From Multimodal Learning to MimicryLearning: The Study on the Impact of Multimedia (Multimodal) Learning on the Vocabulary Achievement of the EFL Deaf Students

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Abstract

The present study investigates the possible relationship between the multimedia (multimodal) learning and the lexical (vocabulary) achievement of the hard of hearing students in the first grade of junior high school in Qom province, Iran. With regard to the fact that we are living in the digital age, or in the technology era, the impact of media or technology on every aspect of our life cannot be disregarded. There is a rich literature on the parts that technology and computer play in our life. Actually we have been bombarded with the technology thereby at times knowing the importance of the computer and technology has raised many crucially important questions such as "Are computers of hindrance or assistance?" The result of the present study on the vocabulary achievement shows that there is a difference therefore, meaningful difference, between the effects of multimodal learning and the vocabulary learning of the students. It displayed that teaching vocabulary through multimedia can substantially influence their learning.

Keywords: multimedia, hard of hearing students

1. Introduction

With the incredible speed of development of ICT (Information and Communication Technology) and with the availability of high speed Internet, the study materials can be distributed in even more complex audio and video formats. Most frequently, it is presented as interactive video on demand. Compared to the traditional written form, a video clip with sound is a more vital method of presenting information. The mimicking and gesturing offered by a video clip tell us much more than just words and pictures in a book. However, the words, sounds and simple mimics and gestures are not always sufficient for successful teaching of the deaf. Therefore, teachers must spend more time using different methods of teaching words. Moreover, the deaf also have difficulties in understanding multimedia applications, which appear on the Internet. The Internet has an overwhelming amount of information, which is available to everyone except the deaf who are not proficient in the written language and often do not know English. The situation becomes even worse because most of the educational institutions for the deaf do not have the required facilities for using ICT and the fact that school programs for teaching foreign languages (e.g. English) to the deaf have just been introduced. While everyone knows that leaning English as a foreign language is highly important, when teaching English as a foreign language to exceptional students such as deaf is taken into account, its significance becomes much greater. It is clear that we can not apply the same methods and approaches of foreign

language teaching to deaf students, because of the fact that hard of hearing students are not the same as usual and ordinary people. Their lack of hearing and speaking ability like common people has marginalized them to the extent that they have been assigned to different schools with specific instructions. Therefore, care must be taken into account in the methods and approaches in teaching English as a foreign language to them. Foreign language should be taught via methods different from those of common ways. Most of these students are vision-oriented, i.e. they learn far more from the pictures and drawings than other material such as text. So, if English were taught to deaf students by applying methods such as Grammar-translation method, or any other similar methods, no significant and positive results regarding their mastering of the English would be obtained. Lots of research has been carried out on the effect of multimedia on learning. Language teachers view multimedia as a vehicle for utilizing promising applications in foreign language learning, especially for the memorization of vocabulary. The interaction between sound, written word, and the image of objects presented is considered to enhance memorization considerably. In terms of vocabulary learning, for instance, research has shown that there is improved learning for those words coded visually and verbally as compared to words coded only verbally (Plass, et al. 1998, 2003).Therefore, there is a body of research that emphasizes the need for multimedia instruction learning materials to be designed in accordance with individual cognitive limitations. Thus, when it comes to the teaching of deaf students we see that it becomes a matter of utmost importance. The present study tries to answer to the question of whether and to what degree multimedia influence the vocabulary achievement of deaf students.

1.1 Research Question and Hypothesis

The present study is carried out to address the following question:

1- Does multimedia (PowerPoint presentation & Word) instruction influence the vocabulary achievement of the hard of hearing students in the first grade of junior high school?

2. Review of Literature

There is luckily a rich literature regarding the multimodal or multimedia learning and instruction. The growing research on the merits of technology on the educational system supports the fact that multimodal instruction and learning works to our advantage. However, research has also shown that this manner of representing information may lead to different results depending on the learning conditions and the individual differences of the learners (Plass et al. 2003). Therefore, the body of research emphasizes the need for multimedia instruction learning materials to be developed according to individual cognitive limitations. But let us have a brief historical overview of multimodal theories before looking at some of the empirical studies done in this respect.

2.1 Multimodal theories

The preliminary premises proposed in this camp are Paivio's Dual Coding Theory (1969), Baddeley's Working Memory Model (1974), and Sweller's Cognitive Load Theory (1994).

In his dual coding theory Paivio made an important distinction between verbal and visual coding of information that provided a firm foundation for subsequent studies. From his vantage point verbal association and visual imagery are two major ways through which a person can elaborate on material in a learning experiment. Pictures typically result

in better memory than do concrete words. In his viewpoint imagery potential outweighs association potential in predicting the quantity and quality of vocabulary learning.

The working memory model proposed initially by Baddeley and Hitch (1974) also distinguishes between a verbal code and a visual code. Here, however, the emphasis in verbal code is placed on phonological information rather than the semantic information. Their model consists of three components: (a) A phonological loop (b) a visuospatial sketchpad, and (c) a central executive, each one responsible for different kinds of incoming information.

In order to overcome the limited capacity of short-term memory in dealing with multiple forms of representation, Sweller (1994) put forward his cognitive load theory. In this theory automatic processing and schema acquisition are enumerated as two means of tackling this problem.

These preliminary works paved the way fora comprehensive theory encompassing all the relevant ideas in one unified theory. Borrowing the required concepts fromPaivio, Baddeley, and Sweller' theories,Mayer (2001) put forward a cognitive theory of multimedia learning with a focus on cognitive processing of verbal and visual material. His theory is based on three main assumptions, namely the dual channels assumption (visual and verbal processing channels); (b) the capacity assumption (limited processing capacity for each channel); (c) the active processing assumption (conscious and careful selection, organization, and integration of the new information with existing knowledge).

2.1.1 Empirical Research on Multimedia Theories

Following Mayer's first assumption Plass, et al (2003) examined the relationship between reading comprehension in the second language acquisition context and vocabulary learning through multimedia annotations. Their conclusion was that receiving visual annotations for vocabulary words, high-verbal and high-spatial ability students outperformed their low-verbal and low spatial ability peers regarding recall of word translations. In a similar study they point out the negative impact of limited processing capacity on multimedia learning, just under some conditions and only for some learners, which is in line with Mayer's second assumption. In Mayer's last assumption presenting new information in multiple modalities is only seen as advantageous to learners who actively process such information. Aldrich, et al. (1998) conducted a study on students' engagement with multimedia resources and use of them to understand various concepts and integrate different kinds of knowledge. They concluded that students' meaningful interaction with these representations, i.e., at the level of cognitive interactivity, is the determining factor for success in such programs.

Dubois and Vial (2000) investigated how different multimedia presentation modes affect the learning of foreign language vocabulary. Their findings showed that adding an image to a sound and text presentation can have a significant contribution to learning, but only under certain conditions.

A recent study in the same context has been done by Tabar and Khodareza (2012) on the effect of multimedia on vocabulary learning of pre-intermediate and intermediate Iranian EFL learners. They taught new words to experimental group using the multimedia software "*Vocaboly*" while introduced the same words to the control group through Teacher-led Method (TLM). The results of the research indicated that the Computer Assisted Vocabulary Instruction (CAVI) group outperforms Teacher-led Instruction group on post-test. Therefore, they concluded that their treatment had a significant impact on vocabulary learning of the learners.

2.2 Multimodal versus Unimodal Instruction

Multimodal vs. unimodal distinction is concerned with one-way (text-only) and two-ways (text plus picture) modes

of instruction. Studies in this respect have shown that even in the complex situation, multimodal instruction led to a better performance than unimodal instruction. (Gellevige, 2002)

2.3 Interactive Multimodal Learning Environments

Multimodal learning environments are those learning environments that use two different modes of representations: verbal and non-verbal (Paivio 1986). In multimodal learning environments, students are presented with verbal and visual representation of the content simultaneously. Although the verbal mode of instruction is a long-standing medium of instruction, some researches have put emphasis on multimodal media, especially those that combine textual and pictorial representations of knowledge. This is rooted in the fact that according to the multimedia principle, learning can be enhanced by the addition of non-verbal representations to verbal explanations (Fletcher and Tobias 2005; Mayer 2001).

A further distinction has been made between interactive and non-interactive multimodal learning environment. The former is a learning situation in which what happens depends on the actions of the learner while in the latter a pre-determined content is presented to the learner irrespective of anything the learner does during learning. (Moreno and Mayer, 2007)

2.4 Deafness and Being Deaf

From a medical perspective, deafness can be acquired at any time of life. Approximately 95% of children who are deaf at birth are born to parents who have no hearing loss whatsoever (Woodcock and Rohan 2007). Deafness after birth may be acquired suddenly as a result of viruses, disease and injury, or progressively as a result of hereditary and idiopathic causes (see Woodcock and Aguayo 2000, for a review of the many causes of hearing loss and deafness). Many of those who do not benefit from or decide not to use ''correction'' technology (hearing aids, cochlear implants etc.) will commonly learn and use sign language to be actively engaged in employment and social life.

2.5 Effectiveness of Technology and Computer-Based Instruction for Deaf Students

Providing technology to bridge the communication gap between deaf and hearing people is a long-standing aspiration. In addition, some may feel that such technology will reduce the conspicuity of the deaf person. Research shows that education with the help of ICT facilitates both teaching and learning, especially with the help of hypermedia systems and applications (Jarvis, 2004). In addition to some studies that have compared the traditional methods of teaching to teaching through multimedia systems, there is still a need to show that education using ICT has significant advantages.

In the case of deaf,Gentry, et al. (2004) tried to assess the relative effectiveness of print, sign, and pictures in facilitating reading comprehension for impaired hearing learners. Their materials were in following formats: print only, print plus pictures, print plus sign language, and print plus pictures plus sign. They come across with significant differences among the four presentation options. Their Findings showed that introducing stories with multiple modes of reading cues, such as print, pictures, and sign language, may be an amusing and pleasant supplement to conventional reading practices.

It has been shown in other research that computer based instruction is emerging as a prevalent method to design and teach vocabulary for individuals with special needs. Dubois and Vial (2000), for instance, found an increase in learning vocabulary when training consisted of the combined textual, oral, and pictorial presentation, in comparison to only using only one of the these modes. The students are able to learn the subject and review the materials in the

language and multimedia forms with which they are most familiar.

3. Methodology

3.1 Design

This study is a kind of experimental research and its design is one-shot case design of pre-experimental research, that is to say, pretest- treatment and then posttest.

3.2 Participants

Ten prelingually deaf students of the first grade of junior high school of Velayat in Qom province, Iran, aged between fourteen and seventeen, participated in this study. Five of these students were profoundly deaf and the other five were partially hard of hearing.Unfortunately there was only one class of the first grade in that school. So there was not any control group. Moreover, there was no missing participant in this study. With regard to the linguistic proficiency of students, the subjects were elementary level.

3.3 Instrumentation

In this study a kind of pre-test was designed for the first four lessons of the first grade of junior high school. Other tools being applied were video projector for magnifying the pictures, computer for applying CD, and finally a kind of post-test for identifying the effects of the multimedia on the lexical learning of the students.

3.4 Procedure

In the current study the first four lessons of English book in junior high school were taught using conventional methods. After covering the four lessons a pre-test was given to the participants. After a while the vocabulary of lesson five were taught through applying multimedia, i.e., PowerPoint Microsoft office and projector for magnifying the pictures. Students were sat in two rows of chairs. At first some pictures were shown to them, say blackboard. When they got the image of the blackboard in their mind, another slide would pop up showing and writing the word "Blackboard" in English. Beneath the English version, its Persian version was written. Then students repeated the Persian version while looking at its English equivalent. And then a full sentence would emerge containing the new word. Other vocabularies were taught according to the above-mentioned manner. Meanwhile, students were provided with sufficient time to write vocabulary's pronunciation and other notes regarding vocabularies. Other vocabularies were taught accordingly. After finishing the lesson they were given a test containing all the newly-taught vocabularies. The results showed that students outperformed in the post-test.

3.5 Results

As the following tables speak for themselves, matched T-test was used for this paper. The reason behind that was the use of one group with two sets of scores. As it was expected, post-test yielded a mean index better than pre-test (16.5>13.4) and there was a significant (.001<.05) and at the same time meaningful (high correlation index of .94) difference between pre- and post-test sets of scores. It can be easily inferred that multimedia instruction has had a quite positive effect on the vocabulary achievement of physiologically impaired students.

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre	13.4000	10	4.32563	1.36789
	Post	16.5000	10	2.91548	.92195

Table 1.Descriptive Statistics of the Pre-Test and Post-Test

Paired Samples Correlations

	N	Correlation	Sig.
Pair 1 Pre & Post	10	.943	.000

Table 2. Correlation between Pre-Test and Post-Test

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	Pre - Post	-3.10000	1.85293	.58595	-4.42550	-1.77450	-5.291	9	.001

Table 3. Descriptive Statistics of Paired Sample T-test

4. Conclusion and Discussion

The current study tried to investigate the effect of applying multimedia on learning vocabulary by hard of hearing students. The results showed that the use of information and communication technology is critical for the deaf in all levels of education. The use of such technology significantly increases the ability to learn and understand the written word, especially if the applications are designed for the deaf. This improves the social inclusion of the deaf and their self-esteem and increases the possibilities for proper rehabilitation.

Although many research have been done with regard to applying the multimedia into the educational context, especially into the teaching of foreign language, there had not been carried out any research concerning teaching English as a foreign language to the hard of hearing students in Iran. It was tried to teach English through the multimedia. As the results showed, applying multimedia to the hard of hearing students had significant results because they benefited most from visually based strategies. They enjoyed the classroom greatly and focused most of

their attention on the slides displayed to them through the video projector. They enjoyed watching the slides so that when the school's bell rang they were not inclined to leave the classroom.

This study provided an evidence for facilitating effect of applying multimedia on vocabulary learning of hard of hearing students. Therefore, language teachers may use such programs to enhance learners' vocabulary perception. In addition to using multimedia for vocabulary instruction in language classes, such kind of programs can be also used by students in their extra class hours. Therefore, students take responsibility for their own learning.

This study explored the effects of multimedia on the vocabulary perception of hard of hearing students after they had received one session of instruction. A study that examines students' vocabulary learning in a longer period of time may obtain more generalizable findings. Other researchers may continue the route of this study by investigating the effect of multimedia on other language skills, such as writing and listening.

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