่ยวกับการเลือกประเภทของสื่อภาพที่เหมาะสมกับการเรียนรู้โปรแกรมประยุกต์ของคนหูหนวก นอกจากนี้สื่อยังอธิบายเนื้อหาทั้งหมดด้วยภาษามือเพื่อให้คนหูหนวกสามารถเข้าถึงเนื้อหาได้มากที่สุด เนื้อหาที่ถูกเลือกมาใช้ในการพัฒนาโปรแกรมต้นแบบคือ โปรแกรมอะดอบีโฟโต้ชอป จากการทดลองใช้สื่อนี้กับนักเรียนหูหนวกในระดับมัธยมต้น ผู้เรียนมีความพึงพอใจกับการใช้งานสื่อ หลังจากแนะนำการใช้งานเบื้องต้นแล้ว ผู้เรียนสามารถใช้งานสื่อได้ด้วยตนเอง โดยไม่ต้องมีล่ามภาษามือช่วยในระหว่างการใช้งาน และผู้เรียนให้ความเห็นว่าอยากให้มีการพัฒนาสื่อในรูปแบบนี้กับโปรแกรมตัวอื่นด้วย เช่น โปรแกรมไมโครซอฟท์ออฟฟิศ

คำสำคัญ: คนหูหนวก; ภาษามือ; สื่อการสอนระบบมัลติมีเดีย; อะดอบีโฟโต้ชอป

ABSTRACT

This article presents a newly developed instructional media for deaf people's education. The media was designed based on the knowledge acquired from a prior research project on the effectiveness of different image types when used as instructional media in teaching application programs to deaf students. All contents in the media were covered in sign language for maximum comprehension. The prototype of the media covering the Adobe Photoshop program was tested out on deaf students to a positive outcome. All students were satisfied as they were able to use the media without the help of a sign language interpreter. Most of

them stated that they would like this kind of instructional media for other programs such as the Microsoft Office.

Keywords: Deaf; Sign language; Instructional Media; Adobe Photoshop

Introduction

Nowadays, knowledge about information technology plays such an important role in our lives. Application programs have become more useful and essential to all career fields. Therefore, people who specialize in using them are needed in every department, even in job applications for deaf people. According to the information from a survey done by the Education Services and Student Affairs Section of Ratchasuda College on their deaf graduates; over 60% stated that the main factor that got them employed is their skill in operating application programs. However, deaf students encounter many difficulties studying the more advanced application programs as they proved to be too complicating and involving too many tools. On top of that, there is no proper instructional media available for them because most of instructional media have been developed for normal-hearing students, meaning they are covered, either verbally or in text, in long sentences. Unsurprisingly, when deaf students use them, problems do occur; from incomplete comprehension of the given manual or tutorial to total inability to understand them.

Therefore, the development of efficient instructional media for application program for deaf students is crucial and will be extremely beneficial to them. While retaining the use of pictures, videos and narrating voice, this new instructional media had been developed to properly cover all specific needs of deaf students.

The research behind the development includes a study that compared the effectiveness of image-based instructional media to that of motion-picture-based instructional media as a self-studying tool for deaf students. The result was analyzed to determine which concept would best allow them to understand and review the steps in using application programs by themselves. The image retouching

application program, Photoshop, was used as the case study because of its exceptionally suitable features for deaf students, since they naturally specialize in arts (Tamara R. K, Sanja T.D., 2023). The program can be used to create a variety of quality work when students have proper knowledge on computer graphics. Not only will the work accomplished be useful in their job applications, but the skill set obtained will also be applicable through their careers had they pursue one involving computer graphic designing.

This development also adopted the Cognitive Load Theory (Sweller, 1988), the Information Processing Theory (Miller, 1956), and the Cognitive Theory of Multimedia Learning (Mayer, 2005) as guidelines in developing the media, which could be listed as follows:

1. Step-by-step-usage tools such as the "text tool" should be taught with slides which teachers can "click" to demonstrate their step-by-step function. With this method, deaf students will have time to remember all the steps in respective order.

2. Continual-usage tools such as the "brush tool", should be taught with motion pictures, in which deaf students can clearly see the movement of the mouse pointer and the changes made to the pictures continuously. This concept of instructional media will initiate clear and continuous comprehension.

3. Only use as much text as needed. Each text should be short and simple because most deaf students have difficulty in understanding long sentences.

4. Pictures used to show the function and usage of a program must be screen captures of the real user-interface of that program. This will enable deaf students to connect the contents in the instructional media to the real program.

5. The instructional media must include sign language explanations for all of the contents.

These guidelines agreed with the findings of the aforementioned study conducted with Photoshop (Luealamai et al., 2014). Furthermore, prior to this development project, a similar study was conducted with the Flash program as the case study (Luealamai, 2013), yielding results agreeing with both the succeeding Photoshop study and the guidelines. Therefore, it can be confirmed that

instructional media for application programs developed based on the conclusions above would meet the needs of deaf students and be the most appropriate and efficient for their learning process and self-revision.

The prototype instructional media was developed to cover contents of the Photoshop program, again, for its suitability for deaf students' artistic nature, with the most special asset of the media being the explanation of contents using sign language and related pictures.

Program Composition

The instructional media is a program consisting of:

1. The first screen

The first screen shows the overall contents in the instructional media using pictures. Students can click the big play button in the middle of the screen to start the lesson. The first screen is shown in figure 1.

Figure 1: the first screen of the instructional media on Photoshop.

2. The second screen (Main Menu: Topic Selection)

After entering the lesson, there will be 5 different topics for students to choose from: Drawing, Painting, Text, Selection and Retouching, as shown in figure 2. When the mouse pointer is placed on a topic, pictures of created work and relevant tools will be shown to briefly inform them of the overall contents of the topic, as shown in figure 2(a) and figure 2(b).

(a) (b)

Figure 2: Topic choosing screen; (a) When the mouse is placed on the topic "Painting" and (b) When the mouse is placed on the topic "Selection"

3. The third screen (Content Overview)

After clicking on a topic, students will be taken to a screen which explains the contents using sign language and pictures. This will inform them of what they are going to study, what for, and what the steps are, as shown in figure 3.

Figure 3: Screen which explains the contents that students will study according to the topic they have chosen.

This allows students to understand the overview of the contents under each topic beforehand, which makes learning more effective.

4. The forth screen (Sub-topic Selection)

After getting the content overview for the chosen topic, more buttons will appear for the students to choose from, this time the subtopics of their chosen topic. They can choose and study each one individually by themselves as shown in figure 4.

Figure 4: Screen for students to choose from the 5 sub-topics under the topic "Painting"

5. The fifth screen (Content Explanation)

After choosing a sub-topic, there will be a detailed explanation of the content including how to use the program. For example, the screen will show the icon of the tool that students have to click, as shown in figure 5. This allows better understanding and enables them to follow the steps and command the real program more easily.

Figure 5: Screen explaining how to use the program step-by-step in sign language

6. The sixth screen (Visual Media)

When the sign language explanation is finished, a button "NEXT" will appear. After clicking the button, students can watch a demonstration of what they just learned. This demonstration will be displayed in motion pictures or several slides, depending on the suitability according to how the tool under demonstration is used. For demonstrations using many slides and clicking method, there will be a button at the bottom right corner which will lead to the next slide, and at the bottom left corner to go back to the previous slide, as shown in figure 6(a). For demonstrations using motion pictures, there will be a button for "Play" and "Pause" at the bottom left corner of the screen, as shown in figure 6(b). Students can control the playback as they please.

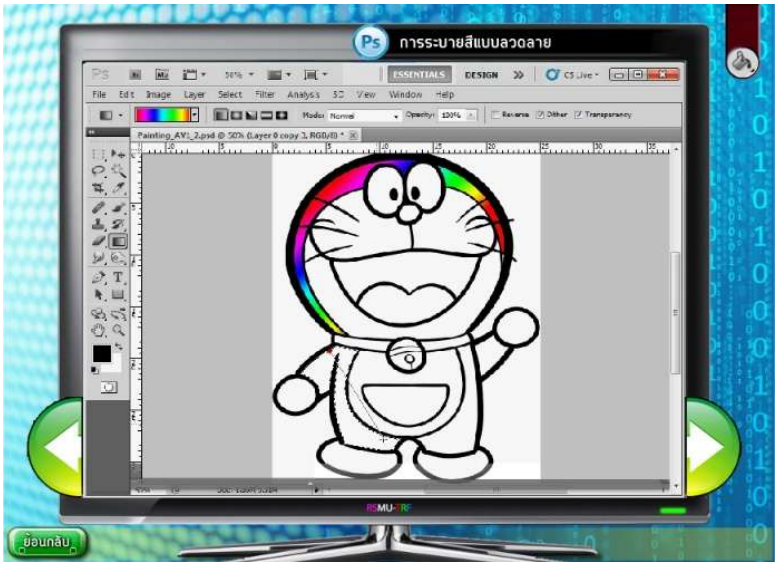

Figure 6a: A screen of a demonstration consisting of several slides (buttons for going to the next slide or the previous one at the right and left corners, respectively.)

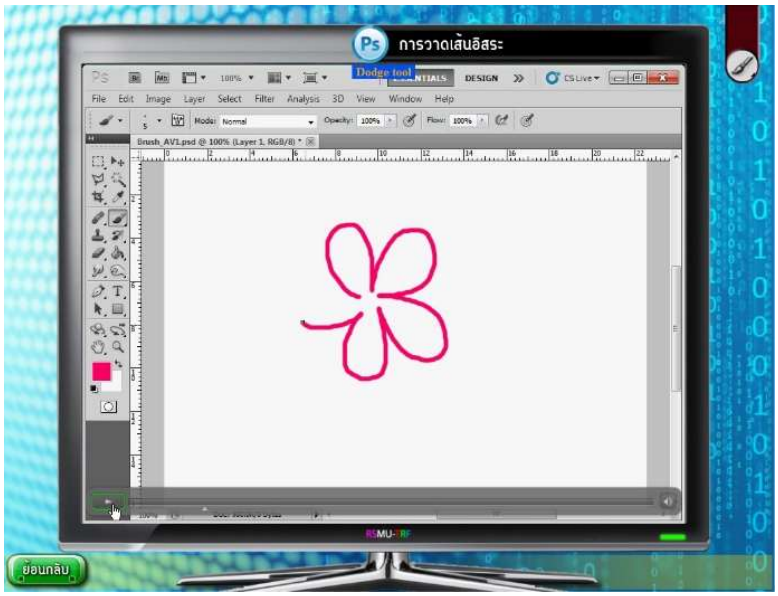

Figure 6b: A screen of a demonstration in motion picture (play/pause button at the bottom left corner of the screen)

On top of all the knowledge that were the foundation of this development, the three principles of Rieber's literature review (1990) had also been integrated into the whole of the instructional media. Those principles being (1) Motion picture should only be used when it features are needed, for example, using motion picture to show a drawing process,

(2) Application of interactive graphics such as allowing students to control the display of media increases learning efficiency, and (3) Giving students an introduction to the content before showing them the respective motion picture allows them to better follow and understand the content of that motion picture. As for this instructional media, for every topic, students must watch the content overview section before they may proceed to the visual media sections.

7. The seventh screen (Exercise)

At the end of every topic, there will be an exercise for students to do to make sure they understand the contents. In these exercises, students are required to work with the real program using provided materials. Detailed instructions in sign language will be given to students before they see the exercise. Figure 7 shows an example of the exercise under the topic "Painting".

Figure 7: An example of a question in an exercise.

The developed prototype instructional media had been tested out as the teaching tool of the PhotoShop program in Nakhon Pathom School for the Deaf twice (3 and 7 students respectively), to observe its practicality and gather teachers' and deaf students' opinion on it. It turned out that nobody had ever seen or used this form of instructional media before. Every student was satisfied with it because of the appealing appearance, clear contents and good complimentary pictures which made it easy for anyone with hearing disabilities to understand. Many students said that they want to try using the program after seeing the instructional media. Everyone stated that they wanted to use it for self-revision at home. Such satisfaction was also observed from the teachers' end. They were interested and pleased to use this instructional media as their teaching tool. There were no suggestions to further improvise it. The only comment was that they want this kind of instructional media for other programs as well, especially the MS-Office Programs. Figure 8 to figure 10 shows the learning atmosphere with the instructional media at Nakhon Pathom School for the Deaf.

Figure 8: First time using the instructional media on the first group (9th grade deaf students). Students study the contents by themselves without the help of a sign language interpreter.

Figure 9: Second time using the instructional media on the second group (8th grade deaf students). Students study the contents by themselves without the help of a sign language interpreter.

Figure 10: Students with hearing disabilities who joined in the study were satisfied with the instructional media.

The teachers and students' opinions clearly indicated that the product of this development is useful for the target group and can be further improvised to cover many more application programs.

Hardware requirement for the instructional media

Devices that can be used to view this instructional media include:

1. Desktop or laptop computers that run Windows XP or above.

2. Tablet that run Windows or Android.

3. Smart Phones that support viewing of Shockwave files of Flash program.

Deaf students who tried viewing the instructional media on tablet that run Windows stated that the convenience and viewing quality are not different from those on typical computers.

Figure 11: Deaf students viewing the instructional media on a tablet that runs Windows

This instructional media for the study of PhotoShop program is the first instructional media developed to teach deaf students on how to use application programs in Thailand. This instructional media is in high demand and is very useful for the learning process of deaf students. It can be concluded that the concept of this instructional media is the beginning of further evolution on the study of application programs in people with hearing disabilities.

Application of work

The benefit from this project, aside from the knowledge gained and the successfully developed instructional media for the study of PhotoShop which can be used as a prototype, is the application of the

knowledge in active learning. For example; as many educational institutions for the deaf offer pottery courses, deaf students who could operate Photoshop for graphic designing could also design more creative or intricate patterns to be screened onto their pottery work. This can be applied in students' future freelance careers. The pottery arts from the application of graphic designing are shown in figure 12.

Figure 12: Ceramic mugs coated with graphic pictures by deaf students who participated in the project.

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