

**Investigating Science Distance Learning Instructions in
COVID-19 and their Impact on SOD students in American
Curriculum Schools in the UAE**

دراسة للتحقق من إرشادات تدريس مادة العلوم عن بعد خلال جائحة كوفيد-19
وتأثيرها على الطلبة من ذوي الإحتياجات التعليمية الخاصة في بعض مدارس
المنهاج الأمريكي في الإمارات العربية المتحدة

by

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Abstract

In modern days, the attention towards technology is massive. For so many years, it has been acknowledged as an important tool in the field of education but it was never a central objective until now. Recently, the need to use technology appears more due to the current global crisis of coronavirus pandemic as a significant educational tool. The main purpose of this study is to examine the effect of using distance learning in the science subject on SOD students' outcomes from the teachers', students', and parents' perceptions on different cases of SOD students in some American curriculum schools in the UAE.

The conduction of this research study has a relevant motive behind it as it clarifies and creates realization regarding the importance of the use of various technical skills in the on-line teaching process in combination with the positive effect they imprint on the students' learning and attainment. This study explores some different ways the students can gain knowledge from home and interpret the impact and the need for using the technology in this case of the distance learning process. This research study accommodated SOD students in the middle school level subject of science through questionnaires provided to 100 teachers, and interviews with students and parents who represent their children, aiming to accomplish the needed documents that will enhance the analysis of the research questions.

The results showed that forty-eight percent of the teachers completely concurred that E-learning needs more mindfulness among parents and students so it can give more advantages to students, and about the same percentage agreed while the rest saw that it does not require any sort of mindfulness. On the other hand, the guardians accepted that distance learning is useful for their kids and it gives diverse learning experiences in contrast with the conventional educating techniques.

Keywords: Technology, SOD students, E-learning, Platforms, Challenges, Motivation, Distance learning.

الملخص

لقد أصبح الإهتمام بالتكنولوجيا كبير جداً في الآونة الأخيرة، فمنذ عدة سنوات تم اعتماد التكنولوجيا كأداة من أدوات التعليم ولكنها لم تكن أبداً هدفاً رئيسياً حتى وقت قريب، ولقد ظهر جلياً ضرورة استخدام التكنولوجيا في مجال التعليم في هذه الأيام بسبب أزمة وباء كورونا العالمية، ومن هنا جاء الغرض من هذه الدراسة، وهو: معرفة مدى تأثير التعليم عن بعد على مخرجات التعلم في مادة العلوم لدى الطلاب ذوي الاحتياجات التعليمية الخاصة -على اختلاف حالاتهم- من وجهة نظر الدارسين والمدرسين وأولياء الأمور وذلك في بعض المدارس الأمريكية في دولة الإمارات العربية المتحدة.

إن وراء إجراء هذه الدراسة البحثية دافع أصيل، لأنها وضحت أهمية استخدام المهارات الفنية المختلفة في عملية التعليم عبر الإنترنت من خلال التأثير الإيجابي الذي ينعكس على تعلم الطلاب وتحصيلهم. كما تكشف هذه الدراسة عن بعض الطرق المختلفة التي يستطيع الطلاب من خلالها إكتساب المعرفة من المنزل، وتفسير التأثير والحاجة إلى التكنولوجيا في حالة التعليم عن بعد. إن هذه الدراسة تستوعب الطلاب ذوي الاحتياجات التعليمية الخاصة في المرحلة الإعدادية في مادة العلوم وذلك من خلال استبانات طرحت على مائة معلم ومقابلات مع الطلاب وأولياء الأمور الذين يمثلون أبناءهم، بهدف الحصول على المستندات المطلوبة التي تساعدنا على تحليل أسئلة البحث.

ولقد أظهرت النتائج أن ثمانية وأربعين بالمائة من المعلمين متفقون تماماً على أن التعليم عن بعد يحتاج من أولياء الأمور والطلبة مزيداً من اليقظة حتى يتمكن المعلمون من إعطاء المزيد من المزايا للطلاب، كما تتفق معهم نفس النسبة تقريباً، بينما يرى البقية أنه لا داعي لأي نوع من أنواع الاهتمام. أما الأوصياء فقد أقرروا أن التعليم عن بعد مفيد لأطفالهم ويعطي تجارب تعليمية متنوعة على عكس أساليب التعليم التقليدية.

الكلمات والعبارات الأساسية:

التكنولوجيا (علوم التقنية) - الطلاب ذوي الهمم والإحتياجات التعليمية الخاصة - التعليم الإلكتروني - المنصات التعليمية - التحديات - الدوافع - التعليم عن بعد.

Dedication

This dissertation has been one of the greatest challenges in my life. This achievement is lovingly dedicated to my family and friends who strongly encouraged me and my mother who believed in my abilities and launched me in the direction of success.

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Chapter 1: Introduction

In today's era of the internet, the trend of distance learning is growing rapidly. In the past five years, the rate of online courses and distance education programs offered by universities and colleges has been increased by 55% (Akkari, 2019). Therefore, various research studies have proliferated research related to distance education programs. The main focus of the research studies in this area is on instructional design, way of interaction, and its impact on the learning of students. While measuring, the impact of distance education on the students, it is essential to explore the characteristics of the learners. In general, it is always advised to know the audience before starting any activity. It becomes essential in the case of teaching through distance education. The instructor needs to know about the characteristics of the learners before setting up the curriculum and instructional design to make distance education effective and viable to serve the needs of the learners (Atitumpong & Badir, 2019).

There exists a vast literature on distance education and its outcomes. There are various forms of distance education such as an offline mode where the content and material is provided to the students and an online mode, where students and teachers can interact through an online application and students can get their queries resolved (Akande, 2019). Online learning has become an important part of distance learning these days. The online mode of distance learning is considered the best because it provides the students with all the facilities to interact with the teachers as they can in the classroom.

Despite the abundant literature on this topic, there is a high dropout rate in distance education programs. Therefore, the first measure to reduce this dropout rate is to identify the characteristics of the learners and to design the curriculum according to the different needs of the students. It is also essential to measure the predictors of the satisfaction of the students. Previous research studies have explored that the satisfaction of the students studying under distance education programs affects their decision regarding whether to continue under this program or not. Though there are various other factors such as motivation from the teachers, way of interaction during online class, course content, and other students, the satisfaction of students from their academic performance is an important characteristic that decides for how long they would continue in this distance education course. Therefore, the research studies need to focus on the characteristics of the learners before measuring the influence of distance education on their academic achievement (Bidabadi, et al., 2019). For this study, distance-learning term is defined as a mode of education where students and teachers are not physically

present in a classroom but they are in contact with each other through the use of modern technology.

1.1. Background of the research

This vast literature on satisfaction from distance education has only focused on the normal students. No study has ever tried to assess the requirements of Students of Determination (SOD) for distance education programs. SOD students are students with learning difficulties or students with disabilities. The students under this category find it difficult to learn in the same manner as other students can. They always need extra and different sort of help from their teacher to make the concepts understandable to them in comparison to other children of their age. The special needs students have somewhere left behind in this race of distance education and online learning. It has become essential for educational institutes to tailor their special education resources in the time of global pandemic because there is no other solution to provide help to the special education students. The adjustment of new remote learning programs in this time of global pandemic can make the learning curve steeper. Thus, it has become the biggest challenge for the teachers to deal with special education needs students.

It is the responsibility of special education teachers to focus on individual education programs to help special needs students. There should be individualized lessons and face-to-face conversations for making them all the concepts clear for such kind of students. Though distance education has brought ease and familiarity with the technology and has made access to education easy for the students, it has brought a big challenge for the students with disabilities and the students with special education needs. In the classroom, these students remain dependent upon the teachers for making their queries clear, but in distance education programs it becomes difficult for them because they do not get the same learning environment as they get in the classroom (Sung & J.N.Choi, 2019).

In the case of special needs students, it is the responsibility of teachers to highly focus on paperwork and documentation for creative activities. The students also need to connect with their parents and caregivers for the same kind of activities so that they can repeat repeatedly what they have learned in their classroom. However, in distance education, the teachers need to adopt new resources and new technology to teach these students according to their level of understanding. Some specific resources can help the special needs students in the classroom. ClassDojo is an application for distance learning programs. This application connects teachers,

students, and family through videos, audio, text messages, and photos. Through this application, special needs students can learn from their teachers in the presence of their family members. Teachers can direct the parents for the activities, which they can do for the conceptual clarity of their children. Kahoot is a game-based learning application that can help in the distance education programs for special needs students (Jereb, et al., 2019). This application helps in promoting fun-based activities for the students. There is an option in this application to categorize the fun interactive activities according to the level and the subject. Teachers can recommend a specific game for students with different needs. In this way, teachers can care for the needs of every student. Padlet is an application that acts as a digital bulletin board where teachers can share information and activities. Every student can see the information on the board and can share their queries individually with the teacher to get the answer to their question regarding that query (Jashan, 2019). There is a website named Flipgrid that develop grids for the video discussion with the students. Every grid in this website is in the form of a message board where the students can pose their questions and get answers to their queries through individual video discussion with their teachers. These video responses can also be posted on the website for reference for other students. Audiobooks are another option that can help special needs students in the distance learning programs. The students can read these books independently, can note down their queries, and can ask the teachers while discussing. Word prediction software engages the students to write assignments given by the teacher in their own words on the topic taught by the teacher in the online lecture. This helps the teachers to assess the level of understanding of the students for the topic taught by the teacher. The teachers to teach the special needs students can use various tools but they need to choose the tool according to the characteristics of the learners. The teachers need to identify the difficulty level of the student (Issa, et al., 2019). There are various formal and informal resources for special education. These resources support the students mentally, emotionally, socially, and academically. The teacher can make the best use of these resources to support the students by following some specific strategies. These strategies consist of emotional attachment with the students, scheduling time together as a class, making teaching videos, regular communication with parents and guardians, collaboration with team members and to conduct assessment tests regularly. Formal resources can better help to serve the special education needs of the students (Issa, et al., 2019).

Various research studies have highlighted the role of online learning on the academic performance of the students. The studies have explored that technology has played a vital role

in improving the performance of the students through online learning. These studies reflect that this technology and online learning can also play an important role in influencing the learning behavior of especially disabled students in the case of distance education programs. This huge writing on fulfillment from separation instruction has just centered on ordinary students. No examination has ever attempted to evaluate the prerequisites of Special Education Needs (SEN) students for separation training programs. SOD students are students with learning challenges or students with handicaps. The students in this class think that it is hard to learn similarly as different students can. They generally need extra and distinctive kind of help from their educator to cause the ideas to comprehend to them in contrast with other offspring of their age. The special needs students have somewhere deserted in this race of separation instruction and internet learning (Hamed, 2019). It has gotten fundamental for instructive establishments to tailor their custom curriculum assets in the hour of the worldwide pandemic because there is no other answer for assisting the custom curriculum students. The alteration of new distant learning programs in this season of a worldwide pandemic can make the expectation to absorb information extreme. Along these lines, it has become the greatest test for educators to manage the custom curriculum needs of students.

Custom curriculum instructors must zero in on singular training projects to help the students with special education needs. There ought to be individualized exercises and vis-à-vis discussions for making all the ideas clear for such sort of students. Even though separation training has carried simplicity and knowledge of the innovation and has made admittance to instruction simple for the students, yet it has carried enormous test for the students with handicaps and the students with custom curriculum needs. In study hall, these students remain reliant on the instructors for making their inquiries understood, however in separation training programs it gets hard for them since they do not get the same learning climate as they get in homeroom (Hamed, 2019). In the event of extraordinary needs students, instructors must profoundly zero in on paperwork and documentation for imaginative exercises. The students likewise need to associate with their folks and parental figures for the same sort of exercises so they can rehash and again what they have realized in their homeroom. However, in separation instruction, the educators need to receive new assets and innovation to train these students as per their degree of comprehension.

The examination study plans to inspect the impact of utilizing separation learning on SOD students' accomplishments and results on various instances of SOD students in some American educational program schools in the UAE. The conduction of this exploration study has a

significant rationale behind it as it explains and makes acknowledgment concerning the significance of the utilization of different specialized aptitudes in the on-line training measure in the mix with the beneficial outcome they engrave on the students' learning and fulfillment (Ferla, 2019). The investigation investigates the difficulties looked by instructors, schools, and specialized curriculum need students as per the view of educators. It additionally mirrors the wellspring of inspiration for exceptional requirements students while inclining through separation instruction mode as indicated by the impression of educators just as students. In the wake of examining the impression of instructors just as students, the investigation has attempted to recognize the new methodologies of internet learning for a specialized curriculum need students (Chung & Li, 2020). Not just this, the study has additionally researched the impact of e-taking on the instructive cycle from the impression of guardians and instructors. The investigation has attempted to cover five unique viewpoints related to separation learning and the necessities of a custom curriculum need for students.

The researcher who has worked on the special education needs of the students has tried to cover the aspect from a different angle. They have focused on their needs while studying in the classroom. They have differentiated their characteristics from the other students of their age group and have analyzed how the teachers should treat such kind of students. The studies have exhibited that the teachers need to maintain an emotional connection with the special needs students to make them able to learn easily (Buchmann & Hannum, 2019). The teachers also need to promote fun-based learning activities to promote fun interactive learning in the classroom. The teachers using paperwork and documentation to promote creative learning are easily making the special needs students learn concepts. The studies have also proved that parents and caretakers also need to involve in these activities at home to make their children actively involved in these activities. In this way, they would make it able for the students to repeat the activities at their home as well.

1.2. Statement of the problem

In modern days, the attention towards technology is massive. For so many years, it has been acknowledged as an important tool in the field of education but it was never a central objective until now. Recently, the need to use technology appears more due to the current global crisis of coronavirus pandemic as a significant educational tool. It is beneficial for normal students to study online from the comfort of their homes. Nevertheless, it has become the biggest challenge for special needs students. Various research studies have explored new strategies that

can help in making distance education effective for the students. But there is a lack of literature on the importance of distance education for special needs students.

1.3. Research Questions

The main purpose of the study is to investigate the impact of Science Online Instruction on SEN students in American curriculum schools in the UAE. The research study aims to answer the following research questions:

1. What kind of challenges faced by teachers, schools, and SOD students from teachers' perceptions?
2. What is the SOD students' motivation to interact through this distance learning from their perception and teachers' perception?
3. What are the SOD students' perceptions regarding the new approach of online teaching?
4. What are the teachers' perceptions regarding SOD students' responses to this new distance learning approach?
5. What is the effect of e-learning on students and the educational process from the perceptions of parents and teachers?

1.4. Purpose of the study

The research study aims to investigate the effects of using science distance learning on SOD students' achievement and outcomes on different cases of SOD students in some American curriculum schools in the UAE. This study explores some different ways the students can gain knowledge from home and interpret the impact and the need for using the technology in this case of the distance learning process.

1.5. Significance of the research study

The conduction of this research study has a relevant motive behind it as it clarifies and creates realization regarding the importance of the use of various technical skills in the on-line teaching process in combination with the positive effect they imprint on the students' learning and attainment. The study explores the challenges faced by teachers, schools and special education need students according to the perception of teachers. It also reflects the source of motivation for special needs students while learning through distance education mode according to the perception of teachers as well as students. After analyzing the perception of teachers as well as

students, the study has tried to identify the new approaches of online learning for special education needs students. Not only this, but the study has also investigated the effect of e-learning on the educational process from the perception of parents and teachers. The study has tried to cover five different aspects associated with distance learning and the needs of special education need students.

1.6. Scope of work

The study investigates the learning characteristics of special needs students in the UAE. There is a relevant motive behind conducting this research study. This study reflects the importance of the use of technology in online learning in different situations. The study has also analyzed the influence of this technology on the academic achievement and learning outcome of the students. The study has explored the number of ways that can be used to gain knowledge from the comfort of home through distance education programs. It is helpful for the researchers to explore the online learning tools that can help them to understand the concepts with more clarity. The study is also helpful for teachers to understand the requirements of the special education needs students of the middle school for science subject. The study further motivates the researchers to conduct studies for special needs students in other classes so that the level of understanding of the students of different grades can be investigated.

1.7. Structure of the Dissertation

This dissertation has been categorized into four chapters. Every chapter is specific to the relevant information required to complete this thesis. Chapter 1 consists of an introduction, the background of the research, the purpose of the study, research questions, scope of research, and the structure of the dissertation. In the introduction part of this chapter, the meaning of distance education, the need for distance education, the role of online learning in distance education has been discussed. The background of research has explained the main focus of the previous researchers while researching distance education. From this background of research, the need for the study has been explored. This need for the study helped in framing the research questions, purpose, and scope of the study.

Chapter 2 is a detailed analysis of the previous studies on the constructs of the study. The research study has used the latest research studies for review purposes to make the research study more effective. The literature review section consists of three sections. Conceptual framework, historical and theoretical background, and previous studies.

Chapter 3 is about research methodology. It explains the blueprint of the research study, instruments used for data collection, and tools used for the analysis purpose. In short, this chapter of the dissertation explains how the sample is selected, how the data for this research study is collected, and how it has been analyzed.

Chapter 4 of the dissertation is about the results and the analysis part. It also consists of conclusions and recommendations based on the results and analysis.

Chapter 2: Literature Review

The focus of the current study is to investigate the effect of using distance learning on SOD students' achievement and outcomes on different cases of SOD students in some American curriculum schools in the UAE. This section of the study has described the conceptual framework for this study based on different theoretical approaches and models. The last section of this chapter has highlighted the reviews of the previous studies related to the constructs of the study.

2.1.1. Teaching science online

Teaching science is very crucial and inspiring and I am quoting from Leonardo da Vinci (1888) when he said, “Those who fall in love with practice without science are like the sailor who enters a ship without a helm or a compass, and who never can be certain whether he is going”. In this modern digital age, science is becoming a major component of about any human activity, and world need for higher education in the STEM domain is steadily growing

In a part, scientists show that science can be taught at a distance, learning at a distance will contribute to high-quality learning. Besides, there are many strategies and approaches to achieve this goal for this type of learning objective being accomplished.

2.1.2. The Challenges

Teaching students with special needs is never a simple task in which the teacher should use creative tools to help each and every one of them understand the concepts according to his own abilities which is totally differ than the others (Dukmak 2010).

And according to Kennepohl & Moore (2016), it is neither an easy nor a direct endeavor to teach science online, this is not an aim itself; it is a more complex task than it appears. There are quite a number of explanations for this complexity that appear through, the practical side and the executive side.

2.2. Theoretical Framework

The concept of distance education has changed from a simple concept of corresponding learning to an interactive learning experience. Therefore, a conceptual framework for this concept cannot be based on a single theory. For this purpose, Social, behavioral, and

constructive theories have been considered and have been funnel down to their specific application on distance education. Learning theory describes and helps to explore the way individuals learn. The most popular theories under learning theories are social, behavioral, and constructive theories.

2.2.1. Theory of Behaviorism

From the word "Behaviorism", it can be understood that it focuses on the behavior of the people (Picciano 2017). It is related to cause and effect. As in the general world, action results in a reaction. In the same way, the behavior of the students while learning decides how much they would learn. Respond of students to certain stimuli reflects the behavior of an individual (Atitumpong & Badir, 2019). This behavior of the students helps in quantifying the concepts learned by them. Behaviorism emphasizes the observable factors, not the cognitive process. The Behaviorism concept was founded by Ivan Pavlov, who was known for his experiments on animals such as dogs and their response to the food and the bell (Chung & Li, 2020). He experimented with the reaction of dogs at the sound of the bell in 1990 and observed that the dogs start salivating at the sound of the bell. Later in the 20h century, various researchers conducted these experiments. Watson was the first researcher who followed the experiments conducted by Pavlov. He further observed that it is a branch of natural science and he termed it behaviorism. He investigated that stimulus and reaction are the two most important things under behaviorism. He has given less importance to mind and consciousness. B.F. Skinner and Edward Thorndike also gave their own opinions associated with behaviorism. They focused on the type of reinforcement that induce individuals to learn new behaviors. The concepts introduced by Skinner are different from the concepts of Pavlov because he simply relied on reflexive responses. The theories of behaviorism given by Pavlov and Skinner promoted repetitive behavior (Ferla, 2019). They also emphasized that this repetitive behavior ends up in habit formation. The theories of Skinner were based on the computer-assisted instructional models given by Pat Suppes and others. These models are based on the repetition of the activities to promote positive learning among individuals. This theory focuses on how the behavior of the students plays a significant role in distance learning.

2.2.2 Theory of Cognitivism

The term "Cognitivism" is used for the reaction to a rigid emphasis on a predictive stimulus. These theorists associated with the cognitive aspect gave high importance to the role of the

mind in learning different activities (Picciano 2017). According to them, it is only the mind that focuses on what happens in the environment and what is the stimulus and acts according to that stimulus. There are various factors associated with the cognitive process of minds such as motivation, imagination, and critical elements linked to learning (Jashan, 2019). Chomsky gave a critical review of behaviorist work and emphasized the importance of the mental process for the reaction to some environmental stimuli. He added that this type of action to reaction is not visible in the physical world. This view of Chomsky gained importance in the field of psychology. However, it is because of the interdisciplinary nature of the concept, this concept has gained popularity in other fields such as biology, neuroscience, computer science, and philosophy. Therefore, various theorists from other fields have also focused on the working of the brain and cognitive development. Resultantly, cognitivism proved as a dominant theory of learning. The theory has a more interesting future because with the use of technology and artificial intelligence, the way of instructing the students can be more efficient. Behaviorism results in various techniques of learning (Sung & J.N.Choi, 2019). Various theorists studied different elements of learning and highlighted that the problem-solving technique is a higher-order skill. Bloom has categorized the taxonomy of the learning process into six different categories. Creating: It is to combine all the elements to create a new pattern or structure and to reorganize the element to generate and plan for some new ideas. Evaluating: It is to evaluate the content created and to make judgments based on particular criteria and standards. Analyzing: It is to categorize the material into different parts and to analyze the relationship between different parts. Applying: To implement the design procedure using a specific methodology. Understanding: To construct meaning from the messages with their proper interpretation, classification, and summary. Remembering: Recalling the concepts, again and again, to memorize them for the long term.

In the development of the taxonomy related to learning, Bloom moved towards cognition and psychological development of the students for effective learning. After the theory given by Bloom, Robert Gagne gave another theory based on the taxonomy of Bloom (Hamed, 2019). The theories of cognitive development given by Gagne are based on the cognitivist instructional design, which is based on nine different elements. These different elements are as follows.

1. To gain attention through relevant use of the media.
2. There should be clear objectives for the overall purpose of the course.

3. There is a high need to stimulate prior knowledge of the concept before introducing the concept to the students.
4. The students should be provided with all the required material associated with the coursework and they should be provided with the prior knowledge to using the tools associated with the learning material.
5. Prior knowledge of the learners for the topics should be checked before starting the new topic.
6. Elicit performance should be preferred. The students should be asked to work in groups. They should be given group-based activities.
7. There is a need to provide immediate feedback to the students so that they can understand where they need to improve while learning a concept.
8. There should be regular assessment tests to assess the learning ability of the students for a certain topic.
9. Learning activities should be associated with real-life activities so that it can be easy for students to understand the activities easily.

The above-given framework is the root of a large number of theories and models. After the 20th century, the major learning theories used by the theorists were the theory of cognitivism and the theory of social constructivism. Lave and Wenger (2019) brought the concepts of communities of practice and situated learning. According to them, learning is a very deep process and it needs community practice that is why they associated these two practices with the concept of learning.

In various theories and models related to online learning and distance learning, their work is evident. These learning aspects have high importance for online education. According to the theory of information processing, the human mind is a system that is full of logic, that is why cognitivism plays an important role in putting information in that human mind. The theory has compared the mind to a computer that is full of programs.

Many researchers have tried to explore the effect of changes in the mental processes on the performance of the students while learning (Ugulu & S.Allen, 2020). The students who need extra effort for learning a concept need high cognitive competence as compared to the other students in the class. Atkinson and Shiffrin are two theorists, who proposed this information-processing model that explains how the information can be acquired, encode, store, and process for further use of the information. Propensities and personalities of the individuals are two

different factors that decide how the individual students would learn from their surrounding environment. According to Carl Jung, there are various personality types according to different human Behaviors. Jung's theory has focused on four different dimensions according to psychological factors. These four different psychological dimensions are 1) extroversion vs Introversion, 2) sensation vs Intuition, 3) Thinking vs feelings, 4) Judging vs. Perceiving. Every dimension has its effect on the learning style of the individuals. At various times, these learning styles are based on a combination of these factors. In addition to the above given psychological dimensions, this can be the addition of sensation, feelings, and perceptions. These dimensions of the characteristics of individuals can be measured through Myers-Briggs Type Inventory (MBTI), which is a very simple and familiar tool to determine different personality types. This factor also determines how this personality type is related to the learning capacity of the students. This scale of measurements is based on the theory of Jung (Kutluk & M.Gulmez, 2020). It has helped in the development of various teaching methods. It helps in the prediction of mental functioning of the students, development of new information, new ideas and to judge the capacity of the students. This scale of attitude is also used to measure the attitude of the students towards learning and their interest in perceiving information from the surrounding environment. Carl Jung, in his theory, has described that MBTI applies to all types of environments. According to this theory of Carl Jung related to MBTI, extrovert students are considered as more active and highly collaborative on the other hand, introvert students are less interactive and less collaborative.

2.3. Integrated model for Distance education and learning among students

Scientific distance education provides a feasible solution to resolving capability and access issues while providing lower costs and versatility (Kennepohl, 2013).

Every learning theory is based on some sort of theoretical foundation. There are various learning theories associated with the learning capability of the students (Picciano 2017). To assess the learning outcome of the students from distance education programs, the following integrated model has been adopted.

Content: Content is known as the primary driver in this process of learning through the distance mode of education. There are various ways to present and deliver the content to the students. But a major part of the content is what is delivered linguistically to the students by

the teachers. The teachers can deliver this content to the students through LMS, CMS, media, and games.

Dialectic/Questioning: Teachers can ask questions from the students regarding what they have learned through the content delivered to them. This helps the teacher to get an estimate about what the students have learned in the class.

Reflection: Reflection is known as a strong pedagogical strategy. There is a vast literature on reflection of learning and reflection of teaching after the 20th century. Though it is a personal activity, it helps in assessing the knowledge level of students for the teacher.

Collaborative learning: It consists of an interactive way used by the teachers to deliver content to the students. Various professional methods can be adopted by the teachers to deliver content to the students. It consists of professional software and applications as well.

Evaluation: Evaluation is how the teachers assess the content learned by the teachers. It is known as the most important component of the model. This component reflects the level of understanding of the students. Online tools that help in the evaluation of the tasks completed by students are CMS and LMS.

Collaborative learning: Collaborating learning is social discussions and peers to peer discussion by the students. This option provides a classroom environment for the students where they can learn while discussing with their friends as well. In the case of special needs students, they can discuss the matter with their parents as well as guardians.

This integrated model based on six different components is aimed to provide rich and interactive learning to the students. This model would assess the learning capability of the students' time to time and would help them in understanding the concepts in a better way. The evaluation methodology of the students' also helpful for the teachers to assess the performance of the students from various angles (Picciano 2017).

2.4 Science and Education reforms at local and international level

All societies in the world have approaches to educate their young to make sure that they become full contributors in society, capable to participate and develop it and so come to be more human (Savater 2004 in UNESCO 2010). It has been suggested that pedagogy for conceptual, procedural, and NOS (Nature of Science) learning in science education should be

more high quality and inclusive when science is taught and discovered in contexts in which school students can make links between their existing knowledge, the study room experiences, and the science to be learned. Moreover, this right to global access to improve science education has been identified by UNESCO, with recent improvements of the arguments in its favor (UNESCO 2015). Not to mention that researchers found another benefit of high-quality science education for all is its contribution to improving ways of thinking. Pozo 2008 in (UNESCO 2015) has shown in some contexts that thinking scientifically helps enhance new methods of thinking; it expands our capacities to think. “Thinking scientifically means we have to reach new approaches that provide powerful probabilities for the future, which are not available without teaching. To encourage people to learn science, The International Council of Associations for Science Education (ICASE) and the Australian Science instructor Association (ASTA) with the help of UNESCO, reached a definite conclusion on why pupils might lose interest, due to Learning science is quite difficult, for each successful and unsuccessful students and it’s not shocking that many students in concerning the students with special needs should proceed to study science subjects (Fensham 2008). Important to realize that, surveys such as that conducted by The European Commission discovered that education in science is always related to gaining information instead of grasp concepts and investigating them. They argue for inquiry-based education, as it has proven to be efficient in raising attainment throughout basic education, contributes to motivating both student and teacher for science. In other words, inquiry-based tactics can meet several of the fundamental challenges we have identified above. A main literature review and meta-analysis carried out for the New Zealand Government by (Hipkins et al. 2002). Gave more details on what is an inquiry-based method would possibly be, they show that “although the link between theory and evidence is not apparent for students, it is important.”

2.5 Teaching Students with Disabilities

Planning for pupils with SOD and/or disabilities should be part of the individual science teaching strategies for children with special needs. Referring to National Curriculum, QCA 2008 in (TDA 2009) “Schools have a responsibility to provide a broad and balanced Science curriculum for all pupils.” This is more than only giving students ‘access to the science curriculum’. The curriculum should be flexible, not immovable, like some buildings, to which students with SEN and/or disabilities have to gain access. It is there to be modified, where

necessary, to include all students (Geoff Whitty 2017). For science lessons to be inclusive, teachers need to predict what barriers to take part in and learn specific activities and lessons may pose for students with particular SOD and/or disabilities. Therefore, in teachers' planning, they need to consider ways to minimize those barriers so that all students can take part and learn (TDA 2009). In some activities, students with disabilities will be able to take part in the same way as their peers. In others, some modifications are better to be made to include everyone.

Furthermore, teaching for Autism Spectrum Disorder students in UAE has brought a challenge for the teachers to implement scientific concepts that suit the needs of students. Pupils with Autism show a series of unique problems that may create confusion for all the involved parties due to the fact of the conflict in the understanding of their attitude in comparison to regular students. Additionally, Norfishah Mat Rabi also states that children with special needs have problems of behavior, communication, and developing their language, which create problems for teachers in delivering teaching and learning for them, equally important to know that every SEN Child may have various characteristics. Therefore, teaching science for children with special needs teachers to be ready with a modified curriculum and adapting their teaching methodologies according to the progress of individual students (Hussin, Siraj 2019).

According to (Alanazi 2017), advanced techniques and strategies are essential to assist SOD students to gather knowledge, skills, and behavior change. In November 2006, the United Arab Emirates Federal Government passed the UAE Disability Act (Federal Law No. 29/2006 in Dukmak 2019) to protect the rights of people with disabilities. One of the basics of this new law is that people with special needs should have access to all new property improvement projects (Al Roumi, 2019 in Dukmak 2019). This law gives people with disabilities the right to live harmoniously and prohibits discrimination based on disability (Breen & Jonsson, 2019).

2.5.1. Special education and science instruction

For the special education need students, the responsibility of teachers become more complex when they are teaching science to those students. There are various research studies, which have generally discussed the role of instructions or the way of instructions used by the teachers and its effect on the performance of the students (Bidabadi, et al., 2019). But what about the students with special education needs who do not understand the concepts in the same way as other students can.

Other studies have highlighted the role of technology in the academic performance and level of understanding of students (Buchmann & Hannum, 2019). These studies reflect that this technology and online learning can also play an important role in influencing the learning behavior of especially disabled students in case of distance education programs. This huge writing on fulfillment from separation instruction has just centered on ordinary students. No examination has ever attempted to evaluate the prerequisites of Students of Determination (SOD) students for separation training programs. SOD students are students with learning challenges or students with handicaps. The students in this class think that it is hard to learn similarly as different students can (Chung & Li, 2020). They generally need extra and distinctive kind of help from their educator to cause the ideas to comprehend to them in contrast with other offspring of their age. These SOD students have somewhere deserted in this race of separation instruction and internet learning. It has gotten fundamental for instructive establishments to tailor their custom curriculum assets in the hour of the worldwide pandemic because there is no other answer to give assistance to the SOD students (Ferla, 2019). The alteration of new distant learning programs in this season of a worldwide pandemic can make the expectation to absorb information more extreme. Along these lines, it has become the greatest test for educators to manage students with special needs.

2.6. Factors affecting distance learning

There is a strong remarkable connection between e-learning which is represented here as an online teaching or distance learning and the academic performance of the students as well as their attendance in the class. Also, there has been shown a moderate and important association between the academic performance of the students and their learning habits. The research of (Chen & Lin 2002) shows that twelve factors can affect distance learning for students outcomes, Two of the top four driving factors are personal, therefore, they are crucial elements that affect the outcome of distance learning, hence, understanding a way to help students contend with those challenges they encountered in e-learning is very necessary.

The other two factors are considered environment factors; it was assumed that by going through with the growing prevalence of internet broadband and the development of interactive computing devices those two detrimental variables should be removed as they affect learning outcomes. These factors are having speed and stability on the internet, job impact, conscientiousness, technology for presentation of teacher lectures online, content material, the engagement between classmates, the quality of teaching, interaction between teachers and

students, teaching styles and techniques, self-esteem, domestic factors within the family, the cost of internet service.

2.6.1. Role of teachers in e-education embed with above and more focus on distance education

Essential preconditions of the executive activities of teachers are elucidated by highly professional standards. Technological measures of professional dealing paradigms of teachers are built on e-teaching and e-education. According to (Bjekić et al. 2014) Several standards are portrayed as the most common competence of teachers in the implementation of ICT, and various other standards are set out to be distinctive e-competencies for a unique system abstraction of e-education (e-teaching, e-learning, etc.). There are three facets of the teachers' ICT-proficiencies (a) The teacher's apprehension of what knowledge activities may be of use in the education of ICT awareness, (b) The required skills for the use of hardware and software (ICT readiness) are endured by the teachers, and (c) The educational-didactical components of ICT (ICT drill and practice) should be known by the teachers. The definition of the ICT integration in daily teaching and various learning practices is based on three elements pedagogy knowledge that is relevant to certain content; knowledge of how the application of technology alters the matter of subjects; and finally, to know how technology aids the goals of pedagogy.

The positions of the creator of e-teaching methods or the E-teaching/E-learning achievement users can be easily taken up by teachers. Activities of teachers in different outlines of e-teaching can be split into two massive endeavors: implementing the content for the students and backing up communication between teachers and students. Both endeavors create many issues for teachers who are more acclimated to the use of traditional teaching techniques. Consequently, organizations of various sorts of e-teaching and e-learning schemes should be done by e-teachers and modern teachers. Based on new requests in the proficient activities of teachers and the settings of e-teaching, the obscure arrangement of distinctive competencies and positions are competencies of the teachers' e-teaching.

Throughout this paper, the use of the word e-teacher is to portray the teachers in different school systems who use the application of ICT as a reliable teaching method according to the concepts of e-learning (Subramanian 2017). Salmon 2007 in Northcote 2008 highlights how vital e-moderation is in various learning conditions that ICT supports. Therefore, e-moderator is considered to be one of the most vital roles of teachers in e-teaching, particularly in the

comprehensive e-teaching. Denis et al. 2014 characterized several central and outlying roles of e-teachers as e-moderators/e-tutors in e-learning: avoid bullets”

- Basic roles: process facilitator, content facilitator, counselor, metacognition facilitator, technologist, assessor (summative and formative), resource provider.
- Outlying and secondary roles: planner, researcher, principal, administrator, co-learner.

2.7. E-support to inclusive education

The Declaration of Madrid demonstrates a policy of disability, which is written by the European Disability Forum for the year of people with disabilities. One of the main issues regarding human rights that are being currently focused on is a disability. The same human rights of all the citizens of Europe should be designated as equal to people with disabilities. Generally, in a lot of countries, the following subdivisions are included regarding people with special educational requirements: (1) people who have limited and special learning disabilities (2) people who are visually impaired (3) people who are hearing impaired (4) people with a more reluctant brain functioning (5) people who are autistic (6) people who face various difficulties, and (7) people who have disabilities regarding their language and speech.

What is the foundation of the e-environment that students with disabilities would have? The contrast is assembled between e-learning/e-teaching and assistive technology for students with disabilities as their parts of the e-environment (Bjekic et al. 2019). Assistive technology is also said to be rehabilitative technology, which is any device, equipment, or software that assists people with disabilities to work around their challenges and enhance their capabilities (Akkari, 2019). Assistive technology allows people with disabilities to perform different tasks or functions that could be more demanding or impossible to execute without any technical assistance and it also helps them reach their goals and attain their professional, intellectual, and social encompassing. A computer is the main component that is used in assistive technology for students with disabilities.

The idea of constructivism and socio-constructivism is based on the primary frame of various inclusive teaching types. At the same time, these ideas make up the foundation of the modern technologies of e-learning. Hence, combining e-learning and e-teaching as aided technologies is very useful in helping students with disabilities learn. As learning is an example of social activity and understanding is assembled socially, e-learning should be drawn out to encourage participation, giving a chance for all the students to engage in all activities and

subjects, embellishing collaborative learning, offering opportunities that are strong and effective (Kent 2015). In the present-day, e-education (the fundamental part of e-education is e-learning/e-teaching) is already highly extensive for students with disabilities (Kent, Ellis & Giles 2018). The most innovative content, solutions, and procedures of e-learning are present in this field.

A broad spectrum of tools for Web 2.0 is used to endure inclusion (ETTAD) - some are moderately “low tech” engineering solutions (primarily based on platforms of discussion), and new advanced platform technologies (deeply engaging technologies and combinations of games with tools such as blogs, podcasts, and social networking). The modern Web 2.0 technology (and other progressive technologies) implement e-learning based on high cognitive procedures and collaborative processes. It is perceived that e-learning is a system consisting of activities that fortify the knowledge domain for students. Several factors are emphasized such as the organization of learning activities and the advancement of scenarios (not the learning materials’ design), particularly in the education field regarding students with disabilities. Currently, the social aspect has been the central focus of the process of e-learning/e-teaching. Accordingly, new dimensions have been obtained regarding the conception of “distance” which is built on the development of technology and modern opportunities of interaction and communication (Bjekić et al. 2014). In this modern digital age, science is becoming a major component of about any human activity, and world need for higher education in the STEM domain is steadily growing. In a part, scientists show that science can be taught at a distance, learning at a distance will contribute to high-quality learning. Besides, there are many strategies and approaches to achieve this goal for this type of learning objective being accomplished. The methods and techniques, which we are going to mention here, are not for a specific branch of science but usually, they are generalizable to any other science subject (Jashan, 2019).

2.8. Previous research studies

Specialized curriculum instructors have to zero in on singular training projects to help the exceptional needs students. There ought to be individualized exercises and up close and personal discussions for making, all the ideas clear for such sort of students. Even though separation training has carried simplicity and knowledge of the innovation and has made admittance to instruction simple for the students, however, it has carried enormous test for the students with incapacities and the students with specialized curriculum needs (Kutluk &

M.Gulmez, 2020). In study hall, these students remain reliant on the educators for making their inquiries understood, yet in separation instruction programs it gets hard for them since they do not get the same learning climate as they get in the classroom.

If there should be an occurrence of exceptional needs students, instructors must profoundly zero in on paperwork and documentation for inventive exercises. The students additionally need to associate with their folks and guardians for the same sort of exercises. Therefore, they can rehash and again what they have realized in their homeroom. Nevertheless, in separation instruction, the educators need to receive new assets and innovation to encourage these students as per their degree of comprehension. Some particular assets can help the exceptional needs of students in the study hall. ClassDojo is an application for separation learning programs. This application associates educators, students, and family through recordings, sound, instant messages, and photographs. Through this application, uncommon needs students can gain from their educators within the sight of their relatives (Kmason, 2019). Educators can coordinate the guardians for the exercises that they can accomplish for the idea lucidity of their youngsters. Kahoot is a game-based learning application that can help somewhere far off instruction programs for unique needs students. This application helps in advancing fun-based exercises for the students. There is a choice in this application to order the fun intelligent exercises as indicated by the level and the subject. Educators can suggest an explicit game for students with various necessities. Along these lines, educators can think about the necessities of each understudy (Kim, et al., 2019). Padlet is an application that goes about as a computerized release board where instructors can share the data and the exercises. Each understudy can see the data on the board and can share their inquiries separately with the instructor to find the solution to their inquiry concerning that question.

There is a site named Flipgrid that create frameworks for the video conversation with the students. Each matrix in this site is as a message board where the students can offer their conversation starters and find solutions to their questions through individual video conversations with their educators (Jereb, et al., 2019). These video reactions can likewise be posted on the site for reference for different students. Book recordings are another alternative that can help the uncommon need students somewhere far off learning programs. The students can peruse these books freely and can note down their inquiries and can ask the educators while conversing (Jereb, et al., 2019).

Word expectation programming draws in the students to compose tasks given by the instructor in their own words on the theme educated by the educator in the online talk. This encourages educators to evaluate the degree of comprehension of the students for the point instructed by the instructor. The instructors to show the uncommon needs of students however, they have to pick the device as per the qualities of the students can utilize different apparatuses. The educators need to distinguish the trouble level of the understudy. There are different formal and casual assets for a custom curriculum. These assets uphold the students intellectually, inwardly, socially, and scholastically (Issa, et al., 2019). The instructor can utilize these assets to help the students by following some particular procedures. These methodologies comprise of passionate connection with the students, booking time altogether, making showing recordings, customary correspondence with guardians and gatekeepers, coordinated effort with colleagues, and leading appraisal tests routinely. Formal assets can all the more likely assist to serve the custom curriculum needs of the students (Breen & Jonsson, 2019). The different examination considers have featured the function of web-based learning on the scholarly presentation of the students. The investigations have investigated that innovation has assumed a fundamental function in improving the exhibition of the students through internet learning. These examinations mirror that this innovation and internet learning can likewise assume a significant part in influencing the learning conduct of extraordinarily debilitated students in the event of separation training programs (Chung & Li, 2020).

This colossal composition on satisfaction from detachment guidance has recently revolved around the standard students. No assessment has ever endeavored to assess the requirements of Students of Determination (SOD) for partition preparing programs. SOD students are students with learning difficulties or students with handicaps. The students in this class imagine that it is difficult to learn comparatively as various students can. They by and large need extra and unmistakable sort of help from their teacher to make the thoughts fathom to them interestingly with other posterity of their age (Bandura, 2019). These remarkable needs students have some spot abandoned in this race of detachment guidance and web learning. It has gotten central for informative foundations to tailor their custom educational plan resources in the hour of overall pandemic considering the way that there is no other response for offer help to the custom educational program students. The change of new far off learning programs in this period of an overall pandemic can make the desire to ingest data more outrageous. Thusly, it has become the best test for the instructors to deal with the custom educational plan needs of students (Akkari, 2019).

It is the commitment of special educational plan teachers to focus on particular preparing undertakings to help the special need students. There should be individualized activities and versus conversations for making all the thoughts clear for that group of students. Despite the way, that partition preparing has conveyed effortlessness and information on the advancement and has made induction to guidance basic for the students, yet it has conveyed tremendous test for the students with handicaps and the students with a custom educational program needs (Akande, 2019). In the study corridor, these students remain dependent on the educators, anyway in partition preparing programs it gets hard for them since they do not get the same learning atmosphere as they get in homeroom. In the case of unprecedented needs students, it is the obligation of teachers to significantly focus on paperwork and documentation for innovative activities (Atitumpong & Badir, 2019). The students in like manner need to connect with their people and parental figures for the same kind of activities so they can repeat again what they have acknowledged in their homeroom. Nevertheless, in partition guidance, the instructors need to get new resources and new advancement to prepare these students according to their level of perception.

The assessment study intends to examine the effect of using division learning on SEN students' achievement and results on different examples of SOD students in some American instructive program schools in the UAE. The conduction of this investigation study has noteworthy reasoning behind it as it clarifies and makes affirmation concerning the noteworthiness of the use of various particular aptitudes in the on-line preparing measure in blend in with the useful result they etch on the students' learning and satisfaction (Chung & Li, 2020). The examination researches the troubles looked by teachers, schools, and concentrated educational plan need students according to the perspective of instructors (Ugulu & S.Allen, 2020). It also reflects the wellspring of motivation for extraordinary necessities students while slanting through detachment guidance mode as demonstrated by the impression of instructors similarly as students. In the wake of establishing assessment of the connection of educators similarly as students, the examination has endeavored to perceive the new procedures of web learning for a specific educational program need students. Not simply this, the assessment has also investigated the effect of e-taking in an informational cycle from the impression of watchmen and teachers. The examination has endeavored to cover five extraordinary perspectives related to partition learning and the necessities of a custom educational program that need students. The theorists who have investigated the curriculum from the need of the students have covered various factors in the investigation. This investigation is different from the investigation of the

effect of learning on students in the classroom. The studies have explored that the teachers need to maintain coordination with the needs of the students and they also need to involve the parents and guardians of the students to make them practically understand the concepts (Sung & J.N.Choi, 2019). Therefore, the study has explored the number of ways that can be used to gain knowledge from the comfort of home through distance education programs. It is helpful for the researchers to explore the online learning tools that can help them to understand the concepts with more clarity. The study is also helpful for teachers to understand the requirements of the special education needs students of the middle school for science subject. The study further motivates the researchers to conduct studies for special needs students in other classes so that the level of understanding of the students of different grades can be investigated.

Chapter 3: Methodology

The preceding section revealed that limited distance education studies are available for SEN students. They explored the use of the media and various applications as educational teaching tools and their implementation in the UAE, and no studies refer to its impact on students' achievements. This study was conducted over a period of three months at a private school in Sharjah, where SEN teachers are trained to apply different activities in their science classes. The key focus of the research is on distance learning instructional features that are currently incorporated in science classes for SEN students. As well as the production of scientific abilities by students, which could influence their achievements in the exams. Several techniques and applications have also been used to address the challenge of assessing forms of scientific skills such as cognitive and collaborative skills as they are highly correlated. (Lai & Viering 2012).

3.1 Research Design

The present study presents a mixed-method approach of research to collect the required data that will completely answer all the research questions. Through the explanatory sequential approach, where data will be collected first from a quantitative method using teachers' questionnaire than through interviews with students and parents in the qualitative method. And because it is important to identify the sampling strategies and the approaches used to establish the validity of the data, purposeful sampling will be used for data collection, therefore the selected individuals should be deeply experienced the central phenomena which are in this research the distance learning.

The instruments involved in the qualitative approach are interviews with the parents of the SEN students as well as interviews with their teachers, while in the quantitative the questionnaire was conducted to the science teachers. The use of both instruments in the research was needed to get a comprehensive insight into the topic of discussion and according to (Jonker & Pennink 2010) it is called "multi-method approach" where this triangulation provides proper and concurrent use of those studying design can also give useful insight, the further scope for the creation of theories, an increased understanding of current theoretical ideas and an immediate and tangible gain. Creswell 2009 defined this design as "an approach to inquiry that combines or associates both qualitative and quantitative forms".

Therefore, in the research paradigms, the reasoning behind the introduction of a mixed-method design signifies current effectiveness that can efficiently transcend the constraints of each solitary system to achieve full benefits by comprehension and cooperation from both quantitative and qualitative benefits for greater sheer magnitude (Johnson, Onwuegbuzie & Turner 2007). This research involves many methods to gather sufficient data to better solve the research issue and to correctly interpret its whole features (Creswell 2013; Fraenkel & Wallen 2012). Besides, it is suggested to incorporate several data collection steps to completely address the study questions (Creswell 2008). Therefore, it is useful to obtain quantitative and qualitative data to assess the attitudes of teachers and the abilities of students. The collection of data in the quantitative and qualitative cases took place through sequential strategy in order to decide whether there is some overlap or integration when the two datasets are tested and interpreted, via a simultaneously interconnected technique with mixed methods (Creswell 2009). Such integration is needed when applying the “sequential triangulation approach” for reasons of credibility, clarification, or analysis (Steckler et al. 1992). However, more recently, this design is called a “sequential exploratory strategy” (Creswell 2014) which is carried out to evaluate various viewpoints derived from both quantitative and qualitative results. The sequential explanatory approach is a common mixed strategy for the design of methods that also cater to researchers with powerful quantitative inclinations. It is defined by quantitative gathering and interpretation of data in the first phase of research, followed by the compilation and evaluation of the qualitative data in phase two, which builds upon the outcomes of the initial quantitative findings (Creswell 2008).

At phase number one, by the end of the three months of teaching science online to SOD students due to the COVID-19 pandemic, quantitative data obtained from the perception of science teachers who teach the special educational needs students, in order to answer the first question in the study: i.e. 'What kind of challenges faced the science teachers and SOD students from teachers' perceptions?

As well as the second question will be answered by teachers: 'What is the SOD students' motivation to interact through this distance learning from their perception and science teachers' perception?

Last question: What are the science teachers' perceptions regarding SOD students' responses to this new distance learning approach?

This stage is followed by qualitative data collection that took place in phase number two through interviews with some students and their parents to fulfill the fourth question and to answer the third question in the study: 'What are the SOD students' perceptions regarding the new approach of online teaching?' Also the fifth question: 'What is the effect of e-learning on students and the educational process from the perceptions of parents?' Worth mentioning, that the quantitative data collected first and then, the questions of the interview were prepared according to the results obtained from the initial quantitative part.

As the primary data that directs the analysis, quantitative statistics are considered. The qualitative data, therefore, complements the processes as needed (Creswell 2009). As a prevailing factor in addressing the anticipated results, weight is therefore given to the quantitative data while the qualitative data is enclosed data, mixing happens when the initial quantitative findings notify the secondary compilation of qualitative data. The two types of data are therefore independent but related to investigating the effect of science distance learning instructions on SEN students during the first period of the pandemic. The combination of data from different sources allows the researcher to have insights that can provide an acceptable reliability assessment of the research study (Johnson & Christensen 2012).

The following diagram illustrates the sequential explanatory design of the study.

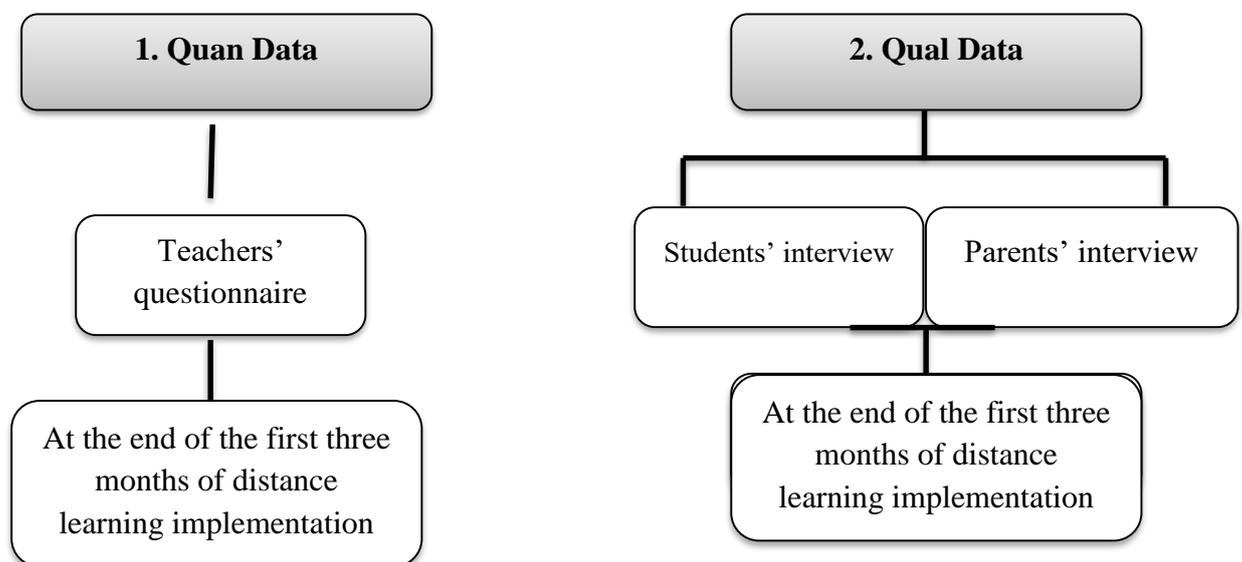


Figure 1: The sequential explanatory design of the study

Qualitative research	Quantitative research
Qualitative research aims at detailed and described kinds of research.	Quantitative research aims are to quantify, count them, using statistical models to explain them.
In qualitative research, sometimes the researcher may sometime lack in what they are looking for.	In quantitative research, the researcher aims at understanding what they are looking for and what the research goals are.
When the research project is done on the primary or initial level, Qualitative research is recommended by the experts.	When the expert intends to focus on the deeper analysis or has a scope on the regional or national level, qualitative research is recommended.
In qualitative research, qualitative data is collected by the researchers.	In quantitative research, quantitative data is collected by the researchers.
Sometimes, qualitative data may be in the form of words, pictures, and also the objects.	Sometimes, quantitative data is in the form of numbers or statistics.
Qualitative data attracts high shortcomings or errors.	Quantitative data attracts a few shortcoming or errors.

Table 1: Quan versus Qual

Qualitative data generally depends upon undertaking the unstructured and non-structured data. The main intention behind conducting qualitative research is to understand the relationship between dependent and independent variables. On the other hand, quantitative data can be used to qualify the problem in the data, which can be further analyzed in the form of stats or numerical numbers. Qualitative information is generally based on the quantity that is obtained through a quantifiable measurement process. Quantitative data is information about the qualitative while is generally descriptive and regards a phenomenon that can only be measured.

Qualitative data is an accurate research method that helps to provide a deeper look at analyzing the ranks and also counts on recording the feeling, attitude, and behavior. Additionally, it was also understood that qualitative data is an accurate one as it encourages people to expand on their responses, which can help to explore the areas, which were not initially considered. Qualitative research helps in understanding things in a natural setting, attempts to make sense of or interpret in terms of meeting people. It is studied that there is an integral part of the data without the active participation of the researcher, there is no exact data that exists. Generally, the design of the qualitative data is no single reality; the study is subjective and exists only in

the observer's reference. The author states that an excellent example of qualitative research is trying to collect data from unstructured data/interviews that is generated through open questions. Undertaking the qualitative research method in this way can help to develop a deeper understanding of the topic and also develop a real sense of the person's understanding of the situation.

A phenomenological approach is one of the research approaches that is adopted when research questions need good understanding and awareness about human natures, experiences, and behavior in certain situations. This approach is a study of the nature and meaning of things that can give an understanding of various fundamentals of human nature or behavior. The phenomenological approach is mostly focused on the facts, concepts, events, and human experience, which could lead to a change in life. The Phenomenological methods are very helpful in revealing certain aspects of view or thoughts of participants and examine the possible feeling of participants in the survey or study.

This approach has been selected in this research to understand how different aspects of employee engagement, motivation in increasing the productivity and efficiency of employees in an organization. This approach will help in answering in a suitable way to primary and secondary research questions.

3.2 Sources of data:

A cross-sectional research design was adopted for this study. A simple purposive sampling was used to choose participants for the study as the primary resource data/information desired to address the research questions.

For the questionnaire, a hundred teachers who teach science to students with learning difficulties were chosen as a source of data, while in the interviews, the parents of the SEN students were the participants.

3.3 Deductive approach

The deductive research approach allows creating hypotheses using different theories. Under this approach, various data and information for proving the hypothesis i.e. whether to accept or reject the hypothesis.

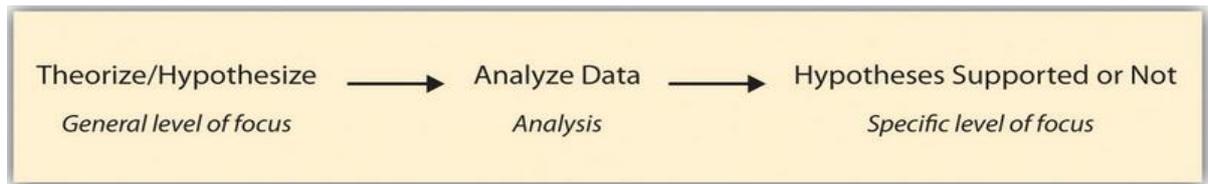


Figure 2 Deductive Approach

There are various steps in deductive that are used for theory development and observation through data, information. The above picture shows the steps in the deductive research method. This method is mainly based on creating a hypothesis based on existing theories. There are few advantages of the deductive research approach as it offers,

- It explains the relationship between concepts and variable
- It helps in the measurement of concepts.
- It generalizes the results of research to a certain extent.

3.4 Instrumentation

3.4.1 Science Teachers Questionnaire

Data collection is key to any research as it provides key information and data from the research and finds meaningful outcomes from the research. It is very important to have an accurate and effective data collection method that could help to gather relevant information and data for the research. In the research, a quantitative data collection approach has been adopted. The data collection method will be the use of a questionnaire. Below are a few questions: What are the other challenges related to online learning? How do you motivate and engage your special needs students in an online environment? What e-learning tools, platforms, or apps have u used?.

The researcher used the Likert scale as a major component of the questionnaire in determining the responses of the respondents. Likert scale statements will strongly disagree (1), disagree (2), undecided (3), agree (4), and strongly agree (5). Additionally, twenty questions were self-constructed by me as a researcher, which comprises four questions (4) for each construct.

A secondary data collection method was used to conduct the literature review for this study. Furthermore, the utilization of secondary data collection methods would enable me as a researcher to develop a better understanding of the concepts associated with the study. For secondary data collection, I relied on journal articles, books, conference papers, and online articles.

3.4.2 Interviews

The second method for primary data collection is semi-structured interviews. These interviews took place and were conducted with parents and students. Through the interviews, I was aiming to understand the feedback as well as the mindset of the parents and students on the effect of using distance learning on SOD student's achievements and outcomes in academic performance. I was planning to conduct at least 5-10 interviews with the parents and SEN students in some American curriculum schools in UAE. Below are the interview questions for the research:

- How did you find the online teaching experience?
- What was better for your child, the school physical environment, or distance learning?
- Is it easy for SEN students to use the internet?
- Does this experience improve your child's skills?
- Was it effective?
- How did your child respond and what was motivating him?
- How do you evaluate this experience?

3.5 Sampling

In research, Sampling plays a key role in targeting and analyzing the outcome of data. It is not an easy task and becomes nearly impossible to study the whole population for the research. Sampling gives a tool through which a sample of data is collected from the population for the research and study purpose. The population is an entire population and a sample is a group of people from which data is collected.

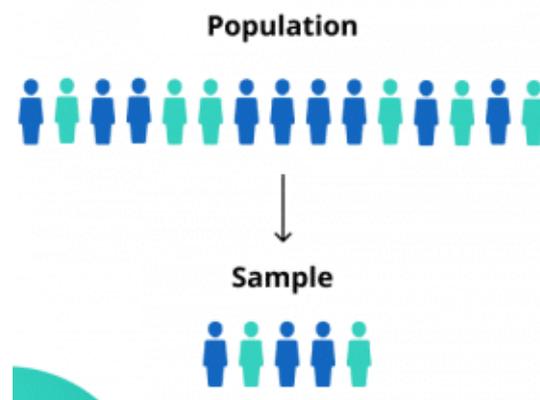


Figure 3 Sampling

Purposive sampling was used in the study. It is a selective sampling method in which own judgment plays a key role in choosing the sample or participant of the sample data. A total of

100 respondents coming from science teachers who teach SEN students in some UAE schools were selected. This is a very helpful technique when we want to reach the target participant very quickly.

3.5 Ethical Considerations

Punch (2005) points to the benefit of predicting any ethical dilemmas that might occur in the research to be completely approached in advance. Creswell (2009, p. 87) describes five ethical standards that are based on the Psychologists' Ethical Theory and Code of Conduct, namely Informed consent, Fidelity and liability, honesty, fairness and respect for the freedom and dignity of citizens. Correspondingly, it takes into account all conceivable legal permissions. The scope of the research and its positives were explained in details with the administrations of the schools to get the consent. The process of collecting data was explained and accepted. The study participants, who were assured of their confidentiality and anonymity, thus signed the informed research consent form.

Chapter 4: Data analysis

Upon the retrieval of the questionnaires, the frequency country to determine how many responses are collected from every question item. The mean was determined and percentages were assigned. The results of the findings are presented in graphical images for clearer presentation and display of results. There few methods for this type of analysis which represents as follows,

- Narrative analysis
- Grounded approach
- Phenomenological data analysis
- Inferential analysis

The grounded theory method involves a causal explanation of a single event or variable from an examination of one or more classes. In this case, are examined and explanations are altered until an explanation is found which fits all cases. Narrative analysis is used to analyze the data which is collected through various sources such as surveys, interviews, etc. It involved reframing the stories given by people based on their experiences.

Data Analysis and Results

The Data analysis and results are a major part of any research which provides a base and key finding of the whole research paper. It is very important to understand the results of the study for a meaningful conclusion. In this study, we have analyzed the survey questions, which were asked to the teachers in some UAE American curriculum schools about the online teaching experiences and their opinion about distance learning, especially for the SOD students. The Descriptive analysis and frequency analysis has been used to analyze the key findings of the results

Descriptive statistics: The below table shows the descriptive analysis of the data collected. The shows the mean and standard deviation of the collected data. The mean response for teachers who were teaching SOD students were 1.594.

	N	Mean	Std. Deviation
SEN Teaching Courses	101	1.594	0.4935
D.L.A.1	101	3.188	1.1288
D.L.A.2	101	3.653	0.9637
D.L.A.3	101	4.594	0.8022
D.L.A.4	101	4.089	0.9391
D.L.A.5	101	4.376	0.7328
D.L.A.6	101	3.713	1.0425
D.L.A.7	101	4.327	0.9067
D.L.A.8	101	3.594	1.1591
D.L.A.9	101	3.901	0.6856
D.L.A.10	101	2.871	1.0832
D.L.A.11	101	3.069	0.9084
D.L.A.12	101	2.96	0.9687
D.L.A.13	101	3.584	1.1425
D.L.A.14	101	3.416	1.0224
C& amp; M 15	101	1.990	0.8185
S.R 21	101	1.614	0.4893
T.C 22	101	2.554	1.3818
T.C23	101	2.059	1.0181

As per the above responses, we found that 40.6% of the teachers were teaching SEN courses to the students. 59.4% of the teachers were not teaching any SEN courses at their schools.

SEN Teaching courses

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	41	40.6	40.6	40.6
	60	59.4	59.4	100
Total	101	100	100	

D.L.A.1- Save time and efforts of both teachers and students

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.0	7	6.9	6.9	6.9
	2.0	24	23.8	23.8	30.7
	3.0	24	23.8	23.8	54.5
	4.0	35	34.7	34.7	89.1
	5.0	11	10.9	10.9	100.0
	Total	101	100.0	100.0	

As per the survey results, we can see that 6.9% of teachers disagree that online teaching help in time-saving and efforts of teachers and students together. Almost 45.6% of the teachers believe that online teaching saved time and effort for the students as well as teachers. 23.8% thinks that it is not making any difference to the current teaching process.

D.L.A.2- Provides rich resources

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	2	2	2.0	2.0
	2	11	10.9	10.9	12.9
	3	25	24.8	24.8	37.6
	4	45	44.6	44.6	82.2
	5	18	17.8	17.8	100.0
	Total	101	100	100	

The table shows that only 2% disagreed that online teaching does not provide rich resources. 25% of teachers were neutral on this question and they believe that there is no effect on either side. 44.6% and 17.8% strongly agreed that online teaching has some rich resources which help students to learn more in the academic.

D.L.A.3- Needs well-prepared online materials

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1	3	3.0	3.0	3.0
3	2	2.0	2.0	5.0
4	25	24.8	24.8	29.7
5	71	70.3	70.3	100.0
Total	101	100	100	0.0

Online teaching requires well-prepared material for the teachers so that it can help them to teach students. 3% of teachers believe that they do not need any well prepared online material for teaching while 95.1% of teachers believed and strongly agreed that they do need prepared online material for teaching students. It helps them to deliver well- organized teaching experience to the students.

D.L.A.4- Needs more training courses for implementation

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1	3	3.0	3.0	3.0
2	3	3.0	3.0	5.9
3	13	12.9	12.9	18.8
4	45	44.6	44.6	63.4
5	37	36.6	36.6	100.0
Total	101	100	100	

Online teaching requires more training courses for implementing it successfully. Only 6% disagreed that any more or additional training is required for implementing the online teaching. 12.9% of teachers were neutral and 44.6% of teachers agreed that there is a need for more training courses for implementation. 36.6% of teachers agreed that there is a requirement for more training courses to implement online teaching for the students.

D.L.A.5- Needs awareness of e-learning

	Frequency	Percent	Valid Percent	Cumulative Percent
1	2	2.0	2.0	2.0
3	3	3.0	3.0	5.0
4	49	48.5	48.5	53.5
5	47	46.5	46.5	100.0
Total	101	100.0	100.0	0

E-learning is not common and trendy among people. Few people or students are aware of the E-learning system and maybe they are not comfortable with the E-learning things. It might require a lot of awareness creation among parents and students. 48.5% agreed and 48.5% agreed that E-learning needs more awareness among students and parents so that it can give more benefits to students. 3% of a teacher were neutral and only 2% believed that it does not require any kind of awareness among parents or students.

D.L.A.6- Improve your teaching skills

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1	2	2.0	2.0	2.0
2	12	11.9	11.9	13.9
3	25	24.8	24.8	38.6
4	36	35.6	35.6	74.3
5	26	25.7	25.7	100.0
Total	101	100	100	

The results show that 13.9% of teachers disagreed that online teaching improves their teaching skills. 24.8% of teachers were neutral about the question asked to them and 35.6% of teachers believed that online teaching improves the teaching skill of the teachers while 25.7% agreed with the statement that online teaching improves the teaching skills.

D.L.A.7- Different teaching strategies are required

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1	4	4.0	4.0	4.0
2	1	1.0	1.0	5.0
3	3	3.0	3.0	7.9
4	43	42.6	42.6	50.5
5	50	49.5	49.5	100.0
Total	101	100	100	

As per the data. We see that only 5% disagreed that online teaching requires different teaching strategies while 3% were neutral. Almost 42.6% and 49.5% of teachers agreed that they require different teaching strategies to teach the student through online platforms.

D.L.A.8 Reduces costs of teaching and learning

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1	8	7.9	7.9	7.9
2	9	8.9	8.9	16.8
3	21	20.8	20.8	37.6
4	41	40.6	40.6	78.2
5	22	21.8	21.8	100.0
Total	101	100	100	

Online teaching is somewhat cost-effective and it requires less infrastructure as compared to the traditional teaching methods. As per the survey, we see that 7.9% disagreed that online teaching reduces the cost of teaching & learning while 8.9% disagreed with the statement. As per them, it increases the cost of teaching and learning. On the other hand, 62.4% of teachers believe online teaching help in reducing the cost of teaching & learning overall.

D.L.A.9- Implementation should be gradual

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1	0	0.0	0.0	0.0
2	2	2.0	2.0	2.0
3	23	22.8	22.8	24.8
4	59	58.4	58.4	83.2
5	17	16.8	16.8	100.0
Total	101	100	100	

As per data, 2% of teachers believe that the implementation of online teaching should not be gradual while 22.8% of teachers were neutral. 58.4% of teachers believed and agreed that implementation should be gradual. 16.8% of teachers agreed with the statement that implementation should be gradual.

D.L.A.10- Easy to monitor teaching and learning process

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1	4	4.0	4.0	4.0
2	44	43.6	43.6	47.5
3	24	23.8	23.8	71.3
4	19	18.8	18.8	90.1
5	10	9.9	9.9	100.0
Total	101	100	100	

Almost 43.6% disagreed that online teaching will not be easy to monitor the teaching and learning process. According to them, it is difficult to monitor online teaching. 23% of a teacher were neutral and did not give any opinion about the question. 18.8% of teachers agreed that online teaching would be easier to monitor the teaching and learning process of students. Only 9.9% of teachers strongly agreed that it would be easy to monitor the learning and teaching of students.

D.L.A.14- Distance learning is a successful experience

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1	6	5.9	5.9	5.9
2	9	8.9	8.9	14.9
3	36	35.6	35.6	50.5
4	37	36.6	36.6	87.1
5	13	12.9	12.9	100.0
Total	101	100	100	

As per the survey data, we found that almost 5.9% disagreed and 8.9% of teachers disagreed with the statement that distance learning is a successful experience while 45.6 were neutral about the opinion. Almost 36.6% of teachers believed that distance learning is a successful experience while 12.9% of teachers agreed with the statement that distance learning is a

successful experience. This shows that almost 49% of teachers believe it is a successful experience.

Challenges and Motivations 15

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1	34	33.7	33.7	33.7
2	34	33.7	33.7	67.3
3	33	32.7	32.7	100.0
Total	101	100.0	100.0	

The results are equally divided among the participants. 33.7% of teachers believe that learner's issues is a challenge which is related to the online learning while other 33.7% believe that instructor issue like the transition from face-to-face to online, managing time, and finding appropriate teaching styles is another challenge to the online teaching. Rest 32.7% of teachers believe that Content issues are a challenge to online teaching.

S.R.19- I can understand what type of learner my student is in an online course.

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1	82	82.0	82.0	82.0
2	18	18.0	18.0	100.0
Total	100	100.0	100.0	

The results show that 82% of teachers understand the types of the learning style of students in online courses while the other 18% of teachers are not able to identify the style of their students.

S.R.20- How do you get the students' feedback?

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1	14	13.9	13.9	13.9
2	10	10.0	10.0	23.9
3	45	45.0	45.0	68.9
4	24	24.0	24.0	92.9
5	8	8.0	8.0	100.9
Total	101	100	100	

The teacher provides feedback to their students in online courses and 13.9 of teachers use polls to give feedback while 10% of teacher uses surveys to provide feedback. 45% of teachers uses classroom participation to provide feedback while 24% of teachers uses a quiz to give feedback. Only 8% uses other methods to provide feedback to students.

S.R 21- Are students with emotional and behavioural disorders do as well socially in online environments?

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1	39	38.6	38.6	38.6
2	62	61.4	61.4	100.0
Total	101	100.0	100.0	

As per results, 38.6% of teachers believe that emotional and behavioral disorders do well socially in an online environment as compare to the classroom environment. 61.4% believed that students with emotional and behavioral disorders are not changed based on a change in a teaching environment.

T.C 22- Attitude to internet use

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1	40	39.6	39.6	39.6
2	4	4.0	4.0	43.6
3	22	22.0	22.0	65.6
4	31	31.0	31.0	96.6
5	4	4.0	4.0	100.6
Total	101	100	100	

We have also asked a question to the teacher about their attitude to using the internet. 39.6% believe that using the internet for learning is a very good idea while only 4% believe that it is a bad idea. 22% of people pinioned that it would be desirable to use the internet for learning.31% of a teacher like the idea of using the internet for learning and 4% dislike the idea of using the internet.

T.C 23 - Behavioural intention

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1	35	34.7	34.7	34.7
2	39	38.6	38.6	73.3
3	13	12.9	12.9	86.1
4	14	13.9	13.9	100.0
Total	101	100	100	

A question was asked about the intention of using the internet to the teachers. 34.7% of a teacher said that the intent to use intent whenever it is possible for them while 38.6% of teacher intent to use the internet in future learning. 12.9% will instantly adopt the internet for learning while 13.9% will adopt the internet in the future for learning.

Interviews

There was six-question in an interview which was asked to the parent and students about the online teaching courses. Below is the analysis of interview responses from the parent and students.

How did you find the online teaching experience?

The parents believed that online teaching experiences is good for their children and it provides different learning experience as compared to the traditional teaching methods. It provides a lot of exposure to a student in terms of teaching and technology. There might be the case that student is not much talkative in a classroom but in an online class, they could answer the question or quiz. As per parents, students do like online teaching courses and the whole process. It becomes for them to sit at home and study their subjects. Overall, all parents believe that online teaching is a good experience till there is an interactive session otherwise it won't add much value to the students learning process through the online teaching process.

What was better for your child, the school physical environment, or distance learning?

Parents believed that there are certain advantages and disadvantages of distance learning. Parents believed that the school physical environment is better for their child as compared to distance learning. School environments provide a different set of learning environments as compare to distance learning. The school environment will provide children to interact with each other, they can play, share their ideas m thoughts, and grow with group learning while distance learning does not provide such a learning environment. These are the key reasons for considering the school's physical environment is better for a child.

Was it easy for them to use the internet?

No, it was very difficult for the child to use the internet for online learning. They need proper guidance and assistance to understand the whole process and it became difficult for the parent as well to focus on these requirements for their child in online learning. SOD students have some disability or difficulties in the learning process so it is not simple for them to use the internet for learning but they still find dome of interesting to learn new things via a different mode of teaching.

Does this experience improve your child's skills?

Parents believed that to a certain extent online class has improved the skills of their child, as they now know about the different technology, teaching methods, how to use the internet, mobile learning devices. Classroom teaching is different as compared to distance learning and distance learning has some advantages that had help children to develop a few more skills, which they could not learn in the classroom teachings at schools. Distance learning has added skills such as Internet use, smart device use, understanding of how to operate, increase in confidence, speaking ability with class, etc. Online learning has an impact on the student's ability to learn and make some changes in their behaviour while in the classroom child might be shy or not getting involved in activities.

Was online teaching is effective?

The parents believed that online teaching has a different experience and their kids enjoyed learning through the online mode. The online teaching was effective, as it has given lots of skills and learning to the students. In some cases, it is very convenient for the child to sit at home and study, learn about different subjects. Online teaching is very effective if a child is having some disability to go to schools. It makes the life of a child and parent little but easier. Parents had appreciated the new teaching method especially for the SOD students in the USE schools. It is not effective in the case of extracurricular activities which can only be done in a school environment but some online sessions of these activities can help SOD students to learn much more and in better ways. Technology is changing and there should be more need to be done to bring more interactive sessions to SOD students through online teachings.

How did your child respond and what was motivating him?

It was difficult for them initially to adapt to online teaching. Classroom teaching was something better for them. The video learning, listening to class sessions, and interaction with other students, teachers were fascinating and motivating them in the online teaching sessions. As per the parent, most of the child has responded in a good way and they liked the online session as it was more convenient and they can interact with people without any hesitations due to their disability issues. They started using mobile devices, new applications for online teaching which motivating factors were for them. Online teaching has made the life of SOD students easier and convenience is another factor, which can contribute to the motivation of a child in terms

of online teaching. As per the survey response, we found that almost 45.6% of the teachers believe that online teaching saved time and effort for the students as well as teachers. This means online teaching makes life much easier for SOD students. In addition, 36.6% of teachers believed that online teaching or learning gives a better experience to SOD students.

Chapter 5. Discussion and Conclusion

The focus of this study is to understand the impact of online teaching and learning of SEN students due to COVID19 pandemic situation, which bring new opportunity for the Education industry to explore the new platform for the teaching purpose in the UAE schools. While measuring, the impact of distance education on the students, it is essential to explore the characteristics of the learners.

5.1 Discussion

SEN Students are Students with learning troubles or understudies with inabilities. The understudies under this classification think that it is hard to learn similarly as different Students can. They generally need extra and distinctive kind of help from their educator to cause the ideas to comprehend to them in contrast with different offspring of their age. These unique requirements understudies have somewhere abandoned in this race of distance schooling and internet learning. It has gotten fundamental for instructive organizations to tailor their specialized curriculum assets in the hour of the worldwide pandemic because there is no other answer to assist the specialized curriculum understudies. The change of new distant learning programs in this season of a worldwide pandemic can make the expectation to absorb information extremely. In this way, it has become the greatest test for the instructors to manage custom curriculum needs understudies.

Specialized curriculum instructors should zero in on individual schooling projects to help the unique need for understudies. There should be individualized exercises and up close and personal discussions for making all, the ideas clear for such sort of understudies. Although distance training has carried straightforwardness and knowledge of the innovation and has made admittance to schooling simple for the Students, it has brought a major test for the Students with inabilities and the Students with custom curriculum needs. In the homeroom, these Students remain reliant on the educators for making their inquiries understood; however, in distance schooling programs it gets hard for them since they do not get the same learning climate as they get in the study hall. The results of the survey shown that only 40.6% of teachers in the UAE are teaching SOD students. This shows that the best teachers are not participating in teaching Sen Students in UAE or maybe their schools do not have such facility to provide education to SOD students. Online teaching has certain advantages as well as disadvantages.

Results show that more than 45% of Online teaching saves time and effort on teachers in teaching SOD students as there would not need for classroom sessions, no papers, or other school facilities. It would also save the efforts of teachers in online learnings while 30.7% of teachers believe that online teaching would not save time and efforts while teaching SOD student rather it will increase the time as well as efforts to make students understand different concepts, learning skills. It would be easier in classroom teaching. 25% of teachers were neutral on a question that online teaching provides rich resources and they believe that there is no effect on either side. 44.6% and 17.8% strongly agreed that online teaching has some rich resources which help students to learn more in the academic.

Online teaching or learning is not an easy task and it requires huge as well as well-prepared material for teaching students online. If there is no pre-planning then the session would not be effective and students would not be able to understand the sessions. In survey results, almost 95% of teachers believed that they would need well-prepared teaching material to conduct online sessions for SOD students. It helps them to deliver well-organized teaching experience to the students. Online teaching is not easy and it requires a lot of resources for implementation. As per results, 12.9% of teachers were neutral and 44.6% of teachers agreed that there is a need for more training courses for implementation. 36.6% of teachers agreed that there is a requirement for more training courses to implement online teaching for the students.

Online learning is not common among schools and parents. It requires awareness among parents and the benefits of an online session should be explained to parents. In the case of special needs students, it is the responsibility of teachers to highly focus on paperwork and documentation for creative activities. The students also need to connect with their parents and caregivers for the same kind of activities so that they can repeat again and again what they have learned in their classroom. But in distance education, the teachers need to adopt new resources and new technology to teach these students according to their level of understanding. Some specific resources can help the special needs students in the classroom.

On account of special needs students, it is the duty of instructors to exceptionally focus on administrative work and documentation for innovative exercises. The students likewise need to associate with their folks and parental figures for similar sorts of exercises so they can rehash and again what they have realized in their classroom. Yet, in distance training, the educators need to receive new assets and innovation to instruct these students as per their degree of

comprehension. Some particular assets can help exceptional necessities students in the study hall.

E-learning is not normal and stylish among individuals. Few individuals or students know about the E-learning framework and might be they are not happy with the E-learning things. It may require a part of mindfulness creation among the guardians and students. 48.5% of teachers agreed and 48.5% of teachers completely concurred that E-learning needs more mindfulness among parents and students so it can give more advantages to students. 3% of the instructor were unbiased and just 2% accepted that it doesn't require any sort of mindfulness among guardians or understudies. We can conclude that

The guardians accepted that online-based instructing teaching is useful for their kids and it gives diverse learning experiences in contrast with the conventional educating techniques, and here is one of the parents' responses on the distance learning, "This is great initiative by the teachers to provide education on zoom app. The voice is coming clear on zoom app and he is also understanding your Science subject taught. He did all his science homework that u had given. He is very excited in the science class. He is very happy when the teacher questions him while teaching and he gives answer. I am satisfied from teachers who give online classes . Every teacher give his good effort.Thank you for supporting our children". The distance learning gives a part of an introduction to students as far as instructing and innovation. There may be a case that students are not a lot chatty in homeroom yet in online class they could respond to the quiz or test. According to guardians, understudies do like the internet showing courses and the entire cycle. It becomes for them to sit at home and study their subjects. Generally, all guardians accept that online teaching is an acceptable experience until there is a learning process else it will not enhance the understudies learning measure through the web-based educating measure.

5.2 Conclusion

Online teaching or distance learning is not easy to adopt in every situation and especially in the case of SOD students who need some special treatment at home as well as at school. The results of the study show that there are many benefits of distance learning to teachers as well as SEN students. The major benefits are that it saves time and effort on part of teachers, less infrastructure is needed for teaching to SOD students. As per the results, we can conclude that distance or online learning requires well-prepared teaching material for teachers. This will help

them to give a good teaching experience to teach SOD students in UAE schools. The study also concludes that parent of SEN students agreed that online teaching experiences is good for their children and it provides different learning experience as compared to the traditional teaching methods. It provides a lot of exposure to a student in terms of teaching and technology. This experience would be good for SOD students. I would recommend that more online teaching or distance learning programs should be conducted in UAE schools for SOD students as well as for other students. This would create a different learning environment and encourages students to do learning on their own. Students would be able to inculcate self-learning habits, which is the best way of learning.

5.3 Recommendations and limitations

For the distance learning to go smoothly and effectively with SOD students in the science subject, there are some issues schools must put in consideration according to UNESCO (2019) such as, assess preparation and select the resources that are most applicable, decide on the use of high-tech and low-tech approaches centered on the efficiency of students and teachers' existing power supplies, Internet access, and digital skills. This could vary from interactive digital learning channels, video lectures, MOOCs, to radio and TV broadcasting.

Ensuring that distance learning programmes are included, Integrate steps to ensure access to distance learning programmes for learners, particularly those with disabilities as well as support parents and teachers in using the digital technologies by providing training or orientation sessions for teachers and parents as well, blend appropriate approaches and limit the number of applications and platforms.

In addition, the distance learning rules should be developed and monitor the students' learning process, and last but not least, one of the very vital recommendations is to Create communities of teachers, parents and school managers to address sense of loneliness or helplessness, facilitate sharing of experience and discussion on coping strategies when facing learning difficulties.

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Appendices

Appendix 1: Parents' consent



To whom it may concern (teacher / **parent**)

I am conducting this research study in the specialization of Science Education from the British University in Dubai. The topic of my research is **“Investigating Science Online Instructions in COVID-19 and their impact on SEN students in American curriculum schools in UAE”**. The study will focus on distance science education process and its effect on the students with special educational needs during the period of the lock down from the perception of the science teachers and SEN teachers as well as the parents of the SEN students.

As I receive your permission, I will give you “as a teacher” the link to my questionnaire, or I will meet you “as a parent” in an interview under school supervision.

The information collected from teachers and parents will be confidential and will be used only for this research. If you want to stop your contribution in this research at any point or you have any inquiry about this research, please contact the undersigned.

Thank you for your cooperation in this academic endeavor.

Best Regards,

Heba El-Gazzar

0502143698

heba00393@email.com

September 2020

Participant's signature,

Appendix 2: Teachers' consent



To whom it may concern (teacher / parent)

I am conducting this research study in the specialization of Science Education from the British University in Dubai. The topic of my research is “**Investigating Science Online Instructions in COVID-19 and their impact on SEN students in American curriculum schools in UAE**”. The study will focus on distance science education process and its effect on the students with special educational needs during the period of the lock down from the perception of the science teachers and SEN teachers as well as the parents of the SEN students.

As I receive your permission, I will give you “as a teacher” the link to my questionnaire, or I will meet you “as a parent” in an interview under school supervision.

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Thank you for your cooperation in this academic endeavor.

Best Regards,

Heba El-Gazzar

0502143698

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September 2020

Participant's signature,

Appendix 3: Questionnaire for science teachers who teach SEN students

Teaching through the pandemic

Due to the pandemic of the COVID-19 all the teachers all over the world had to go through the experience of teaching online or in other words, distance learning.

Part (1) Basics

From your experience as a teacher during the pandemic, how do you evaluate the distance-learning experience so far?

Please circle the relevant number for each question where your degree of acceptance is: 1- Totally disagree 2- Disagree 3- neutral 4- Agree 5- Totally agree

I found the online teaching:

- | | | | | | |
|---|---|---|---|---|---|
| 1- Save time and efforts of both teachers and students | 1 | 2 | 3 | 4 | 5 |
| 2- Provides rich resources | 1 | 2 | 3 | 4 | 5 |
| 3- Needs well-prepared online materials | 1 | 2 | 3 | 4 | 5 |
| 4- Needs more training courses for implementation | 1 | 2 | 3 | 4 | 5 |
| 5- Needs awareness of e-learning | 1 | 2 | 3 | 4 | 5 |
| 6- Improve your teaching skills | 1 | 2 | 3 | 4 | 5 |
| 7- Different teaching strategies are required | 1 | 2 | 3 | 4 | 5 |
| 8- Reduces costs of teaching and learning | 1 | 2 | 3 | 4 | 5 |
| 9- Implementation should be gradual | 1 | 2 | 3 | 4 | 5 |
| 10- Easy to monitor teaching and learning process | 1 | 2 | 3 | 4 | 5 |
| 11- Increasing the learners' achievement | 1 | 2 | 3 | 4 | 5 |
| 12- Decreasing learners' achievement | 1 | 2 | 3 | 4 | 5 |
| 13- Reduces teamwork and collaboration between students | 1 | 2 | 3 | 4 | 5 |
| 14- The distance learning is a successful experience | 1 | 2 | 3 | 4 | 5 |

Part (2) challenges and motivations by using different online teaching styles

15- What are the other challenges related to online learning?

- Learner issues: learners' expectations, readiness, and participation
- Instructor issues: making the transition from face-to-face to online, managing time, and finding appropriate teaching styles
- Content issues: the role of instructors in content development, integration of multimedia, and the role of instructional strategies in content development

16- How do you motivate and engage your special needs students in an online environment?

-Virtual labs, and virtual poster sessions

-Bringing in external speakers

-Role play

-Shared problem solving

-Communicate in multiple formats

-Provide active learning opportunities such as Case studies, group projects, or gathering and analyzing data.

- Making learning social by using social media terms “hashtag, twit, and posts”

-Game like activities

-Others

If others please identify in the box below

17- What e-learning tools, platforms, or apps have u used?

Padlet Teams Google classroom Zoom Edmodo Nearpod Liveboard
Stream Word wall Powtoon Quizlet One Note Kahoot Youtube

Type up on iPad/ computer (Word / Pages)

18- Which one is more effective with your students?

Padlet Teams Google classroom Zoom Edmodo Nearpod Liveboard
Stream Word wall Powtoon Quizlet One Note Kahoot Youtube

Type up on iPad/ computer (Word / Pages)

19- If others please name it in the box below

Part (3) how do students respond to the online learning?

(MEETING STUDENT NEEDS)

20- I can understand what type of learner my student is in an online course?

Yes No

21- How do you get the students feedback?

**Polls
surveys
class participation
quiz
others**

22- If others, please identify in the box below.

23- Are students with emotional and behavioral disorders do as well socially in online environments? Yes No

Part (4)

24- Attitude to internet use

- a. Using the internet for learning was a very good idea.
- b. Using the internet for learning was a very bad idea.
- c. In my opinion, it would be very desirable to use internet for learning.
- d. I like the idea of using internet for learning.
- e. I dislike the idea of using the internet for learning.

25- Behavioral intention

- a. I intend to use the internet whenever possible.
- b. I intend to increase my use of the internet in the future for learning.
- c. Instantly I would adopt the internet for learning.
- d. I will adopt the internet for learning in the future.

Appendix 4: Reliability Test

a) For group (1) questions 1-14

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	25	100.0
	Excluded ^a	0	.0
	Total	25	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.691	14

b) For all the 25 questions

Reliability

[DataSet1]

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	25	100.0
	Excluded ^a	0	.0
	Total	25	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.600	20