The impact of Alef Platform on students' performance at Al Asayel School in Abu Dhabi, UAE

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Abstract

As times and people are changing so should processes and systems. One thing that all experts can agree on is that, driven by technological advancements, the global economy is transforming at a rapid pace and there is need for education to keep up with this transformation. Jobs and most importantly people who are hired for those jobs will need to have very different capabilities in the future. Careers will change and will require that employees be creative, innovative and have expertise in interpersonal communication. Professions will no longer need people to "do" but will require employees to "think" and think outside the box. Artificial Intelligence (AI) will be an important contributor to this expected revolution. AI is progressively making it possible for machines to do the jobs of humans. AI is the enabler for many elements in this transforming economy hence it is expected to play a significant role in the paradigm shift in education. To answer the call to attempt to transform education, Asayel School in Abu, Dhabi UAE has implemented the Alef Program. Alef's digital learning platform is powered by start-of-art technologies that are designed to support learning and to provide education in a way that students can learn based on their needs. The aim of this quantitative research study is to investigate whether the Alef platform enhances student performance at the Al Asayel School by measuring students' motivation, engagement and performance.

Keywords: Artificial Intelligence (AI), Motivation, Engagement, Digital Learning, Digital Literacy, Technology in Education, Learning Outcomes

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1. Introduction

His Highness Sheikh Mohammed bin Zayed Al Nahyan, Crown Prince of Abu Dhabi was clear in his speech to the leadership of the United Arab Emirates in expressing the need for the country to move forward in implementing 21st century technologies to expand the country's resources (Gulfnews, 2018). In alignment with the His Highness' agenda, the UAE 2021 National Agenda has expanded this need for the implementation of technology within its education systems. The vision expressed in the National Agenda calls for reform and requires schools and universities to move from a more traditional method of teaching and learning to one that is equipped with the technology that surrounds the 21st century learning agenda. Additionally, the 2021 vision states that students in the UAE must aspire to rank among the best in the world in the areas of math, science, Arabic and English. Much of this priority can be supported by a study done by Gonzalez (2010) that contends that a large percentage of the US student dropout rate is due to the continuance of traditional teaching methods established in the 19th and 20th centuries. Gonzales also found that educators and education systems have not moved to adopt 21[st]century teaching methods and hence students have developed apathy for the learning environment (Olive, 2013). Kozma, et al. (2011) said "education is slow to change and looks very much like it did at the beginning of the 20th century" (P.20). Therefore, in addition to technology being a part

of the UAE national agenda it can help in reducing the student dropout rate by supporting students with digital learning technologies, modern pedagogy, internationally accredited teachers and updated leadership ideologies. The UAE has committed to investments that will support this transformation and provide the educational leadership teams with the power it needs to help "shape" the minds of the children for the future. Our current economy demands that our current students are prepared for this technical revolution. The entire business enterprise landscape is making changes that require that teachers change teaching strategies so that students are ready to take on this 21st century economy. In fact, one of the top math and engineering schools in the world, MIT, contends that even smartphones maybe outdated in the next ten years with advancements in innovation. MIT supports digital learning in the classroom and argues that this transformation helps students to learn more efficiently, more completely and develop mastery (Open Learning, 2019).

To align with the UAE Vision 2021 and to answer the call for digital transformations in public schools, Al Asayel School which is a public school located in Abu Dhabi, chose to adopt the Alef Platform which is a digital learning program that supports teaching and learning using technology. The Alef Platform was designed to transform traditional teaching methods and transform schools into 21st century learning communities by giving schools the power to implement a student-centered model of teaching that will support independent learning and improve student engagement. The platform imposes a holistic learning approach that engages students in Math, Science, Arabic, Islamic Studies, Social

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Studies, and English (Ganji, 2019).

The following can be summarized as the selected highlights of the Alef Platform which was implemented at the Al Asayel school for grade 6 students during the academic year 2017/2018:

- All students began using individual devices (laptops) for learning academic lessons in the classroom

- For each lesson, all the academic content and assessments items were pre-loaded on the web-based Alef Platform and the role of the teacher was transformed towards the facilitation of learning and preparing individualized instruction to address the specific needs of her students

- Each lesson included videos to explain academic concepts in addition to text, interactive elements (when appropriate) and formative and summative assessment questions

- Students were given experiential learning lessons (hand-on experiments and activities) in science, math and English to further increase their interest and engagement in the academic concepts

- In addition to digital lesson content delivery in the classroom and experiential learning sessions, some class periods were dedicated to facilitate student practice and drills to improve retention of core academic concepts

1.1 Purpose of the study

The purpose of this quantitative research is to investigate the impact of the implementation

of the Alef platform and its effect on Al Asayel students' performance, confidence, independent learning and motivation by measuring students' motivation, confidence, independent learning, and academic performance. The researcher conducted a students' survey to explore if the Alef Platform enhances student's motivation and confidence and independent learning in the main subjects at the Al Asayel School. In addition, the researcher compered exam results from trimester one and trimester two along with diagnostic test results to examine if the Alef Platform enhances student performance at the Al Asayel School.

1.2 Research Question

The primary purpose of this research is to investigate if the Alef Platform enhanced school performance. This research study will explore the following sub-questions:

- To what extent does Alef platform enhance students' motivation as it related to their learning in the main subjects at Al Asayel School?

- To what extent doesAlef platform enhance students' confidence and independent learning at Al Asayel School?

- To what extent does the Alef platform enhance students' performance in the main subjects at the Al Asayel School?

1.3 Research Hypotheses

- Alef platform enhances students' motivation to learn in the main subjects at Al Asayel School.

- Alef platform enhances students' confidence to learn independently at Al Asayel School

- Alef platform enhances students' performance in the main subjects at Al Asayel School.

These hypotheses can be shown diagrammatically as below:
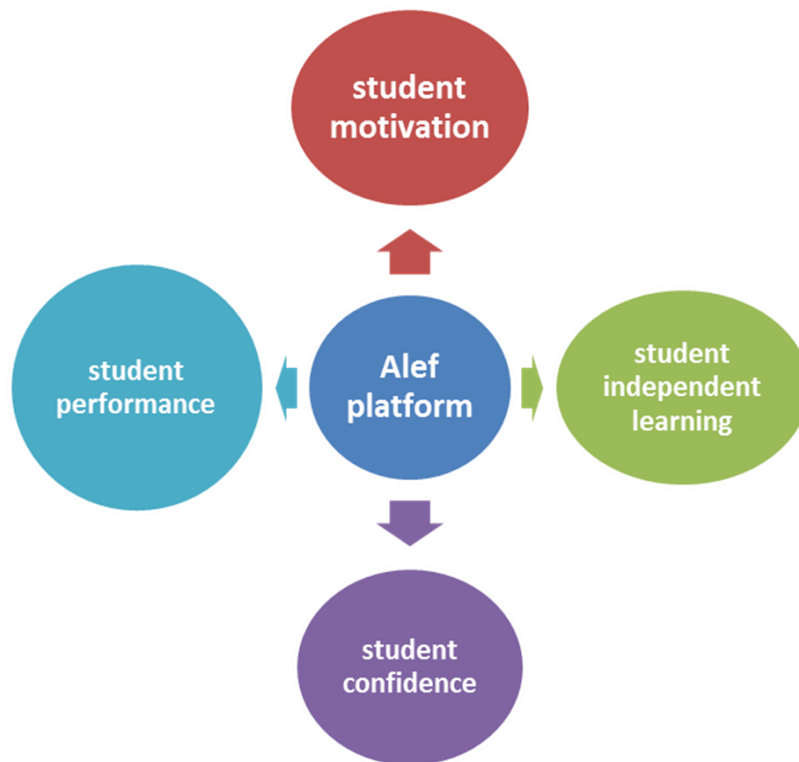
2. Literature review

Many arguments can be made to suggest that effective professional learning teams,

differentiated instruction, and increased collaboration could motivate students and inspire them to want to learn with greater engagement. The current research will show, however, that these programs work, but not in isolation and that they are only pieces of the puzzle necessary to address the need to develop a globally competitive educational plan that will prepare students in the UAE to be innovative, competent, 21st century learners prepared to enter the best colleges and an international job market. The UAE must create opportunities for this as many other countries are also attempting similar transitions. In fact, the OECD reported that countries such as France and Norway have implemented digital literacy into their core curriculum. OECD also said that countries such as Australia have embedded digital literacy into its National Assessment Program and that England, Italy and Estonia have implemented coding into both the secondary and even the primary programs (OECD Observer, 2018).

So what are the reasons for the implementation of digital literacy now? The European Digital Action Plan for 2020 based its call to action on the statistic that 80% of people in European countries use their mobiles for social activities. The report states that primary and secondary schools are lacking in their use of technology and that in many cases those schools are not equipped to support digital learning. The EU plan reports that only 18% of secondary and primary schools were even connected to broadband internet in 2015, heightening the call to action.

Furthermore, Bartholomew, and Reeve (2018) argue that mobile devices can be a powerful

educational tool that students use every day and that these devices should be used in the classrooms where teachers can reinforce its educational value. Additionally, Bartholomew and Reeve (2018) contend that this is an "electronic age of connectivity" and that the time is now to make these changes. Bartholomew and Reeve (2018) add that in their study of using mobile devices in school, teachers are better able to monitor what students are doing when their activities are brought to an online forum. Furthermore, many students' own smartphones which indicates that these devices could be used to improve learning, motivation, engagement, and student progress.

Granito and Chernobilsky (2012) define motivation as an "internal condition that initiates behavior." The article argues that motivation is the key to lifelong learning. Most importantly, Granito and Chernobilsky (2012) say that students are motivated by activities that interest them and that arouse their curiosity. Granito and Chernobilsky (2012) contend that positive motivation is encouraged by technology. It is implied that technology answers the call for the need to motivate learners. In fact, Granito and Chernobilsky (2012) believe that teachers should be encouraged to infuse many activities with digital learning to ensure that students are engaged. Researchers anticipate that such elements might begin to motivate students intrinsically.

Francis (2017) found that although 92% of students use technology in their homes that less than 50% access technology for academic purposes. They argued that technology changes how students learn and should be reflected in school pedagogy. Integration of technology

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in the classroom should motivate students at all levels from students with disabilities to high performing students. Francis (2017) contends that appropriately infusing technology into the main subjects such as social studies, math, and reading motivates all students and that "technology supports the need for divergent learning approaches." He suggests that assistive technology devices provide an equal learning opportunity for disabled students and that technology gives those students a chance to learn along with their peers.

Wilkinson and Lancaster (2014) found that when teachers used online tools such as Facebook, Kahoot, and Vocarro, students were engaged and took more responsibility for their learning. Wilkinson and Lancaster (2014) also recognized that when the vast majority of a population owns smart devices or laptops, educators should provide learning opportunities using those devices thereby motivating students to want to learn.

Gedera & Williams and Wright (2015) use the Oxford Dictionary to define motivation as "the desire and willingness to do something." They argue that motivation can be both intrinsic and extrinsic. In this argument, Gedera & Williams and Wright (2015) contend that extrinsic motivation factors such as the use of effective teaching strategies can reinforce intrinsic motivation in which a student would experience the joy and excitement for learning. Gedera & Williams and Wright (2015) argue that the use of educational technology can trigger a passion and joy for learning which also prompts motivation. This article links motivation to student engagement and reinforces that motivation and student engagement is linked to learning outcomes. Earlier philosophers defined engagement as

"aspects" such as "effort," "interests," "time on tasks" and "motivation" (Gedera & Williams & Wright 2015). Bolliger & Supanakorn and Boggs (2010) find that to keep students motivated students must engage with technology. They argue that technology fosters student's collaboration and interaction. In this study, researchers found that educators are able to make learning more realistic and adaptive to everyday life. When learning is more interactive students are more satisfied. In online education, satisfaction is believed to be one of the five pillars of quality (Bolliger, Supanakorn & Boggs, 2010).

Eaton, et al. (2018) contend that AI supports differentiated learning and encourages team collaboration and independent learning. Instructors now have time to conference with students on their progress and support group discussions. The article recommends that learning simulate that which draws students to technology and warns that these innovative instructional practices should be creative and maintain the interest of the learner by imitating that which they would learn and engage within the real world. In other studies, the positive impacts on student engagement links educational technology to the decreasing drop-out rate which implies that student satisfaction and engagement encourages students to come to school (Eaton et al., 2018). For example, one study initiated in a middle school mathematics classroom based on a Hands-On Equations App made for iPads showed that while using this application, students were more engaged and motivated to learn mathematics. In fact, the learning outcomes improved (Henrie, Halverson & Graham, 2015).

Many school systems all over the world are initiating one-to-one initiatives in which every student has access to their own laptops and/or tablets at school. Online learning is being pushed in every corner of the education community from K12 to colleges and universities. Some learning is blended and some learning is completely online. The numbers of these courses are increasing (Chen, Lambert & Guidry, 2010).

On-going research suggests that digital learning improves students' academic performance, learning achievement and encourages them to do more. It also motivates their learning skills especially in solving problems and decision-making which helps them build self-esteem for their future careers (Sarkar, Mohapatra, & Sundarakrishnan, 2015).

Digital learning urged the student to focus on their studies. When using digital systems, students will not just go to school as a requirement but they will consider their studies as part of their lives that build their future. This type of learning enables them to enhance and extend their abilities to learn more experiences and develop better understanding of digital technologies (Henderson, Selwyn & Aston, 2015).

According to Paechter, Maier and Macher, (2010) achievements of the students depend on how they are motivated to do their job well. Digital learning inspires each student to target highest achievement which will mold their character to trigger their interest in education. Students will further gain sufficient chances to apply what they have learned using a digital system. They will use their time properly to process the leanings in their lives and be driven to do well with their studies (Astiti, 2018).

3. Research Methodology

Quantitative method was used in this research project. A student survey was given to determine if the Alef Platform enhances student motivation and student confidence in the main subjects at the Al Asayel School. Term 1 and Term 2 student results were used to answer if the Alef Platform enhances student performance at Al Asayel School. Analyzing these responses will help to determine if the Alef Platform enhances student performance at Al Asayel School in the main subjects or not.

3.1 Participants

During the academic year 2017/2018 a total of 240 female students in sixth grade received instruction through the Alef Platform at the Al Asayel School in the Emirate of Abu Dhabi. Of these 240 students, 203 girls participated in the survey study which represented 85% of the grade six student populations. All of the student subjects received instruction through the Alef Platform in the key subjects Islamic, Arabic, English, Math, Social Studies and Science during the academic year 2017/2018.

Student performance was measured for the 203 grade six student subjects who took the trimester one math and science Ministry of Education (MOE) exams. The researchers analyzed attainment by the average of students passing at 50% or higher in addition to the average of all students' scores out of 100%. Both scales are aligned to MOE standards.

3.2 Instrument

A quantitative multiple-choice grid survey using a 5-Likert scale was initiated with the student subjects to measure if digital learning enhanced student motivation and student confidence. Survey questions measured student computer access, student motivation to learn using digital technology and the Alef Program, collaborative opportunities with colleagues provided to students using their devices, overall experiences using digital technology and general feedback about the Alef Platform. The Likert scale ranged from 1-5 with 5 meaning that the student participant strongly agreed and 1 indicating that the student participant strongly disagreed.

Diagnostic tests in the main subjects were used to compare student progress from trimester one, two and three. This data instrument measured if digital learning enhanced student performance.

3.3 Procedures

As a pilot, 27 test subjects were used to test the reliability, validity, and readability of the questions as they were written for age group ten to twelve year olds. Participants were selected using simple random sampling. These small groups of students were chosen to pilot the survey to check that the questions were readable, reliable and valid. The sampling group was randomly selected from grade 7. It was determined that the only question that was not readable, reliable or valid was a question about devices in which students were

confused about the word "device." The question was rewritten with the word "device" spelled out and then given to the 6th grade student subjects to determine final results.

A comparative analysis was performed to investigate student progress and end of term results were compared between subjects.

3.4 Ethical Issues

The instrument used to create the survey was Google Forms. In order to ensure responses were reliable and valid, researchers did not capture emails. Responses were anonymous to ensure validity and reliability. The researchers explained that emails would not be captured before the start of the survey. Additionally, the surveys were administered through the English classes. English teachers did not conduct surveys for students for whom they were responsible.

4. Findings and Discussion

In this section, descriptive statistics and the SPSS (Statistical Package for the Social Sciences) system were used to analyze the quantitative data of the student surveys. Currently, many researchers use the SPSS module to analyze quantitative data to then present their findings (Paura, & Arhipova, 2012). Additionally, to understand if the Alef Platform enhances students' performance researchers analyzed two sources of data. First they compared students' performance data on the MOE exam from term one and term two. Then they compared the diagnostic test results from September, December and March.

The Cronbach Alpha test was used to test the reliability of the motivation questions for all main subjects. This test determines that if the survey was conducted in the same way at different times that the "same variables" would be measured the "same way." The Cronbach Alpha expects a value above 0.7 to be reliable (Bryman, A. & Cramer, D. 2011).
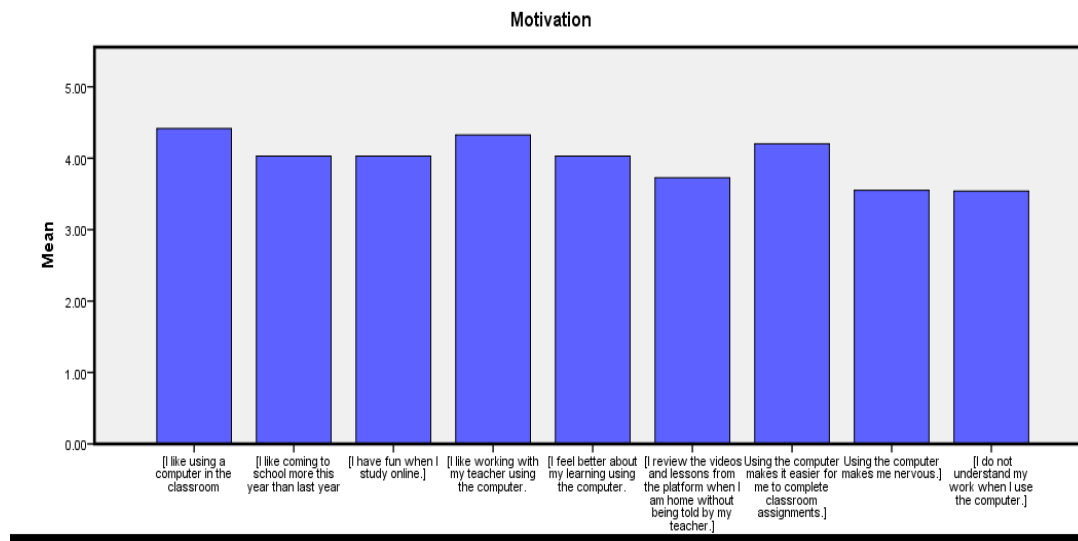
4.1 The impact on students' motivation

The first research question of the research answered, to what extent does the Alef platform enhance students' motivation, as it relates to their learning in the area of the main subjects in the Al Asayel school. The student survey results in Table1 presents, the Reliability Statistics (Cronbach's Alpha) for motivation questions (0.746 > 0.7) and Table 2 (one-sample test) shows that the Sig.(2-tailed) is .000 for all nine motivation questions. The significance measure is very high and supports the hypothesis that that Alef Platform enhances student motivation to learn in the main subjects at Al Asayel School. Also, Graph 1 below shows that the mean for all motivation questions is above 4. Therefore, all students strongly agree or agree that the Alef Platform motivates them to learn and, that using the computer in the classroom makes learning fun.

Table 1: Cronbach Alpha Values

Description	Cronbach's Alpha	N of items
Students motivation	.745	9
Islamic Subject	.803	10
Arabic Subject	.786	10
English Subject	.795	10
Social Studies	.849	10
Math Subject	.851	10
Science Subject	.868	10

Graph 1: Motivation

Table 2: One-Sample Test

	Test Value = 0					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
[I like using a computer in the classroom	60.957	201	.000	4.41584	4.2730	4.5587
[I like coming to school more this year than last year	44.442	201	.000	4.02970	3.8509	4.2085
[I have fun when I study online.]	44.442	201	.000	4.02970	3.8509	4.2085
[I like working with my teacher using the computer.	57.185	201	.000	4.32673	4.1775	4.4759
[I feel better about my learning using the computer.	47.696	201	.000	4.02970	3.8631	4.1963
[I review the videos and lessons from the platform when I am home without being told by my teacher.]	42.120	201	.000	3.72772	3.5532	3.9022
Using the computer makes it easier for me to complete classroom assignments.]	54.142	201	.000	4.20297	4.0499	4.3560
Using the computer makes me nervous.]	33.275	201	.000	3.54950	3.3392	3.7598
[I do not understand my work when I use the computer.]	33.690	201	.000	3.53960	3.3324	3.7468

4.2 The impact of Student confidence and independent learning:

In order to investigate if the Alef platform enhances student confidence and independent learning at Al Asayel School, there were questions in the survey which were: if a student is comfortable studying online more than with their books, if they feel more comfortable reviewing the lessons at home where there is more time for them to understand, if they feel more comfortable reviewing the lesson at home when they are uncomfortable with asking their teacher questions in class, and if they able to understand most topics through online videos without any help. The statistical analysis of these questions shows that the Cronbach's Alpha as in Table3 below is 0.892 > 0.7 which shows high reliability, also the Table 4 One-Sample Test Sig. (2-tailed) is .000 and the mean of these questions in each subject is above 4.0 (Graph 2, Graph 3, Graph 4 and Graph 5) and that gives an evidence that the Alef Platform enhances student confidence and independent learning. In addition to the results from the survey, the student's confidence levels may have been enhanced by the relative familiarity they probably experience when operating in the web-based learning environment, whereby there are automatically more engaged in the learning process.

Table 3: Cronbach Alpha Values of confidence questions

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No. of Items
.892	.894	6

Table 4: One-sample Test

One-Sample Test

|	Test Value = 0					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
confedence1	54.814	201	.000	11.22772	10.8238	11.6316
confedence2	57.390	201	.000	11.59901	11.2005	11.9975
confedence3	55.729	201	.000	11.60396	11.1934	12.0145
confedence4	50.224	201	.000	10.94554	10.5158	11.3753
confedence5	48.781	201	.000	11.14356	10.6931	11.5940
confedence6	45.900	201	.000	10.81188	10.3474	11.2764

Graph 2: Islamic subject
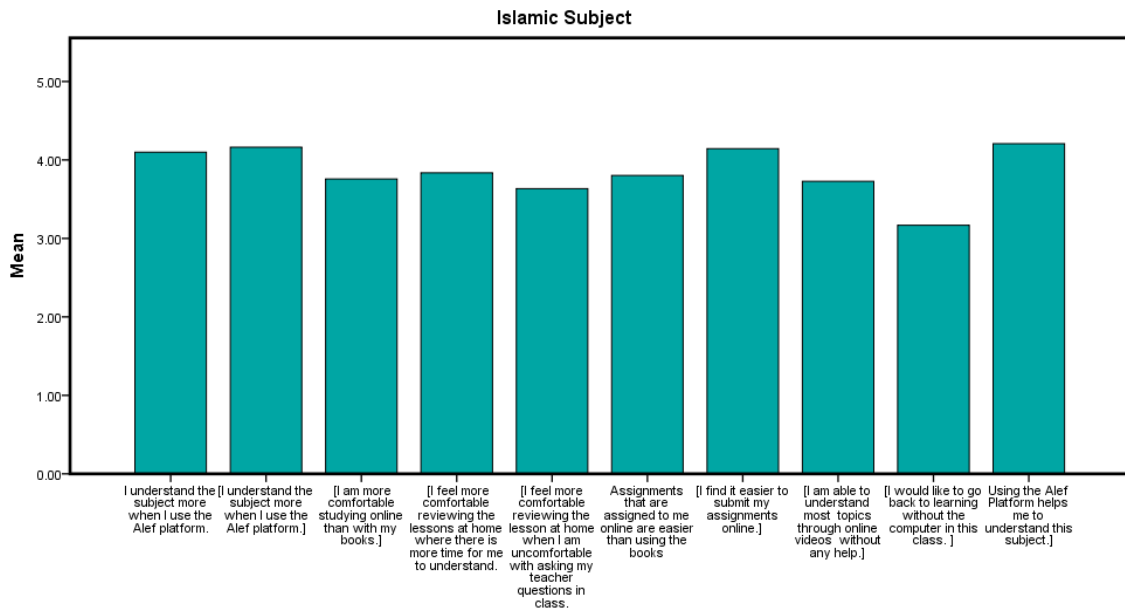
Graph 3: Arabic Subject
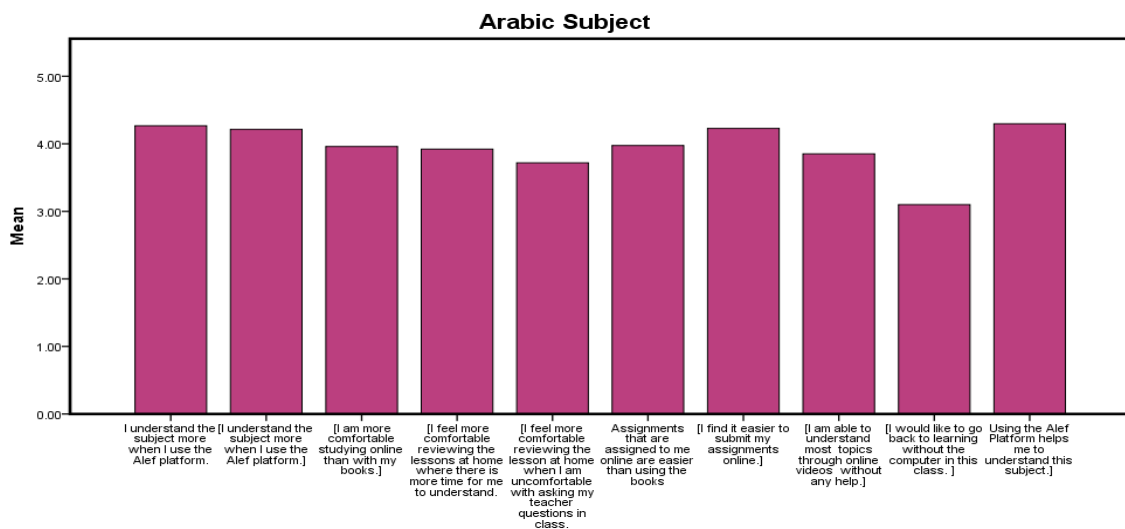
Graph 4: English Subject
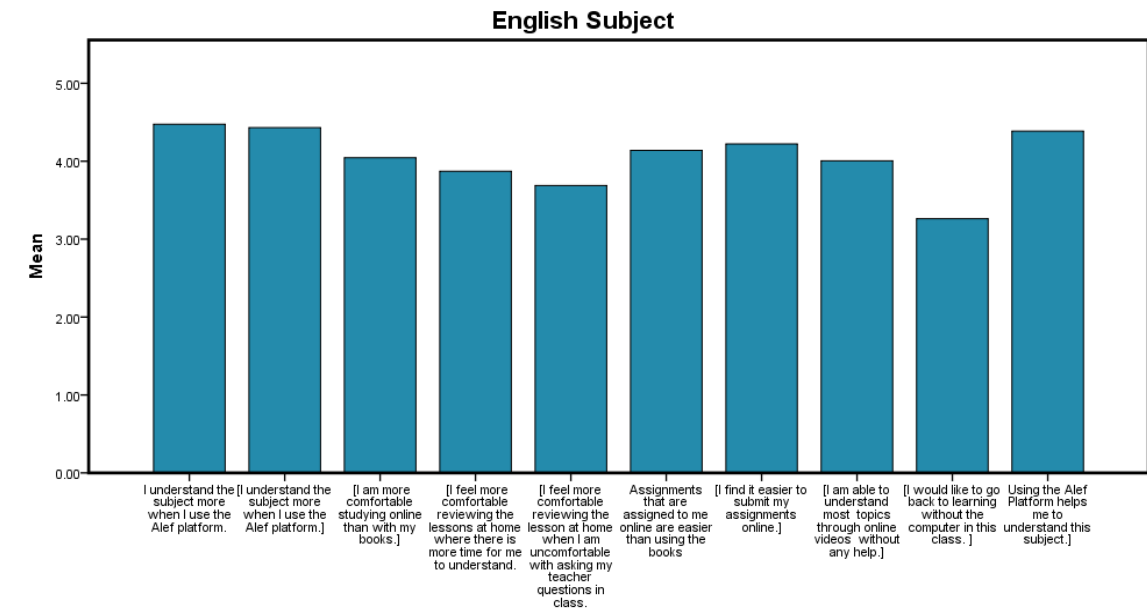
Graph 5: Comparison of Subjects
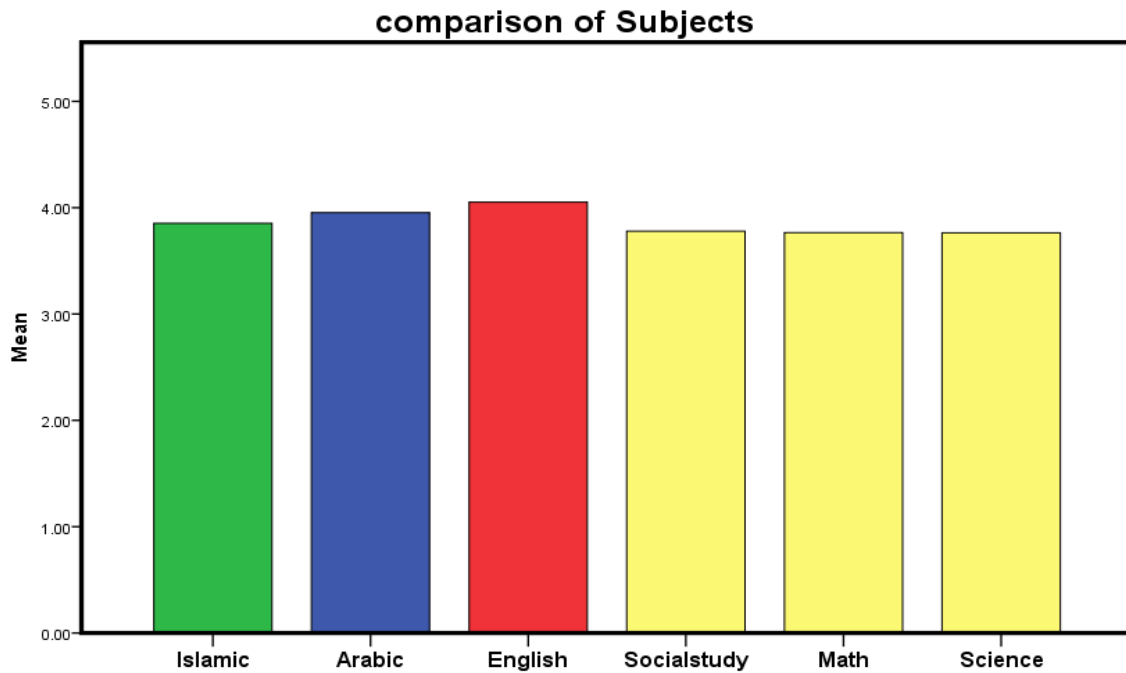
4.3 The impact on students' performance

The next question investigated was: to what extent does digital learning enhance students' performance in the main subjects at Al Asayel School. The researcher compared between student exam results in trimester one and trimester two, and also compared between student results in the three diagnostic tests. In addition, the researcher presented selected analysis of student responses on survey questions about their understanding of the academic concepts through watching videos. The students survey results indicated the Cronbach's Alpha for all subjects as 0.803,0 .786,0 .795,0 .849, 0.851,0.868which are all above 0.7 and that means that the reliability of the results is high. And also as per the subject graphs shown previously in this research, the mean of student responses is above 4 which means that most students thought that the videos at Alef Platform helped them to understand academic concepts well, which supports the hypothesis that the Alef Platform enhances student performance. Videos to introduce and summarize academic concepts in every lesson is an innovation of the Alef's approach and it seems to engage well with the present generation of students who are exposed to high quality multimedia content in all areas of their lives, especially outside the classroom. The comparison of subjects' graphs also shows that the mean of all students' responses about the subject was above 4, and that English was the highest followed by Arabic and Islamic Studies, and the other three subjects.

Alasayel School students had a math exam from the MOE in trimester one and another in trimester two, the comparison of the average scores between trimester one and trimester

two in the graphs (Graph 6 and Graph 7) below shows that there is big improvement in the average of student results at the exam, it shows a significant shift from 20% to 60% in the exam scores. This proves the hypothesis: The Alef platform enhances student performance in the main subjects at the Al Asayel School**.** The significant improvement in the trimester two student scores in math can potentially be attributed to the fact that students probably needed some adjustment to their learning practices as they were introduced to this new way of digital learning. By trimester two, the students had better adoption to the Alef Platform and the results were evident in the exam scores.

The last two graphs (Graph 8 and Graph 9) compare student performance at the diagnostic tests at September, December and March in the subjects of math and science. The graphs show that there is significant progress in student performance throughout the period. The progressive improvement in the diagnostic test results in both subjects indicates that the average student performance improved as students embraced this new method of primary classroom academic learning. Further in the case of math and science, students probably benefited from the experiential learning sessions where they were able to experimentally understand the academic concepts to potentially further enhance their engagement in the subject matter.

From the analysis of the student surveys, trimester one and two MOE exams and the diagnostic tests, it is evident that Alef Platform enhanced student performance at Al Asayel School.

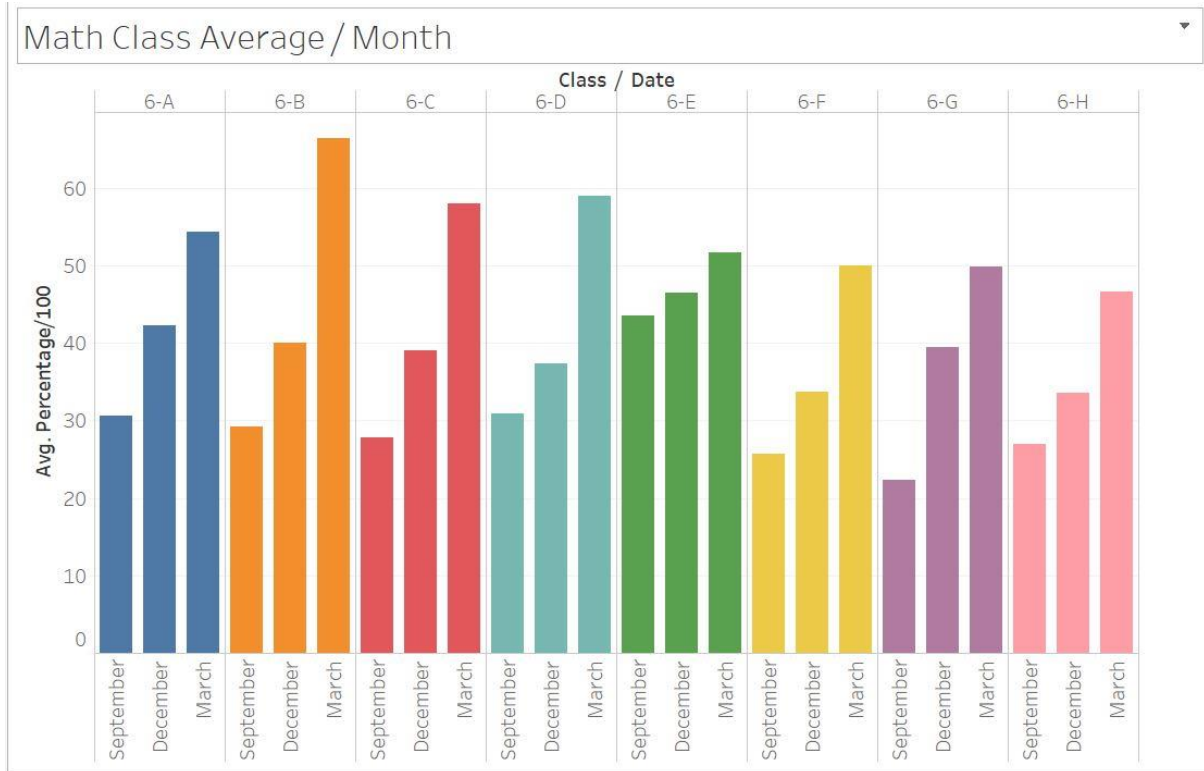*Graph 6: Comparison of average end of Term1 and Term 2*

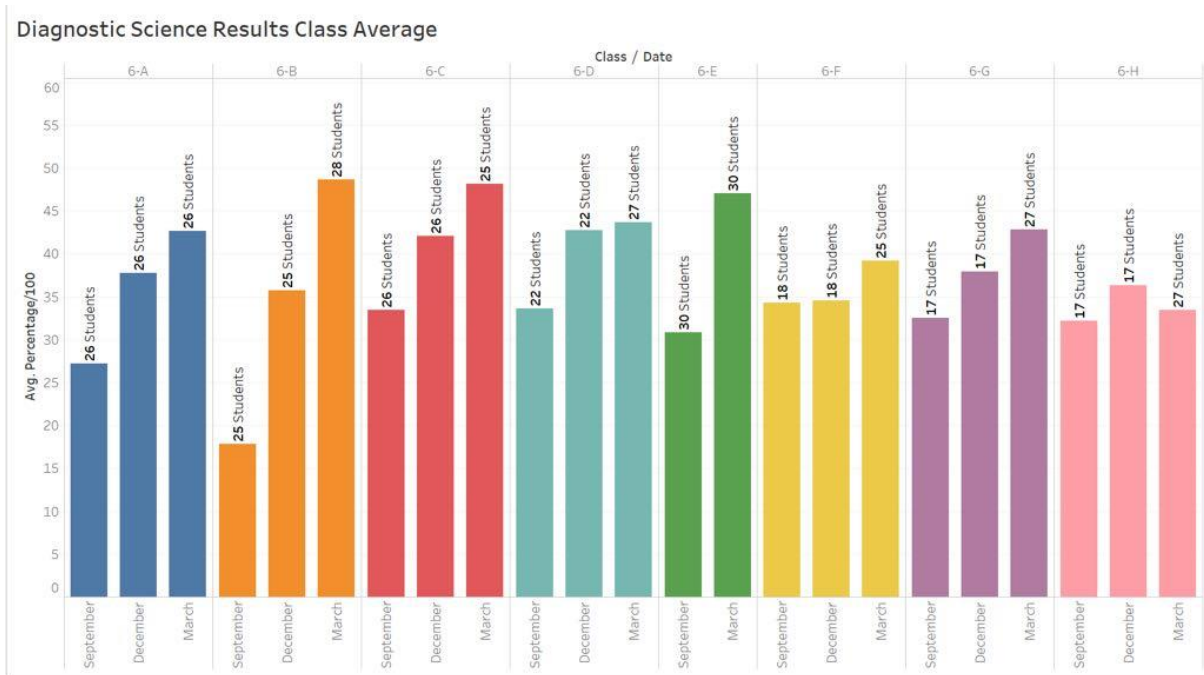*Graph 7: Comparison of average scores by sections*
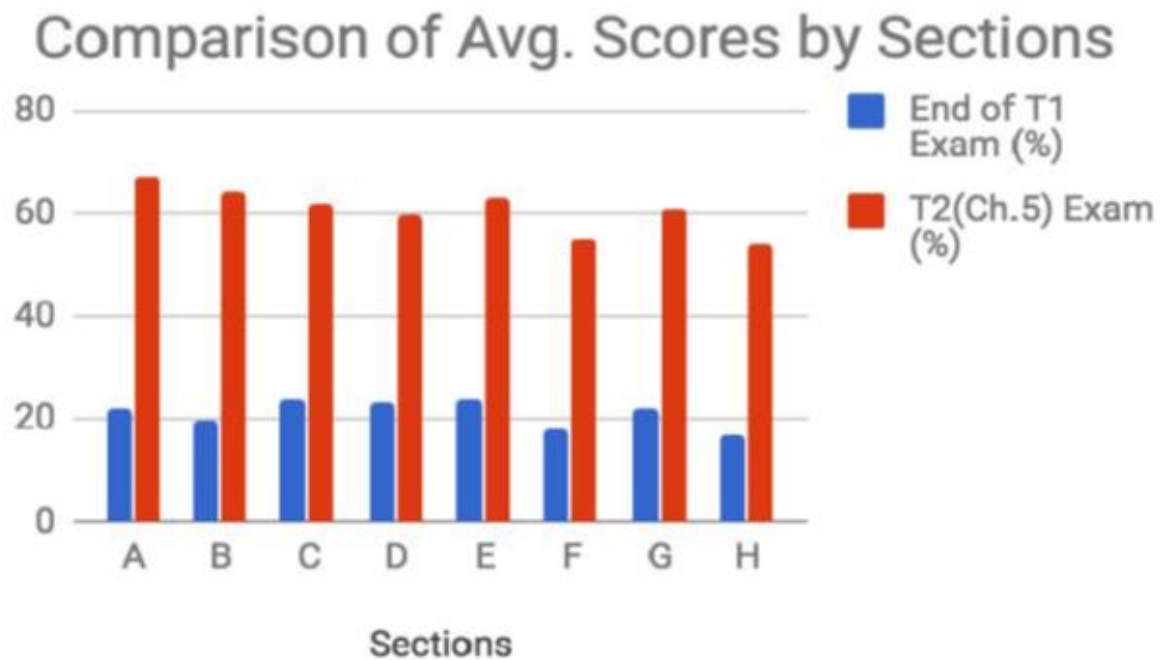
Graph 8: Maths class average/month

Graph 9: Diagnostic Science results class average

5. Implications for Future Studies

Al Asayel is an all-girls public school in Abu Dhabi located in Khalifa City. Many of the girls are from affluent families in which the families do not need support or the families have their own support and means for food, clothing and shelter. Therefore, there were no boys or children of poverty who were a part of this study. In academic gender-based studies performed on both international and national scales, one report conducted in the UAE in 2013 by the Sheikh Saud bin Saqr Al Qasimi Foundation for Policy Research found that boy's dropout rates should be investigated prior to making broad-based conclusions about the effectiveness of any system. Implementing this study in a boys' school will give a more

holistic view of the effects of technology and AI on teaching and learning and in addition will serve to answer questions about the implications of motivation and specifically whether technology and AI will minimize the dropout rate gap between males and females. Furthermore, a study for implications on the motivational effects of technology and AI on students who are victims of poverty will specifically answer questions that could positively impact the secondary graduation gap among students across all demographics.

6. Conclusion

The Alef Platform is not just about placing computers in classrooms and telling students to begin learning digitally. The platform requires a cultural transformation for the learning environment with significant change management to support the transformation of this learning environment. The teachers and administrators progressively become facilitators of learning with the implementation Alef. The Alef Platform does not replace teachers in the classroom and will not disengage teachers from their students. The platform is designed to change the workload of the teachers giving them the opportunity to work more diligently for the benefit of each student. Rather than spending hours working on planning lessons and gathering and analysing data the teacher can now use that time preparing individualized instruction to address the specific needs of her students. In its first academic year of implementation, the Alef Platform had a positive impact on student motivation, student learning and student performance at the Al Asayel School. With continued research and

development and broader implementation in the school systems, Alef has the potential to

positively impact education both within the UAE and internationally.

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