Sign Language Terminology with Multimedia in Computers and Communication Education Context

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Abstract

This paper presents the design and implementation of sign language terminology with multimedia in Computers and Communication education context. The study also conducts the accessibility and appeal of the prototype made it instructive for teachers and students, many of whom do not know the signs for specialized Computers and Communication Terminology.

Introduction

In case of Computers and Communication (C&C) terminology in education context, sub-area fields include: principles of graphic design, using graphic software, animation creation, web development and e-learning. The subject matter of is technical and abstract (e.g., computer graphic, bit map, image layer) and there are no ready Thai Sign Language (ThSL) signs for these common C&C terms. Consequently, fingerspelling—a form of manually coded English (MCE)—is extensively employed during lectures. According to Turkington and Sussman (2004), fingerspelling is a slow communication method. For a very proficient user, “the average fingerspelling rate is about 60 words per minute, which is only about 40 percent as fast as the normal speaking rate”. Frequent use of fingerspelling slows the pace of lectures, such that not all required content can be delivered within classroom time limits. Furthermore, research shows that fingerspelling is frequently a primary source of errors in the interpretation process, even for professional sign language interpreters (Seal, 2004). Thus, dependence on fingerspelling to lecture the C&C concepts and terminology is not the most reliable way to convey information and ensure accuracy meaning.

Consequently, the concept list of computers and communication terminology had, in our case, two existing representation equivalents in the context of spoken languages: a set of English terms (source language) and a set of their Thai translations (receiver language). The task was to create terms in ThSL for the same concepts, allowing for the least possible influence by previously existing representations, while creating terminological items according to sign language word formation principles. This was a crucial prerequisite for the proposed denominations to be recognized by native signers as components of ThSL with acceptable internal structure and specific cognitive content. The task of concept denomination for the formation of a terminology list in ThSL was undertaken by a working group of terminologists, computational linguists, computer scientists, ThSL specialists and computer skills teachers.

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From a perspective of advancing knowledge in deaf higher education, such a study would add to the limited current body of literature are gaps to be filled regarding whether multimedia instruction can be an effective pedagogical tool for the deaf population. The major benefits of multimedia learning environment among the hearing population, from both academic institutions and the corporate training arena, are well documented: accurate and consistent content delivery through visually-enhanced multimedia presentation and simulation, self-paced and learner-controlled learning via dynamic content, learner engagement through interactive learning materials, graphical modeling, and instant feedback, real-world-like practices enabled by virtual labs, simulation, and interactive exercises, accommodation of a variety of learning styles, high retention of content through personalized and active learning, content delivery efficiency, anytime and anywhere learning modality, and meaningful assessment and testing (Demirbilek, 2004; Kumar, 2002; Pastore, 2002; Roblyer, 2004; Rosenberg, 2001; Tang & Lane, 2002).

Although little is known about the precise strategies deaf people follow in processing multimodal information, it is supposed to be based on combining the information from different modalities. Strategic use of multimodal information would probably contain switching from one modality to another, comparing or combining information from two modalities, etc., in order to extract the most likely meaning of the terminology. Multimedia offers a rough simulation of interconnected modalities. Which modality (sign language or graphic animation) or combinations of modalities could sign language terminology with multimedia in computers and communication education context employ to improve DHH learning?

**Preliminary study**

**Prototype Design**

The study goal is to design, develop, implement, and evaluate a delivery system that would blend interactive drill and practices with classroom instruction to enhance DHH college student learning of C&C content. The application involves setting up a multimedia learning environment in with different paths may be followed independently. Exploration of the environment offered by the computer stimulates the user to use and integrate four sources of information: sign language video clip, written text, graphic and animation explanation. The information provide in the various forms is only partially equivalent, and retains some differences of content and form, which depend on the specific modality of presentation. The four modalities are all visual but two are linguistics, while the other two are not. The two linguistics modalities, Thai Sign Language and written Thai, offer the same contents, but respect the grammatical, syntactic and morphological rules of the specific languages. The examples of some screenshots of learning system prototype design are shown in Figure 1, Figure 2 and Figure 3 respectively. There are interesting developments which allow linking groups of sign video sequences, groups of written words and groups of pictures or sequences of animations. These linked groups are controlled with a program script; the user of the learning system can explore the system in several directions.
Pilot Study

A pilot study was conducted which included ten DHH students between the ages of 21-30 who use Thai sign language as a mode of communication. All of the students were attending Bachelor of Arts program in Deaf studies at Ratchasuda College, Mahidol University in Thailand.

The students learned the Computers and Communication terminologies with multimedia in their class. The pilot evaluation took about thirty minutes, the researchers then interviewed the participants to explore their perceptions of the prototype. Results from the pilot study revealed that according to student observation, DHH students attended to and engaged in the computers and communication multimedia system. During the pilot study, the pre-posttest measure was piloted as well as the instrument for observation. Instructors filled out the instrument for observation during or after each of the videotaped signing viewings. The data indicated that the Computers and Communication terminologies with multimedia benefited the students, for example, participants reported that animations make the item more interesting, more
comprehension and reduced their cognitive load as well. The average posttest scores were higher than the average score of the pretest scores. Measures were modified based on feedback resulting from the study. For example, some students commented that some of the pictures were hard to understand clearly or misconception. These pictures were replaced and images made bigger and clearer. The graphic animation should be designed to be interactive, appropriately simplified and constructed in virtual reality animation.

Consequently, the concept list of Computers and Communication (C&C) terminology had, in our case, the representation equivalents in the context of spoken languages: a set of English terms (source language) and a set of Thai translations. In the case of C&C-skills terminology, sub-area fields include: Computer Graphic, Computer Animation, E-learning and Web Accessibility. The task is to create terms in Thai Sign Language (ThSL) for the same concepts, creating terminological items according to sign language word formation principles. This was an essential prerequisite for the proposed denominations to be recognized by native signers as components of ThSL with acceptable internal structure and specific cognitive content. The task of concept denomination for the formation of a terminology list in ThSL is undertaken by a working group of terminologists, computational linguists, ThSL specialists and computer skills teachers. The design of the terminological resources is based on term lists, the formation of which is described in the methodology section. Each entry corresponds to a term in a specific domain and includes fields for the video recorded term-sign, a video file serving as a visualized term definition, the equivalent Thai term, the equivalent English term, and multimedia presentation in which the term is used.

Conclusion

The preliminary study demonstrates that the prototype of sign language terminology with multimedia in computers and communication can yield important educational benefits. In this paper we have described the underlying design principles and implementation of a sign language terminology with multimedia in computers and communication education context. This component uses ThSL and multimedia technologies to provide semantic and syntactic information from written text and encode it with reusable and extensible sign language representations. It is the task of educators to create computers and communication terminology learning environment that is fully accessible to the DHH students. Understanding how DHH student learn C&C terminology. However, this result is still in the preliminary stages of development and evaluation. It emphasizes providing teachers with a framework to design instructions that meet the educational needs of their Deaf and Hard of Hearing students. In ongoing research, these materials are being further developed and evaluated.

References


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