An Investigation of the Perspectives of Teachers on the Literacy Media Selections for Students with Visual Disability: The Role of Assistive Technology

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ABSTRACT

This study explored the preferences and beliefs on teaching media for children with visual impairments. The presented study revealed the characteristics i.e. previous teaching experience with VI students, age, beliefs could motivate teachers in integrating assistive technology in their teaching. The results showed that braille was preferred from the most experienced teachers. Moreover the teachers' age did not seem to play a critical role in the integration of assistive technology in their teaching. Interestingly, although teachers believed that the use of assistive technology is of great importance for students with visual impairments they were not using new types of assistive technology for their students with visual disabilities.

1. INTRODUCTION

Nowadays children with visual impairments (VI) have the opportunity to use various media to access information. Print braille, braille displays, screen readers, screen magnifiers and large print constitute representatives of these media. The research of Goudiras, Papadopoulos, Koutsoklenis, Papageorgiou and Stergiou (2009) showed that the majority of their participants who were visually impaired used more than one media for reading. Bickford and Falco (2012) conducted a research on assistive technology (AT) for early braille literacy and their findings indicated that students benefitted from early instruction with AT when used together with traditional teaching.

In fact, the notion of teaching students with VI through a variety of media with an emphasis on AT, is relatively new and constitutes a challenge for educators (Argyropoulos, Sideridis, & Katsoulis, 2008). A great number of teachers prefer to use the traditional path of learning and writing braille which is through braillers and paper (Bickford & Falco, 2012). Johnstone, Thurlow, Altman, Timmons, and Kato (2009) underscored through their research that if teachers do not believe that technology is important, they are less likely to teach children to use it. A great number of special educators now do believe that AT helps students with disabilities in developing literacy skills (Romeo, 2003). Assistive technology is also stated to be of profound importance for students with VI (Zhou et al, 2012).

The use of AT for students who are visually impaired in primary education settings started in Greece in 2004 at the Special schools for the Blind in Athens (Argyropoulos, Sideridis, & Katsoulis, 2008). Augusto and Schroeder (1995) mentioned that in spite of technological advances, access to information remains an elusive goal for individuals who are visually impaired and "the disconcerting phenomenon continues today" (Kelly, 2009). Despite the fact that teachers recognize the significance of using AT, most of them believe they have no adequate skills to integrate AT into their teaching (Abner & Lahm, 2002; Kapperman, Sticken, & Heinze, 2002; Zhou, Parker, Smith, & Griffin-Shirley, 2011).

Research indicates that the use of just one media does not seem to be adequate for children with visual disability. For example, using synthetic speech is no-time consuming (Argyropoulos & Martos, 2006) but does not lead to deep comprehension of a text (Edmonds & Pring, 2006). Braille and large print on the other hand can be very time consuming anddo not allow access in a variety of information, the number of books for example that are trancripted in the braille code or in large print is a lot smaller compared to the number of books available for individuals without visual disabilities . As a result students with VI fall further behind their sighted peers (Kelly, 2009).

Nowadays there is no doubt that AT is beneficial for the education, the employment and the daily lives of individuals with VI (Cooper & Nicolas, 2007; Gerber, 2003; Strobel, Fossa, Arthanat, & Brace, 2006).

The study presented here attempted to correlate teachers' perspectives and instructional methods with the choices of braille literacy media by students with visual disability. The research questions of the present study were the following:

1. Did the teachers' previous teaching experience have a significant relationship with the media they use for teaching?
2. Did the teachers' age have a significant relationship with the means they use for teaching?
3. What did teachers think of AT and its benefits for children with VI and what types of AT do they usually use?

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2. METHOD

2.1 Participants

The participants were 30 teachers who worked as special education teachers either in special primary schools for the blind and visually impaired students or as itinerant teachers in mainstream settings (primary and secondary) supporting students with visual impairments in 19 prefectures of Greece. 33.3% of the participants had either a master's degree or other type of training (i.e. seminars) in special education. 66. 7% of the participants claimed that their education was in line with the education of children with VI. The research was approved by the Greek Ministry of Education and the Institute of Educational Policy which is located in Athens.

2.2 Instruments

An 18-item questionnaire with input was developed for the teachers of students with visual impairments. The questionnaire guide for the teachers included five sections: demographic characteristics, years of teaching experience, braille knowledge, use of technology, and perspectives on braille.

2.3 Data Analysis

The relationships between the variables were verified based on the demographic characteristics of the sample, and more specifically, age, related studies and the previous experience in teaching students with VI.

Due to the sample size we used non parametric tests for the above verifications. In the case of categorical variables the chi-squared test was used. The Likert scale variables were considered quantitative and scalar. For these variables and due to the sample size the Mann Whitney test was used which is a nonparametric test, instead of the t-test. The significance level (p-value) for the above analyses was predetermined to be equal or less to value of 0.05. SPSS 21 was used for the data analysis.

3. RESULTS

For research question 1 (Did the teacher's previous teaching experience have a significant relationship with the media they use for teaching?) the Mann Whitney test was used.

The results in Table 1 indicated a statistically significant relationship ($p=0.002<0.05$) between the teachers' years of experience and the media that they used in order to teach their students who had visual disability. More specifically when examining the individual means it appears that teachers with more than one year of previous working experience with visually impaired students used print braille M=3. 50. On the other hand teachers with no previous experience in the field of visual disabilities showed a smaller preference in braille use M=2.42. Regarding the use of AT for teaching students with VI, previous experience in teaching children with visual disabilities seems to play an important role as well. A statistically significant relationship ($p=0.0001<0.05$) appeared for the use of AT in teaching students with VI. Teachers with previous experience used more often different types of AT in their teaching than did teachers with no previous experience in teaching students with VI.

For research question 2 (Did the teachers' age have a significant relationship with the media they use for teaching?) the chi-squared test was used.

Table 2 showed no significant relationships between the teachers' age and the media they use for teaching. The percentages showed that 76, 5% of the under 30 age group teachers used AT. The percentage is slightly higher than the one of the 30 plus age group.

For research question 3 (What did teachers think of AT and its benefits for children with VI and what types of AT do they usually use?), analysis of frequencies and estimated margin means was used.

Regarding the importance of AT use, teachers as seen in Table 3 believed unanimously that students with VI would benefit, either much or a great deal, from the use of any type of AT. More specifically as shown in Table 3, 43.3% of the teachers believed that students with VI would much benefit from the use of any type of AT and 50% of the participants believed that students with VI would benefit a great deal from the use of any type of AT. The teachers could choose between five answers for the above question: a great deal, much, somewhat, only a little, barely.

The results in Table 4 on how often do teachers use AT for teaching students with VI showed M= 3.41 which indicates that on average they often use AT in their teaching. The participants had to choose from a five point likert-scale for the above question, ranging from not at all to very often. Regarding the importance of AT for students with VI the results showed M=4. 43, which indicates that AT is very highly considered momentous for the life of students with visual disabilities. Once again, the participants had to choose from a five point likert-scale ranging from almost never to very much.

According to Table 5, 73. 3% of the teachers used one of the listed types of AT (i.e. CCTV, screen reading software etc) for teaching their students with VI. However, a closer look on Table 5 give us the real view on the use of AT. More specifically, 33. 3% used screen magnification software/ hardware and 16, 7% used swell paper devices. Relevantly new technologies like screen readers were being slightly used.

Table 1. Teachers' Previous working experience in students with VI.

Which is your previous experience in teaching students with VI?		N	*M*	*SD*	Mann-Whitney U	Z	p
How often do you use Braille in your teaching?(Very often, often, quite often, rarely, never)	NONE	12	2.42	.996	41.000	-3.044	.002
	MORE THAN 1 YEARS	18	3.50	.618			
How often do you use any type of assistive technology?(Very often, often, quite often, rarely, never)	NONE	12	2.00	1.279	34.500	-3.176	.001
	MORE THAN 1 YEARS	18	3.72	1.127			

Note: M = mean; *SD* = standard deviation; *significant ($p \leq 0.05$)

Table 2. The relationships between the teachers' age and the media they use for teaching.

AGE GROUPS		Under 30 years old Age group	30 Plus years old Age Group	X^2	βε	p
Do you use braille for teaching VI students?	YES	70.6%	69.2%	.006	1	.936
	NO	29.4%	30.8%			
Do you use any type of AT for teaching VI students?	YES	76.5%	69.2%	*		.485
	NO	23.5%	30.8%			

* Fisher test, significant ($p \leq 0.05$)

Table 3. Frequencies of the question "Do you believe that students with VI would benefit from the use of AT?"

		frequency	%	Valid %	Total %
Valid	SOMEWHAT	2	6,7	6,7	6,7
	MUCH	13	43,3	43,3	50,0
	A GREAT DEAL	15	50,0	50,0	100,0
	Total	30	100,0	100,0	

Table 4 . Estimated margin means on teachers' use and perspectives of AT for children with VI

	N	Minimum	Maximum	*M*	*SD*
How often do you use AT for teaching students with VI?	22	1	5	3.41	1.368
Do you think that students with VI would benefit from the use of AT?	30	3	5	4.43	.626
Valid N (listwise)	30				

Note: M = mean; *SD* = standard deviation; *significant ($p \leq 0.05$)

Table 5. Frequencies of the question "Which type of AT do you use for teaching students with VI?"

		frequency	%	valid %	total %
Valid	Screen reading software	3	10,0	10,0	10,0
	Screen magnification software/hardware (i.e. CCTV)	10	33,3	33,3	43,3
	swell paper devices	5	16,7	16,7	60,0
	NOTHING	9	30,0	30,0	90,0
	PC	3	10,0	10,0	100,0
	Total	30	100,0	100,0	

4. DISCUSSION AND CONCLUSIONS

Based on the results of the study it can be argued that the main aim of the overall study has been achieved. The teachers' preferred media for teaching children with VIhas been identified. The results showed that teachers with more than one year of teaching experience with children with VI preferred braille as a teaching medium. On the other hand teachers with less than a year teaching experience did not choose braille as their premium medium for teaching children with VI. We can argue that teachers with previous experience have a better knowledge of the braille code since they have used it before in their teaching. Teachers with no previous experience are more hesitant in using braille in their teaching. Although teachers are being trained in the braille code and should be certified in the braille code in order to work with children with VI there are still teachers that are not very comfortable with their braille knowledge. This fact has led to a braille literacy crisis in America (Bell, Ewell & Mino, 2013).

Another important finding is the small difference that was identified between the under 30 age group and the 30 plus age group regarding the use of AT in teaching children with VI. It is a worldwide fact that that teachers still believe that they do not have adequate skills to integrate AT into the curriculum and instruct students how to use these devices (Abner & Lahm, 2002; Kapperman, Sticken, &Heinze, 2002; Zhou et al., 2011). However the outcomes of the particular study were very heartening since it was revealed that the majority of the teachers regardless their age integrate AT in their teaching.

The presented study managed to identify the beliefs of teachers regarding the use of AT in teaching children with visual disabilities. In average the participants stated that children with VI would benefit from the use of any type of AT. The teachers' beliefs seem to match their actions since in average they often integrate AT in their teaching. Johnstone, Thurlow, Altman, Timmons, and Kato (2009) found in their research that if teachers do not believe that technology is important, they are less likely to teach children to use it. Most special educators now believe that AT helps students with disabilities in developing literacy skills (Romeo, 2003).

Although the results of the present study seemed, as mentioned above, hearting, a closer at the teachers types of AT preferences show as the real picture. Screen magnification software (i.e. CCTV) was the most common type of AT being used as a teaching medium leaving new technological tools like screen readers and braille displays further behind. While being at the research field many teachers would ask the researchers what a screen reader or a braille

display was. Many of them did not know of the existence of these types of AT.

These particular results of the study presented here are in line with results of researches worldwide regarding the perceptions of teachers on their teaching media for students with VI. Even though a wide variety of AT tools and devices are available in the market place, students with VI have not yet benefitted from using this specialized technology (Kelly, 2011). A big discussion can be provoked of why this contradiction appears worldwide. The teachers' familiarity and comfort with braille, in contrast to the difficulties that most of them are fear of facing, influences their instruction through AT (Bickford & Falco, 2012). As Zhou et. al (2012) stated in their research, currently there is also no suggested curriculum on AT for students with VI that focuses on AT for faculty use, and there is also lack of research in this area.

In the case of the Greek educational system many faults can be found regarding the education of children with VI. Primary and high school teachers that teach students with visual disabilities do not necessarily have to be special educators. Any teacher could have a few months training and through exams could be acquired with a state recognized certificate on the braille code and have the ability to teach a student with VI. Teachers go through no further training on AT in order to meet the needs of their students. Another weakness is the fact that the vast majority of the teachers who work with students with VI are substitute teachers and result in being in different school settings and even in different parts of Greece every year. This was the case also in the presented study. Only the teachers who worked in the special schools for blind children and children with visual impairments were not substitute teachers. More specifically 10 teachers out of the 30 that participated in the study were not substitute teachers. Hence students with visual disabilities end up with a different teacher every year that may or may not have previous experience with visual disabilities or have knowledge of AT. Sometimes the teachers are not adequately informed by the school's principle on the available hardware and software for their students with VI. Even if these teachers have the chance to be trained in new technologies for visual disabilities they might not have the time by the end of the training to teach their current student and it is mostly certain that will not support the same student for another year. They might even never have to work with a student with visual disabilities ever again. As a result students with VI face a vicious circle and teachers limit their teaching techniques in the traditional braille and large print media.

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