STUDY ON THE USE OF ASSISTIVE TECHNOLOGY AND THE EMOTIONAL QUOTIENT OF STUDENTS WITH HEARING IMPAIRMENT

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Abstract

This study is aimed to fulfill two main purposes- 1) To investigate the use of assistive technology in students with hearing impairment and examine its impact on physical conditions, emotional quotient, and learning achievement; 2) To compare three related factors regarding the use of assistive technology with respect to emotional quotient and learning achievement of hearing impaired students with different physical conditions. The participants of this study were 185 students enrolled in 12th grade studying in 16 schools for the hearing impaired. The sample consisted of 60% female, 70% of them aged 18 to 20, and 80% had complete hearing impairment. Data was collected with a Likert-scale questionnaire. The research findings were as follows: with regard to the use of assistive technology, it was found to be at medium level. Additionally students' emotional quotient (EQ) was assessed in three main categories-intelligence, virtue, and happiness. Data from the analysis showed that the overall EQ of the hearing impaired students was at a normal level.

Key words: Assistive technology, Emotional Quotient (EQ), Hearing Impairment

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INTRODUCTION

Hearing impairment, particularly where hearing loss or deafness prevails, occurs in populations worldwide; approximately 1-2 hearing-impaired people are found in every 1,000 newborns and 2-4 people in every 1,000 by early school age. According to the data from the Department of Empowerment of Persons with Disabilities in Thailand (2015), the total number of disabled is 1,676,044 while those reported with hearing and communication impairment numbered 278,547 or 16.61% (146,294 male, and 132,253 female). This figure includes people with both partial and complete hearing loss but exact numbers for each category have not been identified because they are not accessing state educational institutions. Yet, a large number of students with hearing impairment are able to study with those with normal hearing.

The care and assistance for those suffering from hearing impairment needs to be provided by both the schools and the families. Actually, many deaf people are not able to depend on hearing aids, and are regarded as severely disabled. Special schools for the deaf are therefore needed for these people. These schools are organized by state agencies located in 20 provinces throughout the country. Existing schools for the deaf are open to those with both partial and complete hearing impairment, and run under two management systems: day schools and boarding schools. Admission is provided from pre-school to high school (Bureau of Special Education, 2015) and all the costs are covered by the government.

The use of assistive technology in education is inevitable; it is only a matter of time before schools will fall behind if they do not keep abreast of the latest technological developments. Students spend long hours outside school using technology so is it reasonable to expect them to be interested in schools lacking appropriate technologies? In addition to the appeal of appropriately designed curriculum, there is also a need of added effectiveness of using technologies in the classrooms (Alnahdi, 2014). Mull & Sitlington (2003) reviewed the literature regarding the use of assistive technology to help students with learning disabilities that succeeded after leaving high school. Based on their comprehensive review of literature, they came up with the following recommendations: assessment of students' needs and the demands of the postsecondary environment should align with assistive technologies that need to be employed. Properly training of students in the use of assistive technology will help them to increase their educational goals. Technology could play an important and significant role in helping students with disabilities overcome the academic difficulties. Examples of the important role that technology can play in helping students to overcome academic difficulties can be found in the study conducted by Mclnerney, Riley, and Osher (1999) who examined six research projects conducted on students with hearing disabilities. They found that text highlighting and supportive captions with digital instructional material resulted in consistent academic gains for students with hearing disabilities. Wehmeyer, Smith, Palmer, Davies, and Stock (2004) found that exposing students with intellectual disabilities to flexible technologies helped increase their functional skills, take advantage of their strengths and compensate for weaknesses.

In the same context, Anderson-Inman, Knox-Quinn, and Horney (1996) found that students with learning disabilities showed increased academic gains when exposed to technology-supported concept mapping strategies. Elbro, Rasmussen, and Spelling (1996) found that students with language-related disabilities showed positive effects for word recognition, comprehension, and fluency when using digital texts with synthetic, syllable or letter name synthetic speech transformations.

Previously, in their review of literature on "Education Management for Students with Hearing Impairment", Easterbrook's and Baker (2002) found that educational curriculum provided for those with hearing impairments focusing on language courses designed for the deaf yielded less advantages than anticipated. During the 14 year of learning path in schools, the number of literate deaf students had declined to only one third at each level. As a result, such students had weak reading skills. Another report by Moors research (2000) indicated educational achievement of deaf students aged 17-18 on average was lower than that of normal students aged 11-12. Only 10% were able to read equal to 7th grade standards or slightly higher. Schirmer (2001) reported that deaf students suffered not only by the lack of reading skills but by weak writing skills as well. He continued that those students with poor writing skills suffered in their interpersonal relations when they had to share work with those with no hearing impairment. Deaf students also suffered with problems of self-control, taking responsibility, exercising patience, and dealing with disappointment and failure (Baron, 1992, as cited in Punnitamai, 2002). Conclusively, the individual's ability to exercise emotional control as well as social

skill depends mainly on EQ, meaning the awareness of thinking, feelings and emotions emerging in themselves and others surrounding them. The ability to be direct and self-affirmative as well as strong emotional skill that sustains the learning process in line with one's goals defines the person of intelligence, allowing one to live a worthwhile life.

Emotional intelligence (EI) represents the ability to perceive, control, and evaluate emotions. Some researchers suggest that emotional intelligence can be learned and strengthened, while others claim it is an inborn trait. Emotional intelligence is defined by Solovey and Mayer (1990) as the process of one's assessment of his or her own and others' emotions accurately; to express feelings appropriately and the capacity of using them to make life better. Goleman (1995) has defined EI as recognizing and managing feelings, self-action, and the ability to understand others' feelings and use them to conduct relationships. Emotional competence is what results and enhances our personal, relational and professional performance, and ultimately helps us increase quality of our life. It is described as an essential social skill to recognize, interpret, and respond constructively to one's own emotions and of others. According to Goleman (1995), emotional competence is a learned ability grounded in emotional intelligence. Emotional intelligence influences our potential for enhancing our competencies and in developing the emotional literacy necessary for quality of life, satisfaction, and overall happiness. According to Bar-On and Parker (2000), general emotional competence "comprises of abilities related to understanding oneself (intrapersonal) and others (interpersonal), relating to people (interpersonal), adapting to

changing environmental demands (adaptability), and managing of emotions [e.g. being angry, losing temper, being upset] (stress management)".

In this study, we were mainly interested in finding the use of assistive technology, in relation to the physical conditions, EQ and the learning achievement of students with hearing impairment. Schools are required to be aware of their mission to develop students' EI along with other aspects of personality so that they grow up as mature and productive members of society. Educational programs giving importance to assistive technologies and aimed at enhancing emotional competence can bring positive gains in academic achievement and student's quality of life.

PURPOSE OF THE STUDY

The purposes of this study were:

1) To investigate the use of assistive technology, the physical conditions, the EQ and the learning achievement of students with hearing impairment.

2) To compare the EQ and the learning achievement of the hearing impaired students with those students with different physical conditions.

METHODOLOGY

The methodology used for this study includes the effect of using assistive technology on EQ and learning achievement of hearing-impaired students in Thailand and are described as follows:

Variables: Independent variables include gender, age, levels of hearing impairment and student grade point average in the cluster of language, social-science, mathematics and science courses and the use of the assistive technology. Dependent variables include the emotional quotient (EQ) of hearing impaired students, and their learning achievement.

Population and participants: 192 students from 16 schools for the deaf, aged between 18 to 25 years studying in 12th grade were selected by random sampling with 12 students chosen from each school.

Definition of Terms:

Assistive technology is defined as an item or piece of equipment or system acquired commercially, off the shelf, modified, or customized and used to increase, maintain, or improve functional capability for individuals with disabilities.

Emotional quotient (EQ) or emotional intelligence (EI) is the ability of individuals to recognize their own and other people's emotions, to discriminate between different feelings and label them appropriately, and to use emotional information to guide thinking and behavior.

Physical condition refers to the hearing disabilities that include complete or partial deafness (deaf and hearing impairment). The hearing loss can be categorized as mild, moderate, severe, or profound.

RESULTS

1. Based on the general information of the respondents, the investigation identified that all active respondents were 12th grade students from 16 schools for the deaf

including. The sample had a total of 185 participants. The data also identified that the majority were female, numbering 111 or 60%. A total of 129 respondents (69.73%) were aged 18-20 and the number of deaf students (hearing loss at 91 decibels) were 161 (87.03%) of total participants.

2. The overall grade point average of the sampled students in languages, mathematics and sciences was determined to be at a low level.

3. Means ($\overline{X}$) and standard deviation (SD) related to the use of assistive technology used at the sampled schools were also calculated.

3.1 *Tools & materials*: The overall use of assistive technology was rated moderate ($\overline{X}$=3.21). In detail, the school's technology services can be described in priority based on the frequency of use of: computers ($\overline{X}$=4.51), Thai dictionary of sign language ($\overline{X}$=3.63), monitor/LCD ($\overline{X}$=3.49), video camera/video player ($\overline{X}$=3.41), amplifier / loudspeaker ($\overline{X}$=3.30), VDO/VCD/DVD presented in a sign language ($\overline{X}$=3.23), bulletin board ($\overline{X}$=3.19), academic development & service department for impaired users ($\overline{X}$=3.19), VDO/VCD/DVD as take-home learning aids ($\overline{X}$=3.15), visualizer ($\overline{X}$=3.12), TV-open captioning ($\overline{X}$=3.12), opaque projector (=$\overline{X}$ 3.06), school website with sign language (2.99), light & voice signal device ($\overline{X}$=2.95), time-out blinker ($\overline{X}$=2.85), text-to-speech software (=2.81), FM/Induction Loop System ($\overline{X}$=2.73) and LED Display ($\overline{X}$=2.52) were the least frequently used.

3.2 *Service Staff*: As a whole, service staff use was at a moderate level ($\overline{X}$=3.50) and is described in detail as follows: sign/finger language interpreter ($\overline{X}$=4.32), audio-visual-aids specialist ($\overline{X}$=3.70), teacher's assistant ($\overline{X}$=3.50), and facilitators for handicapped-class attendance ($\overline{X}$=2.91) were the least used services.

4. The findings also reported that the EQ of the hearing-impaired students was rated normal. The detail are described as follows:

Virtue: 1) self-direction was rated high normal; 2) sympathy was rated normal, and 3) responsibility was rated low normal.

Intelligence: 1) self-motivated, 2) decisive and problem-solving skills, and 3) interpersonal contact/human relationships were all rated normal.

Happiness: 1) self-esteem was rated normal, 2) life-contentment was rated lower than normal, and 3) composure was rated normal.

The details are in table 1.

5. In order to make a comparative analysis for the use of assistive technology and EQ of hearing-impaired students in different physical conditions, following hypothesis was constructed.

Hypothesis: Gender, age and students' degree of hearing impairment differentiated male from female students in terms of their use of assistive devices.

The testing demonstrated that the variables, such as, gender, age and level of

hearing influenced student's use of assistive technology were significantly different for males at p-value of .05 from female students' use of staff services, but they were not significantly different in terms of tools and materials used.

The testing also displayed that different genders, age and level of hearing showed different levels of EQ. This was seen in the category of virtue which was significantly different at p-value .05, while intelligence and happiness were not significantly different (p=.05).

CONCLUSION AND DISCUSSION

The overall image of deaf student's use of such technology was found to be at a moderate level, i.e. computer use was most frequent among participants followed by the Thai dictionary of sign language. Details that are more obvious suggested that the computer could facilitate self-learning, i.e. by searching for vocabulary in the sign-language-online-dictionary; trouble-shooting in reading and writing, because learners were not able to understand meanings for various words, especially related to intangible concepts. They were also found to be very weak in writing skills (Schirmer, 2001). Moreover, impaired students were allowed to take up lessons any time they could afford it, providing them with more opportunity to practice and improve at high school. The report suggested that 47% of all deaf students were literate in computer skills at good to very good levels. They were also able to access lessons by themselves. In terms of physical conditions, the study indicated that these students could perceive sounds of various pitch to some degree. Aitao Lu. (2015) in a study concerning the perception of being deaf compared to a

Table 1: Mean and standard deviation of EQ compared to norm

EQ	Norm criterion	Average obverse score	SD	Meaning
Virtue		**16.04**	**1.69**	
1) self-direction	13-18	15.69	2.00	upper
2) sympathy	16-21	16.15	2.20	normal
3) responsibility	17-23	16.51	2.66	lower
Intelligence		**16.12**	**1.85**	
1) self-motivated	15-21	16.28	2.32	normal
2) decisive and problem-solving skills	14-20	16.13	1.85	normal
3) interpersonal contact/ human relationships	15-20	15.70	2.64	normal
Happiness		**13.71**	**1.57**	
1) self-esteem	9-14	10.52	1.53	normal
2) life-contentment	16-22	14.98	2.47	lower
3) composure	15-21	15.61	2.25	normal
Total	**130-180**	**15.29**	**1.50**	

group of hearing impaired learners indicated that these students were aware of assistive devices available for use and their self-esteem was much better than hearing impaired learners.

Later, the study also suggested that service staff rendered assistance at a moderate level (3.50), i.e. sign interpreters, audio-visual-aids-specialists and teachers' assistants were moderately used. This raises the issue of instructional planning for deaf learners: a dual-language lesson plan is required for them. Such plans should be based on the language and culture of deaf people, and rely by adding technically skilled personnel, such as, skillful sign interpreters, aural interpreter, as well as a well-prepared lessons. For this reason, the Center for Education Technology employs sign interpreters of the Deaf Association of Thailand who are also certified by Ministry of Education. However, as shown in this study, deaf learners prefer a set up for their own use rather than the standard one affecting the learners' comprehension skills. A case study in the USA conducted by Easterbrooks and Baker (2002) make it clear that deaf learners made much effort to follow language lesson plans while gaining unsatisfactory results. In particular, the learners reading and comprehension skills made little progress. The study concluded that only 1/3 of the learners at all schooling levels achieved satisfactory results.

With regard to the EQ of hearing impaired learners, this investigation yielded a normal level. When organized in three different categories, it was found that the category of virtue which referred to learners' self-direction, was above normal, while their levels of taking responsibility were below normal. For the EQ category of intelligence, the study

showed a normal level while happiness, related to learners' life-contentment, was found to be below normal. Todres (2010), similarly found that the EQ of medical students is a factor affecting the student's personality and learning capability and both were closely related to the student's age, gender and the schooling years in London's Medical College. Female students yielded higher EQ scores than males, and senior students yielded higher scores than junior students (Todres, 2010). The study also found that the top senior students were likely to manage their emotions better than the juniors.

The Thailand Mental Health Department (2001) reported that EQ or emotional quotient refers to the ability to creatively and happily manage one's emotions in different situations in order to live one's life with others happily on a daily basis. According to the report, schools and colleges are supposed to lay the foundation for life development for all students to live in peace in society. Theses human development goals are aimed to help the individual perceive and deal with his/her emotional change wisely and help them cultivate sound psychological traits as to endure variety of social pressures in different situations and achieve better quality of life by themselves.

RECOMMENDATIONS

1. Recommendations for beneficial employment.

This study is based on a group of 12th grade hearing-impaired students aged between 18-25 to determine their overall EQ. Schools and colleges with hearing-impaired students should encourage the use of assistive

technologies and prescribe a strategic plan for the use of variety of media to enhance students learning achievement.

2. Recommendations for further study.

There should be further studies about deaf students' current use of assistive technologies as well as assessment of new assistive technologies and how their use in the schools for the hearing impaired can help improve their learning outcomes, skills and improve quality of their lives.

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