Assistive Technology Use for Students with Down syndrome at Mainstream Schools in Riyadh, Saudi Arabia: Teachers' Perspectives

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Abstract

In this study, the researcher sought to examine the teachers' Attitudes on use of assistive technology for Students with Down syndrome in Riyadh, Saudi Arabia. The study undertook literature review and survey in order to answer the research questions that had been formulated. The survey involved 50 teachers who had been selected form teachers teaching students with down syndrome in schools located in Riyadh, Saudi Arabia. The results from the survey and from the literature review indicate that teachers have positive attitudes the use of assistive technology. Teachers felt that assistive technology is a good tool that assists children with Down syndrome in their learning activities and even social activities. When they use assistive technology, teachers reported that assistive technology was an effective tool in improving literacy among these children. Still, teachers as well reported that there are several barriers towards the use of assistive technology. These barriers include, lack of training or skills, lack of support, lack of enough resources and lack of time. The teachers felt that there was need to provide more training and to include assistive training in school curriculum. The study concluded that use of assistive technology is supported by teachers and therefore enough support should be given to theme for better outcome in use of assistive technology.

Keywords: Assistive technology, Down syndrome (DS) and teachers' Attitudes

1.Introduction

Down syndrome (DS) is a generic disorder that results from Chromosomal abnormalities. As explained by Al Shamsi, Talhami & Shaalan (2006), this condition arises when an individual has one extra chromosome. Children with Down syndrome may have different cognitive and physical difficulties that require being serious considered when in classrooms. The learning problem includes poor balance, poor hearing and vision, poor communication and unintelligible speech. They as well suffer from motor development and have difficulties in expressing themselves. Accordingly, as mentioned by Buehl & Fives (2009) there are several strategies that can be used to assist these children in learning. One of these strategies is assistive technology (Black and Wood, 2003), which assist children with DS with self-paced learning, sounds, instant feedback and visual presentation.

Bouck, Maeda & Flanagan (2012) restates that students with DS have difficulties in learning using the traditional methods and this has been going on a long time. He points out that in traditionally, teachers have used different teaching methods and techniques like task analysis, pacing and repetition to assist these students in learning. Whereas these methods and techniques have been successful with some DS students, it has failed to work with some DS students hence the need for more innovative ways and strategies of assisting DS students. With recent advancement made in technology, there are now various devices that can be used by students with DS as learning aids and teachers have alternatives on assistive technology they can use. Nonetheless, the adoption of these technologies differs from one school to another, and even by country. Similarly, teachers have varying perceptions regarding these technologies. As such, the present study seeks to teachers' attitudes towards assistive technology use for students with Down syndrome in Riyadh, Saudi Arabia.

1.1 Statement of problem

Though the use of assistive technology to assist the children with special needs particular those with Down syndrome has continued to be widely accepted in used in many countries (Bursuck, & Blanks, 2010), there are some countries that are yet to fully embrace this technological assistance for children with DS. Teachers being at the center of teaching children with DS have a big role in successfully acceptance and use of assistive

technology in their school. Their attitudes can either promote or hinder the use of assistive technology. In Saudi Arabia, the Ministry of Education implemented policies and allocated resources towards supporting children with DS (with special needs). Nonetheless, as reported by Cennamo, Ross & Ertmer (2010) there is scarcity of information regarding the attitudes and perceptions of teachers regarding assistive technology. Therefore, there is need to understand a study to examine the attitudes held by teachers in regard to use of assistive technology in assisting student with DS in learning activities. This explains why the present study is being carried out.

1.2 Aim of the study

To examine the use of Assistive Technology Use for Students with Down Syndrome (DS) from the teachers' perspective at Saudi Schools in Riyadh, Saudi Arabia.

1.3 Study questions

1. What are teachers' attitudes about Assistive Technology use for students with Down Syndrome?

2. How do teachers perceive the barriers to Assistive Technology use with students with Down Syndrome?

3. What are the main factors contributing to developing Assistive Technology use with students with Down Syndrome**?**

2. Literature Review

2.1 Assistive Technology Concept

Assistive technology has become centre of focus in education practice to support children with disability. Al Shamsi (2006) defines assistive technology as a device that can be used to enhance improvement in the performance of individuals with disability. Assistive technology plays significant role in the education of children with special needs As such, Li (2006) notes that with advancement in technology and medical care, students with disability can learn today just like those without disability. As such, Bursuck, & Blanks, 2010), Ertmer and Ottenbreit-Leftwich (2010) recognised a number of assistive technology programs and software that have been carefully planned to benefit students with disability. As noted by Edyburn, 2006), use of assistive technology to aid complement traditional teaching methods actively increases the participation of students. Similarly, Ertmer and Ottenbreit-Leftwich (2010) argues that assistive technology enables students with special needs to relate more easily in social and academic activities. According, though technology is a powerful tool in classroom that can help children with Down syndrome, teachers have to be agents of change to achieve desired results.

Additionally, teacher educational training process have recognised the need for technology in supporting learners with disability to reduce the problems that are associated with the teaching and learning among students with disability. Al Shamsi, Talhami & Shaalan (2006) observed that assistive technology does not guarantee the inclusion of students with disability in the learning process. Al Shamsi, Talhami & Shaalan (2006) pointed out that there is need for better teacher training programme to equip teacher to use technology and good support structures. Li (2006) noted that assistive technology has improved learning among students with disability. Li (2006) further suggested that the success on the use of the assistive technology depends entirely on the teacher and not the technology in isolation. Al Shamsi, Talhami & Shaalan (2006) proposes that that the students' needs should be matched with their ability for better academic performance. The needs and the abilities should be matched to students' age, availability of the assistive technology and the ease of using the device.

2.2 Studies on Teachers' perceptions of Assistive Technology for students with special education needs

Though assistive technology is widely used at present, is use among schools with special needs students differs (Edyburn, 2009). Certainly, the teacher's perceptions on the use of technology for teaching children with special needs can significantly impact the extent in which the technology is used (Pierce & Ball, 2009). Marino (2009) noted that beliefs held by teachers could influence the way technology is developed and integrated in the

classroom. Several studies for example by Chen et al., 2009; Yuen & Ma, 2008, done on perceptions of teachers on use of technology have established that teachers' perceptions have a significant impact on use of technology within their classrooms. In a study carried out Coppola (2004), he established that teachers' use of technology depended on their beliefs that the technology was useful and could be integrated well as a teaching tool. Li (2006) also found that teachers' perception on the uses of assistive technology affected its application in the learning process. Li (2006) also found that teachers believed that the assistive technology does help learners in the special education programme. According to (Al Shamsi, 2006), technology plays a critical role in the support structure for the students whose disabilities have been matched with the appropriate assistive technology.

Joshi et al (2010) argued that assistive technology cannot replace the actual instructional process. Some teachers believed that the technology placed the students at the same level and that it overcomes their individual impairments. They noted that even the students without disability had different entry behaviours and individual abilities *(*Joshi et al, 2010*)*. As such, teachers' perception about the use of technology posted numerous challenges on the effective use of assistive technology by students with divergent needs. Technology in its entirety is not perfect hence the rapid development in its use. Joshi et al, (2010) propose that technology use in special schools be monitored to ensure it benefits individual students. He further suggested that in service teacher training programmes should focus on individual productivity of the teachers in using technology for teaching and learning. In service training initiates, a positive perception of teachers about students with disabilities (Al Shamsi, Talhami & Shaalan, 2006). Teachers believe that assistive technology enhance inclusivity in the learning process. Al Shamsi, Talhami & Shaalan (2006) found that teachers believed that assistive technology help concretize abstract ideas and make previously difficult tasks easy. Interestingly, assistive technology relatively compensates for the disability giving students with disability to engage in debates and discussions with mates to enhance effective learning. In addition, Al Shamsi, Talhami & Shaalan (2006) established that teachers on practise found out that their knowledge on effective use of assistive technology was out of date with the current guidelines on the optimal use of the technology. They noted that the contributory fact to this inefficiency was inadequacy of professional to facilitate curriculum implementation in the special schools. As a result, many professionals in the sector were untrained and not fully qualified for the various responsibilities held. In another study, Murry & Murry (2000) found that teachers believed that inadequate support structure and services were provided by the authority and therefore more support system must be implemented for maximum output and performance of the assistive technology.

2.3 Studies on Effectiveness of Assistive Technology for children with Down Syndrome Effects of Down syndrome on Children Learning

As noted by Kleiman (2010), assistive technology can improve learning and teaching of students with down syndrome in different ways. Accordingly, it is important to understand how effectively the technology can be used. This is critical because as asserted by Kleiman (2010), it will help teachers to formulate the best strategies on the use of assistive technology. In a study by Williamson-Henriques & Friend (2012), found that assistive technology helped students with learning difficulties to perform social and education assignments. On his part, Hasselbring and Bausch (2006) established that assistive technology when used could break down the barriers of learning by providing reading support. This implies that assistive technology can assist students with learning difficulties to successfully read their books through. Secondly, the technology provides reading intervention among children with Down syndrome, and this assists them in improving their general reading skills. These findings agree with   those of McKenney, & Voogt (2009) who found that computer technology helped children with Down syndrome to acquire foundational reading skills. Likewise, Hasselbring and Bausch (2006) found that the computer-based Read 180 program resulted in significant improvements for students with Down syndrome in reading comprehension.

Assistive technology is very instrumental in the learning of these students. Joshi et al (2010) noted that these students have poor vision and their matches their need for the magnifying screen. This enhances clear vision and clarity of objects and pictures. Edwards (2005) emphasized that these types of students learn through repetition of tasks and the use of computer aided technology. Assistive computer technology breaks down task into simple stages that enable the students to learn step by step while concretizing the abstract concepts (Klein et al. 2001, p. 26). They observed that repetition of task is the best way to promote learning among students with learning disability. In addition, computer aided mechanisms such visual presentation, captivating graphics and sound greatly benefits students with Down syndrome *(Black & Wood, 2003)*. *Black & Wood, 2003 further argued that application of assisted technology in education presented peculiar benefits to students with Down syndrome, as well as individuals with learning disability generally. Interestingly, Buckley (2000) noted that the available data and practical observations indicate that students with Down syndrome benefit from use of computer aided*

*learning. Edwards (2005) further posted that computer aided learning enhances motivation, using learning aids like pictures, sounds and animation which arouses curiosity among learners. He further noted that computer aided learning enhanced self confidence among learners with Down syndrome through manipulation enabling them to have self-confidence and control over what they do (*Joshi et al, 2010*). Eventually, this leads to freedom and independence in learning thereby reinforcing heuristic learning (*Blackwell et al, 2013*). He confirmed that children with Down syndrome learn through visualizing more than listening and that computer aided programs would present both visual and audio material thereby making learning more efficient. It further encourages high retention of the content learnt. Buckley (2000) emphasized that visual presentations of instructional materials through computer aided learning reinforces language processing problems. In addition, Shamsi, Talhami & Shaalan, (2006) notes that self-matched learning enables the student to learn and progress at their own pace.*

2.3 Barriers to Technology Integration in inclusive Schools

*Available literature has indicated that teachers' beliefs and attitudes is a major barrier to the use of assisted technology in schools (*Blackwell et al, 2013*). For example, a study carried by* Levin & Wadmany (2006) found that some teachers resist the use of technology because of they lack complete understanding of the technology being used. This results in such teachers to hold conflicting beliefs regarding the technology. In another study done by Balanskat, Blamire, and Kefala (2006), the researcher found that teachers suffered from anxiety in the use of technology due to limited knowledge they hand and they affected their confidence level. These teachers were afraid that they may fail in their use of the technology. A different study by Davies (2010), reported that lack of enough support, resource and time by school leadership hindered the use of technology in schools. Several studies for example, Brinkerhoff (2006) have shown that   many teacher is ill-equipped and not well prepared to use technology and this results in difficulties in teaching students using assistive technology.

Similarly, Judson (2006) *identified inadequate knowledge and skills on the use of ICT as a barrier to technology integration in schools as. If teachers lack the knowledge and skills required, it would be obvious that ICT integration would be compromised.* Duhaney (2006) *stated that educators require specific skills and knowledge for effective integration of technology in school.* Duhaney (2006) observed that inadequacy of certain skills among educators limits the integration of technology in schools. They further suggested that inclusive schools portrayed a mixture of talent and abilities. Therefore, matching students' abilities to the appropriate instructional technology became a difficult task.

Nonetheless, lack of technological equipment and support infrastructure was identified as a barrier to effective use of technology in the teaching and learning. Leung (2003) identified that most schools situated in the rural area do not have electricity to power the devices. In addition, he observed that the technological devices do not match the growing number of students in inclusive schools. With inadequate technological resource, it has become difficult for teachers to integrate technology in education. In addition, large classes are barrier to technology integration. Leung (2003) indicated that there exists more difficulty in dealing with large class sizes with limited technological resources. Management and supervision on the use of the ICT equipment is more difficulty than instructional facilitation (Clark & Luckin, 2013). Children become more aggressive whenever there is delay in the process thereby making them develop violent behavior. Educators also noted that accessing the physical technological facilities is difficult due to sharing by colleagues. Additionally, Clark and Luckin (2013) noted that due to limited knowledge by educators on the use the technological resources, most educators have lacked the confidence to integrate technology in learning. Unavailability of the educational software and applications has grounded the use of technology in education. Ihmeideh (2009) observed the most critical barrier in ICT integration is lack of software. He noted that the programs cannot run without the application software.

3. Methods

3.1 Participants

The researcher used 50 teachers who work in special education classroom of student with DS, and therefore for were experienced in this area. The teachers were selected from 5 schools in Riyadh and all of them participated in the study (N=50).

3.2 Survey instrument
The researcher collected data using survey questionnaire that had been developed previous by another research

(though he sought concert first). The questionnaire narrowed on three areas, they are underlined below:

- Background/personal data of the participant
- The attitudes held by teachers regarding the use of assistive technology in teaching of students with DS.
- Barriers towards the use of assistive technology among DS students
- Main factors that influence use of assistance technology among DS students.

To maintain high validity and reliability of the data collection instrument, the research employed the services of three experts who ensured that the questionnaire was appropriate and answered the aims of the study. In addition, test-retest was applied to ensure that there was also internal reliability. When Cronbach alpha method was applied a result of 0.86 was recorded underlining the reliability of the instrument.   Three different sections were created for the purpose of data collection in the survey. The Likert scale used by the researcher ranged from strongly agree, agree, neutral, disagree and strongly disagree. Accordingly, "strongly agree" was represented by 1, while 5 was for strongly "disagree"

3.3 Procedure

The researcher sent the 80 questionnaires to the participants as anonymous self-completion questionnaire in January 2017. However, only 50 questionnaires were returned fully completed. This implied that study has an 80% response rate, which is acceptable.

3.4 Data analysis

For data analysis, the researcher opted for descriptive analysis as the best approach to analyse teachers' attitudes of using assistive technology as collected in the questionnaires. As such, descriptive statistical analysis helped the researcher to explain the common attributes or feature that was contained in the data collected. After the analysis, the researcher summarized the results in tables. More so, to statistical analysis, the researcher used SPSS (Statistical Package for the Social Sciences) to get statistical data as advised by (Creswell, 2009).

4.Results

4.1 Teachers' Attitudes about use of Assistive Technology for students with Down Syndrome.

From the results obtained from the questionnaires, most teachers agreed that the use of assistive technology was important in their classrooms. Similarly, the teachers as well were in strong support of assistive technology as useful tools in that can be used to develop the social and academic skills of DS children. Positive attitudes towards assistive technology was also reported on their ability to assist children with DS to easily understand the curriculum, and the children are more attracted to coming in class when given assistive technology. There were moderate teachers' attitudes towards regarding how assistive technology assists children with DS to improve their language skills and life skills. Still, majority of the teachers were of the view that assistive technology did help students in those areas, only few held contra opinion. In addition, most of the teachers agreed that assistive technology was an important tool for these students to achieve different learning needs within the classroom. Regarding if the assistive technology resulted in negative impact on children, majority of teachers were in disagreement indicating that assistive was good for students. They as well agreed that assistive technology is not disruptive and it makes children with DS to enjoy learning. The general results underline a strong support by teachers on use of assistive technology among children with DS.

4.1 Teachers' Attitudes about use of Assistive Technology for students with Down Syndrome

Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Mean	Std. Deviation
Is it important to avail AT devices to student with DS in your classroom?	42.7	48.0	4.7	3.3	1.3	4.27	.81
AT devices helps students with DS to develop their social and academic skills	35.3	53.3	6.7	2.7	2.0	4.17	.82
Students with DS complete the curriculum easily with the help of AT.	27.3	51.3	15.3	3.3	2.7	3.97	.89
Students with DS interact more in the class when they use AT devices	15.3	46.7	30.0	5.3	2.7	3.66	.89
AT devices helps student with DS to develop their language skills and life skills.	10.7	47.3	25.3	11.3	5.3	3.46	1.007
Students with DS can complete various activities and needs in the classroom with the help of AT devices	12.7	51.3	22.7	10.7	2.7	3.60	.93
AT devices can disrupt the learning of students with DS.	6.7	50.0	30.7	9.3	3.3	3.47	.88
Using AT results in students with DS depending on these devices which hinder the development of their different skills.	2.2	5.3	8.0	60.0	24.7	4.00	.85
Students with DS can complete assignments and classwork with the help of AT devices.	33.3	52.0	8.7	3.3	2.7	2.98	1.13
AT devices makes it easier for children with DS to enjoy language learning.	3.3	42.7	13.3	30.0	10.7	4.10	.88

4.2 Barriers to Assistive Technology use for students with Down syndrome

The biggest barrier as per the findings is the negative influence by other teachers on the use of assistive technology as the response recorded a mean of 4.14. Other leading barriers reported included inefficient technological devices provided at schools. This implies that though teachers are willing to use assistive technology, the limited devices limit their efforts. Similarly, time factor is another barrier. Use of assistive technology requires additional time to teach students on its usage, but teachers have other classwork duties to undertake and are find little to use assistive technology. Lack of proper training or refresher courses on use of assistive technology as well hinders teachers to fully exploit the technology in the classroom.

Other issue raise by the teachers was the poor collaboration from parents, teachers felt that parents do give their children enough time to use assistive technology when they are at home, and instead give me domestic duties therefore creating a barrier in the use of the technology. More so some parents are not concerned with the assistive devices support to their children and therefore at home they tend to ignore the use of the assistive device. Similarly, another concern raised by these teachers touched on inadequate learning devices tailored towards the local needs. For example, Arabic software devices were few on the market, yet this is the language used for teaching in the classroom. Inadequate learning devices (for example Arabic software) that can be used

by teachers who teach students with DS.

4.2 Barriers to Assistive Technology use for students with Down syndrome

Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Mean	Std. Deviation
Inefficient technologies devices provision to schools	19.3	54.7	12.7	10.0	3.3	3.76	.98
AT is time demanding yet there is limited time for classwork	6.0	27.3	48.0	14.0	4.7	3.36	.95
Teachers do not attend regular training courses and this limits the use of AT in their classrooms	14.0	50.0	20.0	11.3	4.7	2.98	1.13
Home duties and lack of cooperation from parents of students with DS	11.3	52.7	28.0	6.7	1.3	3.66	.81
Inadequate learning devices (for example Arabic software) that can be used by teachers who teach students with DS.	25.3	50.7	18.0	10.0	2.0	2.91	1.14
Some teachers negatively influence others on use of AT	10.0	25	59.3	2.7	3.0	4.14	.79

4.3 Factors for developing use of Assistive Technology for students with Down syndrome

When asked to state factors that need to include in developing use of assistive technology for students with Down syndrome, the following factors were given. Most teachers strongly felt that to develop high use of assistive technology for students with down syndrome in schools, the technology should be included in the school curriculum making it part of syllabus taught in schools. Secondly, they as well felt that at the university level where teachers are taught, lessons on use of assistive technology should be passed on to the trainee teachers. This will prepare them well for future use of assistive technology as teachers. Similarly, most teachers strongly agreed that increasing the amount allocated to schools was a good strategy towards enhancing the use of assistive technology since the money could be used to buy more devices and this will certainly allow more children with Down syndrome to use the devices.   Lack of adequate training of teachers was established as a barrier to use of assistive technology. Accordingly, teachers felt regular and re-fresher courses on use of assistive technology should be offered to teachers as a way of improving the use of this technology in schools. Lastly, the teachers felt that the government should provide more resources to schools with for them (teachers) to improve the use of assistive technology in schools. The resources required include posting of enough teachers, provision of technical support for example training from experts, on-shelve lessons and provision of other learning materials.

4.3 Factors for developing use of Assistive Technology for students with Down syndrome

Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Mean	Std. Deviation
Assistive technology should be incorporated in the school curriculum used to teach students with Down syndrome.	26.7	58.0	8.0	6.0	1.3	4.02	.84
Increasing financial allocation given to schools to enable them to purchase more assistive technology devices.	19.3	54.7	12.7	10.0	3.3	3.76	.98
Offer regular training to teaches on use of assistive technology an and equip them latest information about the technology	16.0	48.0	27.3	4.0	4.7	3.36	.95
Use of Assistive technology should be included as a course in teaching courses at the university	25.7	30.3	40	3.0	1.0	4.27	.81
Schools should be provided with adequate material in terms of teachers, technical support and on-shelve lessons for effective use of assistive technology availed.	6.7	53.3	36.0	2.0	2.0	4.17	.82

5. Discussion

From the paper, it can be stated that Down syndrome (DS) is a generic disorder resulting from chromosal abnormalities, and children who suffer this condition face several learning challenges. These challenges include includes poor balance, poor hearing and vision, poor communication and unintelligible speech. Assistive technology is used to assist these children overcome these learning difficulties. Indeed, Li (2006) points out that assistive technology plays significant role in the education of children with special needs as they need special instructional methods that suit their unique individual needs. However; teachers have varying perceptions regarding the use of assistive technology, though most of the teachers agree that it's a good technology.

The study has shown that most if not all teachers who were interviewed believed that assistive technology is good tool that teachers should use in teaching student with Down syndrome. Indeed, this generally agrees with past studies that found that teachers' perceived technology has having   big impact of teaching of children with special needs (Pierce & Ball, 2009). Responses form teachers revealed that teachers strongly support the use of assistive technology as useful tools that can be used to develop the social and academic skills of DS children. This statement agrees well with argues that Ertmer and Ottenbreit-Leftwich (2010) who   noted that assistive technology enables students with special needs to relate more easily in social and academic activities. Similarly,

Yuen & Ma (2008), as well established that perceptions of teachers on use of technology determine how it will be used in classrooms.

The fact that teachers use assistive technology underlines that they positively view that the technology can assist their learning. For example, teachers in the survey believed that assistive technology helped children with Down syndrome to easily understand the curriculum, and the children are more attracted more learning. This shows that teachers believe that technology makes learning to be interesting. This views mirrors that shared by Al Shamsi (2006) who asserted that technology is important in supporting structure for the students with learning difficulties who are matched with the appropriate assistive technology, such students will be more motivated to learn. More so, teachers in the survey agreed by Al Shamsi (2006) when they reported that assistive technology was an important tool for student with Down syndrome to achieve different learning needs in the classroom. From the survey, it is clear that teachers held positive beliefs about the use of assistive technology, and as established by Marino (2009) beliefs held by teachers' influences the way technology is developed and integrated in the classroom. Therefore, it can be argued that teachers advanced the use of assistive technology and integrated it use well in the curriculum and in teaching because they felt that this best way to assist the students with Down syndrome. Indeed, in such cases, desired results can be achieved because of the positive perception and efforts undertaken by the teachers. Indeed, as noted by Ertmer and Ottenbreit-Leftwich (2010) in spite of the fact that technology is a powerful tool that can help children with Down syndrome, teachers have to be agents of change to achieve desired results.

Though assistive technology can significantly offer learning support to children with Down syndrome, studies have shown that teachers continue to face several challenges that act as barriers towards the use of this technology (Blackwell et al, 2013*). One of the biggest challenges that teachers face is lack of technology skills or competencies to equip them with the necessary competencies and confidence in use of assistance technology. Indeed, in the survey teachers agreed that Lack* of proper training on use of assistive technology hinders their ability to fully exploit the technology in the classroom. This finding echoes well with sentiments expressed by Duhaney (2006) *who stated that teachers require specific skills and knowledge for effective integration of technology in their classrooms.* Duhaney (2006) further noted that inadequacy of certain skills among teachers limits the integration of technology in schools.

One of the barriers that were given by teachers is the influence of other teachers. This hindered them form accepting or using assistive technology. This finding relates to teacher's resistance that was established by Levin & Wadmany (2006) who in their study concluded that some teachers resist the use of technology because they lack complete understanding of the technology being used. Accordingly, such teachers can easily influence other against the use of assistive technology because they do not know how best the technology works. Closely related to this is Lack of proper training on use of assistive technology, a reason given by teachers in the study as one of the barriers. Indeed, in a study of Balanskat, Blamire, and Kefala (2006), they established that some teachers suffered from anxiety in the use of technology owing to lack of adequate training and skills and this made them not to promote the use of technology. Another barrier comes from availability of facilities. Teachers reported that they lacked enough resources in terms of availability of teachers, technical support, time and even software for assistive technology. For example, teachers cited there were inadequate learning devices tailored towards the local needs, particularly noting that Arabic software devices were few on the market. These views are like those of Davies (2010) who found that lack of enough support, resource and time by school leadership created a big barrier in the use of technology in schools. Similarly, Leung (2003) observed that the technological devices do not match the growing number of students with special needs. On a similar note, Ihmeideh (2009) observed a barrier in ICT integration is lack of software. For effective use of assistive technology, teachers pointed out that they required additional time to teach students with this technology. However, the amount of classwork that the teachers must cover makes it hard for them to get enough time to effectively use assistive technology. Lack of cooperation from parents was also noted as barriers, and this requires that parents get involved in the learning of their students assist them when at home in use of assistive technology.

To address the barrier that have been established and to increase the effective assistive technology, several factors need to be considered. For example, teachers surveyed indicated that it was important for the school administration provide more support in terms of teachers, required software time and even technical assistance. In addition, the teachers felt that that to develop high use of assistive technology for students how to use technology should be part of the school curriculum. Indeed, the findings underlines the importance of assistive technology as established by Kleiman (2010), who noted that assistive technology can improve learning and teaching of students with down syndrome in different ways. As such Kleiman (2010) suggest that is necessary that teachers and schools understand how effectively the technology can be used. This is critical because it will

help teachers to in formulating the best approaches in using assistive technology.

Training of teachers was also stressed by teachers who were surveyed. They underlined that training should start at the university level when teachers are being trained. Indeed, lack of training was identified as one of the leading barrier towards the use of assistive technology therefore it is needs to be addressed well. Studies by of Balanskat, Blamire, and Kefala (2006) underlined the importance of training by noting that some teachers were unable to use technology because they lacked the necessary skills and competencies. Accordingly, they felt anxious and feared that they may fail in the use of the technology. To avoid such cases, training should be stressed. Even for those teachers who are trained in the use of assistive technology, they require regular update to be aware of new techniques on the market. Edwards (2005) *has also underlined the importance of computer based teaching by stating that children with learning difficulties when exposed to computer learning were more confident and motivated. However, it will require a teacher will necessary skills to equip the student adequately.* The teachers felt in order to increase the effectiveness of assistive technology, the Saudi government ought to provide adequate resources. They also observed that they should be given enough time and other resources. Indeed, as observed by Davies (2010), it is very important to have enough resources and support from the school administration. This boosts the morale of teachers and encourages them to use assistive technology. Still, from the findings, it is apparent that adequate training should be provided to teachers for effective use of assistive technology. School support and availability of appropriate software, parent involvement can be restated as the important factors that should be considered by all schools that seek to use assistive technology.

6. Conclusion

It can be concluding that Down syndrome (DS) is serious disorder that causes leaning difficulties that includes poor balance, poor hearing and vision, poor communication and unintelligible speech. Thereby it requires special teaching approaches to address these difficulties. As such, it has been recognized that f assistive technology programs and software when carefully planned can benefit students with Down syndrome. Assistive technology supplements traditional teaching methods and increases the participation of students.   More so, assistive technology enables students Down syndrome to relate more easily in social and academic activities.

Generally, teachers have positive perceptions towards the use of assistive technology because they fell that it helps the learning process of children with Down syndrome. Indeed, teachers observe that assistive technology helps students with Down syndrome in speech, reading, language, comprehension and social activities. However, there are several barriers that hinders the use of assistive technology. The main barriers include, lack or enough training of teaching on use of assistive technology, bad influence from other teachers, lack of enough resources particularly software and   inadequate time, lack of support from the school administration and lack of cooperation by parents.

To address these barriers, it is important that training programs should be put in place that target teachers. More so, regular shot courses on new trends in assistive technology ought to be offered to these teachers. There is also need to restructure the curriculum to include assistive technology as a way of strengthening its use. The issue of funding is also important, technology is usually expensive and government as to allocate enough funds to schools with special children. This will allow these schools to acquire the required materials that will increase the effectiveness of the use of assistive technology. Certainly, this paper concludes that Saudi teachers hold positive perception towards the use of assistive technology in their schools and this implies that thy are committed towards improving the learning of children with students with Down syndrome using assistive technology

7. Recommendations

In line of the findings of this paper, the following recommendation is given:

- Proper and adequate training should be provided to teachers dealing with children with student's Down syndrome on the use of assistive technology for better results.
- Schools need to ensure that enough resources are availed towards the use of assistive technology as a way of motivating and encouraging teachers to use this technology, and enhancing its effectiveness.

- There is need to assess the effectiveness of assistive technology to identify areas that need improvements.

Acknowledgements

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