International Education Studies; Vol. 13, No. 8; 2020
ISSN 1913-9020 E-ISSN 1913-9039
Published by Canadian Center of Science and Education

Obstacles to Blind Students' Learning Maths in Jordan from Students' and Teachers' Perspectives

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Received: February 23, 2020 Accepted: April 25, 2020 Online Published: July 23, 2020

doi:10.5539/ies.v13n8p1 URL: https://doi.org/10.5539/ies.v13n8p1

Abstract

The present study aims at investigating the obstacles to learning maths by blind students from the perspectives of students and teachers. The sample of the study consisted of 30 students who are blind or with visually impaired. To learn about the obstacles they faced in learning maths, a questionnaire was employed, which was verified in terms of validity and consistency. In addition, 2 maths teachers at blind schools in the Jordanian capital Amman were interviewed. The results showed that the obstacles were so high by 89, 3%, downwards for the following aspects: administrative 94%, cultural 89% and curricular 85%. The researchers recommend providing supporting programmes and curricula which meet the needs of blind students in Jordan.

Keywords: blind students, mathematics, learning

1. Introduction

The integration of students with vision disabilities in school constitutes one of the major challenges in Jordan. It requires programmes and curricula which fit such a category and overcome the obstacles to their learning. Therefore, it is necessary to plan relevant programmes, in terms of diagnosis, development and assessment, as well as identify the reality of current programmes and the obstacles encountering the students and supervisors involved.

There are many international proposals and standards to care for individual differences and students with learning difficulties and disabilities, especially those related to vision, in teaching maths. Among the principles adopted in the US is to teach maths at all levels. Another states equality between learners in terms of providing multiple activities and learning environments which fit all student categories (NCTM, 2000).

Blind students are those who have lost their sight to the extent that they cannot find their way in a place that is unknown to them without being guided. On the other hand, there should be distinction between the students whose sight is weak and those whose sight is completely missing.

As maths is a basic subject in education, blind students face problems related to ways and strategies while learning concepts and skills. In fact, mathematical experience should be conveyed to blind students in a joyful, interesting and expressive manner (Alhadidi, 1998).

One of the blind students' fundamental needs in learning maths is mastering different mathematical facts like numbers and calculations in a way similar to sighted students. They also have to learn the subject in the same order. As a result, teachers need to use different teaching methods and physical tools, such as beads, cubes, geometric shapes, abacus, and relief graphs. The aim of teaching maths for blind students, in particular, is to help them acquire the concepts of size, distance, direction and number, in addition to mastering basic computations of addition, subtraction, multiplication and division. There are also some key information in geometry, algebra and statistics and the ability to draw simple graphs and geometric shapes. While the first concern is to assist the students to understand and master the mathematical skill, they are later trained on speedy performance. It is noteworthy that the blind students' perfection of mathematical skills requires longer time and harder effort. However, due to the cumulative and sequential nature of the maths curricula, it is necessary not to omit any present concepts or skill (Sha'eer, 2009).

Blind students are those with visual acuity less than 20/200, while for the weak sighted it is between 20/70 and 20/200. Thus, blind students cannot employ sight for learning; while the weak sighted have difficulties in doing

visual tasks and can learn by visual sense with the use of technological educational tools (Krek et al., 2000).

Such vision disabilities could be attributed to a neural network defect, prematurity, neural tissue syndrome, neural atrophy or birth infection. As for heredity, there is little link and it often has to do with albinism – pigmentation deficiency (Krek et al., 2000).

Among the features of children with vision disabilities is their slow growth. Thus, there needs to be an environment full of stimuli and encouragement, as well as programmes and technological tools which raises their learning motivation. Necessary services should be secured at early stages for such families and their children, especially those who have more than one disability (Diane et al., 2012).

To accomplish the blind students' learning and teaching, it is necessary to identify the factors making such processes a success at schools, as well as the obstacles to their educational progress in all grades, whether they attend regular schools for integration or those special for the visually impaired (Heward, 2006). Here, it should be taken into consideration that the educational system directed to this group is a comprehensive, integrated one to be taken as a whole. This extensive study would make a full picture of the reality of the programmes, challenges and obstacles, especially with regard to maths, facilitating the task of developing these programmes.

There is much literature on the obstacles to blind students' learning in general. However, it is important to recognize the actual services and schemes for teaching maths to blind students in Jordan. For instance, Al-Dababna (2012) used the following dimensions: preparation, teaching, teachers' training, financial and administrative facilities and auspices partnership. It was concluded that most dimensions constituted average obstacles. Only preparation and training were significant obstacles in regular schools.

Bader's Modern Approaches to Teaching Maths for Those with Special Needs (2006) attempted to identify the modern methods in teaching the subject to the students who are deaf, blind, mentally handicapped but capable of learning, gifted and outstanding and with learning difficulties. It was concluded that the blind need special ways of learning which require the use of the other senses. For instance, the Braille system, physical objects and models serve touching; brainstorming, role-playing, educational games and problem solving serve hearing. Furthermore, there are learning technologies, like programmes for reading or converting images to Braille symbols and talking calculators. Finally, it is useful to phrase mathematical concepts in poetry or songs.

Aldemerdash (2003) tried to obtain conclusive evidence of the tangible manual materials' role in teaching maths for the visually impaired students and developing their educational achievement to reach comprehension. The sample consisted of 33 visually impaired seventh-graders at Al-Noor Schools in the Egyptian governorates of Daqhaliyya, Dimiat and Cairo. The study adopted the pretest and posttest quasi-experimental methodology, creating an achievement test in the Algebra Limits and Quantities Unit in the Braille form. There were statistical differences between the averages of visually impaired students' achievement in mathematics, attributed to the use of tangible, manual tools in contrast with routine methods in favour of the first ones.

Another study (Alkhashrami, 2009) explored the problems associated with interpreting the blind's tables and graphs as well as listing up-to-date technological methods helping in communicating digital data.

Martin, Brenda and Michele (2012) investigated the impact of academic support on visually impaired students' achievement in maths. It was found that these students were 3 years behind sighted students. Moreover, the blind who suffered from cognitive issues needed even more support. On the other hand, there was no impact of the sex and grade variables on achievement.

Al-Dababna & Hassan (2012) looked into the obstacles facing blind students in Jordan. The obstacles were generally average, while post-training obstacles tended to be high for teachers, especially in regular schools, even after preparation. A statistical function proved the variable of school type in favour of regular schools. As for the sex variable, there was no impact, in general, except in teacher training – in favour of males – and partnership – in favour of females. However, with reference to the grade variable, there was a statistical impact, in general, except in auspices partnership.

Another study (Carole & Penny, 2018) explored the impact of the iPad in the blind students' achievement in algebra and solving mathematical problems. The students were taught algebra subjects, like drawing and paragraphs, using the iPad. The results showed that the device application was easier and more motivating to the blind students' for learning.

Tugba (2018) investigated the maths teachers' perception of blind students' environments, employing organized interviews with 7 teachers through the Environment-DAVIPE test. The findings classified the maths teachers' perceptions into external, internal, abstract, dark and available environments, whose sources were emotional, physical, kinesthetic, environmental and intellectual. In addition, blind students could move, put on glasses and

improve their living standards, but they suffered from others' disregard.

Based on the above review, most of the literature focused on identifying the factors hindering the blind students' learning in general, likes Al-Dababna and Hassan (2012) and Aldemerdash (2003).

Some, like Carole and Penny (2018), referred to the potential of teaching blind students maths by using modern applications and devices like the latest iPad. Finally, Tugba (2018) looked into maths teachers' perceptions of the environments appropriate for blind students, how to improve them and how to sympathize with such students.

However, the present study is aimed at identifying the obstacles to the blind students' learning maths in Jordan from the students' and teachers' perspectives.

1.1 Problem of the Study

According to Al-Dababna (2012), there are obstacles to improving blind students' programmes in Jordan. Plans for maths, in particular, need to be developed, along with teacher training on the most recent strategies in educating the blind in Jordan. Upon field visits to schools which host blind students, it is noticed that such programmes are few or, even, unavailable, attributed to the fact the Ministry of Education gives these students the option of excluding the maths subject from the curricula. Thus, this study looks into the problems encountering blind students in learning maths in kingdom.

1.2 Questions of the Study

1) What are the obstacles to blind students' learning maths in Jordan from the students' perspective?
2) What are the obstacles to blind students' learning maths in Jordan from the teachers' perspective?

2. Method

2.1 Sample of the Study

The sample comes from schools for the blind in Amman. It consists of 30 sixth-, seventh- and eighth-graders and 2 teachers.

2.2 Tools of the Study

2.2.1 Questionnaire

A questionnaire was developed to identify the obstacles to blind students' learning maths in Jordan. It consisted of 3 sections: obstacles related to culture, curriculum and progress. It was based on the difficulties leading to learning problems and in the blind person's future personality as well as similar tools like that of Al-Dababna (2012) on general challenges to the blind in Jordan. The tool was verified in validity by a number of referees in maths teaching methods and learning difficulties, whose notes were observed to modify paragraphs that suited blind students. As for consistency, it amounted to 0.87 according to Cronbach's Alpha measure.

2.2.2 Extensive Interview

Three questions were addressed to blind students' maths teachers:

1) In your opinion, what are the cultural obstacles to blind students' learning maths?
2) In your opinion, what are the curricular obstacles to blind students' learning maths?
3) In your opinion, what are the administrative obstacles to blind students' learning maths?

2.3 Procedures

Upon feeling the problem of the study, which had to do with the blind students' learning maths and scientific subjects after completing high school, it was necessary to identify relevant obstacles. Firstly, the schools which hosted blind students in Amman were visited. Secondly, the tool of the study was developed in a form of questionnaire. Thirdly, teachers in these schools were extensively interviewed. Fourthly, the questionnaire was distributed by the teachers to ask students about obstacles to learning maths. Fifthly, the validity and consistency of the tool were verified by the SPSS software in order to come up with findings and make recommendations.

2.4 Methodology of the Study

The descriptive-analytical methodology and qualitative analysis were employed.

3. Results and Discussion

3.1 Question 1

What are the obstacles to blind students' learning maths from the students' perspective?

Averages and standard deviations were calculated for each aspect, as shown in the following table.

Table 1. Arthematic means and standard deviations for the aspects of blind students' learning maths in Jordan from the students' perspective

Domain of obstacles'	Percentage	Arthematic mean	S.DEV
Cultural	89%	22.23	5.956
Curricular	85%	21.5	6.295
Administrative	94%	28.3	5.968
Total	89.3%	72.03	17.65

According to the above table, the obstacles are high by 89.3%, with those administrative 96%, cultural 89% and curricular 85%.

A proof of such challenges is the lack of special maths curricula, as the subjects taught to blind students in Jordan are weak for only addressing simple matters related to number. One of the official challenges is that these students are encouraged to choose the literary steam, which excludes maths. As a result, they do not care about maths and, thus, they are deprived from specializing in scientific subjects at university or college. As for cultural obstacles, parents encourage their children to care for other subjects, since maths can be excluded later. Most probably, parents urge them to concentrate on theoretical subjects.

Many previous studies explored blind students' learning challenges, like Baxter, Woodward, and Olson (2001), Cook, Gerber, and Semmel (1997) and Mills et al. (1998). They argued that these students lacked sufficient chances to train on different necessary skills within an intensive, diverse and multi-period schedule. On the other hand, maths teachers needed to learn up-to-date educational strategies which suited blind students and provided appropriate alternatives.

3.2 Question 2

What are the obstacles to blind students' learning maths from the teachers' perspective?

In one of the blind students' schools, 2 teachers were interviewed with regard to maths, upon taking permission from the administration. They were asked:

1) In your opinion, what are the cultural obstacles to blind students' learning maths?
2) In your opinion, what are the curricular obstacles to blind students' learning maths?
3) In your opinion, what are the administrative obstacles to blind students' learning maths?

The answers are as follows. Cultural obstacles are related to blind students' weak motivation to study maths, as they are encouraged by their parents to study literary subjects. The teachers link it to the Ministry of Education's rules that such students may omit maths from the Secondary Examination, so the parents do not give it attention from the beginning. They also argue that there is no curriculum adapted for blind students, especially at higher levels. One of them highlights creating special curricula for blind students in primary, preparatory and secondary stages. Modern strategies which fit such learners are proposed, like training on mental arithmetic.

The researchers believe that blind students need an integrated maths curriculum which observes their special conditions, such as providing physical objects, models, mathematical language and comprehensive communication tools for maths, as well as integrating other systems – like Braille – for mathematical symbols. Maths teaching standards necessitate providing the communication principle in a bid to properly read, comprehend and express maths (NCTM, 2000).

Heward (2006) emphasized meeting the blind students' emotional and social needs. Many of them have distinguished mental abilities, which lead to positive approaches to studying maths topics and better self-competence and self-image.

Erin (1993) proposed a series of guidelines which contributed to the blind students' learning and teaching. Focus should be laid on meaningful educational programmes in all the subjects and curricula to observe all the growth and factors meeting their educational requirements. Examples had to do with active participation, curricula development and provision of supporting curricula.

Kirk et al. (2000) referred to the importance of improving the teachers' proficiency in the blind students' programmes and curricula, awareness of these students' characteristics and providing intensive and frequent

training for these students.

4. Recommendations

In light of the above findings, the researchers recommend building alternative maths curricula for blind students which boost their motivation to learn the subject. Another recommendation is to raise the blind students' parents' awareness that their children can have high mathematical abilities, which could make them specialize in scientific subjects in the future, like engineering, computer, etc. Finally, blind students' teachers must be trained on modern strategies, like mental arithmetic, and tools, like Abacus, to teach students kinesthetic and mental skills.

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