Analytical Study of Using Multimedia Techniques for Helping Learning Disabilities Students: The Case of Centers in Bahrain

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Abstract. This paper examines the use of multimedia techniques to help students with learning disabilities. The paper makes use of previous studies to research the effect of multimedia techniques on students in Bahrain. The research draws on information from the Ministry of Development and also from Private Centers in Bahrain which have students with learning disabilities. It is noticed that Bahrain’s Private Centers for learning disabilities have a large number of students with disabilities, the majority of whom are males. About 60% of these students are autistic children with learning disabilities whereas the rest represent children with mental impairment and Down syndrome respectively. The objective of this research is to investigate the influence of multimedia on the students facing difficulties in learning. It was known that the Centers in Bahrain are using multimedia techniques and that they were being helpful in making the conditions better for them. Thus, this shows that multimedia could be the right tool to choose to help the betterment of those students. Various ways of using multimedia tools were found through the previous studies which can be used to help improve the learning of the students’ with disabilities. The multimedia social stories, visual aids can be used as tools for making the students learn as shown by the results of the previous studies. This paper describes the development of an adaptive multimedia eLearning system for autistic learners that improves their learning skills and serves as eLearning environment for learning disabilities also. It helps enhancing the user’s social skills such as the communication skills which are a good practice for the autistic children.

Introduction

Disabilities not only affect the learning skills but may also be affecting the person’s higher level skills such as organization, time planning, abstract reasoning, long or short term memory and attention. It not only affects the academic growth but also interferes in the individual’s life and has impact on their relationships with family, friends and workplace. Multimedia can bridge them; nowadays there are several options of expressing your thoughts rather than simply writing them down. It can be shown through a video and animation etc. Utilizing multimedia to help students with learning disabilities is a challenge. The aim of this paper is to know whether the Centers in Bahrain utilize IT tools in students learning, especially when teaching kids with autism. An autistic child has different problems while connecting with the real world. A study by Tina and Linda [17] shows that “Technology is quickly melding into the social mainstream with PDA’s, cell phones, laptops and MP3 players becoming increasingly common and affordable. With this increasing use may come, increased acceptability for technological invention aides for children with autism that will not result in children with autism standing out from the crowd, but rather, blending into our more advanced technological society”. The paper focuses on the population of Bahrain. For the purpose of this research, data will be collected from centers that support disabled individuals. The purpose is to investigate the effect of multimedia techniques on the disabled children. The aim of the study is to illustrate the benefit that students with disabilities gain from using multimedia techniques. It is important to make good use of the new technologies in learning. As new technologies can strengthen student’s knowledge and improve their skills.
Literature Review

In education, there has been a shift from teaching to learning in which the new methods could facilitate such learning especially for people with disabilities. In classrooms, teachers employ the new technologies to increase student ability to learn and improve comprehension. Those with disabilities are in a disadvantage position to support themselves and acquire the knowledge and information they need for improving their social and economic well-being. For example, a study by Murray [12] Similarly, Tina and Linda [17] clarifies that computer-based instructions result in benefits to users such as increased motivation, decreased inappropriate behavior, and increased attention and also results in increased learning compared to traditional methods. The devices such as hand-held devices, laptops, and desktop computers can be used for showing multimedia elements incorporated in teaching. An experiment carried out by Bosseler and Masaro [2] shows that they developed and evaluated a computer-animated tutor to improve vocabulary and grammar in children with autism. In their investigation, eight children were given initial assessment tests and tutorials, and were then reassessed 30 days following mastery of the vocabulary items. This experiment shows that there is a positive impact on the children who took part in this experiment. This study encourages the use of computer-based interventions and incorporating the multimedia techniques to catch the attention of the children.

Findings and Analysis

Findings are based on the results obtained using Microsoft Excel to bring out the statistics with the data gathered. There are three different sources used for collecting the data including the Ministry of Education, the Ministry of Development and the 11 Private Centers which were visited.

![Figure 1. Basic details about the students (Gender, Nationality and Types of Disabilities).](image)

Figure 1 shows the statistics collected by the ministry of development. The percentage of the male students is 59% while the other category is 41%. All of them are Bahraini Nationals. As presented in the Fig., Mental Impairment has the highest percentage with 37%, followed by physical disability which is 30% and goes on as the different types of disabilities in Bahrain faced by the students. As Ministry of Development has the data for only Bahraini Nationals, the Private Centers in Bahrain were visited to gain an insight about the non-Bahrainis as well. The following Figure 2 will be from the 11 different Centers of Bahrain. The list of the Centers visited are Al Hidd Center, Enmaa Center, Kayan Center, Bedaya Center, Al Wafa Center, Hope Center, Al Dana Center, Ria Center, Al Manal Center, Al Tafaol Center, and Alia Center. Answers of the questions from the Private Centers were gathered and analyzed. The results will be displayed below with the help of Figure 2. The total number of students in the 10 Centers is 518, the numbers were not given by Kayan Center. Figure 2 shows the distribution of the percentage of the students from different Centers. The students from different Centers make up the total of 518 students. Figure 3 shows the details about the students with the learning disabilities who go to the private Centers. The statistics show that 77% of the students are Bahraini Nationals and 23% are other nationals. The gender
statistics show that there is a majority of males with learning disabilities forming 68% of the total. Figure 4 shows the ranges of the age in which the students fall for the learning disabilities they have.

![Figure 2. Distribution of numbers of students in each center.](image1)

![Figure 3. Basic details about the students in the centers (Nationality and Gender).](image2)

![Figure 4. Age distribution of the students with learning disabilities.](image3)

From the Fig.5 it can be known that most of the students fall in the category of 6-8 years, followed by 1-5 years of age and continues. From the graph another result can be deducted that the most affected ones are from the age 1-8 years, which means the learning disabilities are more likely to be shown in the early age of the children. And it displays the different type of learning disabilities the children have which come to different Centers. The Figure helped in realizing that Autism is the most common disability among these students, which makes the 60% of the total. Autism is most common in Bahrain which shows that the right steps are needed to be taken to tackle such situation. The results shows autism is followed by mental impairment disability by 15% and down syndrome makes 12% followed by the other disabilities such as brain damage, cerebral palsy, genetic disorder etc.

![Figure 5. Different types of learning disabilities.](image4)
The Figure 6 shows an amazingly positive result which shows that the centers use multimedia techniques such as (text, audio and videos) to help the children with learning disabilities. However, the methods applied are different from each other. Some of the centers do not rely totally on the technology, whereas others use alternative ways to help the students with their learning problems by using speaking pens, projectors etc. This Figure 7 is the answer to the question put forward by the paper which is to know what the results of using multimedia techniques are or using some technology based programs to help the students to come over their disabilities or to the minimum should help them. The results clearly show that 90% of them think the results were good enough and they helped the students with their problems. However, 10% of the total shows that the results were bad which means that the multimedia has both the negative and positive effects on the students. The best solution is to take benefits from it in a way that it will be less harmful for the children.

![Use of multimedia](image1)

**Figure 6. Use of multimedia in the center.**

![What Are the Results of using those multimedia Or Technology?](image2)

**Figure 7. Results of using multimedia or technology.**

![Do you think Multimedia or technology helps in fighting the issue?](image3)

**Figure 8. Impact of the multimedia or technologies on the students.**

The Figure 8 shows the heavy percentage of 90% for accepting that multimedia and technology is good for the students and helps them to be better. Whereas, the 10% cannot be left as well because there can be negative affect as well, but the key is to use such techniques to gain benefits from this. Findings are also gathered from the previous studies which supports that multimedia technologies can be used to have a positive effect on the students and help them learning things easily. There are mounting evidences that computer-based interventions are beneficial for children with learning disabilities. Chen and Bernard-Optiz [3] compare live personal instruction to computer-assisted instruction and found better motivation and fewer behavioral problems with computer-assisted instructions for 3 of the 4 participants. Despite the fact that there were no significant results in the learning rates of the participants. Liu & Breslin [9] performed an experiment on a group of 25 children between 3 - 16 years, having 20 boys and 5 girls facing Autism Spectrum Disorder (ASD). The method applied was visual aids picture activity, which had different pictures shown to the children using strategy. The performance was enhanced 90% than other groups. The children
successfully performed with visual support. In another study which was carried out on the students having autism, dyslexia and other disabilities to know the effect on their reading and attention. The results were effective and showed that colors have the potential to increase chances of external stimuli [5].

**The Proposed System Design**

Moore and Taylor [11] clarify that educational multimedia systems have a potentially important role to play in the education of students with autism. The study proposes a conceptual framework for the Interactive Multimedia eLearning System (IMELS) as shown in Figure9; where the user interacts with the system using the web browser, while using the website and through the user interface using the mobile application. The website is connected to the web server and the database which interacts with the IMELS. The IMEL system consists of the critical components for successful multimedia based collaborative eLearning [1]. IMELS contains eLearning models that have learning autonomy which helps in the refinement of the motor skills to be faster and make the children actively involved in their learning [16] which will help the autistic children. Another aspect included is the teachers as the tutors; the teachers will play their roles as the helping guides to the students. Learner interaction is another important aspect which lies under the eLearning models, it is important as it helps in ensuring that the user is active because it will ask the users’ participation to progress. It helps enhancing the user’s social skills such as the communication skills which are a good practice for the autistic children. Learner’s Activities forms another component of the system. The proposed framework of IMELS includes interaction, accountability and collaborability. These all help in the communication skills as stated earlier for interaction, and to share knowledge with others which will help the children to communicate with others. Interactive Environment contains the personalization services which will help the users to customize the content provided to the autistic learner based on their disability levels.

Figure10 shows the block diagram for the cognitive theory of multimedia, which shows how the multimedia elements have an impact on the learners. Clark and Mayer [4] state the multimedia principle which says that the students learn better from words and pictures than from words alone. The principle states that the text or auditory alone are less effective than the text or narration when augmented with the visual images. The active learning occurs when the learner selects, organizes and integrates the verbal and non-verbal information, therefore these multimedia elements are put together to make the content using both visual and text or narration to help the autistic learners[8,10]. As mentioned above the colors have a significant effect on the learners, therefore should be taken in consideration while designing the user interface. Dzulkifli and Mustafar [5] claim that colors play significant role in attracting the attention and influencing the memory of the learners. According to Omar and Bidin [13]autistic children tend to look more at the colors than the shapes, and are able to decode color before language as they are visual. Colors such as yellow, blue and green or color overlay are used in cognitive theory of multimedia which has been proven to be effective in improving reading and attention accuracy [13].

**Conclusion and Recommendations**

The research gathered and studied the data from within Bahrain, to assess the influence of multimedia on the learning disabilities students which turned out to be positive. The data was gathered from the 11 private Centers, as the other Centers refused to share their data. So, the results rely on the data being provided by those 11 Centers. The statistics assessed shows that total number of students in the private Centers makes approximately 518 students. The statistics show that there is more number of males, about 68% being affected by the learning disabilities. The most common range for the age is 6-8 years old children facing such difficulties in learning. 77% of the students are Bahraini nationals. The disability which is the most common in Bahrain is Autism which forms 60% of the total from different types of disabilities. There was high percentage received from the statistics that says that multimedia in form of audio, video, text is used by the Centers to help their students in
learning and the same goes for the results of using such techniques for the students, it was agreed with the high percentage being 90%. Almost all of the Centers use the multimedia and technology in a way or other. They think of the techniques, in a way that would benefit the students and not make their case worse. Though, the results obtained while using multimedia techniques for learning disabilities were good, but they showed concern of excessive use of such techniques might even make their case worse. So, they all agreed that these techniques can be beneficial but should not be excessively used. As studied from the previous researches some experiments were shown that gave examples on how multimedia techniques can be used in order to help the learning ability of the students. For example, multimedia social stories can be used; visual aids can also be used to show some basic information about daily routine which can be given through the use of smart phones etc. Basic communication skills can be taught and explained through computer-assisted programs. Future recommendations that can be extracted from the study are to make some application in order to help the learning disabilities students. The applications must be made with advice from the expert so most of the benefit can be taken from this. And the Adaptive Multimedia e Learning (AMeL) system will be improved to examine the potentials of the customization techniques.

Figure 9. The conceptual framework IMELS (Interactive Multimedia e Learning System)

Figure 11. Block diagram for the cognitive theory of multimedia.
References


