

**The use of ICT in supporting secondary school learner with
disabilities: 2 case studies**

إستخدام تقنية الإتصالات والمعلومات في دعم تعليم طلاب الثانوية من ذوي
الإعاقات : دراسة حالتين

by

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**Dissertation submitted in fulfilment
of the requirements for the degree of
MASTER OF EDUCATION**

at

The British University in Dubai

July 2019

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ABSTRACT

This mixed research study explores how information and communication technologies (ICT) which refers to all types of technology such as ipads helps secondary learners with special education needs and/ or disabilities (SEND) known in the UAE as determined students to communicate information. Both Participants came from secondary classrooms one identified as Non verbal Autistic on the higher spectrum and another a very gifted and talented student both using ICT. Both qualitative and quantitative data was obtained to examine practices of technology integration to support students in the special education classroom. Results showed that teachers value the role of various educational technologies to support student communication and enhance learning experiences for SEND students but face certain challenges. Participants also highlighted various practical considerations that teachers and schools should consider. The significance of the study in the field of educating SEND students are discussed. More research into the matter is required to explore which specific educational technologies are most beneficial for SEND student needs.

ملخص

هذه الدراسة البحثية المزدوجة تستكشف كيف أن تقنيات المعلومات والإتصالات بما في ذلك أجهزة الأيباد تدعم جهود طلاب الثانوية من ذوي الإحتياجات الخاصة المعروفون في الإمارات العربية المتحدة بإسم طلاب مصممون على إيصال المعلومة. كلا الدراستين كانت لطلاب من صفوف ثانوية، أحدهم كان يعاني من توحد غير لفظي حاد والآخر طالب موهوب وذو مهارة وكلاهما يستخدم تقنية المعلومات والإتصالات. تم جمع معلومات كمية وكيفية للوقوف على مدى التكامل في الممارسات التقنية في دعم الطلاب في صف التعليم الخاص. أظهرت النتائج أن المعلمين يثمنون الدور الذي تلعبه التقنيات التعليمية المختلفة في دعم تواصل الطلاب ذوي الإحتياجات الخاصة ويعزز العملية التعليمية ولكن مع وجود بعض التحديات. التي يواجهونها.

أيضا أثبت المشاركون في الحاتين على عدة إعتبرات عملية لا بد من أخذها من قبل الطلاب والمعلمون في عين الإعتبار. تم مناقشة أهمية هذه الدراسة في مجال تعليم الطلاب ذوي الإحتياجات، علما بأن المزيد من الأبحاث مازالت مطلوبة في هذه المسألة للكشف عم ما هي أنجع الوسائل التقنية التي تخطط الطلبة ذوي الإحتياجات.

Dedication

I dedicate this dissertation to my mother (may Allah rest her soul in peace) for always believing in me, and encouraging me to follow my dreams. I dedicate it to my husband, Khalil Ahmed for always supporting me in my aspirations and for your patience, encouragement throughout (my pillar of strength). I dedicate to my pride and joy, my children- Naureen, Noaman and Noufia who were my source of inspiration. And finally, I dedicate to the two students who participated in this study, and all the determined children for letting me be part of your world. I hope that one day I can play a positive significant role in their lives. My passion lies in working with these determined children.

ARJUMAND KHALIL AHMED PATNE

Acknowledgments

To begin with, I would like to thank Prof. Eman Gaad, Dr. Emaad Abuyash, Dr. Solomon Arulraj David, Dr. Rawi Thaebet and Dr. Abdulai Abukari , their knowledge and guidance have guided me in my academic pursuit. I would like to express my sincere gratitude to my program supervisor Prof. Eman Gaad for her guidance and inspiration throughout my journey at the British University in Dubai. She made my journey an inspirational and enjoyable one. I thank her from the bottom of my heart for always being there for us.

I also take this opportunity to thank my family for their love and encouragement.

Finally, and above all, I owe much gratitude to Khalil Ahmed, my soulmate, for believing in me and supporting me throughout this process, I could not have done it without you.

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A LIST OF ABBREVIATIONS USED

SEND	Special Educational Needs and Disabilities
SN	Special Needs
LD	Learning Disability
IITE	Institute for Information technologies in Education
UNESCO	United Nations Educational, Scientific and Cultural Organization
UAE	The United Arab Emirates
ASD	Autism spectrum disorder
GNT	Gifted and Talented
DDA	Disability discrimination Act
CAI	Computer assisted Instruction
FEW	Facial Expression Wonderland
PDD-NOS	Pervasive Development Disorder Not otherwise specified
ICDL	International Computer Driving License
NACE	National Association for Able children in Education
CHI	Children of Higher Intelligence
NAGC	National Association for Gifted Children

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Chapter 1- Introduction

Introduction to the Research Study

We live in an era of technology where we are surrounded with technology in our daily lives to the extent that even our classrooms use technology right from kindergarten to promote learning in students of all abilities. Hence, it is important to research on the role it plays in boosting education, along with the capability to positively affect student attainment and desire to learn (Campigotto, McEwen, & Demmans Epp, 2013; Heafner, 2004). A number of apps can be used in the classrooms and their features allow us to personalize, intensify, and show different ways to a student's learning. The flexibility in teaching by way of technology has enabled teachers to differentiate their instruction in ways that were not possible due to the limitations of a traditional classroom media (Meyer & Rose, 2005). Therefore, technology can be used as a tool to provide for the diverse needs of learners, there by improving student achievement by triggering their interest.

While there are many advantages of the use of technology in general education classrooms, it also is an important tool for communication for students with exceptionalities. Assistive technology can be categorized into low and high technological devices. Low technological devices include graphic organizers, pogo boards etc, whereas high technological devices includes ipads, computers, smart pens that are specifically designed to help students with exceptionalities. Moreover, technological innovations such as iPads offer students who are non verbal for communicating and accessing curriculum. Hence, in classrooms that have students with various needs, technology can maximize educational opportunities and improve outcomes (Jenson, Taylor, & Fisher, 2010).

1.1-Purpose of the study

This study aims to find out how technology is used to help learners of determination especially non verbal Autistic children and Gifted and talented students. How the use of ICT can open new opportunities to communicate their thoughts, ideas and personalize learning. ICT helps learners of different abilities to obtain information through text, pictures and sound. A qualitative as well as quantitative research design, is used as the tools will help obtain the objective of investigating the teachers' perceptions and practices of technology integration for students with exceptional needs. Specifically, my study hopes to illustrate how these technologies are being used, the impact it has on SEND students, and also practical considerations concerning technology integration. This investigation is vital, as ICT influences how SEND learners learn. This study may affect the following stake holders within the educational community: SEND students in the classroom, their teachers, parents. It will reflect on practices of technology integration in the classroom setting to support SEND learners. Keeping in view the effect, educational technologies can have on SEND students, it is imperative to look into the use of technology and its integration by teachers as tools in the learning of SEND students.

1.2-Background of researcher

I undertook this area of research as I wanted to learn more about how assistive technology can help SEND students, especially a non verbal Autistic child who has no other means of communication. At the other end, I had a Gifted and talented child who used ICT to gain information over and above his/her required learning. As a teacher who uses technology in the classroom, I wanted to know how technology can have the capacity to support meaningful learning for such SEND students.

1.3-Research questions

The research question which I undertook were –

- 1- To what extent ICT can help learners with Autism and gifted students achieve educational goals?
- 2- What could be recommended to maximize their educational opportunity using ICT?

1.4-Overview

This study answers the above mentioned research questions by using both qualitative and quantitative methods that includes interviews with teachers, students and parents. I will also obtain data through test scores and questionnaires. In chapter 2, I will present a review of the literature with a focus on use of ICT for SEND students with reference to special education policy in Dubai, as well as challenges concerning technology integration in classrooms. In chapter 3, the research design, data collection methods, participants, and ethical review procedures will be given. In Chapter 4, a detailed report on the research findings from the parents, teachers and students are discussed. In the final chapter I highlight my findings, insights and their indication for the educational community, including proposition for further study.

The main objective of this paper is to gain an insight on the use of assistive technology for students with autism (non verbal) and gifted and talented students. It is followed by three specific objectives which described as below:

- To highlight various assistive technology categories.
- To learn about the types of assistive technology used by Autistic and Gifted and talented students.
- To share findings from my work.

Chapter 2 – Literature review

Technology is becoming an indispensable part of the educational system; this article provides an insight in use and implementation of ICT with SEND students that caters to their learning and makes learning more meaningful. It is evident that with our lives and actions being maneuvered by way of online information and media, the importance of ICT in education is becoming prominently symbolic of achievement, and is constantly evolving within the 21st century business (Li, 2012).

The field of education is being greatly influenced by ICT and all aspects of learning, teaching, and research revolves around it. Various studies have brought to light the benefits of ICT in the enhancement of providing good quality of education. ICTs have the ability of stimulating, revolutionizing, expanding, and developing skills (Hourigan, Murray, & Riordan, 2011). Some research on the use of ICT in academically helping students with autism has shown that the inventiveness of it is vital to gain better understanding of education concepts for the students. An excellent example is the introduction of Computer Assisted Instruction (CAI) that is vital in the developing reading skills of students with autism (Coleman-Martin, 2005; Tuedor, 2006; Luckevich, 2008), and development of listening skills, language, and vocabulary (Massaro & Bosseler, 2006). Various studies have brought to light that ICT is a platform can enhance the SEND students' basic communication abilities (Sansosti & Powell-Smith, 2008), task schedules and attainment (Kimball et al., 2008), development of social skills (Moore et al., 2005), and development of symbolic play skills (Herrara et al., 2008). However, since the study was based on a small sample of clinical trials, the accuracy of these findings have been found inconclusive.

The level to which ICT may affect a person's learning varies according to their learning style and capability. It can have a long-lasting or short term effect.

If a student has more than one form of difficulties then the impact may be different. It is vital to establish an environment for learners with different needs and abilities so that they have the chance to develop. Recent research has indicated and stressed on the need to increase the use of ICT at home, in school, and the community. Most of these studies clearly prove that the use of ICT can give SEND students equity in learning and help in their daily lives, thereby making them independent and promoting self-advocacy. Several issues can be solved by the use of ICTs in special education such as assistive or enabling technology, internet applications, augmentative communication systems, adaptive devices. This paper will focus on some basic use of ICT and software applications programs for SEND students with Autism and also Gifted and Talented.

Let us discuss about one category of 'Developmental Dis-orders' also known as Autistic Spectrum Disorders (ASD). ASD is a developmental problems that hampers the social and communication skills. According to the diagnostic systems of World Health Organization and American Psychiatric Association the umbrella of ASD includes a number of conditions e.g. autism; Asperger's syndrome; Rett's syndrome; semantic pragmatic disorder; atypical autism; pervasive developmental disorder-not otherwise specified; childhood disintegrative disorder . The diagnosis of autism or ASD is mostly done by several traditional assessment tests that are used by professionals. However, currently, significant findings have been made in the field of ICT assessment. Also, numerous studies have been undertaken in ICT to aid and train youngsters and adults with Autistic Spectrum Disorders (ASD).

Ozonoff et al., (2004) developed the Cambridge Neuro-psychological Test Automated Battery (CANTAB), a test based on computer which consists of neuropsychological tests created to investigate specific factors that trigger cognition. These tests look in to the functioning of frontal cortex as it plays a vital role in autism. This test was administered to 79 people with autism with 70 typical people and it was found that the autism group had impairment in interactions which were social and there was a shift in information processing in comparison to the control group. Based on these findings, it was agreed that there is frontal lobe function which played a role in autism.

Vera et al., (2007) showed the use of 'Real Time' graphic utilization as intervention tools in the SEND learners. Their main tools were the use of 3D graphics, which needs only a computer (with screen, keyboard, mouse and joystic) and the learner can access it easily. This tool can be used by learners who have issues in attention, perception, memory, down syndrome and autism. This application enables the user an opportunity to comprehend and control abstract concepts, complicated in real world.

Tseng and Yi-Luen Do (2010) presented a unique design of ICT application for children with ASD. The design is such that it can develop the ability of ASD learners in facial expression recognition with the help of Facial Expression Wonderland (FEW) application. FEW is a daily training tool which consists of different levels and it requires learners with ASD to play on a regular basis in order to improve their skills in facial expression recognition and 'Theory of Mind' (the ability to understand mental status of other people). Although the outcome of FEW application is not known and is yet to be found.

The research and data gained from various studies /literature has shown that many SEND students with ASD love technology and show a natural talent for it.

The simple functions with which these apps use clear rule- based systems make digital and visual technology an excellent way to support students with ASD in various areas of learning (Golan LaCava, & Baron-Cohen, 2007). It has been established in clinical trials that the use of anticipated, every day conventional systems-oriented visual technologies can help reinforce the learning of students with ASD (Kinney, Vedora, & Stromer, 2003; Coleman-Martin, Heller, Cihak, & Irvine, 2005; Luckevich, 2008; Tuedor, 2006).

With regards to the application of the 28C Resolution 1.5 adopted by the 28th Session of the General Conference, and which is in accordance to Article 4 of the Salamanca Statement, UNESCO had an unofficial discussion in March 1995 with countries such as Denmark, Finland, the Netherlands, Norway, Portugal, Spain, and Sweden, to discuss the project proposal *'Inclusive Schools and Community Support Programmes'* with the aim of to give wider access and quality education for SEND children and youth to boost inclusion in regular education set up. The main aim of the meeting was to look into the needs and distribute information of innovations useful for SEND students at the global level, which in turn will serve as a medium for all countries to carry out initiatives in accordance with the Salamanca Framework for Action. The main purpose of the project was to frame policies in school development so that the teachers could be educated to use better tools to educate the SEND learners. The aim of UNESCO was to use technology to cater to the SEND needs. Therefore, the UNESCO Institute for Information Technologies in Education (IITE) was established in Moscow, which was based on resolution 6 accepted by all at its 29th session as part of a plan to supplement the Organization's activities in order to introduce and apply information and communication technologies in SEND education.

The 30th Session of the General conference of UNESCO had set the following targets of IITE:

- An international network for the exchange of information and innovations;
- 'ICTs in Education: State of the Art, Needs and Perspectives' as a main project;

- To test strategies of training of concerned individuals for different categories of education related with ICT;
- Agreements and partnerships with established institutions, and organizations for the use of ICT with SEND people;
- Launching of pilot projects.

As per the agreement, IITE launched many projects which were endorsed by the international IITE Governing Board, and 'ICTs in Education for People with Special Needs' was one such high priority project which was targeted with the intent to provide access to electronic educational assistance for SEND learners. Technology cannot replace a teacher but it can be used as an important tool to coincide with their contribution.

ICT is constantly evolving and progressing, therefore, most of the technological instruments are not described in any detail, only a few are mentioned below. It is also a fact that technology that is available in advanced countries may not be available in the less developed countries, but on the flip side, obsolete technology is available in these less developed countries. These days technology is playing the most important and absolute role in communication – be it banks, schools or business organizations. This is evident with the emergence of the Internet, whereby any individual, and organization can be connected with each other in order to communicate with any systems anywhere and everywhere in the world. Though it has made us vulnerable to the use and abuse of information, we still cannot overlook its advantages. This is the state of *information and communication technology* or ICT.

Educating SEND effectively requires special and updated facilities and skills which may be difficult to find and expensive to use. ICT has a vital role to play in circulating and sharing information in many forms for SEND children. Many developed countries use ICT as part of the curriculum. The very presence of ICT in every walk of life means that absence of its use could lead to a handicap or disadvantage. Thus, though the intention in this paper is on use of ICT to educate SEND learners, it should not be forgotten that technology already exist in our daily lives and its proper utilization can be a great asset for the SEND learners. The degree to which technology is used may vary from people to people as computer literacy to some may imply only a basic familiarity with the technology, but here relevant and effective use is important. ICT also plays an important role in assessment as everything changes and evolves and so do some impairments. Changes can take place in education system or their environment. ICT helps us to keep a check on these changes by way of its assessments.

2.1-UAE Policy

Inclusion in UAE considers an educational platform where diverse learners of varied backgrounds and abilities learn together. Attention must be given to provide the student with disabilities an education in the environment in which the student is comfortable in other words the least restrictive environment, a student with disabilities should be educated with age-appropriate peers who do not have a disability. The regular classroom should be taken as the best educational option for all students, including students requiring special education services. An inclusive education learning environment should be available to meet the needs of students with special needs along a continuum from least-to-most restrictive learning environments.

The Ministry of Education has categorized disabilities into different categories in order to enable us to know which student is eligible to be enlisted in the special education programs and receive help, in order to help the child academically as it is a fact that the disability hampers a child's performance:

2.2-Specific Learning Disabilities

It refers to a disorder with one or more issues in the basic psychological processes involved with understanding or in use of spoken or written language that may show itself in the inability to listen, think, speak, read, write, spell, or perform mathematical calculations and/or mathematical reasoning, including inability to perceive things as they seem due to brain injury, or brain dysfunction, dyslexia, or any other developmental aphasia.

Learning problems that may exist due to loss of visual, auditory or motor abilities, cognitive ability, emotional ability, or due to environmental, cultural, or economic factors do not come under learning disability.

Physical and health related disability

Any problem that is related to the physic or severely impairs a persons functionality and negatively affects the academic achievement of the student such as: (asthma, attention deficit disorder with hyperactivity, diabetes, heart disease, epilepsy, leukaemia, cerebral palsy, renal failure, HIV, and head injuries etc) comes under this category.

Visual Impairment

Visual impairment may include partial or complete loss of sight. It may include instances when even with correction, a child's educational performance is hampered.

Hearing Impairment Including Deafness

Hearing impairment refers to deafness with or without amplification, it may be mild or severe ; permanent or fluctuating; or such that a child cannot hear with sound amplification of 20db which might result in low or no processing of linguistic information.

Speech and Language Disorders

All communication disorders such as stuttering, impaired articulation, language impairment, or a voice impairment that directly affects a child's performance in school fall under speech and language disorder. ICT can also be used for sign language as it differs from country to country. Many deaf people use sign language and sign language can be projected on the screen by use of animated figures instead of text or speech. Also, computer dictionaries of sign with animation are much better than books with pictures.

2.3-Autism Spectrum Disorders

Autism Spectrum Disorders (ASD), also known as Pervasive Developmental Disorders (PDDs), cause severe and prevalent impairment in thought, senses, language, and the ability to communicate with others. These days the symptoms are varies and may be diagnosed in early childhood. The symptoms may range from a severe to milder form. A severe form is called Autistic Disorder, or Pervasive Development Disorder Not Otherwise Specified (PDD-NOS), a much milder form is known as Asperger's Disorder. Rett's Disorder and Childhood Disintegrative Disorder also come under it.

Emotional and Behavioral Disorders

If a person exhibits one or more of the below given characteristics over a long period of time, then, the person suffers from emotional and behavioral disorder. These include: (a) incompetence to learn anything that cannot be explained by intellectual, sensory, or health factors; (b) incompetence to build an interpersonal relationships with people; (c) improper behavior and burst of feelings not considered right under normal or usual circumstances, (d) consistently being unhappy or depressed, and (e) an inclination to develop physical symptoms or fears associated with any problem which may include schizophrenia. The term is not used usually with children who are socially disturbed unless it is proved by an authorized clinic.

Intellectual Disabilities

Intellectual disabilities which also used to be called “mental retardation” implies a notably below average intellectual functioning, combined with inadequate functioning of social behavior which are seen during the child’s development and has an impact on the child’s academic performance.

2.4-Definition for Gifted and Talented

Children with outstanding ability, or a great deal of knowledge over and above their age level in more than one areas of intelligence, which makes them exceptionally creative, or academically high achievers or possess talents and abilities which include being a good orator or poet, music , art, sports, or any other capacity. The gifted and talented student is usually exceptionally high achiever in a particular or all areas (found from CAT4 and other scans) and they require special provisions to meet their educational needs.

The Disability Discrimination Act (DDA) essentially implies that everyone involved with such kids should be involved in planning the curriculum. Schools have specific obligation towards such students according to the DDA and should do the following:

- Should have policies to practice inclusion in order to avoid discrimination against disabled pupils.
- Make provision for accessibility of disabled pupils, including accommodations to the curriculum, through special planning, and
- promote equity in school so that these students will achieve it.

The school has a moral obligation to:

- Be dedicated in providing and promoting disability equality and avoiding discrimination, and
- Include considerations in every from at every level of teaching and learning in the school.

To enhance the teaching and learning experience, it is important to use ICT as a tool towards inclusion, teachers need to anticipate the needs and overcome the barriers learning of pupils with particular SEND and/or disabilities. So the teacher's planning must include to provide to the needs of SEND students so that all students can fully take part in the learning.

All activities, may not need modifications but some may need modifications in terms of ICT so that it can appeal to the sensory learning of SEND students and trigger learning.

For activities, need 'parallel' activities for SEND students, so that they can attain the same lesson objectives as the class but by using specialist software or ICT lead apps which may also include signs and symbols.

Occasionally, pupils with SEND and/or disabilities will have to work on different activities, or towards different objectives, from their peers.

These days technology has helped people with different disabilities to function as other members of the community. These are known as assistive technology. In fact, many companies specializing in technology all over the world are innovating new information and communication technology (ICT) apps to help all people with special needs of all ages.

While attending Gulf Educational Supplies and Solution 2010, Tricia Murphy, former president of Nasen, in Dubai told Emirates Business: "ICT is a helpful tool for those with special needs at all levels and with almost any kind of special needs and disabilities. It can be of optimum utilization as an inspirational tool for those who do not have the ability or dislike writing (for various reasons) and can be used as a means of access to all areas of the curriculum."

Many Special needs adults in the UAE are being helped and encouraged to learn the use of computers so that they can be a part of a workforce suitable for them. A big example of this initiative is the International Computer Driving Licence (ICDL) certification programme at the ICDL training and testing center at the General Information Authority in Abu Dhabi which was introduced keeping the visually impaired in mind and is an initiative which is uniquely implemented in the UAE and covers the ICDL computer literacy syllabus for the visually impaired. The visually impaired can do almost anything with the help of ICT. They can even make airline bookings using ICT.

An 'IT Skills for All' first of its kind programme is undertaken in the UAE by the ICDL GCC Foundation which has been begun with the purpose of making differently-abled people a part of the mainstream. The organisation is stressing on the need to provide training to Special needs people both in the private and public sector to in use of computer skills to facilitate them to get jobs. Providing IT facilities for the physically-challenged, will create opportunities for differently-abled individuals and enable them to be a part of social and economic development. However, the technology and equipment should be suitable for them and also training should be given according to the requirement of that particular field.

As quoted by, Kenny Spence, Founder, Men in Childcare Association (2010), to the use of ICT for SEND students, he stated that: "The use of ICT in the early years has the capability to improve educational break though for SEND students. Relevant ICT can lead to an intensely useful and inductive play."

Not only does ICT help spark the SEND students interest and learning, it also creates a platform for discussion, sharing of ideas, builds creativity, helps in problem solving, and enhances innovative thinking. Such an environment which is student -centred and responsive to ideas creates zeal for learning.

In an era where students are surrounded with technology, ICT triggers inspiration among SEND children by providing them immediate response to their findings which is a rewarding experience. It also helps build confidence in a child as success motivates a student to go forward to the next level of attainment.

Spence said: "ICT can help curb social exclusion by inspiring SEND children .It has been seen that children who are Autistic or suffer from some other severe form of special need or communication difficulties have been excellent at communicating using the computer and possess good ICT skills which make them able to help others who find use of ICT difficult and this ability enhances their participation in class and also boost their self esteem. The computer can repeat the same event in the same order as the child wants is in correlation with the requirement of an autistic child and he can enjoy the same."

According to Ian Campbell, who is an International Business Development Manager, of BLi Education, and he works closely with people of special needs, agrees that ICT makes curriculum more attainable for the students of special needs. The different gadgets such as touch screen laptops and ipads, computers that help you talk and do various jobs for you such as spell check greatly help students of special needs. It paves way for personalized learning and students can work at their own pace too.

There are a number of gadgets available for children with special needs such as 3 D computers, musical keyboards and switch-operated devices which help children who have difficulties with fine motor skills. There are toys such as the cause and effect toys which have a built in software are for people with autism that repeat instructions for them. There are also abundance of Softwares to help with hand-eye co-ordinations for children who suffer with global delay.

Spence also believes that children who need stimulation and have experienced the effects of under stimulation show a better response to use of computers than with people. They like the outcome of cause and effect that is obtained from the computer without any speech. The children find their interaction with the computer very rewarding as the computer responds to them every time.

2.5-ICT, best practices for Autism and Gifted and Talented

Autistic children usually have difficulties in social interaction, communication and behaviour. Since communication is a prominent feature of autism therefore it is estimated that more than 50% of autistic people do not develop meaningful communicative language and also suffer from other forms of communication.

Some characteristic of Autistic people are that they are not focused and have poor organisational skills. They cannot comprehend abstraction ideas and are obsessed with details. These features may also coincide with people suffering from learning difficulties. People suffering from autism often have different abilities, with noticeable strengths and weaknesses in some areas. Autistic people may have strong reactions to sensory input, such as smell, certain colors of light and sound.

ICT can provide help or assistance to such students especially if facing communication and motor difficulties. On the other hand, it should be noted that the misuse of computer may also prove to be a tool for some of the adverse tendencies of autism. In fact the use of computers may even restrict social interaction and trigger undesirable behavior.

Depending on the degree of problem the use of computer software should be considered. The use and need of a student should be taken into account and accordingly the range of ICT resources be provided. Careful consideration and thought should can be given to the useful ways in which computers can be used and made appropriate to support SEND students.

Characteristics of autism spectrum disorder fall into three categories:

- 1) **Communication problems:** Autistic people may have difficulty in using or understanding language. Some **Autistic** children are non verbal while some may have problems in focusing their attention. On the other hand, some may repeat phrases.
- 2) **Difficulty in socializing and understanding feelings or emotions:** Autistic people have trouble making friends and interacting with people. They may find it difficult to make eye contact and also not be able to read facial expressions.
- 3) **Repetitive body movements or behaviors:** such as hand flapping or repeating sound or phrases.

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The main objective of this paper is to gain an insight on the use of assistive technology for students with autism (non verbal). It is followed by three specific objectives which described as below:

- To highlight various assistive technology categories.
- To learn about the types of assistive technology used by Autistic and Gifted and talented students.
- To share findings from my work.

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Usually Gifted and talented children are identified by professionally qualified persons who use different test such as CAT 4 and other IQ test. Gifted and talented students have unique ability and are high achievers .These children require special educational programs tailored according to their needs in order to realize their contribution to self and society (Marland, 1972). In a regular school set up there may be only a single gifted child in the classroom and therefore may not find like minded students to learn from. In such a classroom scenario, ICT can be used to open doors for the development of such a student in order to promote higher order thinking skills.

Gifted children are some times marginalized as they do not need support in their learning. The teacher, usually finds it difficult to cater to the needs of a gifted child as she/he is too preoccupied to cater to the average and the below average student. Galton (1822-1911) dedicated much of his work to finding of different valid test in order to and use these tests and analyze data obtained to study intelligence and other aspects which could be measured. Giftedness may be defined by a score on a general IQ test, e.g. L.M. Terman, in his famous study of 1,528 gifted children, set an I.Q. 140 as the lower limit of giftedness (Sahu, 2002).

According to the National center for research for the education of gifted and talented children and youth (2007), gifted students usually have an above average understanding and the curriculum is inadequate for them. They find themselves in the school with other student's of the same physical age but not according to their intellectual capacity which leaves them with a feeling of void. Schools mostly focus on ways to cater to the needs of low achievers, often at the cost of gifted students. The reality is that many gifted students are not exposed to a challenging curriculum. Due to the lack of academically challenging curricula, many gifted students fail to develop critical thinking skills.

Gifted students are often taken for granted as they are not normally considered at risk for academic failure or problems due to their exceptional abilities. Since these gifted students are marginalized it is found in some studies that 15-40% of identified gifted students are at risk of academic failure or performing far below their academic potential (Seeley, 1993).

<p>Negative characteristics (Davis & Rimm, 998) (Often exhibited by gifted underachievers and students with a learning disability)</p>	<ul style="list-style-type: none"> • Stubbornness • non-participation in class activities • Uncooperativeness • Cynicism • Sloppiness and disorganization • A tendency to question authority • Emotional frustration • Absent-mindedness
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To overcome this problem of marginalizing gifted and talented students, the teacher can use ICT in classrooms so that these students find a means to get answers for their questions and thereby help excel in specific academic needs. These students have the ability to decide for themselves when and whether to use ICT, how, why, and for what objective, i.e. they should be encouraged to use it appropriately.

A gifted learner's potential can be maximized by way of coordination of various visual, spatial, verbal, and sensory areas of the brain. The use of cognitive strategies, helps gifted and talented students to sort, analyze, and apply information. Work that is challenging in nature and which evokes interest for such students helps gifted and talented students to enjoy learning simply based on the process and stimulation (Burney, 2008). Some notable studies show that gifted students, who are not provided a stimulating environment or experience, often regress in their critical thinking abilities (Renzulli, 2005). The results of a study by Nikolova and Taylor (2003) affirm that when gifted and talented students are provided proper stimulus they show an improvement in their academic performance. When a gifted and talented child is provided with instances to problem-solve and think critically, their academic experiences are enhanced. Gifted students who are allowed to choose topics that interest them, then their learning increases and shows progress. Dixon, Cassidy, Cross and Williams (2005) found that gifted and talented students scored better in computer tests by way of better critical thinking than hand-written tests.

2.6-How ICT supports the development of SEND learners

Students should decide for themselves how, why, and for what objective to use ICT; i.e. they should be taught to use it appropriately.

1. ***Access to experts***: ICT is a platform that gives access to wide range of information (e.g. by way of the use Internet or sharing ideas by video conferencing or skype). This opens doors to expertise and information that may not be obtained in their classrooms.
2. ***Provide challenges to use ICT***: According to a student's learning style, a student's needs has to be met. A gifted and talented learner needs exposure to their visual, spatial, verbal, and sensory needs. The brain must be accordingly coordinated. Cognitive strategies, allow students to sort, analyze, and apply information. Challenging work motivates the students to enjoy learning due to the stimulation it offers (Burney, 2008).
3. ***Easy access at home***: ICT helps students to work from anywhere, whether home or anywhere else. Children who are home schooled too benefit from it. Resources to teach such students such as CD-ROMs, on-line information and the Internet are easily available which can be in accordance to the students' needs and thereby helping them to develop a higher order thinking skill.
4. ***ICT helps to improve their social communication***: ICT provides wider radius of communication for the gifted students thereby broadening their thinking skills and at the same time curtailing a feeling of isolation. They can reach and share ideas with other like minded students by way of E-mail or video conferencing or skype, so that sharing of ideas take place.
5. ***ICT is helpful for teachers to give extended work to gifted children***: The National Association for Able Children in Education (NACE), the Support Society for Children of Higher Intelligence (CHI), and the National Association for Gifted Children (NAGC) are some conventions which help the teachers cater to the needs of gifted children by providing teachers with links, projects and special Web sites.

6. *Use of Smart Board:* Touch-sensitive screens with projectors in the classroom helps share information that can be used and shared in various ways. The blessing of Smart board technology is that it helps in group shared activities where the gifted students can interact. Participants become engrossed as they can see and become part of input when they connect with others through multimedia thereby creating a collaborative learning environment (Smart Technologies, 2004). With the help of electronic pens, students and teachers can write, create ideas on the screen. With the help of the smart board students can manipulate text and images, view websites, cut and use research information, view video clips, make graphs, and create their own presentations. The smart board compels students to use their cognitive and physical abilities.

7. *Arouse the curiosity:* Gifted children usually have many questions and have an inherent desire to fulfill their thirst for knowledge. Every information they access has to needs to quench their thirst by answering the 'why' and 'how'. The type of questioning skills itself show their superior capacity for observing and thinking (Rao, 2003). This is where ICT proves its place as it answers all their questions through different ways and mediums.

2.7-Technology in Special and inclusive education

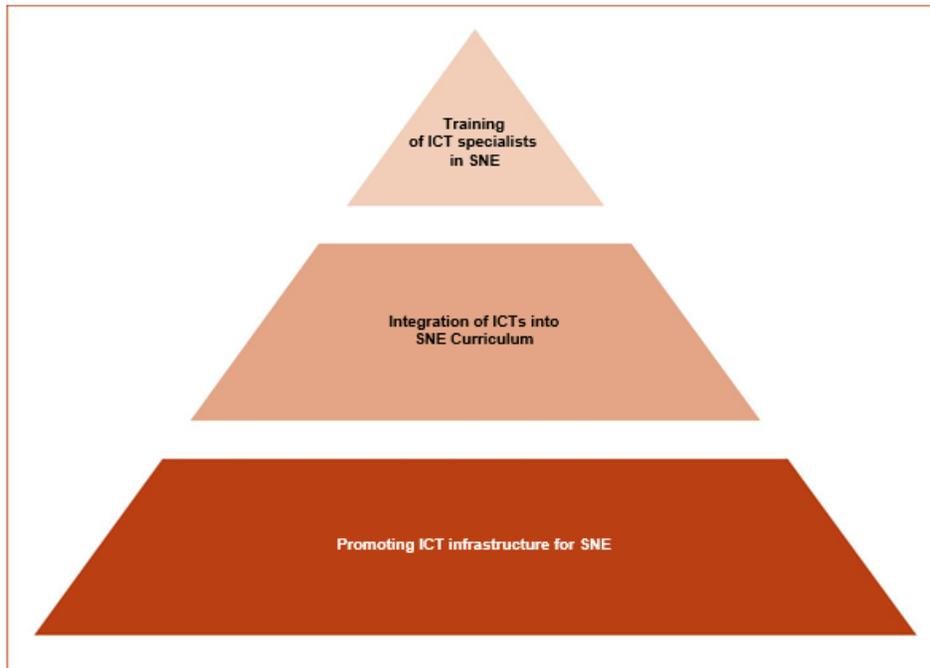
There is a vast moment in the education field to create an inclusive education environment for students with different needs into the mainstream classrooms. This can be attained only when we create a learning environment which will help overcome all barriers to the learning process especially, when conditions are fulfilled to facilitate use of ICT for SEND, integration of ICTs into SEND curriculum and training of ICT specialists in SEND (see figure 1.2).

ICT helps to create an environment for SEND students to learn in conditions appropriate for teaching and learning. The conditions in an inclusive educational area can only be successfully with the appropriate ICT tools. Assistive tools help SEND students to participate in the educational process based on their needs.

The use of technology in special education is an important breakthrough as it overcomes the barriers for SEND students and provide them access to the latest educational programs or apps. Appropriately designed software and hardware enable SEND students to get access to modern education.

Technology helps teachers to provide for SEND students by way of differentiation. With modern technology, teachers can adjust to the requirements of a particular student with minimum effort and choose from one of the numerous learning apps designed to meet the needs of such learners.

Figure 1.2 The main arrangements for successful inclusion of students with SEN



For some SEND students, a technological intervention is the only way to ensure that they can communicate their needs, opinions, and views. For a non verbal autistic child ICT is a lifeline to his voice. ICT plays a vital role in inclusive education as it helps find solutions to issues that apply to a spectrum of potential learning needs. The key ways in which ICTs can support SEND students are as follows:

Facilitates greater freedom and self-reliance to learner ;

Unlocks hidden or untapped talent for those who find it difficult to communicate as in the case of a non-verbal Autistic child.

Helps students to show accomplishment in different ways which might not be possible with traditional methods;

Helps create task which are individualized according to the student's skills and abilities.

2.8-ICT benefits for students:

- 1) Students can independently obtain resources from anywhere (Moore and Taylor, 2000; Waddell, 2000);
- 2) SEND students are able to complete their tasks at their own pace (ACE Centre Advisory Trust, 1999);
- 3) Visually impaired students can work in parallel with their colleagues by use of access information via internet (Waddell, 2000);
- 4) SEND Students with severe and multiple learning difficulties can communicate with ease. (Detheridge, 1997);
- 5) SEND Students who need to use voice communication aids can communicate with their friends with the help of such devices in school and outside as well. (Worth, 2001);
- 6) The use of ICT has helped SEND students to use internet at home for schoolwork and to play (Waddell, 2000).

It is crucial to understand that ICT on its own cannot be considered as a solution to all problems as it has to be accompanied by the compliance of teachers to use innovative teaching methods and adopt a positive approach to modern technology. If a SEND student is unable to perform a particular activity (due to physical or sensory barriers), different substituting activities must be provided so that he/she gets a chance to inclusion. To implement inclusion, ICT is an important tool and must be embedded in school curricula. Curriculum modification is not about its simplification for some students or lowering of academic requirements or standards. The modified curriculum must enhance the skills or knowledge required for a particular course and provide knowledge and resources in a more productive manner and be fairly distributed.

2.9-Types of assistive technology

The National Education Associates states that there has been a substantial increase in SEND students all over the world and every educational institute is trying to help the SEND students using assistive technology. It is an important tool to exchange information and help students with certain disabilities learn more effectively. Assistive technology is categorized into low technology and high technology. Low technology includes graphic organizer worksheet and other basic tools whereas high technology includes cutting-edge software and smartphone apps, and much more.

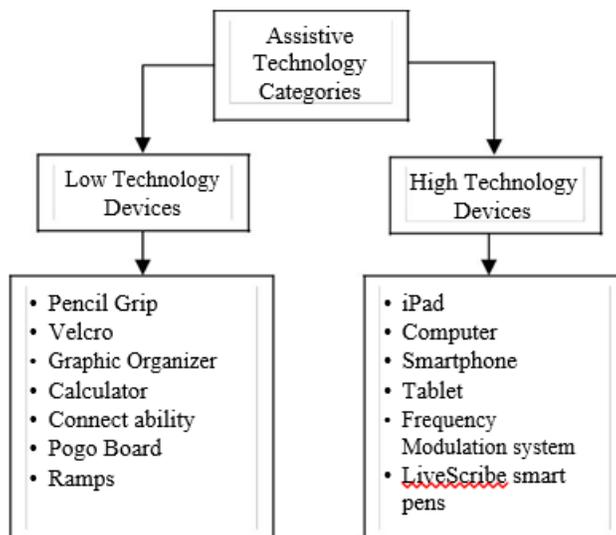


Figure 1: Assistive Technology Categories

AEM Student Summary Worksheet

This is a resource that, enables teachers to make choices on the students ability to obtain information from printed material as other students or to put it in a specialized format, it also gives options to make modification to the content .

Text-To-Speech Assistive Tools

Text-to-speech (TTS) is a software that is helpful for students who have difficulties in reading a standard print. This is helpful for students who suffer from partial blindness, dyslexia or any other type of visual impairment. TTS is useful for children with autism and attention deficit hyperactivity disorder (ADHD) or an intellectual disability. The technology first scans the matter and then the matter is synthesized in to voice. TTS technology is very accurate and helps in reading text.

Kurzweil 3000

Kurzweil 3000 is another TTS software that helps students in literacy. It has lots of features, that can help students even in many aspects, even to those who may have a non-print disability due to its features such as:

- Multiple TTS voices
- Support for 18 languages and dialects
- Audio spell-checker
- Graphic dictionary for more than 40,000 words
- Magnifies text
- Writing essay or for taking any test

The Kurzweil 3000 functions provide students with a multi-sensory approach to literacy learning. Graphic organizers can be a useful tool to help students to organize their thoughts during the writing process. This is particularly useful to students with dysgraphia or those who have different types of difficulties in written work.

Draft: Builder

The writing process is broken down with the help of this tool into three steps- outlining, note taking and draft writing. With the help of a graphic organizer, the program helps the student to step by step put the required information into its place. It automatically helps the student to insert proper information via notes to create a rough draft. The spell checker is another feature that helps the student in writing. Tools such as bibliography, dictionary further assist in written work.

Assistive Listening Systems

Assistive technology that help in hearing helps students who are deaf or suffer from hearing or auditory problems. Hearing aids and cochlear implants help these students but use of assistive listening technology such as a microphone, or any other transmission technology that can carry sound waves to these students ears are part of assistive technology. FM systems is one such technology that helps children with sensorineural hearing loss which occurs when the inner ear (cochlea) or nerve pathways from the inner ear to the brain are damaged. FM systems technology works on similar lines as radio broadcast technology.

A teacher and student can communicate effectively irrespective of the distance involved with the help of a transmitter microphone and a receiver.

Sound-Field Systems

Students who suffer from any auditory and learning problems, such as language delays, central auditory processing disorder, articulation disorders and development delays find this type of tool useful. Here sound is projected through speakers put into the classroom that works with the help of a microphone.

Sip-and-Puff Systems

This type of system is helpful for students who are immobile, and suffer from paralysis or other fine motor disabilities. This system with the help of a computer allows the person to control any mobile device or technological application by the help of his or her mouth. It work just like a joystick, the enables the child to move the controller in any direction and click on different navigational tools with the help of a sip or a puff.

Jouse3

The jouse 3 is an advanced tool that enables a child to control a device using any part of the mouth, cheek, chin or tongue. Users usually use this tool for drawing or computer games. Moreover, it does not have to be on the body of the user and can be put on a desktop, or any other structure anywhere.

Proofreading Software

The Proofreading software is a type of assistive technology that is very advanced and can be found for correcting spellings of words in a word processing system, and can be used by dyslexic students. It has various features that can help students work on his or her English skills thereby enabling them to become a more accurate writer. This tool can help students suffering from any type of reading and writing problems.

Ginger

This tool has various features that can help SEND students either with dyslexia or any other learning disorders with writing. It is also helpful for speakers of languages other than English. Some of the features include:

- Checking Grammatical errors or misspellings. For example, Ginger can help rectify common errors like “there,” “their” or “they’re” should be used in a sentence.
- Sentence rephrasing and word prediction tool that can be helpful for students who need help in constructing sentences properly.
- TTS functionality helps students hear what they’ve written.

Ghotit

This tool is specially made for students with dyslexia and other learning disorders which are related to writing. The name comes from the word “Ghoti,” which is referred to irregularities in the English language. It features includes prediction of words, checking passages of text contextually, read text aloud using TTS technology and recognize split and merged words. It also consists of a dictionary for students to look for words or meanings.

Math Tools

There are various tools that can help students that have problems in math, which is also called dyscalculia. Dyscalculia makes it difficult to understand numbers and therefore the student finds it difficult to understand the different functions in the field of math. Assistive technology in math is not just used for students suffering from dyscalculia but also for blind students, fine motor skill disabilities students or some other type of disability that hinders from performing task related to math work.

MathTalk

This is a comprehensive tool which is a speech recognition software program for math that can help students with different types of disabilities. Students can solve math problems by talking into a microphone on their computer. The program can help students with fine motor skill disabilities, blind students or vision disabilities. MathTalk also is liked and used by student’s with dyscalculia. This is an electronic math worksheet that allows children to organize, and solve problems on the screen, making it useful for students who have difficulties solving math problems on paper.

Math Simulations

Math simulations is useful for students with dyscalculia. It helps students understand the concepts of the math problems due to which the students can gain a better understanding of its application .It consists of animated simulations in the form of videos, which teachers and students can see in order to learn a math concept or problem. It also helps students to work out the problem and then check the result by playing it out in the simulation.

2.9.1-Conclusion

Due to the rapid advancement in assistive technology, students, parents, and teachers have a wide range of tools at their disposal.

The use of these tools in various walks of life such as our home and in the classroom, parents and teachers can make use of them SEND students' academic and personal growth. But technology has to go hand in hand with a plan for their use for it to be effectively used.

Chapter 3- Methodology

The outline of the theory of this study is based on the concept of a theory propagated by Vygotsky that the children's learning and development both socially and culturally is a mediated process (Vygotsky, 1978). This socio-cultural theory proved to be "a useful framework for research on special needs education" as being able "to describe the intricacy and the social isolation of the under study". (Ghesquière, & Van der Aalsvoort, 2009, p.217).

The digital technologies have provided as useful tools for supporting SEND children's learning (Jonassen, 2000). This theoretical approach, along with Activity Theory (Engestrom, 2001) will be used to examine various contributing factors that influence the positive use of technology in the classroom of an American curriculum school. Triangulation is based on information from the individual, parent and teacher. At the individual level, how the use of digital technology is helpful to the student will be evaluated and as a teaching and learning tool how can this help the teacher to achieve his or her pedagogical goals will be examined.

The communication of curriculum by the use of technology by the teacher will be analysed. The data collection and analysis will be done according to this framework. I have used both qualitative and quantitative method of collecting data.

3.1-Questionnaire Construction

As put forward by Brace (2004) the construction of questionnaire is necessary where the researcher needs to get observable information from participants. Brace (2004) also states that forming relevant questionnaire is a very intricate and critical to the research activity. It is important to formulate the relevant questions that will help gain accurate and reliable information in order to make informed decision and also that in order to test a theory there must be good research skills used. Keeping all the factors in mind, the researcher formulated questionnaires that were crucial to the study to get information from teachers regarding their personal experience and approach to the use of ICT with SEND students. As stated by Babbie (1990), that it is an apt method when undertaking a study centered on people and their views, beliefs, motivations and behaviors.

The data collection instrument consisted of three areas: the first consisted of teachers views regarding ICT use for teaching SEND students, the second addressed to barriers faced during implementation of ICT in the school and the third got feedback or recommendations for improving ICT usage. The questionnaire used likert scale based on strongly agree, agree, neutral, disagree and strongly disagree.

Procedure

This study used a qualitative as well as quantitative research approach to investigate how a small sample of teachers are integrating technology with SEND students in the classroom, and the impact it had on such students .The dual nature of this approach allows the researcher to explore use of technology with SEND students in a small group of individuals who have experienced this practice (Creswell, 2013).

The approach was suitable for this study as the research explored the experiences of use of ICT with a non verbal Autistic child and a Gifted and talented child.

It will also shed light on the procedures of the study through a interview of all the participants namely parents, teachers and the open-ended questions aimed to gather data that leads to an understanding of the experiences of the participants.

“Credibility, neutrality or conformability, consistency or dependability and applicability or transferability are essential criterion for quality paradigms” (Lincoln & Guba, 1985, p. 300). One way that reliability and validity are established in a qualitative study is by using Yin’s (2003) three principles of data collection. These principles “deal with the problems of establishing construct validity and reliability; (1) Use of multiple sources of data, (2) Creation of a case study database, and, (3) Maintaining a chain of evidence” (pp. 97-105).

The reliability and validity were maintained by way of descriptive observations, and collecting first hand data from the members thereby establishing proper methods of qualitative data analysis. The teacher’s interview, observations of the learners while completing the activity, and classroom visits along with conversations with the children, suggested by Yin’s (2003) three principles.

The principles that were followed were as follows:

- 1) The consent was taken from the parent or guardian which was signed, and returned before meeting the participants.
- 2) The learners, signed the consent form before start of the activity.
- 3) The teacher signed the consent form and agreed to conduct the interview.

The form of this research included a comprehensive literature review, which provides a theoretical background and context for the study. Data was collected from two in-depth interviews with participants who met the criteria outlined by the researcher. A composite description of themes that emerged from the study is presented in Chapter four.

3.2-Instruments of Data Collection

The primary source of data collection was generated from two individual semi-structured interviews with teachers from a American curriculum school in Dubai with students of multiple exceptionalities (Autism and Gifted and Talented). Thus, the researcher was a key instrument in the data collection of this study. Consistent with the nature of qualitative inquiry, interviews were conducted in participants' natural work settings. The informal, semi-structured nature of the interview granted flexibility and potential to elicit significant depth in addressing the research questions. Each interview took 30 minutes to cover all details and strategies and opinions. Interviews were manually transcribed. Some interview questions included: *What impact do you think technology has on learning of students with exceptional needs? what issues or challenges have you faced while implementing technology for SEND students?* An identical list of questions was presented to each participant. The full interview protocol can be found in Appendix B.

Data was collected by making classroom observations and making notes during these classroom observations. The researcher acted as a quiet participant, as observations were made while the teachers were fully engaging at the time of being observed (Creswell, 2013). The permission to observe was granted by the school as the researcher was observing within the research setting. Observations were strictly based on the research purpose and questions. The participants were observed in their daily classroom setting noting their interactions with technology and its effects on their learning.

3.3-Participants

This study maintained purposeful sampling and selected 2 participants, one an Autistic student on the higher spectrum and another Gifted and Talented. In addition, they were using educational technology to support their learning in the special education classroom.

Teachers teaching the participants were interviewed. Pseudonyms are used to maintain anonymity. The first participant is a nonverbal Autistic child who will be referred as “H” and the second participant is a Gifted and Talented child who will be referred as “W”. Both participants contributed valuable insight about their practices and perceptions of technology integration for students with multiple exceptionalities.

3.4-Data Collection and Analysis

Qualitative data was gathered via individual semi-structured interviews with two students, parents and teachers. With permission from participants, each interview was recorded and manually transcribed. Data was analyzed and themes generated in line with the research questions. This information was represented in the form of a data table, which included supporting statements for each category.

3.5-Ethical considerations

A letter of consent was signed by the school which included the purpose of the study for the proposed project, stating that it was a requirement of the Master of Teaching Program.

Participants were contacted and informed of the purpose of study and they too signed a consent letter as the participants were agreeable to the study. The two individuals who agreed to participate were requested to read and sign an informed letter of consent, which disclosed the purpose of study (See Appendix A for Consent Letter).

They were also informed that it was their right to decline any interview questions and/or withdraw from the study at any time. The names of participants and school is not used and thus pseudonyms are used to preserve their anonymity.

This is a low risk level study as the names of the participants are not used. The interviewer also made sure that the participants were not asked sensitive questions that would likely upset them.

This study is likely to reveal important information about special education teachers' perceptions and practices of technology integration for students with multiple exceptionalities.

3.6-Limitations

The current study exhibited the following limitations- The first limitation is that the sample size was small as it was based on two case studies. Although this provided the opportunity for a better depth of participants' experiences, but having a wide sample size would have allowed for more concrete conclusions to be drawn. The next limitation was due to the data collection method as the researcher could only collect data from teachers teaching the two participants. There may other teachers who could have been added value in interviewing these individuals, and who would offer different perspectives on the research questions. A third limitation was due to the limited period timeline. If there was more time available a more longitudinal effect may have been studied.

3.7-Strengths

Due to the small-scale study many strengths of qualitative and quantitative research approach were embedded. The small sample size proved to be helpful in acquiring an in-depth accounts of two special education students experience's with technology integration.

The compact nature of the study helped the researcher to analyse each of participants' first hand descriptions of their lived experiences with technology in their classroom. This enabled the researcher to develop a complex description of the essence of this experience for both participants. Finally, given the researcher's position as a teacher, the opportunity to conduct face-to-face interviews with educators was informative and valuable for collecting first-hand insights into the practice of use of technology in the classroom with SEND students.

3.8-Timeline

This research project began from the month of April 2019 and went on to the month of July 2019, nearly 4 months. The project commenced in April 2019; at this time the research problem was identified and the research questions were articulated after which the literature review was developed which provided a theoretical basis for this project. The data collection phase subsequently took a month. Phenomenological analysis of interview data began in May, and shortly thereafter, themes and implications were reported in line with program requirements.

Chapter 4: FINDINGS

Introduction

In this chapter, the findings from the questionnaire are discussed as well as the face-to-face interviews with teachers, parents and participants from a single private school in Dubai. Four themes emerged due to the cross-case analysis of data. These themes seek to gain as much insight as possible into the central research questions of this study: *How are a teachers integrating ICT with SEND students; and what impact does the use of technology has on SEND students?* To highlight the complexity and the inferences made the data, the four themes were found. The four central themes are the following:

- 1- Both parents as well as teachers consider that certain educational technologies can support the communication as well as learning of students who are nonverbal. This is also in case of Gifted and Talented students.
- 2- Both parents as well as teachers consider that educational technologies can enhance the learning experience of SEND students in the classroom.
- 3- For technology integration to be successful there has to be professional development given to teachers so that they can help SEND students.
- 4- Practical relevant considerations related to use of technology integration with SEND students in the classroom should be considered.

4.1-Theme 1- Both parents as well as teachers consider that certain educational technologies can support the communication as well as learning of students who are nonverbal. This is also in case of Gifted and Talented students.

Both the participants agreed that education technology plays an important role in supporting their learning especially in case of “H” as he is totally non verbal. ICT has opened channels of communication for him and it has helped him to channelize and express his thoughts in a right manner especially as “H” is a non verbal autistic child who only communicates using assistive technology. “W” is a gifted and talented child who feels that ICT has greatly helped her to develop her research and inquiry skills. It was found that students exhibit an overall decrease in frustration and increase in independent work. This is seen especially in the non verbal autistic student “H”. “H” uses a buddy board to communicate for common words and requirements such as “I am thirsty” “I need to type”, “I need to leave”, “Happy”, “sad”, “Frustrated”. Copy is attached for reference.

4.2-Theme 2- Both parents as well as teachers consider that educational technologies can enhance the learning experience of SEND students in the classroom.

No doubt that technology cannot replace the teacher but it can help the teacher to use ICT as a tool to enhance their students learning by providing the students work and means to learn according to their needs. Teachers can give differentiate work. Teachers agree that ICT does indeed help them to provide for students different needs as not all students work at the same level or pace or understanding. Especially in the case of “H” who is a non verbal autistic student. The teachers post study material and communicate with “H” with the means of google classroom which is the only means of communication in his case. The teachers give feedback to him on the same.

4.3-Theme 3- For technology integration to be successful there has to be professional development given to teachers so that they can help SEND students. Most of the teachers gave a feedback in their questionnaire that they needed more professional development and resources in terms of software to teach SEND students. There are a number of apps that can be used these day to help the SEND students. These apps are not available in the school and some teachers are unaware of the use of such technology. The teachers have said that they would love to use such devices to help the SEND students in the classroom. There is no special program for the Gifted and Talented students. The findings show that the teachers are receptive to use of ICT but the school has not put much effort or resources to build it. The teachers feel that the students can benefit from a number of apps that are not available to them.

4.4-Theme 4- Practical considerations related to technology integration in the special education classroom should be considered. The school does not provide the resources or the training to the teachers to integrate technology into the classroom. One of the teacher also complained about poor wifi connectivity in the classroom. These technical issue hinder their intentions of using technology effectively with the SEND students in the classroom.

Table 1 displays the questions asked to 7 teachers teaching student “H” who is non verbal autistic and “W” who is gifted and talented on use of ICT. The majority of participants indicated a positive response to question 1- ICT helps to enhance the learning of Special needs and exceptional needs. All the 7 teachers strongly agreed that ICT does indeed help in enhancing the learning of the SEND students. They also agreed that ICT was an important tool to support learning needs of SEND students. The teachers agreed that ICT supported the teaching and learning process, and help build social interaction of students with ASD. All the participants responded positively to the idea that ICT should be included in the curriculum. The teachers also agreed that the use of ICT was in fact fruitful and not at all time consuming. However, all the teachers also showed a concern over the lack of apps and programs in the school to help the students. They were of the opinion that they needed more ways (apps) through which they could teach effectively the SEND students. The teachers also brought to attention that the school does not have good wifi connection and technical support in the classes. A strong lack of software resources is in fact hampering the effective use of technology in the school and there is a strong need of the same. The teachers were very positive and open to teaching using various apps but unfortunately resources were not available. The teachers were only using google classroom to post information and questions. Some teachers were using MAP skill navigator also which is helpful in the American curriculum. Apart from that plickers, Kahoot, Khan academy (as it gives differentiated instructions), prezzi, youtube was being used.

4.5- Requirements

The following school related requirements were found:

- 1- The school did not have enough educational resources (hardware and software) to effectively use ICT with SEND students.
- 2- The school had poor wifi connection and faced technical issues.
- 3- The school needs to implement use of ICT in its curriculum.

The following are teacher related requirements:

- 1- The teachers did not feel obliged to use ICT with SEND students.
- 2- The teachers did not have any information about using new apps with the non verbal autistic student. Even the Gifted and Talented child thought that more could be done to enhance the learning.
- 3- There was no training provided to the teachers on the use of ICT with SEND students.
- 4- The teachers should be told to make provision in their lesson plans for using ICT with SEND students.

4.6-Parents views:

Both the parents of the students though that ICT was a wonderful tool used by their students to communicate. In fact. ICT was the only tool though which “H” who is a non verbal autistic child communicates. They also agreed that more apps needed to be used by the students. ICT helps them to channelize their thoughts and ideas. It also opens new avenues to explore and gain information. The gifted and talented student found that ICT helped her with her research abilities and helped her gain more information and knowledge on different subjects.

She wanted exposure to more challenging work and she was inclined and interested to do ICT based work. Also, ICT helps to allot work according to the students learning style. The research questions were successfully answered but it also indicated that much research and application is required in the use of ICT for SEND students. Until all barriers to ICT based learning is eradicated the effective use cannot be attained.

4.7-TABLE 1- Survey Questionnaire: Teachers views regarding use of ICT with SEN

students (adapted from Journal of Education and Practice www.iiste.org

ISSN 2222-1735 (Paper) ISSN 2222-288X (Online),Vol.7, No.5, 2016)

	strongly agree	agree	uncertain/ not applicable	disagree	strongly disagree
1. ICT helps to enhance the learning of Special needs and exceptional needs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. ICT is an important tool and supports learning of special needs students.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Using ICT for teaching is difficult and time consuming.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Using ICT requires more effort from me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. ICT helps to develop communication skills and social interaction of special needs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I received the answer to my enquiry too late for it to be useful.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Use of ICT is difficult in our school.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Different programs or apps are used by teachers to teach special needs and gifted students.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Teachers should be provided with information on use of technology to teach special needs students.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Teachers face lack of technical support in the school.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Resources or softwares are available to teach students of special needs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The survey questionnaire was piloted before being used.

Chapter 5 : Discussion

Introduction

The main purpose of this research was to find out how teachers use technology with students with multiple exceptionalities. It was also an attempted to look into some practical considerations in order to implement the use of ICT. Four themes arose during the study that were presented in Chapter Four, it is quiet evident that technology is indeed beneficial and supports students with multiple exceptionalities especially in the case of a non verbal autistic child. In this chapter I reflect on these findings by focusing on the professional implications the study has on the teaching practice and also on the educational community at large. As my study was limited, there is need to further study the implications as many questions arose during it.

5.1- Implication for the researcher

The findings of this study was very helpful as it highlighted on the importance of ICT on the teaching and learning of SEND student regardless of the educational setting that prevails in the country. At the very heart of these findings is the increasing number of ways that technology integration can support students with exceptionalities. Although only two participants were drawn from a single school for the study of students with exceptionalities, the findings from this study are also pertinent to general education classes in which students with exceptionalities are being increasingly integrated. I began this research study with the limited knowledge on the use of technology for SEND students but I learnt that it can be a very valuable tool for all students especially to differentiate tasks for students as all students have their own pace of learning.

The research has led me to have a more informed understanding of how technology can be specifically incorporated for students with exceptionalities in order to support their educational needs. This study has also brought to light some practical considerations that need to be taken into account, including possible barriers to it

5.2-Implications and Recommendations for the Educational Community

This study has revealed important implications for the educational community with regards to teaching SEND students. I hope that educators and all educational institutions will use technology to help SEND students and will not be discouraged by problems/ obstacles in their way but rather try to find ways by which to overcome them.

It is important for the teaching community to integrate technology in their curriculum and classrooms as it helps students with different learning needs, and today's 21st century life compels us to be committed to technology integration. The study highlighted the problems faced by teachers while trying to integrate technology in their teaching and I hope that this study inspires the administration of schools to develop ICT , to render professional development to their staff members in order to attain successful integration of technology in schools.

Reflecting on the important role that technology plays to support SEND students, I recommend that all schools strengthen their technology integration practices. Technology should be more conscientiously and meaningfully integrated in all teaching areas, specifically, for students with exceptionalities. With more technology-based experiences incorporated across schools, teachers will develop a positive attitudes towards technology integration.

5.3-Limitations

The major limitation of this study is that it was conducted on only two participants. Although only two participants were used in this study, both individuals provided meaningful and relevant insight into the perceptions, and practices of technology integration with SEND students in the classroom. Additional participants would have intensified the results of this study and made findings more generalizable to the greater educational community.

Another limitation is that the perspective gathered from the interviews were limited to a few teachers who belonged to the same organization thus limiting the breadth of data analyzed. While valuable information was obtained from the teachers' perspectives, many other individuals other than the educators themselves are involved in the use of technology for SEND students such as the parents and friends in the case of the non verbal autistic child. Even teaching assistants, LSA and school SEND department also play a role in assisting with technology integration, and could also be useful informants in subsequent research. With a different participants, broader scope of viewpoints, and extended time frame, the study would have been improved in proving the positive use of technology for SEND students.

However, this school has many students with multiple exceptionalities and therefore teachers in mainstream schools may encounter different resources and barriers.

5.4-Further Study

This study shed light on how teachers are integrating technology for SEND students with multiple exceptionalities, and the impact on their learning. However, many questions remain. For example, the filtration of digital technologies entering the 21st century classroom, it would be useful to investigate *which specific technologies* might be advantageous for *what types of SEND students*. Given that the range of disabilities is vast and growing, a study that focused on how specific technologies can benefit students with certain learning needs would provide valuable guidance for teachers to help SEND students. In addition, further study could help investigate what is hindering teachers from utilizing technology for students with multiple exceptionalities. Lastly, teacher thoughts and practices were examined only once. Longitudinal data on thoughts and practices of technology integration for the SEND students would gain better richer understanding.

5.5-Conclusion

Keeping in mind the varied needs of learners in the 21st century classroom, educational technology holds enormous value for supporting various student needs. Technology integration is an complex process, as the needs, challenges, and strengths of each child must be kept in mind while administering the use. This research study showed that teachers' perceive educational technology to have a positive impact on students with multiple exceptionalities, particularly in terms of supporting communication and enhancing learning experiences of the SEND students. However, integration of technology with optimum utilization of SEND students is solely dependent on the role of the teacher and the scale to which his or her professional support structure allows it. The findings of this study point to the fact that teachers require a professional learning community in which support, collaboration, and mentoring are needed. Leaders who make decisions regarding the infusion of technology into the classroom must do so keeping in mind the needs of the SEND students and must also take into account the teachers' perspectives.

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Consent letter

Nibras International School, DIP.

22nd April'2019

Warmest greetings

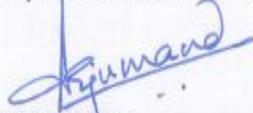
I would like to take permission to allow me to conduct my research and complete the questionnaire by the teachers as part of my research study in Masters of inclusive Education. All information provided will be kept in utmost confidentiality and would be used only for academic purposes. The names of the students and the name of your school will not appear in any publications resulting from this study unless you agreed to.

If you agree, kindly sign below acknowledging your consent and permission for me to conduct this research at your school and return the signed form .

Your approval to conduct this research will be greatly appreciated. Thank you in advance for your assistance in the research.

Regards

Arjumand Khalil Ahmed Patne



Approved by :



School Principal

Name *MICHAEL CIPRIANO* signature *Michael Gow*

Date: *APRIL 28, 2019*

Appendix 1

Letter of Consent for Interview

Dear

I am a student at The British University in Dubai, and am currently doing my Masters in Special Education. For the purpose of my research paper, I am studying how teachers are using technology to help children of exceptional needs reach their learning goals and how it can be used to enhance their learning and communication skills. Your knowledge and experience will provide valuable insight into my topic of investigation.

This is my dissertation topic for my Masters of Teaching Program. My course instructor who is providing guidance for this assignment is Dr. Eman Gaad. I shall be using information from interviews for my research project. The participants name and personal details will not be used in my work. This information will remain confidential. There is no risks or benefits to you for assisting in the project.

Please sign the attached form, if you agree to the above. Thank you for your assistance.

Yours sincerely

Researcher : Mrs. Arjumand Khalil Ahmed Patne

I have read the letter provided to me by Mrs. Arjumand Khalil Ahmed Patne and grant her permission to conduct her research for the purpose described.

Signature:  _____

Name of the Participant: Dr. Nazima Abdulrazzaq.

Date : 20/8/19

Appendix 2

Letter of Consent for Interview

Dear

I am a student at The British University in Dubai, and am currently doing my Masters in Special Education. For the purpose of my research paper, I am studying how teachers are using technology to help SEND students reach their learning goals and how it can be used to enhance their learning and communication skills. Your knowledge and experience will provide valuable insight into my topic of investigation.

This is my dissertation topic for my Masters of Teaching Program. My course instructor who is providing guidance for this assignment is Dr. Eman Gaad. I shall be using information from interviews for my research project. The participants name and personal details will not be used in my work. This information will remain confidential. There is no risks or benefits to you for assisting in the project.

Please sign the attached form, if you agree to be interviewed. Thank you for your assistance.

Yours sincerely

Researcher : Mrs. Arjumand Khalil Ahmed Patne

I acknowledge that the topic of the interview has been explained to me and that all the questions are answered with out any bias.

I have read the letter provided to me by Mrs. Arjumand Khalil Ahmed Patne and agree to participate in the interview for the purpose described.

Signature: warisha

Name of the Participant: WARISHA ADIL

Date : May 24 2019

Appendix 3

Survey Questionnaire: Teachers views regarding use of ICT with SEN students

Name: Dunqar Dohati GRADE: 7-12
 Title: Math Teacher

Please complete the following questionnaire with specific regard to the above enquiry, by placing a CROSS in the appropriate box

	strongly agree	agree	uncertain/ not applicable	disagree	strongly disagree
1. ICT helps to enhance the learning of Special needs and exceptional needs.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. ICT is an important tool and supports learning of special needs students.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Using ICT for teaching is difficult and time consuming.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4. Using ICT requires more effort from me.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. ICT helps to develop communication skills and social interaction of special needs.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I received the answer to my enquiry too late for it to be useful.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7. Use of ICT is difficult in our school.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Different programs or apps are used by teachers to teach special needs and gifted students.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Teachers should be provided with information on use of technology to teach special needs students.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Teachers face lack of technical support in the school.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Resources or softwares are available to teach students of special needs.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Student No : 20173136

EDU523: Project Report

Appendix 1- Questionnaire Form

The Purpose of the study is to investigate the extent to which ICT can help learners with disabilities (SEND) to achieve educational goals at the secondary level in schools in Dubai. This study targets the use of ICT or assistive technology with SEND learners. Your opinion on the use of ICT and its usefulness to teach SEND learners is valued. The study outcomes will be used to develop recommendations into the existing practices for children with special needs in private schools in Dubai.

Section A- Background Information

This information will enable us to compare groups of respondents. Your name and personal information will not be disclosed, and your response will remain anonymous. Your co-operation is highly appreciated.

1. Gender : Male
Female
2. Age (in years) : 36
3. Experience in teaching profession : 10 years
4. Experience in teaching students with exceptional needs : Some

Section B- Interview questions

- 1- How long have you been teaching students with exceptional needs in the classroom?

In the last three years

- 2- How do the students of exceptional needs communicate in the classroom?

I try to communicate with them as much as I try to with regular students to make them feel welcome

- 3- Do you use ICT or assistive technology to teach special needs students in your classroom?

Yes, google classroom

- 4- Do you think ICT is helpful to teach Special needs students? If so, how?

Yes

- 5- What are the different apps that you use to teach special needs students ?

Google Classroom

- 6- Are there any apps that according to you are immensely useful to teach special needs students?

N/A

- 7- Can you give an example of effective use of technology in your classroom?

I use google classroom and MAP SKILLS Navigator

- 8- What impact do you think technology has on learning of students with exceptional needs?

Differentiate their learning and making ~~the~~ learning more fun and interactive.

- 9- What issues have you faced while implementing technology for students with special needs?

Lack of tech devices

- 10- Would you like to give a suggestion for use of ICT with students of special needs?

It would be useful and a way to motivate them.

Survey Questionnaire: Teachers views regarding use of ICT with SEN students

Name: M. DIJOUYO GRADE: 9-12.
 Title: HoD - English

Please complete the following questionnaire with specific regard to the above enquiry, by placing a CROSS in the appropriate box

	strongly agree	agree	uncertain/ not applicable	disagree	strongly disagree
1. ICT helps to enhance the learning of Special needs and exceptional needs.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. ICT is an important tool and supports learning of special needs students.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Using ICT for teaching is difficult and time consuming.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Using ICT requires more effort from me.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. ICT helps to develop communication skills and social interaction of special needs.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I received the answer to my enquiry too late for it to be useful.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Use of ICT is difficult in our school.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Different programs or apps are used by teachers to teach special needs and gifted students.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Teachers should be provided with information on use of technology to teach special needs students.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Teachers face lack of technical support in the school.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Resources or softwares are available to teach students of special needs.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix 1- Questionnaire Form

The Purpose of the study is to investigate the extent to which ICT can help learners with disabilities (SEND) to achieve educational goals at the secondary level in schools in Dubai. This study targets the use of ICT or assistive technology with SEND learners. Your opinion on the use of ICT and its usefulness to teach SEND learners is valued. The study outcomes will be used to develop recommendations into the existing practices for children with special needs in private schools in Dubai.

Section A- Background information

This information will enable us to compare groups of respondents. Your name and personal information will not be disclosed, and your response will remain anonymous. Your co-operation is highly appreciated.

1. Gender : Male
Female
2. Age (in years) : 56
3. Experience in teaching profession : 15+
4. Experience in teaching students with exceptional needs : _____

Section B- Interview questions

- 1- How long have you been teaching students with exceptional needs in the classroom?
15 years
- 2- How do the students of exceptional needs communicate in the classroom?
However they can or by all means available
- 3- Do you use ICT or assistive technology to teach special needs students in your classroom?
yes, I use tech for all students
- 4- Do you think ICT is helpful to teach Special needs students? If so, how?
ICT allows people to byPass physical challenges
- 5- What are the different apps that you use to teach special needs students?
google class / forms / u tube / multi media
- 6- Are there any apps that according to you are immensely useful to teach special needs students?
google classroom / head phones / mic
- 7- Can you give an example of effective use of technology in your classroom?
I put all my Assessments and classwork online
- 8- What impact do you think technology has on learning of students with exceptional needs?
a significant one
- 9- What issues have you faced while implementing technology for students with special needs?
access to devices
- 10- Would you like to give a suggestion for use of ICT with students of special needs?
more Money / more devices / more training
more more more i

Student No : 20173136

EDU523: Project Report

Appendix 1- Questionnaire Form

The Purpose of the study is to investigate the extent to which information and communications technology (ICT) can help learners with different needs (SEND) to achieve educational goals at the secondary level in schools in Dubai. This study targets the use of ICT with SEND learners. Your opinion on the use of ICT and its usefulness to teach SEND learners is valued. The study outcomes will be used to develop recommendations into the existing practices for children with special needs in private schools in Dubai.

Section A- Background information

This information will enable us to compare groups of respondents. Your name and personal information will not be disclosed, and your response will remain anonymous. Your co-operation is highly appreciated.

1. Gender : Male
Female
2. Age (in years) : 13 yrs
3. Child's name (optional) : Hood Saied
4. School (optional) : Nibaa International
5. Type of Learning disability : Autistic Spectrum Disorders

Section B- Interview questions

- 1- How long have your child been studying in the school? Since 3yrs.
- 2- How does your child communicate in the classroom? Using facilitated communication through typing.
- 3- Does the school use ICT to teach your child? He learns the same way other students learn in class. But uses FCT to
- 4- Do you think ICT is helpful to your child's learning? If so, how? Yes, helps in demonstrating his answers quizzes, assignments & projects.
- 5- What are the different apps that your child uses? Assistive Express, Google docs.
- 6- Are there any apps that according to you are immensely useful to your child? Same as above.
- 7- Can you give an example of effective use of technology for your child? Use of FCT in writing exams
- 8- What impact do you think technology has on learning of your child?
Immense impact. Opened the channel of communication for him as he is totally nonverbal.

13

Appendix 8

- 9- What issues does your child face while using technology? Are there any challenges? If yes, please state the challenges. Needs facilitation in the form of light touch on any part of the body. Of face.
- 10- Do you have any suggestion for use of ICT with students of special needs?
Highly Helpful. Should be utilized in children with autism whether they are verbal or nonverbal, as it helps them to channelize and express their thoughts in a right manner.
this should slowly be progressing for him to type independently.

Survey Questionnaire: Teachers views regarding use of ICT with SEN students

Name: Dorothy Dodson GRADE: middle/high
 Title: Social Studies

Please complete the following questionnaire with specific regard to the above enquiry, by placing a CROSS in the appropriate box

	strongly agree	agree	uncertain/ not applicable	disagree	strongly disagree
1. ICT helps to enhance the learning of Special needs and exceptional needs.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. ICT is an important tool and supports learning of special needs students.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Using ICT for teaching is difficult and time consuming.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Using ICT requires more effort from me.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. ICT helps to develop communication skills and social interaction of special needs.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I received the answer to my enquiry too late for it to be useful.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Use of ICT is difficult in our school.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Different programs or apps are used by teachers to teach special needs and gifted students.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9. Teachers should be provided with information on use of technology to teach special needs students.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Teachers face lack of technical support in the school.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
11. Resources or softwares are available to teach students of special needs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Survey Questionnaire: Teachers views regarding use of ICT with SEN students

Name: SARAH KIBITZ GRADE: 7
 Title: Teacher

Please complete the following questionnaire with specific regard to the above enquiry, by placing a CROSS in the appropriate box

	strongly agree	agree	uncertain/ not applicable	disagree	strongly disagree
1. ICT helps to enhance the learning of Special needs and exceptional needs.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. ICT is an important tool and supports learning of special needs students.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Using ICT for teaching is difficult and time consuming.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4. Using ICT requires more effort from me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5. ICT helps to develop communication skills and social interaction of special needs.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I received the answer to my enquiry too late for it to be useful.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Use of ICT is difficult in our school.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Different programs or apps are used by teachers to teach special needs and gifted students.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9. Teachers should be provided with information on use of technology to teach special needs students.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Teachers face lack of technical support in the school.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Resources or softwares are available to teach students of special needs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Student No : 20173136

EDU523: Project Report

Appendix 1- Questionnaire Form

The Purpose of the study is to investigate the extent to which ICT can help learners with disabilities (SEND) to achieve educational goals at the secondary level in schools in Dubai. This study targets the use of ICT or assistive technology with SEND learners. Your opinion on the use of ICT and its usefulness to teach SEND learners is valued. The study outcomes will be used to develop recommendations into the existing practices for children with special needs in private schools in Dubai.

Section A- Background information

This information will enable us to compare groups of respondents. Your name and personal information will not be disclosed, and your response will remain anonymous. Your co-operation is highly appreciated.

1. Gender : Male
Female
2. Age (in years) : 38
3. Experience in teaching profession : 14 years
4. Experience in teaching students with exceptional needs : 14 years 1 year

Section B- Interview questions

- 1- How long have you been teaching students with exceptional needs in the classroom?
14 years - (1 year hood)
- 2- How do the students of exceptional needs communicate in the classroom?
VIA LSA / WRITTEN COMMUNICATION / EMAIL
- 3- Do you use ICT or assistive technology to teach special needs students in your classroom?
YES
- 4- Do you think ICT is helpful to teach Special needs students? If so, how?
YES AS IT REMOVES BARRIERS TO LANGUAGE, SPELLING, GRAMMARE, PENMANSHIP
- 5- What are the different apps that you use to teach special needs students?
EMAIL / NOT SURE THE NAME OF HIS APPS.

2

- 6- Are there any apps that according to you are immensely useful to teach special needs students?
?
- 7- Can you give an example of effective use of technology in your classroom?
HOOD TYPES ESSAYS, WRITTEN RESPONSES AND EMAILS WHEN COMPLETED
- 8- What impact do you think technology has on learning of students with exceptional needs?
GIVES THEM A VOICE
- 9- What issues have you faced while implementing technology for students with special needs?
NO TIME TO WORK COLLABORATIVELY WITH THE LSA TO SEE WHAT PROGRAMS HOOD USES.
- 10- Would you like to give a suggestion for use of ICT with students of special needs?
⊕

Survey Questionnaire: Teachers views regarding use of ICT with SEN students

Name: GRADE:
 Title:

Please complete the following questionnaire with specific regard to the above enquiry, by placing a CROSS in the appropriate box

	strongly agree	agree	uncertain/ not applicable	disagree	strongly disagree
1. ICT helps to enhance the learning of Special needs and exceptional needs.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. ICT is an important tool and supports learning of special needs students.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Using ICT for teaching is difficult and time consuming.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4. Using ICT requires more effort from me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5. ICT helps to develop communication skills and social interaction of special needs.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I received the answer to my enquiry too late for it to be useful.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Use of ICT is difficult in our school.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8. Different programs or apps are used by teachers to teach special needs and gifted students.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9. Teachers should be provided with information on use of technology to teach special needs students.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Teachers face lack of technical support in the school.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
11. Resources or softwares are available to teach students of special needs.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Student No : 20173136

EDU523: Project Report

Appendix 1- Questionnaire Form

The Purpose of the study is to investigate the extent to which ICT can help learners with disabilities (SEND) to achieve educational goals at the secondary level in schools in Dubai. This study targets the use of ICT or assistive technology with SEND learners. Your opinion on the use of ICT and its usefulness to teach SEND learners is valued. The study outcomes will be used to develop recommendations into the existing practices for children with special needs in private schools in Dubai.

Section A- Background information

This information will enable us to compare groups of respondents. Your name and personal information will not be disclosed, and your response will remain anonymous. Your co-operation is highly appreciated.

1. Gender : Male
Female
2. Age (in years) : 27
3. Experience in teaching profession : 5 years
4. Experience in teaching students with exceptional needs : 5 years

Section B- Interview questions

1- How long have you been teaching students with exceptional needs in the classroom?

5 yrs.

2- How do the students of exceptional needs communicate in the classroom?

Using google classroom and plickers app.

3- Do you use ICT or assistive technology to teach special needs students in your classroom?

Yes

4- Do you think ICT is helpful to teach Special needs students? If so, how?

It's very helpful where these students are more able to express their needs and to show their answers.

5- What are the different apps that you use to teach special needs students?

→ Plickers
→ Khanacademy
→ Kahoot

5

6- Are there any apps that according to you are immensely useful to teach special needs students?

Khanacademy because it has a differentiated instructions.

7- Can you give an example of effective use of technology in your classroom?

Students can research and explain a new topic. They can post their answers online.

8- What impact do you think technology has on learning of students with exceptional needs?

Technology is making it easy for these kids to improve their academic skills.

9- What issues have you faced while implementing technology for students with special needs?

At the beginning, it takes more time with them to get used to how they can use these apps.

10- Would you like to give a suggestion for use of ICT with students of special needs?

Survey Questionnaire: Teachers views regarding use of ICT with SEN students

Name: Brandon Lewis GRADE: HS (11)

Title: International Studies (MOD)

Please complete the following questionnaire with specific regard to the above enquiry, by placing a CROSS in the appropriate box

	strongly agree	agree	uncertain/ not applicable	disagree	strongly disagree
1. ICT helps to enhance the learning of Special needs and exceptional needs.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. ICT is an important tool and supports learning of special needs students.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Using ICT for teaching is difficult and time consuming.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. Using ICT requires more effort from me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5. ICT helps to develop communication skills and social interaction of special needs.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I received the answer to my enquiry too late for it to be useful.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7. Use of ICT is difficult in our school.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8. Different programs or apps are used by teachers to teach special needs and gifted students.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Teachers should be provided with information on use of technology to teach special needs students.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Teachers face lack of technical support in the school.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
11. Resources or softwares are available to teach students of special needs.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7

Student No : 20173136

EDU523: Project Report

Appendix 1- Questionnaire Form

The Purpose of the study is to investigate the extent to which ICT can help learners with disabilities (SEND) to achieve educational goals at the secondary level in schools in Dubai. This study targets the use of ICT or assistive technology with SEND learners. Your opinion on the use of ICT and its usefulness to teach SEND learners is valued. The study outcomes will be used to develop recommendations into the existing practices for children with special needs in private schools in Dubai.

Section A- Background information

This information will enable us to compare groups of respondents. Your name and personal information will not be disclosed, and your response will remain anonymous. Your co-operation is highly appreciated.

1. Gender : Male
Female
2. Age (in years) : 37
3. Experience in teaching profession : 15
4. Experience in teaching students with exceptional needs : 15

Section B- Interview questions

- 1- How long have you been teaching students with exceptional needs in the classroom?
15.
- 2- How do the students of exceptional needs communicate in the classroom?
In different ways; body language is usually a good indicator.
- 3- Do you use ICT or assistive technology to teach special needs students in your classroom?
Sometimes.
- 4- Do you think ICT is helpful to teach Special needs students? If so, how?
Yes; it can build upon skills they already employ w/ cellphones, video games, etc.
- 5- What are the different apps that you use to teach special needs students?
Shawbie, Google Classroom, Kahoot

8

4

6- Are there any apps that according to you are immensely useful to teach special needs students?

no.

7- Can you give an example of effective use of technology in your classroom?

Presentations using different apps like Prezi has proven effective.

8- What impact do you think technology has on learning of students with exceptional needs?

Can spark interest, and inturn, confidence.

9- What issues have you faced while implementing technology for students with special needs?

none.

10- Would you like to give a suggestion for use of ICT with students of special needs?

N/A

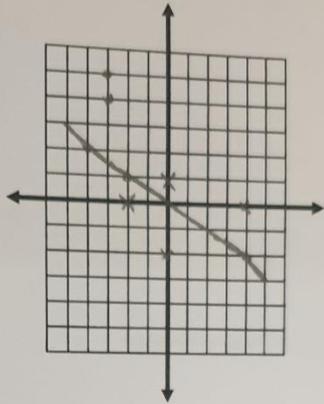
9

Steps for Solving a Linear System Using Graphing:

1. Put the equations in slope-intercept or standard form.
2. Graph each equation on the same coordinate system.
3. Locate the point of intersection and write it down.
4. Verify that the point makes both equations true!

Example: $y = 2x$

$y = -x + 3$

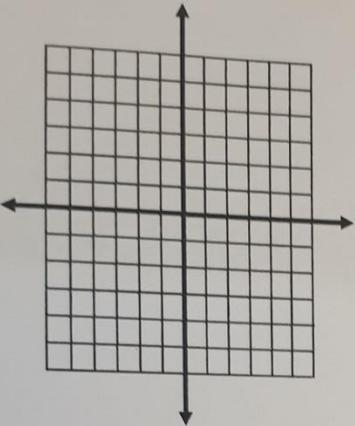


Point _____

Verify: _____

Example: $y - 2x = -4$

$y = x - 2$



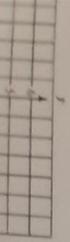
Point _____

Verify: _____

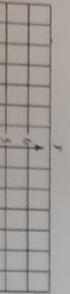
Try these:

$y = -x + 5$

$y = x + 1$



2. $2x - y = 2$
 $x = 3$

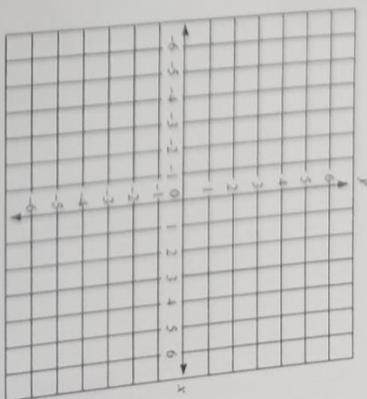


3. $2x + y = 2$
 $x - y = 4$

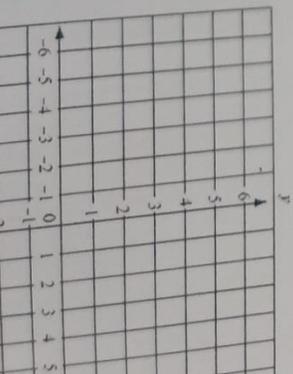


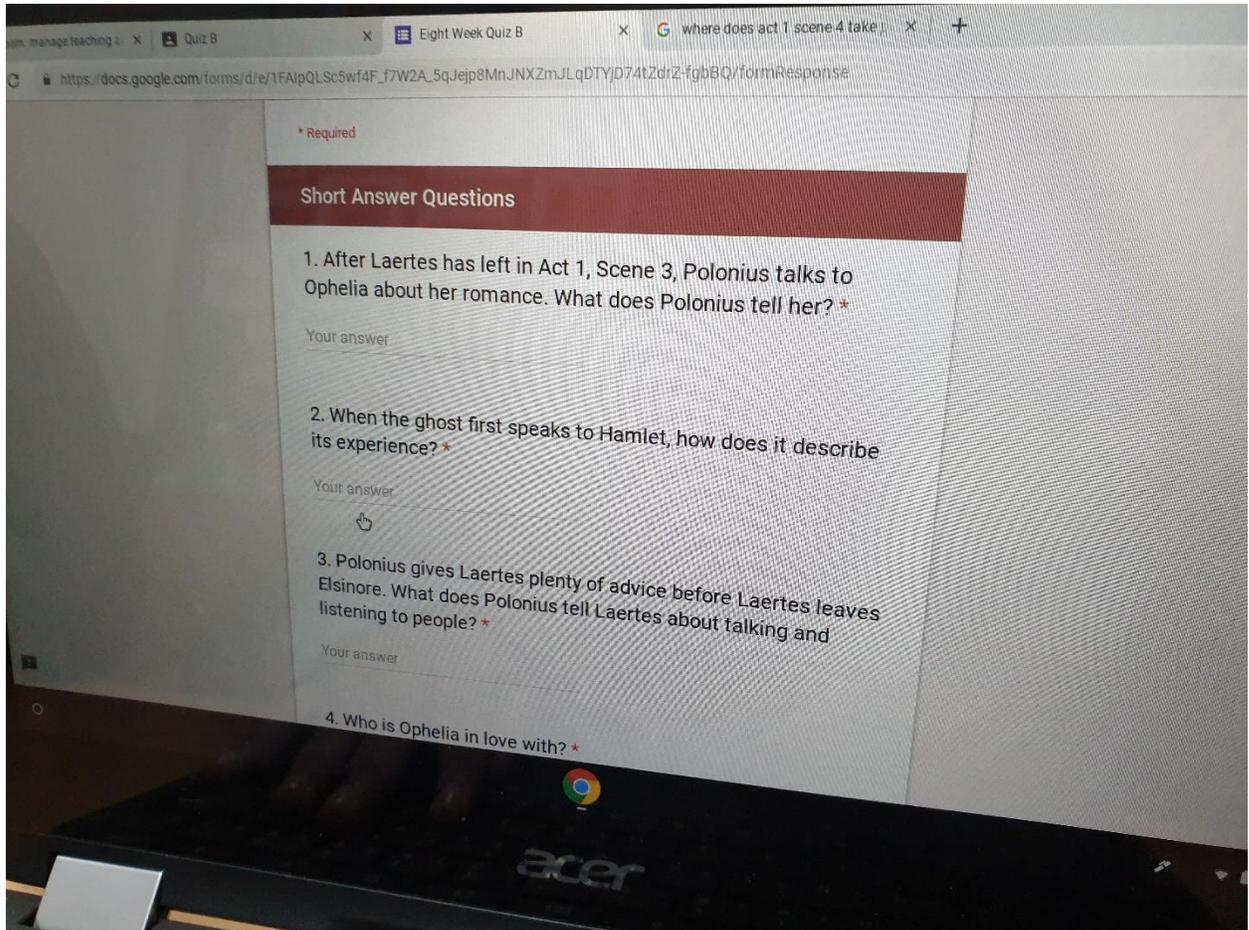
7.1 - Solving Systems of Equations by Graphing
Solve these linear systems by graphing.

1) $y = -x + 3$ and $y = 2x - 6$



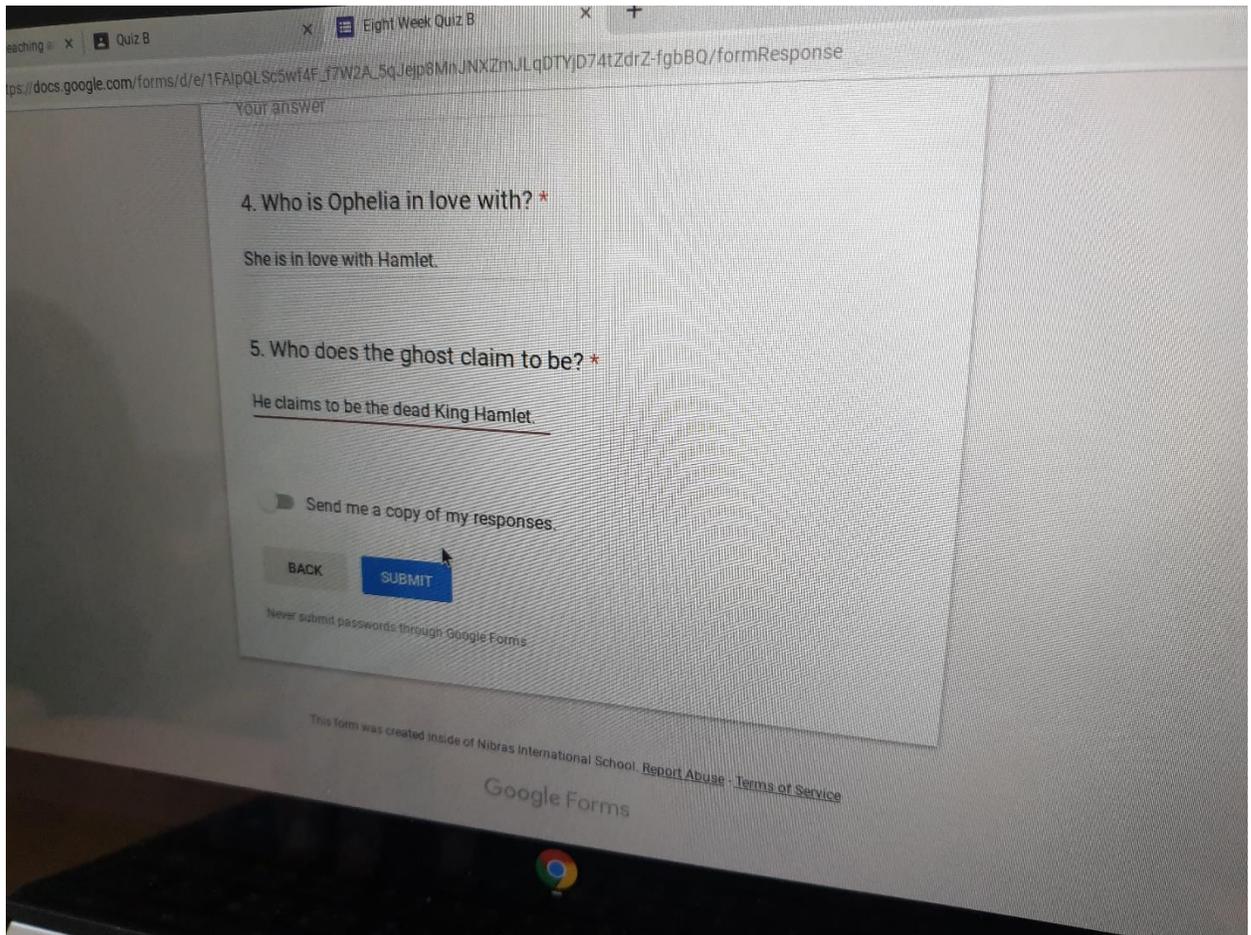
3) $x - y = 2$ and $x + y = -6$





Questions for “H” who is non verbal autistic learner.

Appendix 19



Questions for “H” who is non verbal autistic learner.

Appendix 20

Eight Week Quiz B

Your email address (w.adil@nisdubai.ae) will be recorded when you submit this form. Not you?
[Switch account](#)

* Required

Short Answer Questions

1. After Laertes has left in Act 1, Scene 3, Polonius talks to Ophelia about her romance. What does Polonius tell her? *

entry and he won't be able to love Ophelia

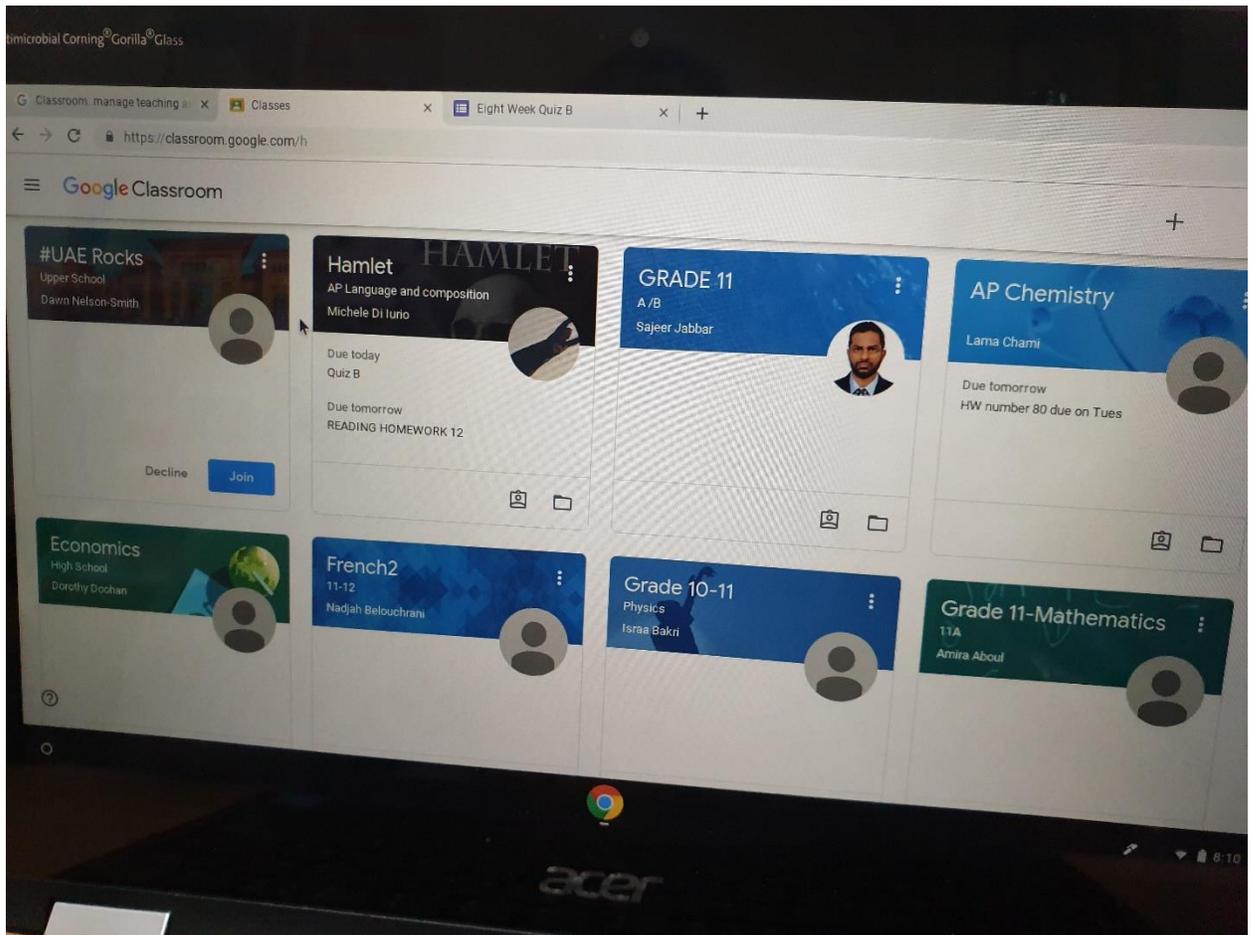
2. When the ghost first speaks to Hamlet, how does it describe its experience? *

To be tortured during the day and roam

3. Polonius gives Laertes plenty of advice before Laertes leaves Elsinore. What does Polonius tell Laertes?

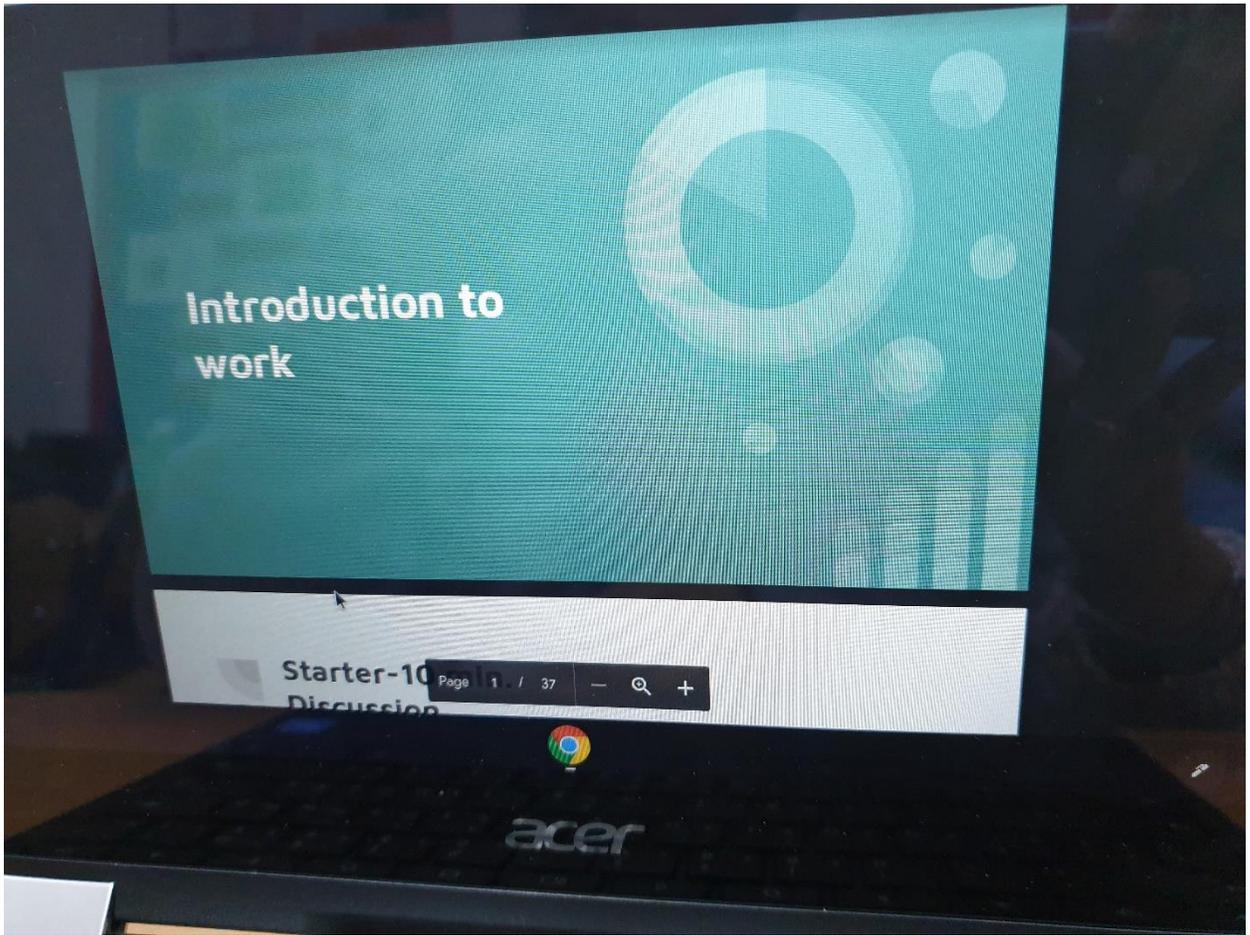
Quiz administered for the non verbal autistic student.

Appendix 21

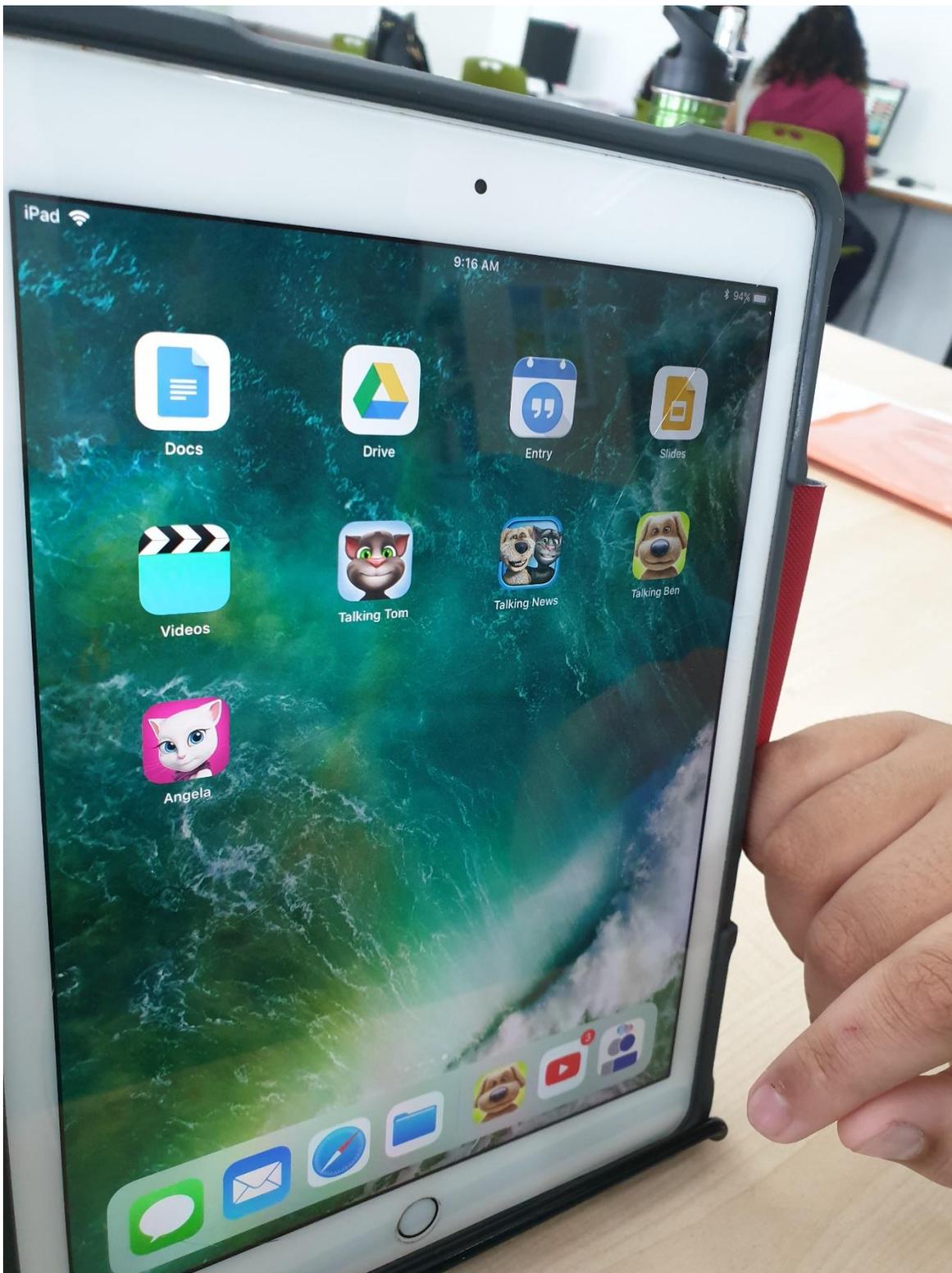


Teachers using google classroom

Appendix 22



Appendix 23

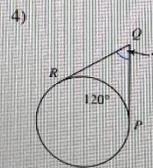
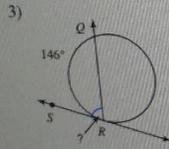
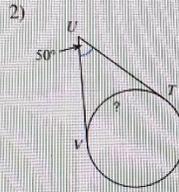
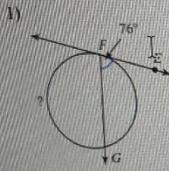


Apps Used by “H” to communicate as he is non verbal autistic

Appendix 24

Secant-Tangent and Tangent-Tangent Angles

Find the measure of the arc or angle indicated. Assume that lines which appear tangent are tangent.



Differentiated work given to the Gifted and talented student by the teacher on Google classroom.

Appendix 25

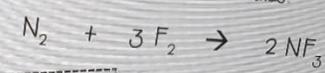
INTRODUCTION TO BALANCING EQUATIONS

The Law of Conservation of Mass tells us that the total amount of matter is neither created nor destroyed during any physical or chemical change. Therefore, the mass stays the same before and after a chemical reaction.



Chemical equations demonstrate this principle because they are always balanced. The total mass of the reactants must equal the total mass of the products. You can check to see if an equation is balanced by counting up the number of atoms- it has to be the same on each side of the equation. To balance an equation, you can adjust the coefficients until there are the same number of each type of atom on both sides. You are never allowed to change the smaller numbers that make up the chemical formulas.

See! This is balanced!



2 nitrogens and 6 fluorines on this side...

and 2 nitrogens and 6 fluorines on this side!



Practice

Balance each equation using the law of conservation of mass. There is a chart above each problem to help you. Use the chart to make sure that you have the same number of atoms on each side.

First- Count up the number of atoms you currently have. Write that number in the chart for both sides of the equation.

Second- If the numbers don't match, try adjusting the coefficients one at a time. Make sure to change the number in the chart.

Remember- you can't change the formulas!

1.

Reactants	
H	
O	

Products	
H	
O	

 $\underline{\quad} H_2 + \underline{\quad} O_2 \rightarrow \underline{\quad} H_2O$

You should do this in pencil!

2.

Reactants	
P	
O	

Products	
P	
O	

 $\underline{\quad} P_4 + \underline{\quad} O_2 \rightarrow \underline{\quad} P_2O_3$



© 2015 Adventures in Science

3.

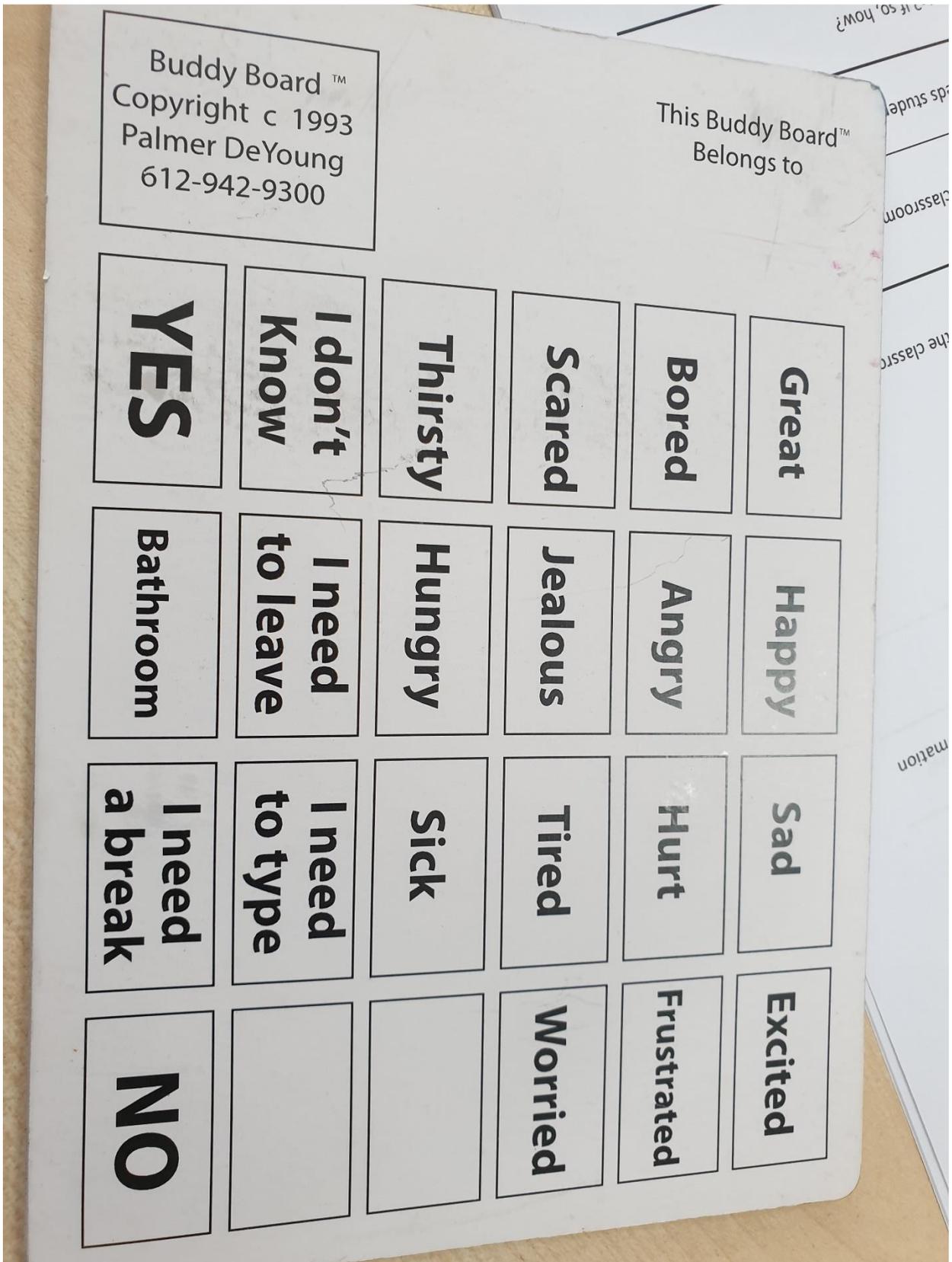
Reactants	
N	

Products	
H	

4.

Reactants	
K	

Products	
K	



Buddy board used by “H” to communicate for simple words in the absence of an ipad.

30th 4. 2019.

10-2 Circles

Example 4: Writing the Equation of a Tangent

Write the equation of the line tangent to the circle $x^2 + y^2 = 29$ at the point $(2, 5)$.

FREEZE II

