

Managing Students' Engagement before and during Covid-19

إدارة تفاعل الطلاب قبل
وأثناء جائحة كوفيد -19

by

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Abstract

The objective of this research is to determine how managing students' engagement changes before and during Covid-19 through online distance learning. Online distance learning occurs by having students learn through live sessions over a certain platform that the school is following. This study depends on interviews that were conducted by the researcher to middle school mathematics teachers to check how engagement of students differs from the beginning of Covid-19 until now. The research approach in this research has been used by qualitative research. The results of this study showed that teachers did observe that having students physically present in class makes a huge difference compared to teaching them online from their own houses. It was also mentioned that body language played an important role when it comes to understanding how well students are doing with regards to understanding the objectives that are explained in the lesson. On the other hand, online learning had its positives as well when discussed with the participants. Mathematics was chosen specifically for this study because it was one of the abstract subjects that rely almost exclusively on having students in class, and since the researcher was a mathematics teacher so challenges were also personally faced throughout the era of online learning during this pandemic. Future research could be conducted to include more options on how to have students with special learning needs to be engaged during online learning and to include parents' and students' perspectives regarding students' engagement.

الملخص

الهدف من هذا البحث هو تحديد كيفية إدارة مشاركة الطلاب المتغيرة من قبل وأثناء جائحة كوفيد-19 من خلال التعلم عن بعد عبر الإنترنت. يحدث التعلم عن بعد عبر الإنترنت من خلال جعل الطلاب يتعلمون من خلال جلسات مباشرة عبر منصة معينة تتبعها المدرسة. تعتمد هذه الدراسة على المقابلات التي أجراها الباحث لمعلمي الرياضيات في المدارس المتوسطة للتحقق من كيفية اختلاف مشاركة الطلاب من بداية الجائحة حتى الآن. تم استخدام نهج البحث في هذا البحث من خلال البحث النوعي. أظهرت نتائج هذه الدراسة أن المعلمين لاحظوا أن وجود الطلاب حاضرين جسدياً في الفصل يحدث فرقاً كبيراً مقارنة بتعليمهم عبر الإنترنت من منازلهم. وذكر أيضاً أن لغة الجسد لعبت دوراً هاماً عندما يتعلق الأمر بفهم مدى جودة أداء الطلاب فيما يتعلق بفهم الأهداف الموضحة في الدرس. من ناحية أخرى ، كان للتعلم عبر الإنترنت إيجابياته أيضاً عند مناقشته مع المشاركين. تم اختيار الرياضيات خصيصاً لهذه الدراسة لأنها كانت واحدة من الموضوعات المجردة التي تعتمد بشكل حصري تقريباً على وجود الطلاب في الفصل ، وبما أن الباحث كان مدرساً للرياضيات ، فقد واجهت التحديات شخصياً طوال عصر التعلم عبر الإنترنت خلال هذا الوباء. يمكن إجراء أبحاث مستقبلية لتشمل المزيد من الخيارات حول كيفية إشراك الطلاب ذوي الاحتياجات التعليمية الخاصة أثناء التعلم عبر الإنترنت وإدراج وجهات نظر أولياء الأمور والطلاب فيما يتعلق بمشاركة الطلاب.

Dedication

I dedicate the achievement and success of my dissertation to my parents, Safwan and Taghrid, as they were constantly supportive and pushed me to exceed my limits in my educational journey. I remember when my father told me at the beginning of my Bachelor degree, “go ahead, the future is ahead of you” and he has been supporting me and motivating me ever since and I am glad to make him proud and to hold his name forever. I dedicate to my husband, Mohamad Khalaf, for being supportive and patient throughout the journey of my research and for constantly seeing his pride in his own eyes. My one and only sister, Ayah, who is although younger than me, yet she was always there whenever I needed her and acted as the older sisters in points throughout the dissertation when I felt at my lowest. I would like to also dedicate this dissertation to Dr. Bushra Furoodian who was a source of inspiration, and a person who would dedicate an hour every Sunday to listen to what I have learned on Saturdays during my Masters classes. Thank you to every single one of you for constantly motivating and helping me stand where I am now.

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Chapter 1: Introduction

Ever since the beginning of March 2020, Covid-19 hit the world and affected the quality of life, the present, and the future of people. Millions of people were infected with the pandemic and almost all countries implied quarantine and curfew to prevent the virus from spreading further (Bojović, Bojović, Vujošević & Šuh, 2020). Moreover, academic educational institutions had to rapidly adapt to online distance learning to protect the future of students, teachers, and even stakeholders. Some countries such as Kuwait (Kuwait schools and universities to close until August, 2021) decided to postpone schools and universities until August 2020, the beginning of the new academic year 2020-2021. On the other hand, over 186 countries (Oraif & Elyas, 2021) such as the United Arab Emirates decided to adapt online distance learning and it was supposed to last for six weeks hoping that the pandemic would be diminished by then, but online distance learning was applied until the very end of the academic year (Website, 2021). Later at the beginning of the academic year 2020-2021, ADEK applied the hybrid system on private schools as students have the choice to choose whether they would like to continue studying from home (Blended learning is the way forward for UAE universities, 2021). The rapid shift from traditional learning to online learning would help students in not losing any academic years and it will help to keep them partially in track with their social lives (Bojović, Bojović, Vujošević & Šuh, 2020). In order to implement online virtual classes, teachers and students should follow information and communications technology as it plays an important part for students to be able to attend their online classes and to be involved in discussion boards, live sessions, and any other forms of teacher-student engagement (Bojović, Bojović, Vujošević & Šuh, 2020).

Ever since the beginning of the pandemic, human interaction was altered because of the transition to the virtual world where it acted as a positive aspect because it brought people

from over the world all together (Oraif & Elyas, 2021). This transition of course affected the educational systems, where schools had to provide their students with dynamic virtual classes where students could be able to interact with their colleagues and teachers and to feel supported and comfortable enough emotionally and mentally. The ease of access to technology allowed students from all over the world to gain access to more than one institute and to connect with academics from different places (Sheenoy, Vahindra, & Vijay, 2020).

One of the very crucial challenges that teachers usually encounter is the engagement of students in classrooms and it does not matter whether it was in a face-to-face classroom or a virtual classroom (Sheenoy, Vahindra, & Vijay, 2020). Moreover, it was observed in India that engagement was better due to high percentage of attendance in virtual classrooms, however teacher student interaction was affected. In the following sections, discussions of teacher-student interaction have been affected ever since the adoption of online virtual classrooms with Covid-19.

1.1 Background and Overview of Research

With the rapid spread of the pandemic, schools and academic institutions across the United Arab Emirates have shifted towards online learning. It was not an easy shift, especially that most teachers do not have the experience to teach online. Furthermore, students were also confused with dealing with studying their lessons online. At the beginning and the peak of the pandemic, teachers and students were asked to stay at home and give out their lessons from home. Later in the next academic year, schools were asked to follow the hybrid systems which involve having students under a certain capacity in classes, and the other students to learn from home. Teachers started to practice and learn about more platforms throughout the pandemic and teachers could observe progress in their performance towards teaching and

learning in online distance learning. The platforms that were usually used for live sessions were either MS Teams or Zoom. Other schools decided to record the sessions and share them with the students for independent learning. As per assessment platforms, quizizz, kahoot, nearpod, quizlet, and many more were also included to assess students' performance and engagement. However, to achieve desired results, student engagement should be involved in the whole learning process. It was required by students to feel encouraged to independently interact with their teachers during learning activities. This independent encouragement depends on the environment and the characteristics of the student himself or herself. Parents should be providing their children with an environment at home that would have them in the most comfortable mental state to have their online learning sessions. Indicators of student engagement could be effective, behavioral, and cognitive (Borup et al., 2020). Students should receive support and guidance not only from their teachers, but also from counselors and even their colleagues. Furthermore, support from their parents, siblings and friends should also be provided. These communities can act as a huge contribution to students' engagement.

Several types of student engagement are available in today's educational system:

- Oral discussions during live sessions.
- Private chats with the teacher.
- Chat in the conversation during the live session.
- Submission of assignments/assessments

However, teachers felt that students were not highly motivated to be engaged or involved during their sessions and this was also demotivating the teacher himself or herself.

1.2 Statement of Problem

As per the 21st century's learning needs, which are (1) problem solving (2) creativity (3) analytic thinking (4) collaboration (5) communication (6) ethics, action, and accountability (Stauffer, 2021), teachers should be acting as guides on the sides and not sages on the stages. Yet, with the beginning of this global pandemic and the conduction of online distance learning, teachers have difficulties to act as guides most of the time although technology has been applied for not quite a short period of time. In this research, the problem is to figure out how to manage students' engagement and improve their motivation. This is going to act as an aid for teachers who are currently dealing with online learning, and even fresh graduates who are planning to pursue education as their own career later throughout the years because it seems that the pandemic is not ending anytime soon. This problem and pandemic have led to teachers having burnouts due to the stressful situation of online learning.

1.3 Research Questions

A specific set of research questions are going to be answered and discussed right after the discussion of the literature review. In this research of managing students' engagement before and during the pandemic, the following set of research questions have been raised:

1. What are the key challenges with teaching students during online learning?
2. What are the key challenges with teaching students in face-to-face physical classes?
3. Are there any differences in teaching students online and face to face?
4. Do the face-to-face responses work with students online and vice versa?
5. What are the strategies and resources that were used to help improve students' engagement in online live sessions?

Moreover, the aim of these research questions in this specific research is towards the improvement of students' engagement in online learning and to support middle school mathematics teachers who are facing trouble in teaching this abstract course or subject online.

1.4 Research Hypothesis

A research hypothesis is a statement of prediction that will be tested by a certain study or research. It should be testable, clear, and also falsifiable. The hypotheses have been written based on the literature review or the framework:

Hypothesis (1): Resources or strategies that are used in physical face to face classes cannot work in online classes.

Hypothesis (2): Involvement of parents does affect how a student is interacting during online learning.

Hypothesis (3): Teachers and administrators should encourage parents to support effective engagement in online learning.

1.5 Outline of the dissertation chapters

This research is divided into five chapters that describe how it was implemented. The first chapter of this dissertation will aim to show how managing students' engagement has changed from the beginning of the pandemic until now with the implementation of online distance learning. The second chapter of the research will discuss the literature review based on previous research. The third chapter will show the methodology that was used in order to implement the research. Moreover, the fourth chapter will show the analysis of the interviews and the data that was interpreted. Last but not least, the final chapter will be discussing the conclusion, what was missing, and how this research aid for further studies.

Chapter 2: Literature review

2.1 Introduction

The world has shifted from traditional student-centered classrooms to e-learning models due to the novel pandemic Covid-19. The idea of online distance learning or e-learning was implemented to help students earn their rightful place in gaining an education. Even after the implementation of hybrid learning in private schools in Abu Dhabi, most students decided to continue with online distance learning to stay on the safe side of avoiding any social encounters and getting infected with the virus. In this case, students would gain the educational experience from the comfort of their own houses. However, student interactivity during online classes wasn't as active as the usual cases although attendance has quite improved due to the ease of access of virtual classes.

Online learning interactivity includes interaction between students and their teacher, students and other students, students and the material of the subject or course, and the learning platform (Chou, Peng, & Chang, 2010). Teachers play a very important role in managing the interaction of students in the classroom and furthermore the interaction with the students themselves (Chessin & Moore, 2004). Students play the main role in student-teacher interaction especially in the online distance learning environment. Interaction through online learning could take place either by private messaging, oral discussions, or simply by just answering a certain poll to reflect on the understanding. Messaging for example, it could be a tool to be used in different ways. However, if it was used more than the usual, students would not be able to respond or give feedback to the huge number of messages that were posted by the teacher (Mazzolini & Madison, 2003). The online learning environment should be dynamic, productive and secure for students to be able to interact and engage with each other and even with the teacher. Providing students with constructive feedback and in a certain

time could act as an important part to improve the success of online distance learning. Moreover, following the curriculum should be adapted in a certain way for lessons to be easily explained through online learning. Lessons that were usually explained in traditional classes, could sometimes be difficult to understand if explained through e-learning. This is why the content of the course or subject is considered to be vital when it comes to students' engagement in online learning. It would be advisable to use platforms that would help students to understand the content easily without feeling the urge of physically coming to class.

The constructivist social environment, that could be presented in an online classroom, works on helping students to work independently without asking for help or training (Benbunan-Fich, 2002). Students should also be provided by a variety of learning materials to improve their engagement in online classes. Hara and Kling (2001) worked on a study related to students' e-learning experience, and most of the responses were related to not receiving constructive timely feedback from their teachers and some doubt in communication with their classmates which led to low self-esteem and self-confidence issues. Although we are currently in 2021 and we are provided with high-speed internet and computers with high-speed processing units, yet students also face some technical difficulties when accessing their e-learning resources. These technical issues affect their efficiency and satisfaction in the whole learning experience and process. Effective and efficient usage of technology should be used in order to deliver a well-designed learning and teaching experience, as all students and teachers were forced into this situation due the Covid-19 pandemic (Madiope & Mendy, 2021)

Some activities that were provided in the literature by some scholars, are having discussion boards in the platform that is used by the teacher. Having discussion boards allow students to

have an interactive engaging bond experience as they learn from each other. Students can interact with each other depending on their learning needs and they would be able to get efficient feedback from their colleagues and even their own teacher to evaluate their performance (Douglas et al., 2018). Another technology that helps students in committing to the information and knowledge that is being taught is having video conferences (Martin & Bolliger). The fact that students are able to have video calls or conferences and to be able to see the body language of each other, actually aids in supporting students to be efficiently interactive. Video conferences helped some shy students who rarely participate in live sessions to share their ideas and participate more (Lowenthal, Borup, West & Archambault, 2020). Furthermore, video conferences act as an ease of communication during a live session and it acts as an emotional connection between the teacher and the student. However, video conferences could be not a good solution for every situation or school as some schools are not even allowed to have their cameras open during a live session. It could be a little bit challenging to balance out the ease of communication between live sessions and video conferences and to also give out timely feedback when following certain posts.

2.2 Teaching Mathematics in the Time of Covid-19

Mathematics, the queen of all sciences, is a subject that depends on face-to-face interaction and physical classrooms (Khirwadkar et al., 2020). In order for mathematics to be taught it needs to combine the knowledge of the subject, theoretically and practically (Adler & Davis, 2006). The requirements to deal with mathematics in teaching and learning differs than using mathematics in other fields of work such as engineering or nursing. Using pedagogical methods, teachers try to break down their mathematical knowledge into bits and pieces for students to make sense of this abstract subject based on their pre-requisite skills and experiences. It is also one of the subjects that relies on collaborative work and the presence of

the teacher in the classroom (Ball & Bass, 2003). Covid-19 and its restrictions had obliged schools to rapidly shift from face-to-face teaching to online teaching, therefore, a lot of questions have been raised on how well could the teachers, students, and parents cooperate together to be able to adapt mathematics in an online learning environment (Khirwadkar et al., 2020). In this case, there could be different barriers on the stakeholders of the school because schools had no choice but to directly implement the use of online learning. Barriers could happen with the student, teacher, school, and even the curriculum itself (Mailizar, Almanthari, Maulina & Bruce, 2020).

- School barriers: IT and technical support, virtual learning policy, availability of textbooks and platforms.
- Teacher barriers: e-learning knowledge, confidence, and experience in technology.
- Student barriers: e-learning knowledge, pre-requisite skills, responsibility.
- Curriculum barriers: evaluating assessments and adapting the topics and subjects to e-learning resources.

With the aid of enhanced technology, teachers were able to use collaborative learning and chances for students to learn together and to be able to solve mathematical problems together with the help of the teacher. On the other hand, teachers showed that they were demotivated and they were unable to continue with online distance learning because they believed that they are not giving their best when it comes to explaining the subject (Aldon, Cusi, Schacht & Swidan, 2021).

Learning could be lost the most in a subject like mathematics because it is a subject that is learned constantly at the very beginning of school years until high school graduation (Sawchuk & Sparks, 2020). Moreover, parents do not usually interfere with their own children when it comes to learning mathematics because not all parents cope well with the

subject, therefore they rely on teachers in the classrooms. However, ever since the pandemic, parents are more involved with their children to attain student progress. Based on previous studies, it was suggested that parents are more likely to be involved in reading exercises instead of mathematical problems because they believe that they face mathematical anxiety and they could obviously find a difference between the instructional methods they have been taught with in comparison to their children. On the other hand, mathematics is a subject that students tend to struggle with not because they dislike it or because they find it hard but more because students tend to manifest anxiety ever since kindergarten towards the subject (Picha, 2018). Some signs and symptoms of math anxiety could be lack of response, low self-esteem and achievement, avoidance, and many more (Picha, 2018). This sort of anxiety tends to intensify during online distance learning because stress is already related with the pandemic ever since March 2020. Stress could be eliminated by having a safe friendly environment in the virtual classroom and teachers could also incorporate short anti-stress exercises because it is difficult to read body language or expressions through virtual learning.

In order to involve students more in math lessons, gamification is considered to be one of the ways that could keep students' attention in place and to also involve parents with the subject to be able to integrate the subject as a topic to talk about in their own households (Sawchuk & Sparks, 2020). Students should be provided with all the time they require in order to be able to stay ahold of the subject and to feel comfortable enough to discuss any struggles that are faced during the classroom. Furthermore, using math instructions in collaborative groups of differentiated levels could also act as help because students tend to help each other in a manner that could be easier than the teacher herself or himself.

2.3 Student Engagement differences between online and on-campus classes

Robinson and Hullinger (2008) worked on a study to investigate the differences in student engagement and interaction between online and on-campus classes. It was found that students who are undertaking online distance classes had lower engagement than students who are in class. This was discovered based on the National Survey of Student Engagement (NSSE) which is a survey used specifically to assess student engagement in universities. The survey includes 10 indicators that are used for students to assess themselves in their academic experiences. The indicators are the following according to Alqurashi (2020): “higher-order learning, reflective and integrative learning, learning strategies, quantitative reasoning, collaborative learning, discussions with diverse others, student-faculty interaction, effective teaching practices, quality of interactions, and supportive environment.” This survey depends a lot on how comfortable students are with the environment because psychology plays a role as well when it comes to how well students interact in the academic environment. Based on results from the survey, researchers depended on the university year a student is in and the design of the course. Bonet and Walters (2016) figured out that students who are studying on-campus were more likely to collaborate and interact with the faculty members and that the learning environment played an important role to live the whole educational academic experience. Moreover, on-campus students had lower rates of tardiness and absenteeism. They also had higher collaborative learning levels (Rabe-Hemp et. al, 2009). A scale was developed to check if there are certain activities that could allow students to be more interactive in online classes (Dixon, 2012). Dixon found that students were not affected by the type of activity for their engagement to increase. However, there was a relation between the student-instructor interaction, student-student interaction and student engagement. Teachers who are delivering online classes should be more flexible to communicate with their students to encourage them to interact more in classes with their peers.

2.4 What is Student Engagement?

Student engagement is concerned with the interaction between the time, effort and other relevant resources invested by both students and their institutions intended to optimize the student experience and enhance the learning outcomes and development of students and the performance, and reputation of the institution (Trowler, 2020). Based on observation and experience, there are some factors that can contribute to student engagement. Some these factors include the following:

- Faculty members
- Nature of the subject
- Cameras (on/off)
- Attendance
- The Internet

Faculty Members

Staff members do matter when it comes to student engagement in classrooms (Trowler, 2020). Staff members who provide their own students with a positive environment and a motivational attitude allows students to be more active and productive in their learning process. It is important for the stakeholder in school to contribute in the facilitation of student learning and engagement. Linking students' learning with their own real-life experiences allows students to understand the lessons covered and allows them to be more involved in the classroom and even in experiences outside the classroom (Trowler, 2020). Students should be encouraged to understand the standards and objectives they are being taught throughout the school year and how to be able to apply them in their real-life experiences. To do so, in classrooms with big numbers of students should be encouraged to sit in groups that allows discussions and immediate feedback to keep them motivated and excited to understand the

main concepts and principles that are being taught instead of just memorizing information as if information is being only poured through their brains (Markwell, 2007). When students are split into groups using breakout rooms on Microsoft Teams, they tend to interact more especially if they had the choice to choose their own team members. Students would feel that they are in their own comfort zone surrounded with their friends or colleagues. In order to achieve this goal, faculty members should engage with each other to be able to outgrow the vision and mission of student engagement in an academic institution.

Nature of the subject

Students in qualitative classes engage more in class discussions, in-class activities and in groups. Students lack interest when it comes to subjects that are related to the Lab field, because such topics are being lectured instead of having actual hands-on experience. This is the case with the mathematics subject as well. Mathematics is a subject that depends on the physical presence of the students and the teacher because it is one of the subjects that students usually struggle with. Mathematics teachers usually depend on the student's body language to make sure that the student is doing well and is on the right track.

Cameras

It is quite mysterious to determine how students react to challenging materials and concepts when their cameras are switched off (The Camera-On/Camera-Off Dilemma, 2021). Teachers tend to benefit on nonverbal cues from the students when physically available in the classroom because body language plays an important role in determining students' reaction towards a certain subject or concept. Examples of nonverbal cues could be a simple smile, frown, or a daydreaming look (The Camera-On.Camera-off Dilemma, 2021). Moreover, students tend to feel motivated and supported if their colleagues in the classroom had their

cameras open as well due to developing a feeling of identification with each other in the classroom or group. However, some schools do not allow students and even teachers to open their cameras during a virtual class, for reasons that are related to privacy, and in this case a sense of communication is lost between both sides of the classroom. I personally tried opening my camera while teaching a certain class, and I could feel the rush of excitement that was among the students because they were able to see my identity and my nonverbal cues while explaining specific concepts. This lack of use of cameras affected student engagement because teachers are not even quite sure that students are even sitting next to their devices and whether they are actually listening to what is being said or not (Castelli & Sarvary, 2021).

Attendance

Attendance is one of the important factors of student engagement behavior (Finn, 1993). Students who are easily bored or demotivated get to disengage in classrooms which even triggers them to skip attending the class. Students' attitudes towards learning could accumulate from a very young age as soon as they start with pre-school, therefore, if they were not provided with a motivated positive environment, this is going to affect their academic performance hence their engagement (Smith & Adam, 2007). Poor attendance on a regular basis, unpleasant school experiences, or demotivated classroom environment could affect students' enthusiasm in even staying in school (Smith & Adam, 2007).

The Internet

The Internet is one of the very important sources of our everyday life. All people tend to rely on search engines, online resources in order to help them cope throughout the day. Moreover, the Internet's role in online distance learning is very crucial as it allows students to interact

and communicate with their colleagues, teachers, and it also allows them to access different academic institutions from all over the world as they are no longer obliged to rely only on the resources provided by their own school (Liao & Hsieh, 2011). However, due to the importance of the Internet, a slight error or change in its speed could affect the whole process of learning in virtual classrooms and this does not only affect students, but also teachers as well. Some problems that could sometimes arise are related to the microphone, the speed of the internet, or the device itself. Such cases affect the level of engagement and interaction. Even teachers sometimes get disconnected from the internet and this causes the teacher to postpone the lesson or to think of a backup plan to compensate for the missed lesson. Teachers should be provided with an essential professional development training to have their Information Technology skills improved to try as much as possible to avoid any errors that could affect loss of time.

2.5 Role of Technology and its Use in Teaching

Due to the 21st century's educational needs, technology has been a huge part of the teaching and learning process in classrooms. Technology has acted as an aid in assessing students using different platforms such as quizziz, kahoot, edmodo, etc.. Technology is mainly used to improve the performance of students by using some resources to facilitate the learning process (Association for Educational Communications and Technology). However, although most teachers were used to the application of technology in classrooms, it was not an easy shift to fully adapt technology and to use it as a platform to communicate with the students, to deliver the classes, and to also assess the students. Therefore, teachers were required to be trained by the school in order to understand the need and importance to this change. Several pedagogy approaches were made to develop the engagement of students (Shenoy, Mahendra and Vijay, 2020). The application of technology in schools and academic institutions allows

teachers to change the way information is delivered, analyzed, and presented in a classroom. This gives teachers an opportunity to include students from different levels and backgrounds to be involved in the lesson (The Role of Technology in the Educational Process - Green & Write - College of Education – Michigan State University, 2021). In order for technology to be used properly and to help facilitate student learning, teachers should be aware of the relationship between technology and pedagogy. This awareness would highly encourage teachers to apply critical thinking as they try to use technology in education. Moreover, technology can only be applied within certain tasks in classrooms. Students with special needs have been advised to use technology as an aid to help them understand the material being delivered more effectively. However, the whole decision of adopting technology in classrooms has to do with schools' stakeholders and administrators because without this authority, teachers would not be able to use technology in their classrooms. Teachers should also be well-trained and consulted if technology was the answer to their requirements (The Role of Technology in the Educational Process - Green & Write - College of Education – Michigan State University, 2021).

Technology plays a very important role in education specially during the circumstances that the whole world is currently facing with pandemic. Without technology, schools would have stopped their academic years until further ado with students missing months, or probably years of education. With the application of technology during the pandemic, it increased students' engagement by making teaching and learning more interactive with platforms and applications that are much more enthusiastic rather than just using their pens and copybooks (O'Neal, Gibson and Cotten, 2017). Technology also served as a tool for students to look for more resources online rather than constantly depending on their own teachers. Students needed to be aware of some technology integrated skills that would help them learn to

research and to develop their higher-order thinking. Today's students are not the type of students where instructors simply pour in the information or teachers to just use chalk and talk, students need to be guided in a cooperative learning environment and information should not be passed from the instructor's PowerPoint presentation to the screen of the student. Information should be passed through the mind of the student to be analyzed and evaluated despite the fact that students are more listeners. The embedment of technology in classes could aid in creating a collaborative learning environment to improve students' engagement and interaction, and it would also motivate students as teachers provide them with immediate feedback to check if there are certain topics that would need more dedication or if everything has been fully understood.

2.6 Synchronous Vs. Asynchronous Learning

Online learning classes are spreading widely in education ever since the beginning of the pandemic and the adoption of social distance since March 2020. They were already applied in some institutes in the previous years as teachers were trying to mirror the traditional learning instructions in virtual classrooms (Skylar, 2009). With the help and development of today's technology, students are able to access classrooms from their devices from different locations in order to be provided with a traditional learning environment that does not differ from their face-to-face physical classes. Internet-based classrooms reflect many characteristics of traditional classrooms because they tend to have learning objectives, learning outcomes, deadlines and observation of student progress.

Online classes are divided into types: synchronous learning and asynchronous learning. These two types of learning could be applied in hybrid learning where the UAE is currently applying this system in the academic year 2020-2021 (Blended learning is the way forward

for UAE universities, 2021). Hybrid learning is one of the methods of learning that combines the traditional learning methods and the learning objectives with a digital way of delivering the course or subject (2020). Hybrid learning is mostly used when eLearning tools are not the most effective approaches to deliver a certain objective and now within the pandemic it has been a choice for students to either study from their own houses or to attend their classes physically in school and follow the social distancing rules.

Synchronous learning happens right in the moment (Skylar, 2009). Before the Covid-19 pandemic, synchronous learning was constantly taking place in physical classroom settings, but that has all changed and shifted to virtual classrooms. In the time of Covid-19, synchronous learning is seen and applied through live classes and live professional development training. The advantages of synchronous classes are real-time discussions and immediate feedback (Bhamidi, 2021). Teachers guide and lead their students towards the learning process and students tend to communicate with their colleagues and teachers immediately (Bhamidi, 2021). Students can ask their teachers questions and they will be receiving immediate feedback in return instead of waiting for the next day to receive a reply from the teacher. Another advantage of synchronous learning is that students would be able to clarify their own doubts on spot in case they were struggling or facing some learning difficulties. On the other hand, a disadvantage of synchronous learning is that teachers may not be able to personalize their instructions based on each student's needs because it would be difficult to do with a class of plenty of students during a live session (Bhamidi, 2021). This is where asynchronous learning could come to hand.

Asynchronous learning provides students with more flexibility to access recorded learning sessions without following a fixed time and to also get involved in text-based discussions (Lowenthal, Borup, West and Archambault, 2020). Asynchronous learning is more of a student-paced form of learning where the student gets to control the speed of learning a

certain topic when watching a video or even referring to an article in a pdf format. Although teachers could feel that synchronous learning is more convenient, using asynchronous learning allows students who are too shy to speak through a live session to at least interact with the teacher or colleagues through text messages or textual discussion boards (Lowenthal, Borup, West and Archambault, 2020). With regards to teachers, giving feedback to students through asynchronous learning could be more challenging in textual discussion boards or submissions (Lowenthal, Borup, West, and Archambault, 2020).

Based on the previous analysis, advantages and disadvantages, determining whether synchronous learning or asynchronous learning is better depends mainly on the learning objectives and how do teachers prefer to deliver their course content to their students (Bhamidi, 2021). Issues of online communication in supporting students during online distance learning could be related to immediacy as students who try to communicate with teachers would expect immediate reply or feedback without considering the availability of the teacher. Students constantly need to be assured that help is available if they need it.

According to Bhamidi (2021), she believes that it would be best to blend both types of learning methods in online distance learning as it would support students of different levels and it would also allow students to study at their own pace without the pressure of interacting or engaging during live sessions. One way of linking synchronous and asynchronous learning is by having an online live session on solving a word problem in a math lesson and then having a textual discussion board for students to share their different ways of solving the problem (Bhamidi, 2021).

2.7 Interaction in Teaching

There are many misconceptions in regards to terminologies in education, especially when using some common words such as “independent learning”, “distance”, and even “interaction” (Moore, 1989). Distance learning refers to the fact that the teacher and the student are not physically in the same place. However, scholars discussed and shared more in-depth meaning when it comes to explaining such terminologies. Based on Moore (1989), he suggested that there are three types of interaction which were recognized as (1) student-content interaction, (2) student-teacher interaction, and (3) student-student interaction.

The first interaction to be discussed is the student-content interaction. This interaction is involved between the student and the content or design of the course that is being delivered. It is the most important type of interaction, because of course, without a course design, a student will not be able to receive educational content (Moore, 1989). On the other hand, students get to interact with the design of the course by actually understanding and to explain their own point of view instead of simply being dictated or to memorize the course. Based on the students’ point of view, it would be easy for the teacher to be able understand the learning methods and the cognitive thinking of the student. Holmberg (1986) referred to this type of interaction as the interaction that happens with the student and himself. When a lesson is being explained, students start to think and analyze the knowledge, which is not necessarily academic but also could be related to a television program or even a text message, that is being shared and presented. During the 19th century, distance learning took place in the form of study guides that were in the form of texts, radio and television programs, and also recorded audiotapes for students to “talk to themselves” in order to analyze.

The second type of interaction is what students prefer the most, which is the student-teacher interaction. By having a curriculum that is fully developed and adapted in distance learning, teachers should have prepared a set of learning objectives and outcomes for students to be motivated and interested in the content that is being delivered (Moore, 1989). Presentations that are used in distance learning could be prepared by the teacher of the subject himself or herself, or it could be designed by the course supervisor. The presentation should include all needs required for students to be interactive, motivated, and well-directed. After a certain presentation, teachers should be ready to have students reflect on their own learning or to even evaluate them. Once evaluated, it would be obvious if students would need more counselling and support, or to be given information based on higher levels. Students look up to their teachers and they believe that without their teachers, they would not be able to understand the content of the subject, although without the content of the subject, teachers would not be able to deliver information. Motivation throughout the class could be stimulated by the teacher by constantly providing activities and higher-order thinking problems to facilitate students' support throughout the process of learning.

The third and the last type of interaction according to Moore (1989), is the student-student interaction. Student-student interaction could take place between a pair or groups of students in order to fulfil a certain task whether the teacher was present or not. When students explain information to each other, they tend to explain the topic in a simpler way because they tend to be of the same level and age group which makes the information easier to understand. Interaction among students in a class is important because it enhances skills of group communication, presentation, and simulation (Phillips, Santoro and Kuehn, 1988). It was observed that in a class that is full of students, it could be difficult to initiate face to face interaction with students due to the difficulty of dividing them into groups, therefore, creating

focus groups is considered to be much easier in distance learning platforms (Moore, 1989).

Based on traditional teaching methods, it was stated by teachers that group communication is considered to be disruptive behavior if students tend to communicate with each other. On the other hand, students tend to believe that school is a competitive environment where each student is responsible to act in his or her best interest to do better than the other students in a classroom (Johnson and Johnson, 1985). Moreover, students' interactions and attitudes among each other depends mainly on how their teacher guides them to interact with one another. Teachers should build trust and safety among students in order to have students comfortable enough to communicate with each other (Johnson and Johnson, 1985).

According to Morton Deutsch in 1962, he categorized student-student interaction based on three different ways: cooperative, competitive, and individualistic.

1. Cooperative interaction: this type of interaction happens when each student has a special goal related to their own learning needs and then these goals are linked together in a positive way to achieve common goals. Therefore, the advantage of cooperative learning is that the goal is reached by linking each student's needs to one another.
2. Competitive interaction: the difference between cooperative interaction and competitive interaction is that goals that are linked in competitive interaction cause students to have a negative attitude towards each other because each student wants to personally benefit from the interaction instead of other participants reaching their goals.
3. Individualistic interaction: in this specific interaction, there is no correlation between the student's goal and others. Each student has specific goals that are needed to be accomplished individually with no effect from other participants or teachers.

Cooperative interaction tends to promote motivation and competition among students when compared to competitive and individualistic interaction. It is directly linked to higher self-esteem and positive attitudes when implemented in a classroom setting.

2.8 Teacher Burnout

Exposing teachers to physical, cognitive, and emotional pressures may lead to occupational burnout. “Burnout is regarded as a long-term, negative affective state comprising emotional exhaustion, physical fatigue, and cognitive weariness, and resulting from chronic exposure to unresolvable occupational stress” (Shirom and Melamed, 2006). Teachers get to face stressful life events that could affect the psychological readiness of both parties, teachers and students. Moreover, it could lead to reduced active listening and participation. Another possible predictor of teachers’ burnout is job adversity, or the situations that could initiate a challenge or obstacle in the life of the teacher at school. Multiple use of platforms, for instance, could be confusing for teachers as it is not possible to keep track of all applications, websites, and assessment tools that are constantly being discovered and used ever since the pandemic until now. This causes teachers to feel anxious and unmotivated which causes a reduction in teaching efficacy due to the multitude of tasks and the necessity to adapt to online context and keeping up to date with online teaching technology and trying to be innovative. The quality of teaching as a whole is influenced in addition to engagement and interaction. Assessing student receptivity in online situations is based rather on perception than on active feedback. Other predictors to teachers’ burnout include the ability to accept change and to manage interpersonal relationships. The whole abrupt shift to using online teaching programs and without any smooth transition or training is a huge cause to burnout as well. To limit teacher burnout, it is recommended that stakeholders and principals in the school keep track of teachers and to observe their motivation and to make sure to provide them with support

when needed (Pressley, 2021). Demands are on the rise specially with the new adoption of online learning, and due to this new experience to all stakeholders in the school, however, it is mostly stressful on teachers as they have the responsibility of delivering the curriculum to their students and to make sure that students are on the right track of their learning progress (Pressley, 2021). Support could be provided emotionally and even in the technological aspect. Workshops that include instructional guidance, breathing exercises, and even physical exercises could help reduce teachers' stress which results in improving teacher efficacy (Pressley, 2021).

Chapter 3: Research Methodology

Introduction

This chapter, which represents the research methodology, has been divided into more than one subchapter to show what were the methods that were used to get the answers of the research questions that were proposed in this research. The aim of this research is to determine how managing students' engagement differs in classrooms before and during the novel pandemic Covid-19. Furthermore, this research will also show some suggestions on how to improve the engagement of students during online live sessions because it is still not clear when life in schools could go back to normal. A qualitative research design has been followed based on data collected from interviews that were conducted with middle school mathematics teachers that teach the American curriculum. I chose these teachers specifically because I, myself, am a middle school mathematics teacher who has been struggling with improving and managing students' engagement ever since the beginning of the pandemic. The study is based on qualitative data collected from 10 teachers. Due to the pandemic, the interviews were conducted through zoom among the respondents, and they were recorded with their consent. They have been asked open-ended questions based on their experience with student engagement, their use of resources and teaching strategies that they have been using ever since the beginning of the pandemic and online distance learning. This chapter includes a review of the purpose statement, the research design, the hypothesis, the selected research instrument, and the ethical considerations that were taken to conduct the study.

3.1 Purpose statement

Objectives of a specific study or research are determined by the goals of the study. The main objective of this research is to determine how managing students' engagement differs from physical classes to online classes. The research is going to also act as an aid or guidance to help teachers who are recently working in the educational field to learn more about managing students' engagement as it is considered to be one of the important ways to assess students. Moreover, some methods would be discussed and explained in the study to improve students' engagement during online live sessions.

3.2 Research Questions

After the review of the literature on managing engagement during online learning, the whole research procedure has taken place to answer the following set of questions:

1. What are the key challenges with teaching students during online learning?
2. What are the key challenges with teaching students in face-to-face physical classes?
3. Are there any differences in teaching students online and face to face?
4. Do the face-to-face responses work with students online and vice versa?
5. What are the strategies and resources that were used to help improve students' engagement in online live sessions?

Therefore, the center of this research as composed from the questions is pointing towards managing students' engagement during online learning due to the cause of Covid-19. The research questions also answer the possible solutions that could help teachers and students in both ways to improve their engagement. In the coming section, research hypotheses have been created.

3.3 Qualitative Research

A research that tends to use interviews and people's voices to produce non-numerical data is qualitative research. Qualitative research is one of the research methods between quantitative and mixed methods. It involves a systematic collection of data that is usually collected through observations, written articles, and also interviews (Malterud, 2001). Qualitative research was used in this study because the aim behind it was to understand the main issues of involving students in virtual classrooms and what could be done to solve this problem instead of looking for numerical data on how many teachers or students are struggling with online distance learning. This method provides strength in understanding the perspectives, values, and opinions of a particular population in regard to a certain problem (Qualitative Research Methods Overview, n.d). Moreover, the main differences between qualitative and quantitative methods are mainly between their objectives or research questions, the form of questions that are posed, the types of data whether it is numerical or textual, and also how flexible and less formal the researcher is planning to be with the participants in the interview. There are different types of approaches when it comes to qualitative research, and they are the following (Qualitative Research Methods Overview, n.d).:

- Focus groups
- In-depth observation
- Interviews

These approaches should be conducted through open-ended questions and data collection should be formatted in a textual way instead of numerical data.

3.4 Approach to Sampling

A sample is a portion of a population which is not necessarily related to the number of people (Tailor, 2005). It could refer to a number of study cases or researches that could be related to the content and subject of a certain study. According to Merriam-Webster Dictionary, sampling is defined as “the act, process, or technique of selecting a representative part of a population for the purpose of determining parameters or characteristics of the whole population.” There are two types of sampling and both of them are used depending on the type, purpose, and subject of the study. The two types are probability samples and non-probability sampling (Sampling Strategy: A dissertation guide | Lærd Dissertation, 2021). The key to reach a better understanding of the theoretical framework in a research is data gathering (Bernard, 2002). The research paradigm, design and the research methods used in a certain research are what actually determine what type of sampling is going to be more appropriate. A research that follows a quantitative approach would use probability sampling that includes random selection to make a huge statistical impact on the data in a certain research. On the other hand, a research that follows a qualitative approach would use non-probability sampling which involves non-random selection of samples from a population due to the specific purpose of the study (Sampling Strategy: A dissertation guide | Lærd Dissertation, 2021). It is quite important to calculate the number of participants required in the sample allowing a chance for participants not to respond, or to respond with incomplete, or non-relevant answers. On the other hand, the researcher should prepare a back up plan in case the access to the required sample is not guaranteed.

Since this research follows a qualitative approach, a non-probability sampling method was followed because the main purpose of the study was to compare students’ engagement in middle school mathematics classes before and during the Covid-19 pandemic. Moreover,

because the sample includes middle school mathematics teachers the sample is also considered to be a homogenous sample as it involves people with similar job skills and traits (Etikan, 2016). The main purpose of this sampling is to focus on the common problems that middle school mathematics teachers could face with engaging students in online distance learning. These teachers have different years of experience and they work at different schools that follow the American curriculum in Abu Dhabi. One of them is a mathematics leader and a teacher as well, and another participant was a mathematics leader and is currently only a teacher. The rest of the participants were exclusively teachers.

3.5 Interview Method

Interviews were the main research instrument used in this research and they can be conducted in several ways: face to face, through the telephone, or now with the implementation of different platforms through voice or video calls. Due to the pandemic, the interviews were conducted through Zoom, a video conferencing platform used for people to meet virtually, and they were recorded with the consent of the interviewees. It was an appropriate tool to be used in this research because it helps in understanding the interviewees' perspectives and opinions about the issue of managing students' engagement through online distance learning and it was used synchronously. The main advantage behind conducting interviews online was the ability to reach people from different areas and different schools across Abu Dhabi, and most importantly at the comfort of the participants' setting as it was their choice to choose the most appropriate timing. Moreover, to be able to analyse and transcribe data, participants agreed to have the interview recorded with their own consent of course.

Conducting the interviews through Zoom was a bit of a struggle because cameras were not open from behalf of the interviewees and reading body language is quite important when conducting interviews as it could be used as extra source of information. Therefore, social

cues were reduced within this aspect, however, on the bright side, the tone of the voice and intonation were still available. Another disadvantage of Zoom interviews or online interviews in general is that the interviewer has no control over the place of the interview because it could not be quite assured that the interviewee is sitting in a good ambience with no distractions or interruptions that could affect the quality of the interview (Opdenakker, 2006). One of the situations that took place is that one of the interviewees was interrupted due to a sudden meeting and the interview had to be paused and postponed to another day. However, the interview was conducted successfully and the quality of the answers were not affected.

Because only 10 participants were interviewed, it was easier to use open ended questions to give the participants more freedom to express and elaborate their own opinions. There are three types of interviews that could be held through research: structured, non-structured, and semi-structured. The questions were already structured in the research although they are open ended, but this did not stop participants from the research to explain their own opinion and struggle on the issues of managing students' engagement. In order to successfully conduct an interview, the interviewer should be well-prepared on the topic that is being researched with the interviewees because participants could challenge the researcher with the subject by asking to elaborate on the subject (Harvey, 2011). It is also important for the interviewers to show a comfortable environment and build a positive attitude with the interviewee to have an elite interview (Harvey, 2011). Preparing a highly structured interview, which follows the same language and use of words for each question, would ensure reliability (Silverman, 2009). Wording in the questions of the interview determines the attitude and the purpose behind the interview.

In this research, interviews with middle school mathematics teachers were conducted to understand their perspective on online distance learning and the struggles they have been facing. The interviews were recorded with the participants' consent and agreement, and they were transcribed using NVivo which was less time-consuming than other applications. Using the transcription of the interviews as qualitative data helps in understanding the problem and to create an idea or design for further research in the future. The data helped in understanding the problem or the struggle instead of only collecting numerical data to show what is happening. For instance, if quantitative data was used, it would show how many teachers are actually struggling with managing students' engagement through online distance learning but it would not show why teachers are struggling and there would be some solutions that could help them in their teaching methods. The interview consisted of open-ended questions to offer more flexibility and freedom to both sides of the interview; the interviewer and interviewees. Using open-ended questions keeps the conversation interesting and allows the interviewer to elaborate and give more details that would help in the objective of the research because each interviewer had a unique way of expressing their experience based on the question although in that case some answers could be considered to be irrelevant and some unanticipated issues could happen.

The interview questions were as follows:

1. What are the key challenges you have with engaging students during online distance learning?
2. How do you engage diverse (of different levels) students in a specific component (mathematics)?
3. What do you think are the differences between teaching students online and face to face?
4. What are some strategies that you have used to engage students during an online class?

5. How has students' focus and engagement changed from onsite to online?
6. How has your teaching changed from the beginning of the pandemic until now?
7. What resources did you use to keep students engaged during a virtual class?
8. How would you teach the multiplication table during an online class?

The last question was chosen in specific about the multiplication table because it is one of the very basic skills in mathematics that depend on the presence of the teacher and on the props that are usually used in the classroom, therefore it would be quite interesting to observe teachers' methods in explaining this basic skill through online live classes. Some interviewees felt that the questions are quite close to each other because there was a focus on strategies and resources that are usually used in teacher, however, the difference and the point behind each question was explained by interviewer to ensure relevant answers.

It was important to the interviewer to show the interviewees that they are being listened to without any interruptions or biased opinions, and to build an environment where my personal opinion does not matter and that they appear to be neutral to all answers received even if the answers were not up to my expectations. There should be a powerful relationship between the interviewer and interviewee in order to establish a resourceful interaction between both sides.

The following has been established throughout the interview:

- Value: the interviewer should explain how valuable this interview is and how important it is for this research, and to also value any statements said by the interviewee.
- Trustworthiness: to guarantee that the research has explained objectives and honesty.

Interviewees should feel comfortable enough to share information and to be aware that interviews are being recorded. Therefore, a consent form was shared to protect the anonymity of the interviewer.

- Wordings: the language used in the interview should avoid any sort of words that could be harmful or biased. Moreover, the questions should be too long for the interviewer to lose track of the main idea.

The whole process of the interview took between 15 to 20 minutes maximum because it was important not to bore the interviewees and to keep them in track of the main purpose of the research.

3.6 Research Hypothesis

A research hypothesis is a hypothesis that is clearly stated as a statement about the predictable result of an academic research based on a certain population. Because this research is qualitative research, the outcomes are found in the form of scenarios that were conducted through interviews. These interviews tended to focus on the reason and the ways things work.

Hypothesis (1): Resources or strategies that are used in physical face to face classes cannot work in online classes.

HA1: Resources or strategies of teaching that are used in physical face to face class do actually work in online classes.

Hypothesis (2): Involvement of parents does not affect how a student is interacting during online learning.

HA2: Involvement of parents does affect a student's interaction during an online live session.

Hypothesis (3): It is only the teacher's responsibility to make sure that students are interactive and engaged during online live sessions.

HA3: Teachers, administrators, and stakeholders in the school have the responsibility to make sure students are interactive and also safe during online live sessions.

The previous hypotheses have been written based on the predicted relationship between student engagement and online learning.

3.7 Ethical Considerations

According to Cohen, Marrison & Manion (2018) ethics was defined as “a matter of principled sensitivity to the rights of others.” There has been an improvement in raising awareness on ethics due to the growth of the literature in that aspect. Ethical issues may arise from different reasons such the method of the research, the nature of the participants involved in the research, the topic or the content of the research itself, how is the researcher planning to collect the data and what is he or she planning to do with the data (Cohen, Marrison & Manion, 2018). Therefore, it is quite important to show the participants that they are being treated respectfully and fairly when conducting the research, regardless of age, race, religion, or nationality. When planning for a research, the researcher should consider the following to avoid ethical issues: informed consent, protection of data as data is supposed to be used for a specific reason and exclusively for the study that is being planned.

In this research, a consent was given to the participants explaining the reason and objective behind this research and to also protect the participants’ right to self-determination. It was also stated that participants have the freedom to refuse to take part of the research if they felt any discomfort. The informed consent was obtained in writing and the participants were informed that their benefit of participating in the research is by having an increase in knowledge on how to manage students’ engagement during Covid-19 specially that they are current teachers and online distance learning could be applied for a while even in the future. According to Diener & Crandall (1978), informed consent is defined as “the procedures in which individuals choose whether to participate in an investigation after being informed of

facts that would be likely to influence their decisions.” It is also important that the researchers should ensure that the participants are competent with the aim of the research as they are required to be responsible and mature enough to be engaged in the research (Cohen, Marrison & Manion, 2007). Participants should also be aware of the nature of the study even if it included any risks or issues that might arise. Moreover, another important requirement of an informed consent is that participants should feel free enough to be involved in the research, therefore they should voluntarily be part of it (Cohen, Marrison & Manion, 2007).

Participants, who were involved in this research, are protected ethically since the data was shared anonymously. The consent of the participants was mandatory before the beginning of the study as they were required to sign a consent paper that asks for their permission in sharing their answers but without identifying their identities. The research data remained confidential and anonymous throughout the whole process of the study. To ensure that the interview is conducted in a non-stressful environment, participants had the right to choose the time and place of the interview because it was held through Zoom meeting. Participants were shared with the goals and objectives of the research to understand how important it is for them to be involved. However, even if they did not feel comfortable enough to participate, they would not be obliged whatsoever to take part in the research. The interview questions, that were formulated and conducted, were also considered ethically with regards to the language that was used. For instance, biased or offensive language was not used. Finally, participants had the opportunity of asking questions about any part of the research and they were also aware of the positives and negatives (if any) of the research.

3.8 Trustworthiness and Reliability of the Data

As a middle school mathematics teacher with four years of experience, and as a teacher who is facing struggles and issues with having more students engaged in online live sessions, and despite my own opinions on how to deal with students during online classes, my opinions were not included as part of the research even if the outcomes were opposite to my own beliefs. This process would give more credibility and certainty to the outcomes of the research which will be reviewed in the coming sections.

Moreover, the sample was chosen from more than one school to share more ideas and opinions yet the sample were all teaching the same cycles and they followed the same curriculum. The questions in the interview consisted of open-ended questions to all teachers.

3.9 Timeline

Finding middle school mathematics teacher was kind of a struggle so finding the proper candidates took around three weeks. Afterwards, it was important to ensure the candidates safety and anonymity by having them sign a consent on the interviews that were conducted and the main purpose behind the study. This process took another week to receive all consents from teachers. As soon as the approvals were received, having the interviews took around two weeks to get them conducted through Zoom. An additional week was needed to analyze and organize the data that was found from the interviews and finally, and another 10 days to complete the required data by the research.

3.10 Role of the researcher

It was kind of a struggle to reach the sample that was required although it was not a huge sample, due to the fact that all people are currently busy and struggling in the academic

sector. It was not easy to ask people to be part of the research although it was explained clearly with respect to the ethical considerations and the anonymity of the participants.

3.11 Conclusion

The methodology of a research paper acts as the support and backbone of the research based on what has been discussed in the previous sections. This is a qualitative research that is based on open-ended questions intended to be answered by mathematics middle school teachers in American private schools in Abu Dhabi, UAE. The methodology will help in answering the research questions that were written by the researcher depending on the answers observed by the participants. A qualitative method has been followed, because the main purpose was to analyze and understand the different experiences and points of views that teachers have specially that they are teaching the same grade levels. It was made sure that the participants remained anonymous throughout the research taking into consideration all the ethical measurements. Furthermore, to stay safe during the Covid-19 pandemic, the interviews took place through Zoom to ensure the protection and safe of both sides of the interview.

Chapter 4 Findings and Qualitative Data Analysis

Introduction

In this chapter, answers and findings from the interviews that were conducted through Zoom with middle school mathematics teachers from different schools in Abu Dhabi that follow the American curriculum will be described and analyzed. A total of eight questions were asked to the participants to gather information for the main research question which is “how to manage students’ engagement during Covid-19?”.

The eight questions are the following:

1. What are the key challenges you have with engaging students during online distance learning?
2. How do you engage diverse (of different levels) students in a specific component (mathematics)?
3. What do you think are the differences between teaching students online and face to face?
4. What are some strategies that you have used to engage students during an online class?
5. How has students’ focus and engagement changed from onsite to online?
6. How has your teaching changed from the beginning of the pandemic until now?
7. What resources did you use to keep students engaged during a virtual class?
8. How would you teach the multiplication table during an online class?

Qualitative data analysis includes organizing and explaining data that was collected based on the participating points of view with regards to the interview questions nothing the common themes, ideas, and patterns (Cohen, Marrison & Manion, 2007). The kind of analysis that needs to be followed in a research is determined by the needs of the researcher with the data analysis (Cohen, Marrison & Manion, 2007). The purpose of the data analysis in this study is to describe the different strategies acquired by the teachers who participated in the study and

to summarize and discover the similarities and differences between the answers. It was felt that it was important to keep the flavor and attitude of the answers of the interview, that led to the data, to be faithful to the words that the participants used.

A crucial feature of qualitative research is that data analysis begins at the early stage of collecting data to be able to create the solution of the problem stated in the research (LeCompte and Preissle, 1993). Researchers should prepare the outlines of the research that is being conducted and then prepare data by breaking them down into groups and then put them back together as a whole. This process can be done by taking notes and matching the similarities and differences. The purpose behind this whole procedure is to have a transitional shift from description to generating a solution to the problem stated (LeCompte and Preissle, 1993).

4.1 Question 1: What are the key challenges you have with engaging students during online distance learning?

The common key challenges that were discussed with teachers are the fact that students are sitting at the comfort of their own homes with unprepared learning environments as they could easily be distracted or interrupted throughout the online live session. This could include leisure and activities, and technical problems. However, some students tend to always blame it on the technical issues that are usually encountered and it was observed later on in some cases when talking to parents that there were no technical problems during the live session. Another important note that 40% of teachers noted is that according to a policy in the school they work in, cameras are not allowed to be opened from both sides of the live session, therefore, teachers are not quite sure who is attending and who is not. On the other hand, they believed that social visual cues are important to be seen because looks of confusion or excitement could make a huge difference when explaining a certain lesson. Although students

show advanced knowledge in technology on how to handle social media and gaming websites, they are unable to transfer their knowledge into educational use. Given that they are not familiar with the educational platforms that are being used, this causes the learning process to be slowed down making them unmotivated to participate or to engage in the lesson. An interesting point of view by one of the participants is that behaviors like fidgeting, turning off the camera, or moving around during class meetings can look like a lack of engagement, however, for some students, it's what they need to do to be able to participate in learning. Another key challenge is that immediate feedback through online platforms, whether through chat or emails, does not have the same effect as when given face-to-face as students might simply ignore the message or to decide to reply back few days later. Content adaptation is also one of the key challenges as teachers have to adapt the curriculum they are following regarding time, tools, strategies, and students' abilities with the distance learning requirements.

4.2 Question 2: How do you engage diverse (of different levels) students in a specific component (mathematics)?

It was noted that teachers in this study relied on breakout rooms or channels to divide their students into differentiated groups to work on a differentiated task or worksheet. One teacher mentioned that color coded questions are included in the worksheets assigned as low-level students would be solving questions that require few steps of mathematical operations where on the other hand, high achievers would be solving questions that require more mathematical operations and steps to be solved. Demonstrations and memory matrices are used by one of the teachers stating that these methods are important specially with an abstract subject like mathematics. To give a chance for gifted students, they could get roles such being the teachers' assistant by helping other students who might be struggling with the objective being

explained in the lesson. One of the teachers, who is also a mathematics leader at a school, mentioned that students could experience math anxiety at a very young age causing them to feel stressed and exhausted about the subject. The teacher mentioned that this anxiety has increased ever since the beginning of the pandemic, and it was felt that reducing math anxiety to engage all students of different levels could happen by relating mathematics to everyday life and to encourage students to make mistakes to learn from their own mistakes. Last but not least, designing assessments and assignments with a variety of response types will help students of all levels to be included in the classroom.

4.3 Question 3: What do you think are the differences between teaching students online and face to face?

It was noted that face-to-face teaching is easier for interaction and motivation, and building a stronger bond with the students. Moreover, body language and visual cues are essential in teaching yet with some teachers, due to their school policies, miss this important factor in determining how well are students doing in a classroom because they are not allowed to use cameras during online live sessions. Students also participate more and are more interested in their classroom when they have good relationships with their peers. Those relationships are more difficult to build online, yet, online learning has less peer pressure. Fun activities that used to be done in the classroom purely to build a stronger classroom are now difficult online because they are so heavily dependent on individual participation. Teacher's role during online learning has become more of a facilitator of the learning process, rather than teaching information. During online classes, teacher is to guide students on how to learn rather than teach students. Online learning has hindered student-teacher interactions. During face-to-face, students were able to ask for guidance during and after classes. However, in online learning, direct guidance been rendered inaccessible to students as they might not be familiar nor

comfortable asking for guidance in digital classrooms. Online learning, on the other hand, had helped some teachers in having more creative activities and it was less tiring to give feedback, and the fact that much less paper is required has been an advantage for teachers. On a bright side, online learning allowed students to have access to wider learning materials.

4.4 Question 4: What are some strategies that you have used to engage students during an online class?

As per the responses, strategies that show the most promise are group activities that involve collaborative learning strategies. These group activities could be worksheets or tasks that require students to create something related to the topic. An example could be switching the roles between students and the teacher to give them a chance and a feeling that they are actually contributing to something rather than only opening their microphones and giving out answers. Furthermore, implementing a reward system works in motivating students and encouraging them to participate. A teacher mentioned that some strategies that can be used both onsite and online are (1) assigning a clear learning target for students, (2) start the lesson by an open-ended question as a warm up using one of the interactive tools, (3) plan and design activities to meet the needs and requirements of all students, (4) relate mathematics to real life, (5) allow students to have a chance to ask questions and also give comments and feedback on other students' work, (6) use a loop tool for students to reflect on their own work.

4.5 Question 5: How has students' focus and engagement change from onsite to online?

Generally, students' focus and engagement has relatively dropped during online learning. This could be due to distractions and decreased attention span while facing a screen. In addition, part of this is due to the online learning and the rest of this due to students feeling that online school is a burden and are no longer interested in having to do more than the bare minimum. It

is quite important to also mention that sitting behind a screen for around 6 hours throughout a school year without living the social experience of a school is mentally and emotionally and physically tiring. Of course, this is not applicable to all students. Few of the students have actually flourished as they became more comfortable in their learning environment. Parents also play a very important note as they should not be relying on teachers only specially during online learning. It was mentioned by 40% of the participants that they are feeling demotivated themselves because part of teaching is to be mentally close to students and to be there for them when they need support and this has been quite challenging.

4.6 Question 6: How has your teaching changed from the beginning of the pandemic until now?

80% of the participants mentioned that there has been an improvement ever since the beginning of the pandemic until now. Teachers have been trying to learn more about online platforms and strategies ever since the beginning of the pandemic. There were limitless possibilities as teachers considered this as a new challenge that motivated them to try to learn something new and to share with other colleagues or staff members. It was stated by a teacher with four years of experience in teaching that in order to meet the requirements of online teaching, teaching strategies shifted from teacher guided to student-centered lessons. This has become a necessity to force students to engage during class time and complete their coursework. During student-centered lessons, teachers make sure to add activities throughout that cater different learning styles, including auditory, visual, and kinaesthetic.

However, one of the teachers mentioned that although it was felt that paper-work was endless before Covid-19, teaching has been more fun and enthusiastic. “I felt that teaching mathematics has shifted into being a lecture as if I am teaching history, and this has been affecting me emotionally as I know that this not the best that I can give, yet I am unable to

push myself further as I am demotivated with how abstract teaching mathematics could be through online learning” mentioned by the teacher.

4.7 Question 7: What resources did you use to keep students engaged during a virtual class?

The following are resources that were common among the participants:

- Nearpod
- Padlet
- Teacherspayteachers.com
- Classkick
- Quizziz
- Kahoot!

These types of platforms give teachers the ability to track students’ progress, give them immediate feedback, and assess their knowledge. Moreover, once activities are completed, students get a sense of accomplishment which makes them generally more satisfied with the learning process, and hence are able to acquire a deeper understanding of the topic.

MS Teams chat was also utilized for concept check questions, where teachers post a questions mid lesson and allow students to answer on the chat for immediate response. This allows teachers to identify weak points and address them.

4.8 Question 8: How would you teach the multiplication table during an online class?

Using mental math, games and manipulation are the most practical strategies to teach multiplication. For instance, (a) use games of double to teach the multiplication table of 2, (b) use the clock to teach the multiplication table of 5, (c) use double plus one to teach the multiplication table of 3, and (d) use double the multiplication table of 3 to teach the multiplication table of 6. Some answers were quite interesting as one teacher noted that a

calculator could be simply used as it would be difficult to teach multiplication table to students through online distance learning and another teacher mentioned that memorizing the multiplication table is considered the best most traditional way of teaching.

4.9 Finding Discussion

This research examined mathematics teachers' view on how to manage students' engagement during the pandemic. There are few points that were noticed from this research which will be discussed in the following subsections.

At the beginning of the process of adaptation to online distance learning, everything seemed to be stressful for both students and teachers as they were forced to into something that is completely new. Mathematics teachers felt that their subject was not suitable to be taught online as it relies a lot on visual cues and hands on activities. Social interaction and body language are both quite important when dealing with advanced subjects that require high-level thinking such as mathematics. As a mathematics teacher, this is a struggle specially when teaching lessons that are related to models such volume of 3D figures. In normal cases back in face-to-face classes, students would gather examples of 3D figures around their house and try to find the volume of the dimensions in the classroom. It was also quite a challenge for students to be able to deal with the e-learning platforms although they show that they do have high level of technology skills but this sadly limited to using social media and gaming websites. Most importantly, the setting that the students are usually taking their classes in, do affect their engagement in classes. Some participants shared stories that happened personally with them during a live session where the microphone of one of the students would suddenly be unmuted and they would hear personal family discussions between the parents. In other situations, students do not have their own private room at home and they would have to take their classes either in the living room or with their other siblings which would cause them to

be too shy to open their microphone and interact orally, therefore they would rather participate through chat rooms.

Another point to be discussed is that, according to the participants, the most suitable learning method in online learning is collaborative learning. Students tend to feel more comfortable when working on a certain activity or task with their own peers because they might feel quite shy to approach their own teacher. Online learning classes encouraged more learning experiences where students collaborated together and allowed themselves to learn how to process information being delivered to them. Participants in the research noted that this would not be successfully possible without proper instructions, immediate reflective feedback, and motivational research. This process provided students with a chance of not losing their social interaction skills and to share knowledge among their peers.

Like everything in life, online learning had its positives and negatives. Participants mentioned that they were able to save the environment due to the less consumption of papers due to the paper work back in traditional classes. It was also noted that this experience gave them a chance to develop themselves and to learn more about what could be mostly suitable with students' needs. To be able to keep students on track and to try to have them engaged as much as possible, teachers are meant to try to include as many interactive activities and collaborative learning strategies as it would be quite exhausting for students to be sitting for long hours behind the screen, missing out on the social experience of being physically in school. Students like to learn more about tangible subjects, and because mathematics is not one of these subjects, students would be more engaged when relating mathematics to their everyday real life.

Online learning presents students and teachers with positives and negatives. Teachers are still learning and working hard on developing themselves to improve their experience in online learning, to make sure that students are involved in all the learning objectives and outcomes within the lessons being explained. Building emotional and social interactions with students is highly important as they might already feel anxious and stressed out with this new experience. They should be encouraged to establish a quite digital environment for them to be able to focus and stay on track with their tasks in school.

Chapter 5: Conclusion and Recommendations

Introduction

The main objective of this study was to find out what are some strategies that teachers could follow to manage students' engagement during online learning due to the pandemic and if there are any differences when compared to traditional classrooms. It would help gain more perspectives on the struggles that are usually faced and also provide helpful strategies that could be applicable during this phase. Overall, the study could help fresh graduate teachers who are planning to pursue their careers in the early future specially that it is not quite clear when could the pandemic end and if schools would stop online learning or hybrid systems. In this chapter, implications for the research and possible recommendations will be discussed. Furthermore, further study suggestions will be stated and what caused for research limitations.

5.1 Research Limitations

Characteristics of design or methodology that influenced the observation of the findings and implications in the research are considered to be limitations. The major limitation on this study is the small sample size which included only 10 middle school mathematics teachers, yet, they provided the research with helpful potential suggestions. Another limitation was the use of video conferencing platform, Zoom, to conduct the interviews for collecting data, due to the safety precautions during the pandemic. Use of different research methods could cause a change in the findings that were implied. For instance, if surveys were included, the approach of the study could change into mixed-methods to include both quantitative and qualitative data, and it would be quite interesting to involve parents and students to relate about their engagement during online learning. Moreover, because online learning is still new and researchers are still learning about it, access to previous studies was quite a challenge.

5.2 Research Recommendations

Specific actions to be taken with regards to managing students' engagement during online learning to understand the circumstances that students could be passing through as some students could have limited access to some resources that would allow them to participate and get engaged in classrooms. It is important for teachers to set expectations for their students and to initiate interaction with them to feel supported and motivated to be part of the class. An environment that includes all students from different levels could also be helpful. For instance, students could be given a chance to explain how would they perform a certain task to reach the learning outcome. Overall, students should be encouraged to ask questions and to be involved in discussions whether with their peers or teachers.

5.3 Further Study

Because the main purpose of the study was to learn how to manage students' engagement during distance learning, it would be quite interesting to develop and the research further by observing more psychological and emotional aspects that could also affect students' engagement. Besides, if schools decided to go back to traditional classrooms and students were asked to attend face-to-face classes all over again, how would this affect their engagement after being away from schools for more than a year now? Another perspective that could be observed, is how are teaching managing students' engagement with special learning needs?

5.4 Conclusion

Based on the findings of this study, data analysis, limitations, and previous literature studies, it can be discussed that managing students' engagement could be quite of a struggle for teachers specially who teach high-level subjects such as mathematics. Mathematics is a

subject that most subject relies on, however, it is an abstract subject that most student feel pretty anxious when dealing with it. It is the teacher's role to make sure that students are comfortable and safe enough to be part of the online learning community and this could be developed by encouraging them to participate even if through sending messages. Covid-19 affected our lives in different ways, however, distance learning procedures had their positives and negatives, as some students flourished and improved as they were given a chance to be more creative and innovative with regards to their learning skills. Teachers, on the other hand, worked and are still working hard on developing and improving their e-learning skills to be able to involve all students and to get creative with their own classes.

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Appendix

CONSENT

I have read and I understand the provided information and have had the opportunity to ask questions. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason and without cost. I understand that I will be given a copy of this consent form. I voluntarily agree to take part in this study.

Participant's signature _____ Date _____

Researcher's signature _____ Date _____