



Review Article

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FOREIGN LANGUAGE EDUCATION OF VISUALLY IMPAIRED INDIVIDUALS: A REVIEW OF PERVASIVE STUDIES

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Abstract

Nowadays, the significance of foreign language education has increased and new teaching methods have been developed. Until 1980s, the foreign language education of visually impaired (VI) individuals was not provided effectively. The most important reason for this was the belief that VI individuals were disadvantageous in learning foreign languages. In recent years, studies in neuroscience have led to the conclusion that VI individuals are not disadvantageous, but rather are more advantageous than those sighted people. Experiments conducted in neuroscience showed that, VI people have stronger verbal memory which contributes to their foreign language education. With the changing understanding and the developing technology, studies on foreign language education of VI individuals have gained speed and thus progress has been made. In this study, it was aimed to provide a literature review about pervasive studies in terms of foreign language education of VI and give an idea to the researchers who are interested in this subject. According to the literature review, it can be said that assistive technology developed specifically for the target group contributes to their foreign language education in terms of instantaneous access to information, individualized instruction, and success.

Keywords: Visually impaired; foreign language education; assistive technology

INTRODUCTION

Many people think that visual impairment implies only total blindness. However, visual impairment is a cover term used for describing varying degrees of vision loss from low vision through total blindness (Bailey & Hall, 1989). The eye has different parts working together to enable people to see, if one of the parts does not work well visual impairment occurs. According to the Special Education Guide (2013-2017) common indicators of visual impairment are:

- “Irregular eye movements
- Unusual habits (such as covering one eye or frequently rubbing eyes)
- Sitting abnormally close to a television or holding a book close to the face” (n.p.)

In order to understand the particular visual impairment a person has, it is helpful to understand types of it. The terms partially sighted, low vision, legally blind and total blind are often used to describe and categorize levels of vision by National Dissemination Center for Children with Disabilities (NICHCY, 2017). *Partially sighted* people have some type of visual problem that is not severe, even though they need special education. Seeing partially adversely affects a student's educational performance. People

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with *low vision* have severe visual impairment who are able to learn with visual sense but cannot read normal text size which cannot be improved with regular eyeglasses (Scheiman, Scheiman, & Whittaker, 2007). In order to read, they may need special requirements like magnified print, contrast colors, additional lighting, text size change, and different fonts (Web Accessibility Initiative, 2005). *Legally blind* is a term used to define level of vision loss that has been legally accepted to determine eligibility for benefits. This level is determined by 20/200 measurement in which 20 represents the distance in meters needed by a visually impaired (VI) person to see an object, while 200 represents the distance for sighted people to see the same object (NICHCY, 2017). *Total blind* people do not see anything with their eyes since they do not perceive any form of light. NLP which is the abbreviation for no light perception is used to define total blindness (AFB, 2017). Total blind people use braille and any other nonvisual media. In this study, VI was used as an inclusive term to refer to both total blindness and low vision. According to the data of the World Health Organization (WHO, 2014), 285 million people are recorded to be VI worldwide; 39 million are blind and 246 million have low vision. Turkish Statistical Institute (TUIK, 2015) published a report and indicated there are approximately 5 million disabled people in Turkey and 8.4 % of them are VI which is equal to 216.077. The magnitude of VI is a distinct and multidimensional phenomenon that cannot be ignored in today's society.

In order to understand the effect of visual impairment on education, there have been several research studies conducted (Bishop, 2004; Pring, 2008; Rogers & Puchalski, 1988; Röder, Rösler, & Neville, 2001; Raz, Striem, Pundak, & Orlov, 2007).

First group of studies focused on the learning areas which may adversely affected by visual impairment and the challenges VI people face with. Some of those learning areas are concept development, communication, life skills, orientation and mobility skills, and academic development (Alberta Education Special Programs Branch, 2004). Piaget (1952) indicated that vision is the main source for building of sensorimotor intelligence (as cited in Dote-Kwan & Chen, 1995). In the literature, there are studies that show the challenges VI individuals face with. In their study, Rogers and Puchalski (1988) found that VI infant face with challenges in achieving object performance tests due to their vision loss. Similar to this issue, another challenge occur during the transition from "an interactive process to abstract level" (Bishop, 2004, p. 94). During primary education, learning is concrete with the focus on hands-on practices and interactivity which does not create much trouble for VI students to attend (Bishop, 2004). However, during learning abstract concepts VI students may face with difficulties if they are not provided with more time to learn. Vision loss cause inability in giving meaning to their perceptions of the environment and without hands-on experience VI students cannot perform skills.

The second group of studies -which conducted in neuroscience field- focused on memory functions of VI individuals. Röder et al. (2001) studied with 11 congenitally blind and 11 sighted people and found that VI have superior memory functions. In that issue, Pring (2008) indicated that VI individuals outperform sighted people in memory related situations and as a result they have better retention. This memory advantage may be the result of the attentional effort of VI individuals on auditory processing (Pring, 2008). A similar contribution to the literature was done by the study of Raz et al. (2007) who gave 20 words to both VI and sighted individuals. In the end, VI recalled more words in the sequence of original list.

Those both group of studies provide insights for educators and researchers including foreign language (FL) education. Details are provided in the literature review section.

LITERATURE REVIEW

In terms of FL education of VI individuals, the tendency during ninetens was to systematically ignore their special needs (Guinan, 1997). In 1995, a study was conducted in order to understand the feelings of VI students and teachers about the British National Curriculum in foreign languages (Gray, 1997; 1998). The results showed that there are a lot of things to be done in order to provide equality between VI and sighted students in the area of modern foreign languages. Even nowadays some of those problems can be observed in the foreign language education of VI students (Grundtvig Learning Partnership, 2008-2010; Jayakody, et al., 2016). In 2008-2010, a study was conducted in FL education of VI individuals in Europe with the cooperation of several partners. Those partners believe that their countries do not provide enough opportunities for the EFL of VI adults. For this reason they targeted to include them in language education by increasing their accessibility. Similarly, Jayakody et al. (2016) conducted a research and indicated that VI individuals face with difficulties while learning English and as a result have difficulties in finding a job.

These negative aspects attracted the attention of many researchers. There have been important attempts to solve the problems of VI learners with the technological and pedagogical improvements.

Computer Assisted Language Learning

Computer assisted language learning (CALL) has largely effected the improvements in foreign language learning of VI people. CALL was defined as usage of the computer technologies in teaching and learning of any language (Levy, 1997). The aim of CALL is to improve capacity of language learners through computer technologies.

There are several studies applied CALL for teaching and learning process of VI individuals which came up with suggestions of different methodological approaches for FL teaching (Aiazzi, 2008; Hub, Diepstraten, & Ertl, 2005; Kashdan, Barnes, & Walsh, 2002; Milian & Pearson, 2005). Aiazzi (2008), based on her self- experiences, suggested to teach English to VI learners by increasing their self-assurance and esteem. She indicated that VI students in her class were aware of the importance of English learning and they had desire to work independently. In their study, Hub et al. (2005), emphasized the importance of environmental cues in language learning according to the study they conducted. They focused on the development of a language learning tool at the same time enabling VI learners to discover the environment. Kashdan et al. (2002) conducted a study about the immigrant VI adults and indicated that a “holistic communicative perspective” (n.p.) is fundamental for VI learners to learn a new foreign language. According to them, understanding the importance of multisensory and multiple intelligence learning processes is critical to help visually limited learners to increase their chances for learning. Another approach in the literature was dual-language education for VI learners which was suggested by Millian and Pearson (2005). Dual-language education is a method used in USA aiming to teach English speakers and non-English speakers to learn a second language together. Millian and Pearson (2005) studied this model with VI learners and found promising results on their behalf. Coşkun (2013) investigated an innovative method, talking tactile technology (T3), which is a touch sensitive device providing immediate auditory feedback. The main goal of his study was to investigate the applicability of T3 to foreign language teaching by training English language teachers. The results showed that teachers were eager to use those technologies and also they wanted to create more technologies to teach English for VI learners. The role of assistive technologies in the second language writing skills of VI

learners was studied by Sousa (2013) in her dissertation study. The researcher suggested that assistive technology is fundamental that can improve basic skills but cannot replace them. Additionally, VI students need assistive technology to access the materials and tools, complete educational tasks and join tasks equally with the sighted peers. Also, Sousa (2013) suggested that VI learners should be exposed to the written text to get familiarized with the writing conventions.

These studies show that there are different methodologies beneficial for FL education of VI individuals. Also, these studies mainly related to the implementation of CALL for teaching of any language learning skills. In the following part, computer assisted vocabulary learning (CAVL) which is one of the subdomains of CALL is clarified in order to provide insight about the improvements related to vocabulary teaching.

Computer Assisted Vocabulary Learning

Research in the literature demonstrated the importance of vocabulary knowledge (Allen, 1983; Laufer, 1986; Nation, 1990; Stein et al., 2010) which is at the center of foreign language learning and related to writing, reading, listening and speaking skills. As Nation (2001) stated that “learning vocabulary requires mastering a word’s meaning, form and use” (p. 27). Thus, learning a vocabulary correctly necessitates learning spelling and learning spelling necessitates orthographic knowledge. In traditional education, VI learners were thought disadvantageous in improving their spelling ability (Arter & Mason, 1994; Moodley, 2004; Papadopoulos, Arvaniti, Dimitriadi, Gkoutsioudi, & Zantali, 2009) since they learn the spelling by typing the words based on braille abbreviation (Harley, Truan & Sanford, 1987). Hayes (1922, cited in Birns, 1976, p. 395) indicated that VI learners was “gradewise, a superior speller to the sighted, but agewise he was inferior, mainly because the blind are usually held back in school.” Papadopoulos et al. (2009) conducted a study about spelling of VI learners and indicated that the degree of vision loss has a negative effect on spelling performance of them. However, this negative effect can be decreased if the level of education increases. Similarly, orthography may be a tough subject to master, especially when it comes to English. Because “the English language has so many exceptions to its rules that the rules themselves become meaningless” (Arter & Mason, 1994, p.18).

During 1980s, technology was not improved well and for that reason most of the vocabulary applications were simple like gap-filling activities without pedagogy (Ma, 2009). However, in time, with huge improvements in technology, researchers have started to create effective technological solutions under CAVL. In recent years, there have been studies conducted in order to ensure VI learners to improve themselves in foreign language vocabulary learning (Hub et al., 2005; Jayakody et al, 2016; Stein, Neßelrath, & Alexandersson; 2010; Stein, Neßelrath, Alexandersson, & Tröger, 2011). The common argument of those studies is that in order to meet the needs of VI target group, CAVL program should involve auditory outputs while teaching orthography. As emphasized by Stein et al. (2011), target users should be involved in the design process in order to understand their exact needs.

In their study, Hub et al. (2005) developed an orientation assistant for VI students to teach basic vocabulary in their first and other languages while exploring the environment. This assistant has a sensor module and a portable computer, and requires the formation of a 3D model of a particular environment. The results of the study are promising as VI students were able to learn the object names while exploring the environment.

A CAVL study was conducted by Stein et al. (2011) who designed a usable software for VI people in terms of vocabulary learning with correct spelling. For that purpose, they developed AVoS, an auditory vocabulary and spelling trainer. They included the target group in the design process to ensure the usability of the system. The prototype was employed to 15 VI children and there were promising results in terms of usability of the system. Based on their study, Stein et al. (2011) came up with a customized CAVL program suggestion with two important aspects which are auditory output and effective learning strategies focusing on orthographic forms of vocabulary. Also, they applied a survey with 88 VI adults in order to understand their vocabulary knowledge and computer usage habits. The results showed that due to the mispronunciation of the screen readers, target group finds spelling errors in the texts.

Another mobile application named “An English Eye: Way to Learn English as a Vision Impaired Individual” was developed by Jayakody et al. (2016). This mobile application targeted VI learners at any age and tried to improve their English vocabulary. The system includes translators, speech recognizer, a speech synthesizer and gesture interactions. During the study, they investigated the design process of the system and finally developed an accessible mobile application.

CALL and CAVL studies that have been mentioned until now were conducted by researchers with their own initiatives. They provided important and beneficial suggestions and directed the path of other future studies. In the following part, several comprehensive projects are explained chronologically in order to represent the current situation and importance of FL education of VI individuals. Since the results of these projects were not published, only limited information is given.

A European project, “Eurochance”, was conducted during 2003-2006 which was co-funded by European Leonardo Da Vinci program in order to increase the employment opportunities of learners with VI (<http://eurochance.brailcom.org/index>). For that purpose, they developed a learning management system which included English, German, Spanish and Italian vocational language electronic textbooks that are fully accessible. They aimed to improve language and cultural skills of VI learners. Eurochance 2 (<http://eurochance2.brailcom.org/index>) was the continuation of Eurochance and conducted in 2007-2009 sharing the same purpose. The projects were successful in reaching their goals in two aspects; they increased the qualification of target group in foreign languages and they increased their chance to find a job.

ALLVIP (Accessible Language Learning for Visually Impaired People) is a Socrates project aimed to teach English and German to VI people. The primary goal of the project was to develop an innovative language learning material using haptic design and 3D sound. Thus, the project created a chance for increasing the interactivity of the users by removing the need for screen readers. For that purpose, they developed “SAITEK” haptic joystick. The advantage of this device is being an innovative language learning environment and also suitable for every curriculum activity (http://www.allvip.org/prod_en.htm). This project was important in showing the possibility to create an interactive language learning software for VI learners.

ELLVIS (English Language Learning Program for Visually Impaired Students) was conducted between the years 2009-2011 in order to amplify the ALLVIP project. The purpose of the project was to teach English language to VI nonnatives in order to meet their language learning needs. They developed a new technology based on haptic and kinesthetic human and machine interaction. As indicated in the ELLVIS final report (2011), this device involves diverse manual abilities and stimulates coordination between hearing and hand usage which ensures effective learning experience. This device is attributed

as alternative solution to the book and tape methodology. The project achieved its goals by opening new perspectives for FL learning of VI people.

VET4VIP (The Vocational English Training for Visually Impaired People project) was conducted in 2009-2012 and provided an innovative method using a “talking/tactile technology” in foreign language learning. The purpose of this project was to design and develop language learning materials for VI in terms of vocational vocabulary. Also, there was another dimension of the project which aims to train teachers who cater for VI. VET4VIP project was attributed as a turning point since including VI students in class improved teaching of them. In terms of accessibility and feedback, the project was unique.

MoLLVIS (Mobile Language Learning for Visually Impaired Students) was conducted between January 2014 and 31st March 2016. The project aimed to create German language learning applications for the blind or partially sighted people based on the results of ALLVIP, ELLVIS and VET4VIP projects. They integrated tandem learning approach which is based on mutual language exchange between native tandem partners. These partners assist each other with a live real time experience in a language course without classroom and paper based materials. The outputs of the project are not published.

All of the studies conducted in FL education of VI provided common results which revealed that VI people can learn a foreign language like their sighted counterparts, if they are provided with adequate teaching methods and technology. Vision loss is not a barrier for the FL education of VI students (Kumar, Ramasamy & Stefanich, 2001), instead environmental challenges affect their learning process including teachers’ lack of knowledge about VI and nonaccess to information.

METHOD

This study is a literature review study about FL learning of VI individuals. Literature review provided insights in terms of the problems VI people face with in their FL education, their special educational needs and changing understanding in their FL education. Based on the purpose of the study, the research question was “what are the special foreign language educational needs of VI individuals?”

RESULTS and DISCUSSION

Studies in the literature review showed that when the special and unique needs of VI people met, they can learn any foreign language like their sighted counterparts. Those unique needs can be divided into three categories as equal treatment (Armstrong, 2011; Nikolic, 1987; Araluc, 2002), auditory input (Douglas et al., 2009; Röder, Rösler, & Neville, 2000; Weeks et al., 2000), and assistive technology (Douglas et al., 2009; Lowenfeld, 1973; Sousa, 2013; Tobin, et al., 1997).

Equal Treatment

Based on the literature review, the first critical thing that should be considered in the education of VI is treating all disabled students equally no matter what their disability is (Araluc, 2002; Armstrong, 2011; Nikolic, 1987). United Nations Convention on the Rights of Persons with Disabilities (CRPD, n.d.) indicated that: “State parties shall ensure that persons with disabilities are able to access general tertiary education, vocational training, adult education and lifelong learning without discrimination and on an equal basis with others.” This understanding should be gained by all of the people but it is not enough in order to provide the equality.

Auditory Input

Auditory input is one of the ways that VI students gain information. Listening has been found to be more efficient for VI students when compared to reading (Nolan & Morris, 1973). In the same vein, several scholars discussed positive relationship between auditory input and superior performance (Douglas et al., 2009; Röder et al., 2000; Weeks et al., 2000). In any educational setting, efficient listening skills help VI individuals to be successful in reading skills and communication, through writing and speaking (Heward, 2000). As indicated by Röder et al. (2000), using a variety of auditory tasks ensures higher activation in occipital cortex of blind people's brain.

Assistive Technology

Assistive technology has a major role in FL education of VI individuals especially in instantaneous access to information (Hersh & Johnson, 2008), individualized instruction (Tobin et al., 1997), and success (Koenig & Ashcroft, 1983; LaGrow, 1981). Assistive technologies developed for VI people to access printed information are low vision aids, audio transcriptions, and tactile methods; whilst electronic information is accessible from computers and accessible Web and spoken information is accessible through telecommunication (Hersh & Johnson, 2008). Specifically, computers and web technologies have become supporters for solving the problems people face because of their vision loss. The most widespread techniques for showing textual information to the blind are "speech synthesizers and Braille cell displays or Braille embossing printers" (Shimomura, Hvannberg, & Hafsteinsson, 2010, p.297). Mainly, VI people use screen-reading software (text-to-speech technology) in order to access information on computer screens. Such software can be attributed as a breakthrough for VI people to access information which opens up new opportunities.

To conclude, based on the literature review mentioned, it is possible to say that the challenges that may occur as a result of vision loss do not prevent VI people to learn a foreign language at the same level like their sighted peers (Nicolic, 1986; Warren, 1994), even though they are more advantageous due to their superior memory functions (Pring, 2008). Notably, VI individuals are able to overcome the negative aspects of vision loss and reach similar levels of achievement in foreign language education like sighted people (Cattaneo & Vecchi, 2011; Pring, 2008). The key issue to compensate the restrictions is an understanding of how VI affects learning and what VI students' unique needs are, which can provide a basis for minimizing the barriers and developing adequate strategies. For this reason, advantages of VI people should be highlighted and educational settings should be adapted considering the special needs of VI.

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