Preferences of Students with Visual Impairment between Braille and Screen Reader's Software

Faiza Jaleel[1]

Faisal Anis[2]

Abstract

Innovations in technology put great emphasis on the use of technology and provide the variety of learning medium to students with visual impairment, such as screen reader software and braille as learning medium. The purpose of this study was to explore the preferences of students with visual impairment about their learning medium i.e. braille and screen reader's software. The major question of the study was, what is the difference between braille and screen reader's software preferences of students with visual impairment? It was a descriptive study. The population of this study consisted of students with visual impairment who experience braille and screen reader software as learning medium. The purposive sampling technique was used to select a sample of 70 students. A five-point rating scale was developed that was consisted on 20 questions. These questions were validated by expert's opinion and reliability was also checked by pilot study. Value of coefficient alpha was 0.711. Data was analyzed by using descriptive and inferential analysis techniques. It was concluded that students have specific preferences of learning media based on the educational setting, their grade levels and the task being undertaken.

Keywords: Braille, Screen Reader's Software and Preferences of Students with Visual Impairment

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[1] Lecturer (VI) Govt. Training College for the Teachers of Blind, Lahore. faizakhan208@gmail.com

[2] Assistant Professor, Department of Special Needs Education, University of Management and Technology. faisal.anis@umt.edu.pk

Introduction

Visual impairment may disturb the student's ability to learn different concepts and students with visual impairment also face difficulty in reading and writing. It is the duty of teachers of students with visual impairment to direct a detailed assessment for measuring the primary learning medium for their students (Koenig & Holbrook, 2010). Functional vision, reading proficiency, and diagnosis are essential concerns in the evaluation procedure (Bell, Ewell, & Mino, 2013; Koenig & Holbrook, 2010).

Students with visual impairment depends on senses other than vision for their learning. They require some changes in font size and style of text. All of these changes depend on condition, severity of visual impairment and likings of students. Preferred learning medium should be provided to the students after proper assessment, the functional vision assessment and/or assessment of learning medium (Wiazowski, 2014).

A study conducted by silver et al., (1995) reported that most of the students with visual impairment use Braille as the primary learning medium. Reading medium is another major concern. A few of the students might require a combination of media that may be visual, tangible, auditory or electronic, (e-text) and the media may be used as boosting and supportive primary media of reading. Teachers of students with visual impairment measure practical and useful media of learning for their students.

Students with the visual impairment need accessible computer system for completion of computer centered projects. For this purpose, some of the specialized software will be needed (Wiazowski, 2014).

The use of computer assistive technology is the need of present time and it attracts the students with visual impairment equally as it attracts the students without visual impairment. Specially, the computer with the screen reader's software they provide a lot of chances to the students with visual impairment for individual and professional growth (Sah, 2013). Evidently, demand for present time is the knowledge of computer and computer knowledge provide sufficient information successfully.

A study conducted by Ampratwum, Offei, and Ntoaduro (2016) showed that approximately 95% of students with visual impairment reported that they experience different difficulties while using the keyboard of the computer. This problem of keyboarding was explained by students as they reported that they feel difficult to find the keys especially alphabetic keys on time, so the arrangement of keys is problematic for them. Definitely, the students with visual impairment feel uncomfortable

with arrangements of keys on keyboard which deviate from the particular flow of alphabetic count.

Generally, the student-teachers presented positive approach towards the practice of computers for teaching and learning process. Results of the study showed that the capability of student-teachers is very important for the proper use of computer (Padmavathi, 2015). In the present time learners use technology frequently for doing most of the educational tasks, few of the teachers feel that it is the duty of school to make the students seriously use the electronic information (Withrow, 2004). If institutes yield this role, teachers will require to be capable users of technology, as well as trainers for its usage.

Objectives of the Study

The objectives of the study were to:
i.   Identify the preferences of students with visual impairment about use of braille and screen reader's software.
ii. Find out the difference between braille and screen reader's software preferences of students with visual impairment.
iii. Find out the difference of screen reader's software preferences between students with visual impairment of inclusive and segregated setup.
iv. Find out the difference of Braille preferences between students with visual impairment of inclusive and segregated setup.

Research Questions

i.   What are the preferences of students with visual impairment about use of braille and screen reader's software?
ii. What is the difference between braille and screen reader's software preferences of students with visual impairment?
iii. What is the difference of screen reader's software preferences between students with visual impairment of inclusive and segregated setup?
iv. What is the difference of Braille preferences between students with visual impairment of inclusive and segregated setup?

Methodology

Research Design
To study the preferences of students with visual impairment between braille and screen reader's software descriptive research design was used.

Sample
The population of this study consisted of students with visual impairment studying in high school, college, university level, etc. Research was conducted on preferences of these young adults as they generally access knowledge and information by using both Braille and the computer with the screen reader's software. The purposive sampling technique was used to select the sample. A sample of 70 students (21 students were from inclusive setup and 49 students were from segregated setup) with visual impairment was selected from different educational institutions of Lahore.

Both male and female students with visual impairment were included in study. Age range of students was from 15-29 years old, and they studied in high school, College and university level. For the selection of a sample, the purposive sampling technique was used.

Instruments
A five-point rating scale was developed to measure the preferences of students with visual impairment between braille and screen reader's software. It was consisted of 20 questions. The items of the rating scale were based on relevant literature. The first part of the questionnaire was consisted of demographic information e.g. Gender, Age, Class and educational setting. The 2nd part consisted of 20 questions. These questions were stated to measure preferences of students with visual impairment between braille and screen reader's software.

These questions were validated by expert's opinion and reliability was also checked by pilot study. Value of Coefficient Alpha was 0.711 that was much satisfactory.

Data Collection
The data was personally collected by researchers. Researchers visited the schools, colleges and universities then got consent from administration of institutions and collected data from students with visual impairment.

Data Analysis

To measure the difference between preferences of students with visual impairment regarding the use of braille and screen reader's software paired sample t-test was applied. Independent t-test was used to measure the difference between screen reader's software preferences and the difference of Braille preferences between students with visual impairment studied in inclusive and segregated setup. Pearson correlation coefficient was used to see the significant correlation between variables. The tables were interpreted with complete details.

Procedure

The purpose of this study was to explore the preferences of students with visual impairment about their learning medium i.e. braille and screen reader's software. The researchers reviewed related literature. On the basis of literature review instrument was developed for students with visual impairment. Researchers visited schools for data collection. The researchers personally distributed the questionnaire among respondents to obtain the required information. The purpose of research was fully explained to the respondents. The researchers elaborated the instructions verbally to them. After data collection, it was tabulated and analyzed by SPSS and t-test and Pearson correlation to approach findings and conclusions. The recommendations were given on the basis of findings and conclusions.

Results

The results of the study are given below.

Table 1

Frequency distribution of students with visual impairment on basis of gender.

Respondents	Frequency	Percent
Male	39	55.7
Female	31	44.3
Total	70	100.0

Table 1 Shows that 55.7% students with visual impairment were male and 44% students were female.

Table 2

Frequency of the respondents along with their percentages on preferences of their learning medium i.e. Braille and screen reader's software.

S/N	Statements	Strongly agree		agree		Neutral		Disagree		Strongly disagree	
		Fre.	%	Fre.	%	Fre.	%	Fre.	%	Fre.	%
1	I was not excited about learning braille.	8	11.4	23	32.9	4	5.7	24	34.3	11	15.7
2	When I use braille for my work my work is best.	13	18.6	36	51.4	9	12.9	8	11.4	4	5.7
3	I avoid to use braille as learning medium.	2	2.9	18	25.7	9	12.9	31	44.3	10	14.3
4	Braille is the foundation of blind person's education.	37	52.9	30	42.9	1	1.4	1	1.4	1	1.4
5	Braille help to process and comprehend text in a better way.	15	21.4	39	55.7	14	20.0	2	2.9	0	0.0
6	I think talking soft wares are taking the place of braille.	9	12.9	27	38.6	9	12.9	24	34.3	1	1.4
7	Braille is important for doing math.	13	18.6	27	38.6	15	21.4	11	15.7	4	5.7
8	I will never reject the importance of braille.	34	48.6	26	37.1	2	2.9	7	10.0	1	1.4
9	Braille helps to spell and punctuate different words.	20	28.6	43	61.4	3	4.3	3	4.3	1	1.4
10	I think after completion of school braille is no longer important for blind students.	9	12.9	24	34.3	7	10.0	21	30.0	9	12.9

Screen reader's software

S/N	Statements	Strongly agree		agree		Neutral		Disagree		Strongly disagree	
		Fre.	%	Fre.	%	Fre.	%	Fre.	%	Fre.	%
11	It's convenient for me to use computer with talking software as learning medium.	14	20.0	39	55.7	10	14.3	7	10.0	0	0.0
12	Computer with talking software allows me to process and comprehend the text in a better way.	12	17.1	45	64.3	7	10.0	5	7.1	1	1.4
13	I do not like to listen/read text by using talking software.	2	2.9	17	24.3	6	8.6	36	51.4	9	12.9
14	I think computer with talking software can replace braille.	6	8.6	23	32.9	10	14.3	29	41.4	2	2.9
15	I can do math on computer easily.	3	4.3	20	28.6	14	20.0	21	30.0	12	17.1
16	I can access knowledge faster by using computer with talking software.	19	27.1	42	60.0	5	7.1	2	2.9	2	2.9
17	I can do my work best by using computer with talking software.	21	30.0	39	55.7	5	7.1	4	5.7	1	1.4
18	I prefer to attempt my paper on computer with talks/ JAWS than on braille.	13	18.6	13	18.6	6	8.6	37	52.9	1	1.4
19	I prefer to write notes on computer with talks/JAWS.	14	20.0	31	44.3	8	11.4	14	20.0	3	4.3
20	Computer with talks/JAWS help to spell and punctuate different words.	22	31.4	40	57.1	6	8.6	2	2.9	0	0.0

Table 2 Shows that the majority of the respondents (50%) were excited about learning Braille and (44.3%) respondents were not excited about learning Braille. The majority (70%) of the respondents respond that when they use braille for doing their work, their work is best and majority (58.6%) respondents respond that they did not avoid to use Braille as learning medium. (95.8%) respondents reported that Braille is the foundation of the blind person's education. The majority of the respondents (77%) respond that Braille help to process and comprehend the text in a better way, (51.5%) respondents reported that they think talking software's taking the place of braille, majority (57.2%) respondents reported that Braille is important for doing math. Majority (85.7%) respondents respond that they will never reject the importance of braille, majority (90%) respondents reported that Braille helps to spell and punctuate different words and (47.2%) respondents reported that they think after completion of school braille is no longer important for blind students.

Majority (75.7%) respondents feel convenient to use computer as learning medium, majority (81.4%) respondents reported that computer with talking software allows them to process and comprehend the text in a better way. Majority (64.3%) respondents like to listen/read text by using talking software.   Some of the respondents (44%) think that computer with talking software cannot replace braille. (47%) respondents reported that they cannot do math on computer easily. Majority (87%) of the respondents reported that they can access knowledge faster by using computer with talking software, majority (85.7%) respondents reported that they can do best work by using computer with talking software. Majority (54.3%) of the respondents do not prefer to attempt paper on computer with talks/ JAWS than on braille, majority (64.3%) respondents reported that they prefer to write notes on computer with talks/JAWS. Majority (88.5%) of the respondents reported that computer with talks/JAWS help to spell and punctuate different words.

Table 3

The difference between preferences of students with visual impairment about braille and screen reader's software.

Preferences	N	Mean	S.D	T	Sig. (2-tailed)
Braille	70	36.15	4.86	0.335	0.73
Computer with screen reader's software	70	35.82	5.94		

Table 3 shows no statistical significant difference (p>.05) between braille (M= 36.15, SD= 4.86) and screen reader's software (M= 35.82, SD= 5.94) preferences.

Table 4

The difference of screen reader's software preferences between students with visual impairment of inclusive and segregated setup.

Educational setting	N	Mean	S.D	T	Sig. (two tailed)
Inclusive	21	39.47	5.02	3.64	0.001
Segregated	49	34.26	5.65		

Table 4 shows statistical significant difference (p<.05) between screen reader's software preferences of students with visual impairment studied in inclusive (M= 39.47, SD=5.02) and segregated (M= 34.26, SD= 5.65) setup. Students with visual impairment from inclusive setup preferred screen reader's software as learning medium as compare to the students from segregated setup.

Table 5

The difference of Braille preferences between students with visual impairment of inclusive and segregated setup.

Educational setting	N	Mean	S.D	T	Sig. (two tailed)
Inclusive	21	35.47	6.10	-0.76	0.44
Segregated	49	36.44	4.27		

Table 5 shows no statistical significant difference (p>.05) between Braille preferences of students with visual impairment studied in inclusive (M= 35.47, SD=6.10) and segregated (M= 36.44, SD= 4.27) setup.

Table 6

Correlation between grade level and preferences of computer with screen reader's software of students with visual impairment.

		Computer with screen reader's software
	Pearson Correlation	0.284*
Grade level	Sig. (2-tailed)	0.017
	N	70

Table 6 Shows a significant (p<.05) positive relationship (r=284*) between grade level and preferences of the computer with talking software of students with visual impairment. It shows that grade level is a predictor of preferences of screen reader's software in students with visual impairment.

Table 7

Correlation between grade level and preferences of Braille of students with visual impairment.

		Braille
	Pearson Correlation	-0.137
Grade level	Sig. (2-tailed)	0.26
	N	70

Table 7 Shows a negative relationship (-.137) between grade level and preferences of Braille of students with visual impairment. The negative relationship is not significant (p<.05). It shows that preferences of Braille decreases as the grade level increases.

Table 8

Relationship between grade level and use of braille for doing best work.

		use of braille for doing best work
	Pearson Correlation	-0.241
Grade level	Sig. (2-tailed)	0.04
	N	70

Table 8 Shows a significant (p<.05) negative relationship (r=-.241) between grade level and use of braille for doing best work by students with visual impairment. It shows that as the grade level increases the less likely the students with visual impairment prefer to use Braille for doing best work.

Table 9

Relationship between grade level and use of screen reader's software for doing best work.

		Use of screen reader's software for doing best work.
	Pearson Correlation	0.339**
Grade level	Sig. (2-tailed)	0.004
	N	70

Table 9 Shows a significant (p<.05) positive relationship (r=.339[**]) between grade level and use of screen reader's software for doing best work by students with visual impairment. It shows that as the grade level increases the students with visual impairment prefer to use screen reader's software for doing best work.

Discussion

The major findings of this study were that students with visual impairment were excited about learning Braille. Majority of the students have same preferences regarding the use of Braille and computer with screen reader's software for doing their best work. Most of the students think that Braille is the foundation of blind person's education. Results of the study showed that majority of the students with visual impairment have same preferences that both Braille and computer with screen reader's software help them to comprehend the text in a better way. Students with visual impairment think that screen reader's software is taking the place of Braille. Most of the student's report that they can easily do math on Braille than on computer with screen reader's software. Majority of the students with visual impairment will never reject the importance of Braille. Students think that after the completion of school Braille is no longer important for blind students. Majority of the students with visual impairment respond that they can access the knowledge faster when they use computer with screen reader's software. Students with visual impairment prefer Braille than computer with screen reader's software to attempt their paper. Lack of awareness and proper training of students with visual impairment regarding the use of devices like computer with screen reader's software affects their preferences for assistive technology devices.

Results showed no statistical significant difference between braille and screen reader's software preferences, so students with visual impairment equally prefer the Braille and screen reader's software as learning medium. However, students with visual impairment studied in inclusive setting prefer the screen reader's software than students of segregated setting. It showed that students studied in segregated setting prefer Braille as learning medium. This result was supported by previous study conducted by Andrea & Mary (2012) reported that more time period students with visual impairment spend at a segregated educational setup they more prefer to use Braille as learning medium.

Results of the Pearson Correlation showed that as the grade level increases preferences of computer with screen reader's software also

increases and preferences of Braille decreases as grade level increases. Similarly results showed that as the grade level increases the less likely the students with visual impairment prefer to use Braille for doing best work and as the grade level increases the students with visual impairment prefer to use screen reader's software for doing best work. This result was supported by previous study that showed a large number of students with visual impairment from elementary age use Braille as learning medium than students from middle and high school (Herzberg, Rosenblum, & Robbins, 2017). This means that use of braille was not preferred by students with visual impairment as they move towards higher education or high grade levels. As sample size was not large enough so the findings of the study have some limitations that affect the generalization of results.

Conclusion

Students have specific preferences regarding which learning media to use. These preferences were based on the educational setting, their grade levels and the task being undertaken. Fluency in both Braille and screen reader's software would best meet the needs of most of the students with visual impairment.

Recommendations

On the basis of findings, the following recommendations have been made.
1. Teachers should make proper learning media assessment for their students with visual impairment before offering any learning medium.
2. Teachers should give priority to the preferences of students with visual impairment regarding the use of learning medium.
3. Teachers should understand the unique needs of each of the student with visual impairment and provide them enough opportunities and experiences regarding the use of learning medium.
4. Teacher should try to provide fluency in both Braille and computer with screen reader's software to ensure the future success of students with visual impairment.

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