

EFFECT OF USING ONLY VIRTUAL LEARNING ON ELEMENTARY STUDENTS PERFORMANCE IN MATH IN AL KHOBAR.

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Abstract

As people are now familiar with the flexibility associated with virtual learning, there is a call for its continuous use post covid 19. This study was conducted to assess elementary students' performance in math when taught using only virtual learning. The study was conducted in the second term of the 2019-2020 academic year, on 22 grade 3 students in a private school in Al-Khobar. The one-group pre-test post-test design was used for data collection, while data collected were analyzed using PsPP paired sample t-test. The result of the study indicated that students performed lower in math when taught using only virtual learning compared to when they were taught in class using different strategies. As such, students should be encouraged to continue studying in schools post-covid 19 as staying at home and using only virtual learning could lead to low performance as a result of lack of focus, low motivation and negative attitude to learning.

Keywords: Al-Khobar, Virtual learning, Elementary students, Math

1.0 Introduction

Virtual learning is teaching and learning conducted in an online environment through the use of computers, iPads, mobile devices, and/or the internet. The teacher explains concepts and give instructions, while students spend time learning, completing tasks, and interacting with others despite being physically separated. The idea of using virtual worlds in education and training is relatively new to most educators. Nevertheless, educators the main players in the struggle for positive educational change and must know how to decide on changes and how to implement them effectively (Tao Wang, 2009). Hence some research findings have suggested that online teachers need to be able to modify the instructional practices and pedagogical techniques used in face-to-face settings for online environment (Boston,2002; Lazarus, 2003; Savary, 2005). However, despite the growth and usage of virtual schooling at the K -12 level, research-based investigations into the teaching and learning process are still lacking (Cavanaugh et al., 2004). Most schools use online learning in elementary classroom interchangeably with other strategies to engage students, impart knowledge and information to them, build their critical thinking skills, collaboration etc. The selection of the strategies, activities, and techniques is the teacher's understanding of the relationship between content and pedagogical knowledge (Shulman,1986). In other words, the

teachers act as observers and facilitators, and pair their understanding of the students and content area with their knowledge of pedagogy to establish an effective and positive learning environment, build an engaging experience, ensure students are participating and completing tasks, and ensure established norms are followed. This support students learning and great academic performance. Also, as teachers are face-to-face with the students, they interact and discuss the importance of math with enthusiasm, help develop a growth mindset, and ensure they focus and practice. Most importantly combining strategies can ensure that all students, no matter their learning styles, can benefit from a diverse and meaningful classroom experience.

Hands-on/Inquiry Strategy is among the teaching strategies frequently used in an elementary math classroom. It is a student-centered learning strategy that enable students get involved in the learning process. Dr, Barry Ziff cited in his paper titled - Developing Strategies that Encourage Hands-On Learning – that, “Hands-on creates experimentation, exploration, and self-discovery”. Students learn from each other; from their mistakes and from actually participating in the activity. It basically helps engage learners in a more active classroom. Also, Dr Barry Ziff wrote that, “there are so many exciting active math projects and activities students can actively count, measure, and graph. For instance, the teacher’s table can be measured in inches, feet, hands, and apples. Students can also graph and chart birthday months, they can keep track of their daily, weekly, sugar products intake etc., or make a chart listing how many books they have read in their homes. There are endless examples of math games and activities that teach the basics of addition, subtraction, multiplication and division.” All these activities engage students and make learning fun. However, to efficiently use this method, various learning stations or centers are developed throughout the classroom with various tasks best fitted to support students learning. Students are divided into smaller groups by virtue of their needs, ability or interest, and placed in each center accordingly. However, they are free to move from center to center.

Collaborative/Cooperative learning strategy is another frequently used strategy in an elementary math classroom. It includes projects that involve group work, partner learning, or teacher-student work. Cooperative learning involves working together to attain a common goal as well as creating a rich teaching-learning environment for effective student interaction (Arends, 1998). Students enjoy interacting and sharing ideas with their peers. It also gives the teacher the ability to identify and target students that need extra attention which makes it extremely beneficial for struggling students. Also, this method provides students with the opportunity to exchange ideas, to ask questions freely, to explain to one another, and to clarify ideas in a meaningful way. Studies have shown that Cooperative learning has important effects on improving academic success of students (Kolawole, 2007; Ahmad & Mahmood, 2010, Parveen & Batool, 2012).

Furthermore, while in class, teachers use formative assessments, such as a five minutes quiz, to ensure that students understand the concepts and have mastered the skills covered in the day’s lesson. Most importantly, the teacher observes students while working on a task or quiz to ensure everyone is carried along. Students are also given the opportunity to describe how they solved a problem and why they used a certain way. The communication helps the teacher get information about what students know and understand and then use that information to prepare further lessons/instructions. Also, giving students the opportunity to speak in front of their peers helps build their self-confidence, speaking skills, listening skills and social skills in general.

Due to Covid-19 pandemic, schools were shut down as a precautionary measure to combat the spread of the disease and thus completion of the curriculum was to be done via virtual learning only. As such, teachers were quickly trained on how to use the online platform chosen by their schools, and thus gained new technological skills aimed at creating the most effective online learning environment for students. The students on the other hand depended solely on listening and following the teacher's daily explanation, instructions, and parents' guidance in completing daily assigned tasks.

Initially in Al Khobar, it was difficult for parents to understand the whole process of being tutors or guides to their children especially as they were already used to them coming home and completing their homework online with little or no guidance. To some, virtual learning was nothing more than children completing their given tasks. However, during the first week into virtual learning, school management and teachers in the city got a lot of complains from parents about the quantity of work the children were given. Some parents had issues with teachers introducing new topics and concepts, working mums had the complain of combining tutoring to their busy schedule, others had issues of not waking up early to meet the live sessions and hence couldn't ask questions.

In order to solve all these issues, most school managements suggested that live video recordings be saved and sent, PowerPoint presentations, YouTube links, worksheets, quiz links (when needed) be sent for every subject. Email addresses of teachers and academic directors were also sent to parents to ease the process of asking questions. Parents on the other hand created groups where they could easily share and exchange ideas. Subsequently, the complains reduced and everyone was on track.

With the smooth and flexible continuation of the learning process via virtual learning, most people especially parents became comfortable with the learning experience as they were now aware of the ease and flexibility associated with it. Hence, majority are of the opinion that going forward, virtual learning should be made available as a learning option and not only as an alternative. That is, students should be given the option of learning in the classroom or at home through virtual learning only. In addition to flexibility of time, they reasoned that with virtual learning, students can align their studies with other plans and activities, and can continue schooling even when on vacation or down with cold.

However, despite these advantages, it is important to verify how effective learning at home using virtual learning only is on elementary students' performance especially in mathematics. This is because, mathematics is a subject student usually perceive as abstract and difficult until classroom teachers began to eradicate rote memorization by introducing different teaching strategies/methods, observations, as well as the use of online games to engage, motivate, and facilitate better understanding. Hence, the aim of this study is to determine the effect of using only virtual learning on elementary students' performance in math.

1.1 Objective of The Study

The objectives of the study are:

- To ascertain whether there is any difference in the academic performance of students in math when taught using different strategies in the classroom and when taught using only virtual learning at home.

- To ascertain whether students perform better academically when taught using different strategies in the classroom or when taught using only virtual learning at home.

1.2 Research Questions

Two research questions were raised to guide this study

- Is there any difference in the academic performance of students in math when taught using a blend of different strategies in class and when taught using only virtual learning at home?
- Do students perform better in math when taught using a blend of different strategies in class or when taught at home using only virtual learning?

1.3 Research Hypothesis

H0: There is no significant difference in the academic performance of students when taught using different strategies in class and when taught using only virtual learning at home.

H1: There is a significant difference in the academic performance of students when taught using different strategies in class and when taught using only virtual learning at home.

1.4 Study Area

This research work was conducted in Al-Khobar, a city in the Eastern Province of the Kingdom of Saudi Arabia. The city ranks 20th by population with an estimated 165,799 people living there as of 2019. Al Khobar is home to more than 100 public and private educational institutes, as well as several western-oriented schools which serve a number of students from various expatriate communities (Wikipedia,2020).

2.0 Method

2.1 Research design.

In this study, a one-group pre-test post-test design was used, and the following steps were followed:

- The student's math assessment scores in the first 6 weeks of second term when they were taught using a blend of different strategies, was applied as the pre-test scores of the students.
- While using only virtual learning at home, the students were monitored by the researcher.
- At the end of the term, student's math assessment scores in the last 6 weeks when they were taught using only virtual learning was used as the post-test scores of the students.

2.2 Participants

The research was carried out in a private school situated at Al-Khobar, a city in the Eastern province of the kingdom of Saudi Arabia. The researcher used 22 students in a grade 3 classroom. The mean age of the students was 9.

2.3 Data Analysis

Mean scores were used in evaluating the research questions, while paired sample t-test was used in testing the hypothesis.

3.0 Results and Discussion.

A PsPP paired t-test was run on a sample of 22 students to determine whether there was a statistically significant difference between their performance in math's when taught using a blend of different strategies in class and when taught using only virtual learning at home.

Table 1: Paired Sample Statistics

		Mean	N	Std. Deviation	S.E. Mean
Pair 1	Pre-Test	19.32	22	0.99	0.21
	Post-Test	17.68	22	1.36	0.29

N means number of students; std means standard deviation; and S.E means standard error

3.1 The first research question is “Is there any difference in the academic performance of students in math when taught using a blend of different strategies and when taught using only virtual learning?”.

From table 1 above, the average pre-test achievement is 19.32 and the average post-test achievement is 17.68. This shows that there is a difference in the academic performance of students in math when taught using a blend of different strategies in class and when taught using only virtual learning at home.

3.2 The second research question is “Do students perform better when taught using a blend of different strategies in class or when taught using only virtual learning at home?”.

From table 1 above, since the pre-test mean (19.32) is greater than the post-test mean (17.68), it means that students perform better when taught using a blend of different strategies than when taught using only virtual learning at home.

Table 2: Paired Samples t-Test

		PAIRED DIFFERENCES						
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
				Lower	Upper			
Pre-test								
Post-test	1.64	1.59	0.34	0.93	2.34	4.83	21	0.00

Std means standard deviation; t means t-test; df means degree of freedom; Sig. (2-tailed) means two-tailed p-value.

From table 2 above, the sig.(2-tailed) value is 0.00 which is less than 0.05. This means that there is a statistically significant difference the pre-test and the post-test in favor of the pre-test. (t=4.83; P<0.01). Hence, the null hypothesis is rejected.

A major finding of this study is that there is a decrease in the academic performance of elementary students in math when taught using only virtual learning. The result of the study is not surprising because math is known to be an abstract subject that is best taught using various strategies that involves hands-on activities and practical tasks. Ekwueme (2007), stated that, “Mathematics is a

practical oriented subject that can best be learnt through intelligent manipulation of objects and symbols.” Other researchers have also showed that there are benefits to students exploring mathematics using alternative methods such as collaborative groups, manipulatives, and hands-on activities (Curtain-Phillips, 2017; Harper & Daane, 1998; Wolodko et al., 2003). In most classrooms, lessons are presented in a variety of ways and students are given the opportunity to explore, recognize patterns and relations, and discuss with peers and teachers for deeper understanding of various concepts. The different ways could include play acting, cooperative groups, visual aids, hands on activities and technology (Curtain-Phillips, 2017). Also, the teacher creates students’ groups, observe them as they complete tasks, listen in on their conversation, ask questions, and ensure that all students get an opportunity to participate in the group work. Independent tasks are given afterwards to assess and ensure everyone is on tasks, while online games and quizzes are used to practice and reinforce knowledge. All these strategies boost student’s confidence and understanding leading to a higher academic performance.

Furthermore, while using virtual learning, it is difficult to appropriately observe and follow students due to poor attendance, lack of focus, and connectivity issues affecting online learning classes. Some students do not bother watching the online PowerPoints presentations or videos explaining the topics and directly move to solving the assigned worksheets, games and quizzes. Also, most families have more than one child which makes it difficult to adequately follow up and assist all their children. In most cases, rather than parents explaining concepts their children find challenging, they directly search online for answers, or complete the task themselves. This invariably leads to rote memorization of steps and answers and inadequate practice leading to decrease in their academic performance.

On the other hand, students memorize the process and quickly answer questions so they would have more play time. Quizzes given as formative assessment to check understanding of concepts are attempted more than once to get a perfect or above average score. This rote memorization will once again take students back to the era of accepting abstract mathematical operations as it is done, and not as something that is valuable and useful.

4.0 Conclusion

Technology can help, but it is not a substitute for, careful curriculum planning, inspired examples and good teaching paradigms (Stewart, et al., 2001 as cited in Tao wang, 2009). This study lends empirical support to the fact that virtual learning solely as a teaching-learning process is not sufficient for elementary math. This is because teaching and learning of mathematics nowadays is more than only following directions. It has evolved to include play, experimentation, innovation, and exploration which builds curiosity and enhance deeper learning to make students creative thinkers and life-long learners. Also, teachers, school administrators are constantly attending regular workshops, seminars and professional development programs to ensure they use the classrooms to expose students to various learning strategies, social interaction, active engagement and self-motivation, as well as transfer skills that will be beneficial to students later on. Most importantly, a school setting or classrooms provide a great platform for students to be enormously capable by exploring and learning.

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