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EVALUATING THE USE OF A SPECIALISED TECHNOLOGICAL APPLICATION ON STUDENTS LEARNING GROWTH

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Identification of a Researchable Problem:

From experience, students usually only drop in their achievement levels when faced with a situation that is beyond their control. Situations that impact on them are either physical, mental or both, such as bullying, family sickness or death. The global pandemic that swept the world was a situation that had globally affected all human beings. This impact was substantial not just from a humanistic perspective of wellbeing but also economically and academically. The economic and human impact was an experience that could be seen directly within the schools of qatar. Large swathes of children were showing lower academic levels than was predicted before the pandemic. When we returned from Covid, levels of learning were below what teachers expected. Globally, government and school expectations was for children to catch up. Locally, this was also the expectation. Schools behaved in such a way, that they wanted children to continue as if they had not missed a second of education. Experience and observation showed differently.

This issue was at the forefront of leadership thinking. How could students catch up when the expectations and methods of delivery of educators had not changed? Based on the data and research that has been collected, analysed and shared, and from observation and experience, it became obvious that students were not naturally catching up. Teachers were not able to fill the gap for those students who had academically 'fallen behind'. Thinking bigger meant looking at the options available. Technology in its substantial growth presented those options.

As the world came to terms with the impact of Covid, one of the biggest questions that continues to appear was how students were going to catch up with the learning that they had missed. (Rogers, 2022) Throughout Covid, technology played a major role in the corporate and

real-life world. Rogers, considers this question and looks at how education tried to integrate technology into the learning process, however unlike the corporate world, no real effort was put into meaningful integration and future continuity. Prior to the pandemic, Qatar intentionally placed technology on its economic agenda as part of their future growth and development. Kamel, S. (2014)

Looking deeper into this global issue, 1. 6 billion students had been affected by the pandemic, and that amounts to a financial impact of $17 trillion dollars in lifetime earnings of lost skills. (Pearson, 2022) From a localised perspective this negative effect was not the only impact on students. Research carried out by UNICEF in 2020, also showed that students in the middle east were impacted educationally from an emotional wellbeing perspective. (Touma et al., 2020) Distance learning programs were successful in most middle eastern countries. Qatar was one of those countries where schools successfully integrated blended learning because of upskilled workforces and school communities prior to the pandemic. (Qatar Foundation, 2021)

From the midst of the pandemic, impact could be seen on 2022 baseline data, and historical 2020/21 achievement levels of students. Students' academic achievement compared to previous school years prior to the pandemic was noticeably lower. Students previously showing higher levels of achievement had slipped. Having missed or not being able to keep up with online academic learning meant that skills development slowed down or stopped for those with already low academic levels. Alongside that, the mental wellbeing of students, staff shortages caused by wellbeing issues, high rates of absenteeism and quarantine all impacted on academic levels. (Kuhfeld et al. 2022)

In short, the pandemic had a tremendous effect on millions of lives from a social and economic perspective. Compared to previous pandemics however, society had adapted and connected faster than ever. The economic impact had seen businesses closed, job losses and economic crashes. However, the development and use of technology grew at disproportionate rates. (Saher & Anjum, 2021) This created jobs, simplified communication, created connections between families and allowed education to continue in a blended format. Research had shown that technological innovation changed the parameters of life, communication, and learning. Covid exposed many challenges when it came to education. Teachers were not prepared fully and had never been forced to include technology in their teaching repertoire.

Children embraced technology beyond the expectation of parents and teachers. The new younger generation were already more capable of adapting with technology and this benefited the education world. As Fatma Koprulu, (2021) stated in her research, 'technology had replaced traditional teaching methods of using the pen'. To a degree this has been true but as schools settled back into their norm, the challenges of technology in education and teachers lack of full understanding was exposed. (Janssen, n. d. ?) This led to the question of how technology could be used effectively to support student learning growth.

The purpose of this study was to look at how a specialised technology could be implemented to close skills gaps faster than normal classroom teaching was able to. The study incorporated different groups of students across different grades and academic ability levels within a private and government school. Students involved included those from special education, students in learning support, and mainstream students. The students participated in testing that identified their baseline level of skills in language and reading. The testing was either

completed within the Specialised Application, or within an application that produced baseline data to upload into the specialised application. Once completed or uploaded, the application then adapted to student ability and tracked students mastery of skills. According to the recommendations from the applications research papers, students should normally spend a minimum time of 30 minutes per week for an academic year. To see growth for the purpose of this study, students were allocated more time per week to identify if skills mastery through an application was achievable in the time allocated to the study length.

Literature review

The use of specialised technological applications in education has become increasingly popular in recent years as technology continues to advance and the need for students to be more tech-savvy grows. These applications, are designed to enhance student learning and engagement, and can be used in a variety of ways to support student growth.

A specialised technological application that has been shown to improve student learning is the use of educational games and simulations. These interactive tools allow students to engage with content in a fun and engaging way, and can be used to teach a variety of subjects including math and literacy skills, (Barab & Squire, 2004). Research has shown that educational games can improve student motivation and engagement, as well as increase student achievement (Gee, 2003). Additionally, educational games and simulations can be used to support problem-solving and critical thinking skills, which are essential for student success in today's world (Barab,

Thomas, Dodge, Carteaux, & Tuzun, 2005).

A further specialised technological application that has been effective in supporting student learning is the use of adaptive learning systems. These systems use data and algorithms to personalise learning for students, providing them with individualised feedback and resources to support their learning needs (Kirschner, Strijbos, Kreijns, & Beers, 2004). Research has shown that adaptive learning systems can improve student engagement and motivation, as well as increase student achievement (Dabbagh & Bannan-Ritland, 2005). In addition, adaptive learning systems can be used to support problem-solving and critical thinking skills, going beyond just improving their understanding of the subject material (Kirschner, Strijbos, Kreijns, & Beers, 2004).

The use of specialised technological applications in education has become increasingly popular in recent years as technology continues to advance. These applications, are designed to enhance student learning and engagement, and can be used in a variety of ways to support student growth. The use of adaptive learning systems have all been found to be effective in supporting student learning due to the targeted support of missing or skills gaps within the expected age boundary. One of the key advantages of using specialised technological applications in education is the ability to personalise learning for students ensuring that students are able to learn at their own pace and in a way that is most effective for them. Additionally, these applications provide students with hands-on learning experiences followed by immediate skills level mastery checking of understanding that may not be possible every single time within the traditional classroom.

However, it is important to note that the use of specialised technological applications in education is not without its challenges. One of the main challenges is ensuring that students have access to the technology and internet connectivity required to use these applications. Additionally, there can be a lack of training and support for teachers in how to effectively integrate these applications into their classrooms.

Research Purpose and Questions:

The research aimed to identify if a specialised technological application (STA) could have an impact upon student growth and skills mastery. The studies had been conducted across different schools within Qatar Foundation and Ministry schools and would include a range of school grades, nationalities, genders and learned abilities. The goal was to demonstrate that learned growth could been accelerated to closed gaps in learned used an STA

Research Question:

Can a Specialised technological application (STA) impact on the learning growth of students?

Hypothesis:

Student learning growth had been accelerated and more precisely impacted using a specialised learning technological application.

Variables

Independent variable:

 The use of a Specialised technological application capable of identifying skills mastery

Dependent Variable:

 Students' responded to the application shown through demonstrated learning growth.

 The number of skills achieved, demonstrated through the total amount of mastered skills.

Definition of Terms:

Specialised Technological Application (STA):

 Specialised software is software that is written for a specific task rather for a broad

application area. (Specialised software in a sentence: Sentence examples by Cambridge

Dictionary)

Learning:

 A process that leads to change in a behaviorally potentiality, which occurs as a result of

experience and reinforced practice for improved performance and future learning.

Growth:

 How much the students are improving in their proficiency as they move through the

school system, it can be measured quantitatively.

Likert scale:

 Various kinds of rating scales have been developed to measure attitudes directly. It's a

five-to-seven-point scale which is used to allow the individual to express how much they agree

or disagree with a particular statement.

Skills gap:

The identification of a missing academic skill required to be successful at the appropriate

level of learning. (Collins Dictionary)

Diagnostic testing:

Assessments used by teachers to help them recognise each student's strengths,

weaknesses, and their skills level. (Macmillan Dictionary) ("Diagnostic Assessment: Meaning,

Examples, and Types - Harappa")

Mastery:

A comprehensive knowledge and high understanding of skills in a subject. (Cambridge

Dictionary)

Methodology

The Approach

Data was collected from several areas both quantitative and qualitative. Qualitative data was

collected through surveys that were presented to both teachers and students who participated in

the research. Questions were asked of both groups using a Likert scale. This provided a greater

understanding of responses rather than simple yes/no answering. Data was also collected through

the application itself which tracked the achievement of students through the number of skills that

were able to be mastered.The research was split up into different stages: preparation, baseline

assessment, delivery and ongoing assessment, data collection and analysis of both data sets.

Data Collection Plan:

A range of data collection instruments had been used to create a cleared picture of learned growth. As the research had included historical data, it was important to have other forms of data. This was due to the impact of Covid on historical data

Historical data had been gathered to identify students' prior skills level. This had also potentially assisted in measuring previous learned growth of the students.

Data collection also occurred in used surveys. These had been shared with teachers in the beginning and end to collect quantitative data. The survey identified teachers' professional understanding of where students began and finished. It showed from a professional perspective whether they had seen an improvement in learned growth in the classroom. A survey was also shared with students to gauge how they felt about their learned growth both before and after the process.

As part of the surveyed analysis, interviews had been utilised. These helped to gain further insight into the thoughts and feelings of both teachers and students related to the learned growth. It was important to understand also whether the growth was directly related to the application being used.

Prior to the use of the STA, diagnostic testing took place to identify the accurate current levels of the students. This allowed the STA to set a starting point from where growth measurements had been taken. Growth skill mastery data had been produced by the STA itself once students began to use the program. A second diagnostic was therefore not necessarily due to the reporting element built into the STA

The learning growth picture came from the previous historical data, data produced within the STA, survey data and interviews.

Instrument:

The instruments that were used in this research included likert scale surveys, face to face interviews, historical secondary data, and primary data collection. These surveys were intentionally designed and created by the team for the purpose of eliciting exact data.

The survey contained a series of closed question statements linked to learned growth, such as, 'I had previously used a Specialised technological application', and also, 'students demonstrate mastery of skills rapidly.' These questions have been answered through the closed five-point scale responses, 'Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree' (Willott, 2021). As Lindsay Willot (2021, July 5) explains, a Likert Scale survey helps to create an understanding of both the teachers and students' opinion both on their learned growth and on the STA. This gave us a quantitative perspective towards understanding the STA and its impact.

Face to face interviews were also conducted. These allowed the qualitative data to be collected to support the quantitative data researched. Using this tool for research allowed for controlled structured questioning. By doing this a more accurate response was gained. It was easier to gain more truthful information when face to face. (Jennings, 2005)

An important tool within this study was the data collection element. Data had been collected both as primary from within the STA and secondary from historical baseline and end of term data. These tools were extremely important to the study. They had been used to identify both the prior academic level and potential prior learned growth levels or lack of. The primary data gave a measurement of how much growth had occurred within the timeline. Data was also analysed through comparison using simple growth models and or percentile growth models.

Within the STA, data was also produced that demonstrates the skills mastered. Comparing this to other data assisted in the understanding of the impact of the STA.

The surveys delivered to teachers and students were conducted via google forms. This aided in the analysis of the collected data feedback. As a tool, Google forms easily creates a Likert Scale survey (Wolber, 2018). Face to face interviews were also completed in person. Where direct contact was not possible, technological video connections were utilised to allow electronic face to face communication. The interviews took place after the research was completed. This also gave feedback to the process to allow analysis of the effectiveness of the studies and the overall understanding and engagement throughout.

Teacher survey statements: https://forms.gle/pUXChYPqPTZKEzA8A

	Strongly Agree	Agree	Neutral	Disagree	Srongly Disagree
1 I have previously used a specialised technological application	☐	☐	☐	☐	☐
2 Specialised technological applications can make a difference to student growth.	☐	☐	☐	☐	☐
3 Students are able to demonstrate mastery of skills rapidly	☐	☐	☐	☐	☐
4 Students demonstrate mastery of skills quickly	☐	☐	☐	☐	☐
5 Students are able to self regulate learning	☐	☐	☐	☐	☐
6 Student growth is evident in a single session	☐	☐	☐	☐	☐

Student survey statements: https://forms.gle/6BiLsFy5AJ8Koqt37

	Strongly Agree	Agree	Neutral	Disagree	Srongly Disagree
1 I have previously used a specialised technological application	☐	☐	☐	☐	☐
2 Specialised technological applications can make a difference to my growth	☐	☐	☐	☐	☐
3 I am able to demonstrate mastery of skills rapidly	☐	☐	☐	☐	☐
4 I am able to quickly show my understanding of skills	☐	☐	☐	☐	☐
5 I am in charge of my own learning learning	☐	☐	☐	☐	☐
6 I am able to see my growth in every single session	☐	☐	☐	☐	☐

Teacher Interview Questions:

Do you feel that students were able to demonstrate learning growth more through the use of the

STA?

هل تشعر أن الطلاب كانوا قادرين على إثبات نمو وتطور التعلم بشكل أكبر من خلال استخدام البرامج التكنولوجية

المتخصصة؟

Did the learning growth impact upon class learning?

هل تطور التعلم يؤثر على التعلم في الصف؟

Did learning growth from the STA impact upon their learning within their day-to-day class

learning?

هل أثر تطور التعلم باستخدام التكنولوجيا المتخصصة على تعلم الطلاب من خلال عملهم اليومي في الصف؟

Do you feel that engagement within the class has improved through STA learning growth?

هل تشعر أن المشاركة داخل الصف قد تحسنت من خلال تطور التعلم باستخدام التكنولوجيا المتخصصة؟

Data Analysis Plan:

While completing this research, all data collected within the program and through

surveys has been kept anonymous. Within the progam itself, identifiers linked back to students

within real life have been removed. Letters and numbers had been used to ensure that the identity

and anonymity had been maintained whilst allowing the tracking and comparison of the

participants' data. It was essential to do this as it was considered a norm and a data protection

requirement to not identify individuals directly or indirectly. (McCulloch, 2019) with regard to face-to-face interviews, these had been held either with permission from the teacher with a signed permission form, or in such a manner as to protect the identity of the participant. However, researchers were now finding that teachers wanted to have been known for their part in the research and therefore would not mind being recorded. Shulman, J. H. (1990)

Data gathered through the Google forms was analysed using the mode and median. This allowed us to gain numerical data making it easier to compare after the research had been completed. More specifically, the Likert scale survey gave a compared measurement of the attitudes towards learned growth from students and teachers. (Saher & Anjum, 2021)

Historical data was an important part of the research. As a strategy, historical data supported understanding of a student's prior learned growth patterns. It also aided in determining how much growth a student made over a period of time. By analysing this date, it was possible to compare the primary data collected from the STA. By embracing this data, a clear picture of student-learned growth progression was identifiable (Holland, 2021).

Once a pattern of learning had been established, diagnostic testing was used to establish the starting point within the STA from which learned growth was measured. This establishes a baseline from which primary data has been created within the STA. The primary data within the STA was the main source of data which measured skill mastery. Within the STA data also showed the number of skills that had not been mastered. A simple growth model as shown below, was used to compare data along with a percentile comparison graph. (Stiggins & Hammond, 2016)

Following data collection, a diagnostic test was completed. This added to the

understanding of the researched outcomes in the form of percentile growth. This has been used

alongside skill mastery to have an overall picture of growth.

Following the diagnostic, the final Google survey and video interview took place. These

had been used to identify attitudes, perceptions and understanding of the researched process.

Analysis of the process was essential to understand whether the hypothesis and process was

correct. This identified any flaws, general misconceptions, or misconceptions of data.

Student	Pre Test Score	Post-Test Score	Change
Student A	350	400	+50
Student B	370	415	+45
Student C	380	415	+35
Student D	325	390	+65
Student E	316	370	+60
Class or School Average	347	398	+51

The structure of the research included students from within different test schools. The

schools involved have been identified as A, B and C.

Participants from school A which is a ninety six percent Qatari school includes

approximately thirty individual students from grades six, seven, eight and nine. In school B,

which is one hundred percent Qatari, the students would range from grade three through to grade

eleven. These students had been approximately fifteen in number. In school C, which is also one

hundred percent Qatari, there had been approximately thirty students in grade three. From the

three schools, A and B were both private whereas school C was a public school.

Other project considerations:

With the World Cup having been held in Qatar in November 2022, schools were forced to close earlier than the norm. This meant that the amount of time to collect data was cut short from an eight-week period to a two to four-week period. This was a huge impacting factor upon the length of time that students had to demonstrate achievement within the program.

Secondly, the nature of student engagement within the schools were a concern. Lowered engagement was seen within classrooms as teachers struggled to engage with some students after Covid and the World Cup. In addition to lowered engagement, there had been an increase in absences both in children and staff. This was initially caused by Covid and had led to social emotional issues. Mental wellbeing has become a serious issue and has impacted upon students engaging and attending school. Although parents were supporting their children, it was difficult to engage these students in anything they were not used to.
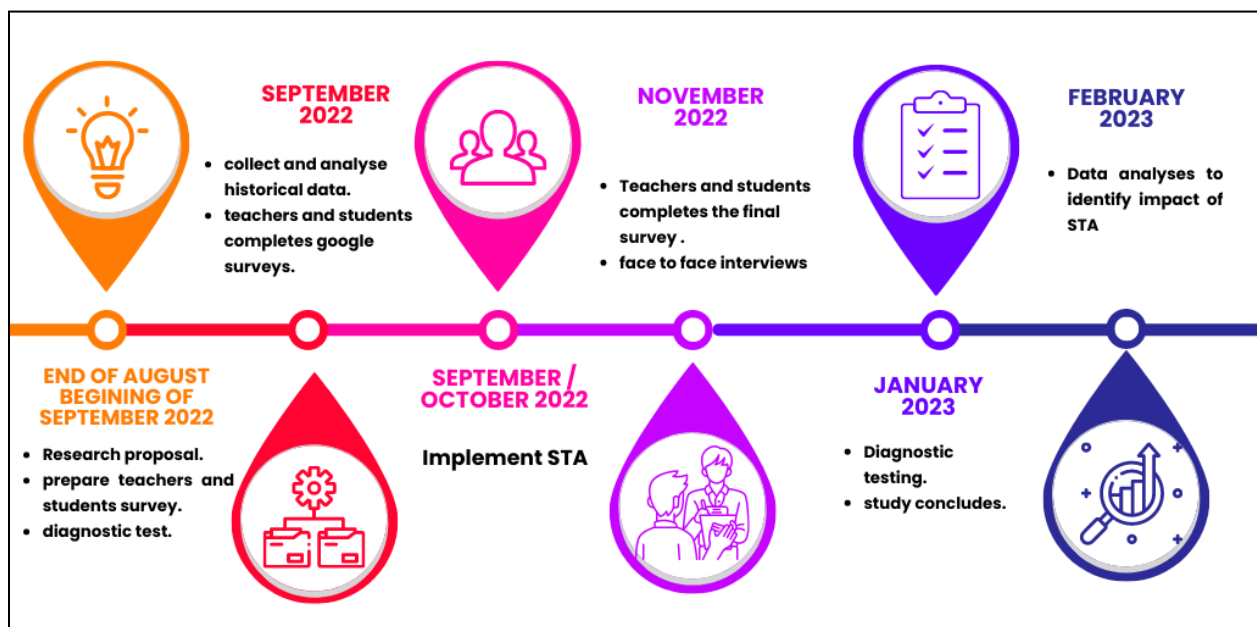
Following directly on from Covid impact, was the Qatar World Cup. All staff and students were on holiday for the equivalent of the summer holidays. This not only prevented use of the STA for the research, but in addition, students became more disengaged again lost opportunity to learn and grow.

In the context of nationalities, a difference has been seen in some areas of language ability linked to dual language learning. Students with language difficulties in English often struggled to engage within the classroom. Occasionally they were not always willing to complete extra work even if it was with technology.

As this study has been completed across educational establishments with different governing structures, the uptake and implementation of the STA has also varied. An additional

impact upon the use also was teacher and student understanding of how to effectively use the

STA.

Project Timeline:

SEPTEMBER 2022
- collect and analyse historical data.
- teachers and students completes google surveys.

NOVEMBER 2022
- Teachers and students completes the final survey.
- face to face interviews

FEBRUARY 2023
- Data analyses to identify impact of STA

END OF AUGUST BEGINING OF SEPTEMBER 2022
- Research proposal.
- prepare teachers and students survey.
- diagnostic test.

SEPTEMBER / OCTOBER 2022

Implement STA

JANUARY 2023
- Diagnostic testing.
- study concludes.

Findings

What happened

Teacher Responses: Baseline and Final

Graphs here

Final Overview of Results

Conclusion and Recommendations for Further Study

Challenges

Expected to see high engagement from teachers - not so due to internal company factors

affecting staff moral, attitudes and willingness to participate. Due to unwillingness of staff,

decision was made not to include them within the surveys, research as they would potentially

impact upon the successful outcomes of the survey.

Changes in school calendar and impact upon student

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