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Evaluation of autistic children's education in Oman: the role of e-Learning as a major aid to fill the gap.

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Abstract- Children with Autism need extra attention and care from the surrounding community, specifically from those who are involved in their education. It is clearly noticed that there are significantly fewer online learning programs and materials for educating children with Autism spectrum disorder. However, the use of technology could help to improve the education process of autistic children; therefore, e-Learning systems are among the desired area of investigation to embed it with autistic children education in Oman. This research aims to understand the current situation of educational support for autistic children in Oman, then to suggest a particular solution to contribute in educating autistic children. Quantitative methods are suitable for this kind of research; therefore, a questionnaire survey was used to collect the required information. Based on the information obtained from the questionnaire that took place in Oman, and the findings of the literature review, the researchers had identified that impairment in social interaction is considered as one of the main problems faced by autistic children in their daily life, in addition, these children have mild autism, furthermore, It was observed that there is a shortage of schools, centers, and personnel who supposed to be trained to educate autistic children. The finding of this research recommended the design and implementation of a special e-Learning system to support autistic children in Oman, which shall provide them with immediate support under the supervision of the surrounding community despite their background or specialization.

Keywords: E-Learning, Children with Autism, Teaching Environment, Communication, Educational Basics.

I. INTRODUCTION

Parents normally could notice the existence of unusual behavior on their children in the age ranging from the few months to three years. At this stage they might be unaware of what does this kind of behavior might be or what does it called. Consulting an expert could reveal that a kid might be suffering "autism disorder", which is defined as a group of disorders that affect the child's communication with the surrounding community and the exchange of relationships with them. This disorder is caused by the difference in the behavior of each child with autism from the other child. It all comes down to the multiple signs of autism in all of them. On the positive side, although the child has autism, he has many wonderful skills that draw attention to him and can be a key factor to help him find the right treatment for him [1].
Child is subject to suffer from the autism symptoms starting from the first three years of his age, this may lead autistic child to be isolated and suffers a lack of interaction with those around him, and in consequence they would fail to develop their language skills at the same level as those of the same age. Therefore, during school time, autistic child will not be able to communicate or learn using normal teaching methods, hence, it is necessary to design special educational system that takes in consideration the special needs by autistic children[2]. Efforts to support autistic children had started long time ago, where parents, governments, schools and NGO's had implemented special methods to support autistic children, in contemporary, autistic needs are vary, therefore, trainings or educational mechanism for autistic child are depending on the status of the children and the level of awareness of their needs within the surrounding community [3].
This research investigates the current state of autistic children's educational difficulties in Sultanate of Oman, in a purpose of providing a clear understanding of the autistic children needs, and suggest a suitable solution benefiting from the advancement of the technology [4]; [5]; [6];[7];[8];[9].

II. LITERATURE REVIEW

The use of technology has been proven to be an added value in almost every industrial field[10]; [11]. In the past few decades, technology starts to play an essential role in education and education management. Technology has provided education sectors with necessary tools and platforms to facilitate different curriculums [12]. The use of e-learning system is an excellent example of how technology was used effectively, therefore, it was necessary to evaluate the effectiveness of technology use with students with special needs [13].

When parents begin to notice their children lack of interaction and social communication, they must conclude that their child may have autism. Parents can turn to technology and use tablets to help their children get out of the isolation they tend to do because of their weakness in interacting with those around them properly. Support programs are available in tablets such as computers, for example, provide programs that the child with autism can use to enhance the skills and abilities of interaction with the community [6].

Children with autism lack the skill to organize emotions. This leads to a weakness in understanding their feelings towards themselves and others. Here lies the importance of the availability of technology and computers to help children with autism through smart applications that contain educational programs. A child with autism can easily access them emotional intelligence [14].

E learning was used to extract physiological activity in expression and its association with various emotions in children with autism. Emotional weakness is an essential component of autism disorder. After experimenting with this method, different results were obtained after heart rate monitoring as well as facial expressions [15]. Care professionals with children with autism find it difficult to get a curriculum consistent with the way children with autism think. This approach allows these children to adapt to those around them and help them control their reactions. This research grants a new technique that helps children with autism. This technique is based on explaining everyday behaviors[16]. Professional should using e learning to bring intelligence to a child with autism. Using an electronic learning system that extracts the IQ of this child with autism. This e-learning system can provide facilities using an individual tutorial that the child uses to demonstrate his / her intelligence abilities [17].

Technological interventions have been able to maintain the attention of children with autism and to distinguish the degree of attention of each child from the other. Electronic interventions have been able to support and assist autistic professionals by providing electronic design and adaptive learning tools that maintain the attention of this group of children. The study was used by [15];[8]to evaluate facial expressions on a group of children with autism. In the end, researchers have come up with multiple results that prove that a vital sign to measure the attention of this category of children is facial expressions[15];[8].

The study on which policymakers relied was able to reveal the importance of the Internet, which helps e learning. After the experiments were conducted on the school Banjarmasin in Indonesia in addition to the use of 17 teachers to carry out this task and participate in the use of this system and experience on their students. These 17 teachers have concluded that in the absence of students, there are many lessons to be missed. This indicates that the presence of students is the main factor for the success of the educational process and in the absence of it, this causes educational losses to students who will lose important educational lessons and on the other hand, to teachers who will suffer from the repetition of lessons again. Researchers were forced to look for a way to solve this problem. They managed to reach a solution that helps bridge this gap and is getting approval to connect the Internet to education. Children will be able to view the lessons they miss in their absence online. Researchers call this solution the term "e-learning". The principle of e learning depends on several stages whose mission is to develop and analyze this principle. These stages fall under the scope of the design of an electronic system after understanding the problem that needs to be addressed and developed and presented to teachers to evaluate the comments on the pros and cons of this educational electronic system and the extent to which it achieves the desired result[7][18][18].

Since ancient times, interest in social development has coincided with the development of methods of growth of studies in e learning. E learning includes a special focus on people with special needs and cognitive disability. E learning contains ways to help a child with autism social integration with his or her relatives or those in the same age. Researchers were able to use four steps in the methodological literature: literature and analysis, comprehensiveness and exclusion, synthesis, and comprehensive research in scientific literature and databases. In the end several conclusions were drawn, the most important of which are: the scarcity of studies concerned with e-learning that addresses the accessibility of the child with autism, the weakness of the inclusion of accessibility and its criteria, the weakness in the conclusion of the results of special education, the replacement of the focus on a range of psychological and neurological disorders compared to the focus on weakness. A range of functions that facilitate access and use in the power of e-learning has been relied upon[19][15][3][20][21].

According to[22][2]In the past, studies in improving social interaction in children have become very rare, or are almost limited in ways to modernize the abilities of children with autism. However, researchers have been able to come up with interactive games that help autistic children improve their abilities, as well as help them access appropriate treatment that enhances the therapeutic process. For a long time, the games were one of the educational means, Nowadays; we use electronic games for the same purpose as

well. In particular, the importance of electronic games has become an effective factor in educating children with autism [19][22].

A study by [23]used a real game which allows the autistic child to use it to assess his feelings and the way he expresses them that results in the movements of his body in general. The assessment of this study is based on exposing 10 children with autism to different sessions in playing this dangerous game and monitoring them using a sensor called RGB-D to record the movement of three-dimensional movement of the bodies of this group of children in particular. Eventually the evaluation of this study resulted in reactions from these autistic children and the translation of their facial expressions.

Increased authorisation of artificial intelligence would influence the education systems as well as consumers in the learning applications. Customers have to do less effort to save time and money to create additional pages that help them appreciate augmented reality. These institutions are reduced. Virtual reality is getting more recognition and so many companies now have systems to learn a virtual reality. This ambitious development is a huge incentive for education institutions to support those with a low wage and lower education quality. Studies are now looking at integrating augmented reality in all parts of the population with particular focus to improve their usefulness in learning applications [14][24][20][21].

Research Problem

There is a shortage in the number of studies that undertake the problem of autistic children's education in Oman. Therefore, there is no enough sources or data to describe the current state of autistic children's education locally, or to describe the difficulties that they or their parents are facing to ensure their receipting of proper education[17][23].

Also, It could be observed that there is a lack in the number of schools or centers that are dedicated to educate autistic children, which means many of them are treated similarly with ordinary children in term of education where they will study using same materials as an ordinary students[16][1].

previously, there were books containing pictures or a lists where parents or teachers can use it to teach the child with autism on routine life things, whether eating, sleeping, or going out of the house, and the child communication with the learner is via choosing the right verb from the pictures presented to him manually, this could be considered as a teaching method for autistic children where the use of visual aids ease the communication between the learner and the autistic children [25].

Autistic children needs to be equipped with special tools or methods to ease their communications with their environments [26][27],hence, the technology can be the right motivator and support for students with special needs [13]. Hence, there is an urgent need to provide autistic children in Oman with a teaching method or tool that suits their needs, this solution shall be benefitting from technology advancement, and be designed specially to serve the autistic children apart from what is available for ordinary children.

Research objectives

This research aims to investigate the current state of autistic children in Oman in a purpose of providing a solution that can contribute to the proper education of autistic children, therefore the following objectives shall be guiding this study.

- To investigate the difficulties that the autistic children or their parents are facing for the autistic children education.
- To identify possible improvement in the autistic children education.
- To suggest suitable teaching method that suits needs of autistic children in Oman.

III. RESEARCH METHODOLOGY AND DATA COLLECTION PROCEDURE

This section consists of two parts. First section is the research methodology, and second section is the procedure of Data Collection as a following:

1. Research Methodology

Based on the nature of this research, quantitative research method is suitable to collect statistical information on the required factors. Questionnaire is quantitative instrument that can be designed to include standard questions that target audience could answer. The questionnaire aims to clarify the patterns of education for children with autism and the availability of the adequate teaching methods or tools, in addition to whether it is possible to find a means of electronic learning availability in schools concerned with children with autism. All of this in order to suggest proper method or tool that can help

children with autism to learn and communicate socially, both with their peers or with those around them in the community, they are in.
Through this questionnaire, the research was able to identify patterns and choose a method of providing the necessary information for children with autism that will be available on the proposed model. The questionnaire was also able to allocate subjects to stimulate mental information in this group of children. The questions in the questionnaire varied between open and closed questions. Where open questions have allowed the respondents to provide their own views regarding the investigated points, which may help the research in opening new horizons and new ideas. The questions were formulated in a professional manner to be easy to understand by the target respondents. As we know that people abilities and capabilities differ from each other. It all depends on their culture, education, and experiences. The questionnaire also contained vocabulary among specialists in the care of children with autism. Includes a questionnaire included in the analysis of the data so as to reach the expected objectives of this research in addition to the possibility of obtaining information that helps the proposed model. Turn the questionnaire to use closed questions as well. That is, we can say that these questions contain in their answers choices that enable the respondent to choose with what suits his opinion.
The availability of these options helps the respondent to answer in a quick way. Closed-ended questions are one of the most popular methods for people who respond to questionnaires if we compare them with other known common methods, especially in surveys. Where it is easy for the respondent to choose the answer is available in front of the answers given to him in each question. The speed of the respondent answer is motivated to get the most number of answers and an easy way to speed up the process of collecting the required data in a very short period of time. It also helps to standardize the answers and find a way to address them and easy analysis.

2. Procedure of Data Collection

The necessity of examining the data, this research obtained an examination of the data collected through the questionnaire by using visual and descriptive tools. The purpose of this data examination is to arrive at the lost data and its patterns. In addition, after specifying outliers, statistical assumptions will be ensured and complied with.
Loss of data and its causes, the main reason for data loss is the respondent's inability to answer a number of questions during the questionnaire or even his inability to answer a single question.

ACS	**N**	**Skewness**	**Kurtosis**
	Statistic	**Statistic**	**Statistic**
ACS1	33	-.401	-.244
ACS2	33	-.362	-.169
ACS3	33	-.397	-.383
ACS4	33	-.928	.864
ACS5	33	-1.042	.955
ACS6	33	-.123	-.702
ACS7	33	-.484	-.454
ACS8	33	-.480	-.153
EL1	33	-.487	.226
EL2	33	.102	-.361
EL3	33	-.034	-.097
EL4	33	-.317	.241
EL5	33	-.795	.771
EL6	33	-1.358	2.042

Table 1 - Skewness and Kurtosis for Autism child support and E-learning

Table No. (1) Sheds light on the support of children with autism, electronic learning methods in addition to the results related to the items. For this reason, the results showed in Table (6) that there are no major issues related to normal distribution

Respondents' profile

The sample's characteristics provide information about the gender, age, Your relationship with children with autism, and Degree. The results were obtained by analyzing the children with autism information and demographic variables as illustrated in Table 2.

Measure	Item	N	(%)	Cumulative %
Gender	Male Female	21 12	63.64 36.36	36.64 100.0
Age	15-25 26-35 36-45 46-55	6 9 7 11	18.18 27.27 21.21 33.33	18.18 45.45 66.66 100.0
Your relationship with children with autism	Teacher Competent Instructional provider Other	13 8 12	39.39 24.24 36.36	39.39 63.63 100.0
Degree	High School Diploma B.Sc. Master Other	11 8 9 5	33.33 24.24 27.27 15.15	33.33 57.57 84.84 100.0

Table 2 - The demographic data of Children with Autism s (N=33)

The reliability of the scale used

In Table (3) the reliability measure is used by analyzing and re-examining the sample. Alpha Kronebach is used to ensure the internal consistency of all factors. The iterative process is also used; Determination of volume reliability.

Variable	Sample (n)	Cronbach's Alpha
Section 2: Autism Child Support		
ACS1	33	.875
ACS2	33	
ACS3	33	
ACS4	33	
ACS5	33	
ACS6	33	
ACS7	33	
ACS8	33	
Section 3: E-learning		
EL1	33	.823
EL2	33	
EL3	33	
EL4	33	
EL5	33	
EL6	33	

Table 3 - Cronbach's Alpha Test Results of the Study.

Table 4 shows the descriptive analysis that contributes to supporting autistic children (ACS). In particular, the average value (ACS4), where we find it high.

No.	Variable	N. of Items	Mean	StdD
	Section 2: Autism child support (ACS)			
ACS1	Have you heard about kids with autism before?	8	3.84	.919
ACS2	Do you have a family member or know a friend or relative who has a child with autism?		3.96	.965
ACS3	If your answer is Yes for question # 2, Does the area where the child live have a school that support children with autism?		3.98	.863
ACS4	If your answer for question #3 is No, how far is the nearest school form the child home/area?		3.74	.866
ACS5	Availability of specialized teachers for children with autism in these schools.		3.69	. 958
ACS6	The method of teaching and learning at these schools is		3.06	.981
ACS7	Based on your answer for question #6, how do you rate the used teaching method		3.91	.985
ACS8	If your answer to Q6 is 2, to what extent do autistic children benefit from e-learning methods?		3.79	.951
Overall of ACS			3,75	.779

Table 4 - Descriptive Analysis for Autism Child Support.

The increase in the average value for the Autism Child Support Factor (EL6) in Table (5) shows the descriptive analysis of elearning.

Section 3: E-learning				
No.	**Variables**	**N. of Items**	**Mean**	**StdD**
EL1	Have been exposed to any means of e-learning previously?	6	3.70	.967
EL2	If your answer for question #1 is Yes, How you rate e-learning method.		4.03	.914
EL3	Do you think e-learning method and support can be used to support child with autism?		3.86	.960
EL4	What kind of Materials should be included in e-learning system for autistic children?		3.90	.948
EL5	What kind of Skills should be included in e-learning system for autistic children?		3.81	.819
EL6	What are the ways that draw the attention of children with autism during education?		4.17	.949
Overall of EL			3.95	.891

Table 5 - Descriptive Analysis of E-Learning.

The increase in the average value for the Autism Child Support Factor (EL6) in Table (5) shows the descriptive analysis of elearning.

Table (6) shows sex dependence to obtain variable levels.

Variable	Gender	N	Mean	Std. Deviation	F Value	Sig. (P value)
Autism Child Support (ACS)	Male	21	3.77	.422	1.581	.209
	Female	12	3.73	.309		
E-Learning (EL)	Male	21	3.70	.605	.050	.824
	Female	12	3.68	.656		

Table 6 - Group Statistics in Terms of Gender.

Table (7) shows age dependence to obtain variable levels.

Variable	Age	N	Mean	Std. Deviation	F Value	Sig. (P value)
Autism Child Support (ACS)	15-25	6	3.74	.368	.574	.682
	26-35	9	3.78	.233		
	36-45	7	3.79	.224		
	46-55	11	3.79	.352		
E-Learning (EL)	15-25	6	3.53	.299		
	26-35	9	3.67	.665	.705	.589
	36-45	7	3.76	.445		
	46-55	11	3.85	.383		

Table 7 – Level of all available by age.

Variable	Relationships	N	Mean	Std. Deviation	F Value	Sig. (P value)
Autism Child Support (ACS)	Teacher	13	3.71	.368	.573	.682
	Competent	8	3.77	.233		
	Instructional provider	12	3.78	.224		
	Other					
E-Learning (EL)	Teacher	13	3.54	.299	.707	.586
	Competent	8	3.68	.665		
	Instructional provider	12	3.77	.445		
	Other					

Table 8 – Level of all available by relationship

Table (8) shows the relationship of the respondent to this child with autism. As he further explained, the levels of all variables are according to this relationship. This relationship contained four options that allowed the respondent to choose from. These four relationships are: the specialist, parents, educational provider, and teacher.

Variable	Degree	N	Mean	Std. Deviation	F Value	Sig. (P value)
Autism Child Support (ACS) 20194844 //	High School	11	3.75	.441	.943	.435
	Diploma	8	3.83	.316		
	B.Sc.	9	3.91	.391		
	Master	5	3.70	.342		
	Other	-				
E-Learning (EL)	High School	11	3.66	.743	.705	.586
	Diploma	8	3.81	.635		
	B.Sc.	9	3.85	.714		

	Master	5	4.02	.364		
	Other	-				

Table 9 – Level of all available by degree.

Table (9) indicated the academic degrees of the respondent for this questionnaire. We conclude from the results that the degrees of the respondents do not affect at all in providing support for autistic children.

IV. RESULTS AND FINDINGS

The results from the previous analysis sections helps to identify the requirements, equipment, and techniques needed for designing an Electronic learning system for the autistic children. in section 7.2 Procedure of Data Collection shown there is direct significant relationship between the use of technology in education and motivating autistic children to involve more in the learning process, also, these demographic factors which include: (Gender, age, your relationship with children with autism, and education level) they have high impact in the learning process of the autistic children. The findings revealed from the table 1. Skewness and Kurtosis test shown that independent variable is Autism child support and proposed model of E-learning as dependent variable which helped and encouraged them to develop their learning and communication skills with the surrounding community.

The proposed model had high motivation to enhance the interactivity of autistic children. This helped them to address problem of their poor social interaction. This research had shown that there is a promising future in Electronic Learning System as core aid to support the education and communication of the autistic children in Oman. However, E-Learning for autistic children still hot topic to be discussed, and there are numerous aspects to be investigated for better alignment with the exacts needs by autistic children within specific domain such as in developing countries, specifically in Oman.

V. RESEARCH CONTRIBUTION

The contribution of this study to the epistemological study in Electronic Learning is very valuable study on the Naturalistic the Teaching Approach from the perspective of improving impairments in education and communication of the autistic children in Oman, particularly to Improve performance and efficiency of teaching and cooperation of the autistic children within their Naturalistic surrounding environment at educational Units was invaluable. This gives very meaning important of how Electronic Learning can help autistic children in more meaningful in their educational.

In this study, a number of relevant issues have been highlighted and discussed which require the use of appropriate effects of the electronic learning support system for children with autism spectrum disorders, whose input is triple:

- ongoing discussion of factors which affect their daily lives in developing countries by the electronic learning support scheme for autism;
- Knowledge of the benefits and conditions of autism's electronic learning intention;
- A study on how autism children are prepared for EL intention to develop countries' autism (Oman).
- Contribution to Knowledge

This report makes an important and groundbreaking contribution to the field of electronic learning (EL). The focus of this study was the provision of theory for the promotion of electronic learning, for example the model proposed. Distinctive and notable concerns are highlighted that are important in strengthening the intention of students to learn electronically. For example, a thorough understanding of the field of electronic learning in developing countries and the findings that have been found would demonstrate how children behaved humorously, and how the issue of social reactions among autistic children evolved and improved. This was accomplished through the interpretation of aspects such as: (i) immediate surroundings (sound, light, temperature and design). (ii) Private enthusiasm (motivation, perseverance, responsibility and flexibility need); (iii) physiological criteria (entity, opponent, parents, and adults); (iv) (sensual power, comprehension, time, and mobility).

Model contribution and Research outcome

The key focus of this research is on the analysis of autistic children's electronic learning social interaction as a significant contributor to electronic education. The understanding of autistic child social interaction gives uniformity in adopted electronic learning principles that ultimately face several obstacles in order to

achieve greater performance. Following implementation, proof of concept testing and assessment of the model, the demand for the study of the perception of the social interaction of autistic children with electro-learning has been identified.

VI. CONCLUSION & RECOMMENDATION

Autistic children are a group of children who needs special care to support them so they can be easily merged with their communities. Education and educational environment are among the main platforms to help autistic children to improve their learning and communication skills. As they are a special case, autistic children need an educational system, tools and material that are designed based on their needs. Autistic children status and necessary support in developed countries such as in Oman need further investigation to better understand their needs and in contemporary provide them with required support.
This research study explores the current state of the autistic children in Oman, the collected views from the surrounding environment of autistic children provides insights on the necessary support to their education and communication skills. The obtained results confirmed the necessity of designing proper tools to support Omani autistic children education and communication skills.
For Future work, further investigation is required to determine the specific set of requirements of an eLearning system that shall be designed and developed specially for Omani autistic children.

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