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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 drop in their achievement levels only 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 has 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 were for children to catch up. In Qatar, this was also the expectation. Schools behaved in such a way that they required 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 have 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 most 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 has shown that technological innovation changed the parameters of life, communication, and learning. Covid exposed many challenges when it came to education. Teachers, although mostly tech capable, were not prepared fully and had never been forced to include technology in their daily teaching repertoire to such extent.

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 private and government schools. 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 reading. The testing was either completed within the Specialised Technological Application (STA), or within an application that produced baseline data to upload into the specialised application. Once testing was completed or uploaded, the application then adapted to student ability and tracked the 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 STA's 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 STA 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 mathematics 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 STA 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 STA's 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 STA's 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 a skill is taught within the traditional classroom.

However, it is important to note that the use of STA's 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 an STA could have an impact upon student growth and

skills mastery. The studies were conducted across three different schools within Qatar and

included a range of school grades and learning abilities. The goal was to identify whether growth

could be accelerated to close gaps in learning using an STA.

Research Question

Can a STA impact the learning growth of students?

Hypothesis:

Student learning growth can be accelerated and more precisely impacted using a

Specialised learning Technological Application.

Variables

Independent Variable:

The use of a STA capable of identifying skills mastery

Dependent Variables:

Students' responses 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 responses. Data was also collected directly through the STA itself which tracked the achievement of students through the number of skills that were able to be mastered. The research was conducted with the following population.

- Students from within three different test schools. The schools involved have been identified as A, B and C.

○ School A, which is a ninety six percent Qatari school focused on fifteen

individual students from grades seven, eight and nine.

○ School B, which is a one hundred percent Qatari special needs school focused on

six students from grades nine and ten.

○ School C, which is a seventy percent Qatari government school focused on

twenty- three students in grade six.

From the three schools, A and B were both private, whereas school C was a government

public school. Once students had been identified, it was important to identify the plan of action

to ensure that each school was following the same procedures. The research itself 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 were used to create a clear picture of the learning

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 learning growth of the students.

Data collection also came from surveys that 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 learning growth both before and after the process.

As part of the surveyed analysis, interviews were also utilised. These helped to gain further insight into the thoughts and feelings of teachers related to the learning growth. It was important to try to understand whether the growth was directly related to the application being used which can be problematic with different elements of both teaching, behaviour and attendance having their own impact.

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 were taken. Growth skill mastery data was produced by the STA itself once students began to use the program. A second diagnostic was therefore not necessary due to the reporting element built into the STA.

The learning growth picture came from the diagnostic 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 have previously used a STA', 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 learning growth and on the STA. This gave 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 was 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. 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 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 program itself, identifiers linked back to students within real life have been removed. Letters and numbers were used to ensure that the identity and anonymity has 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 were 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, 1990)

Data gathered through the Google forms was analysed using the mode. 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 learning 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 learning growth patterns. It also aided in determining how much growth a student made over a period of time. By analysing this data, 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 growth had been established, diagnostic testing was used to establish the starting point within the STA from which learning growth was measured. This established a baseline from which primary data was 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 diagnostic RIT Score 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 diagnostic RIT score growth. This has been used alongside skill mastery to have an overall picture of growth.

Following the diagnostic, the final Google survey and 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

Project Timeline
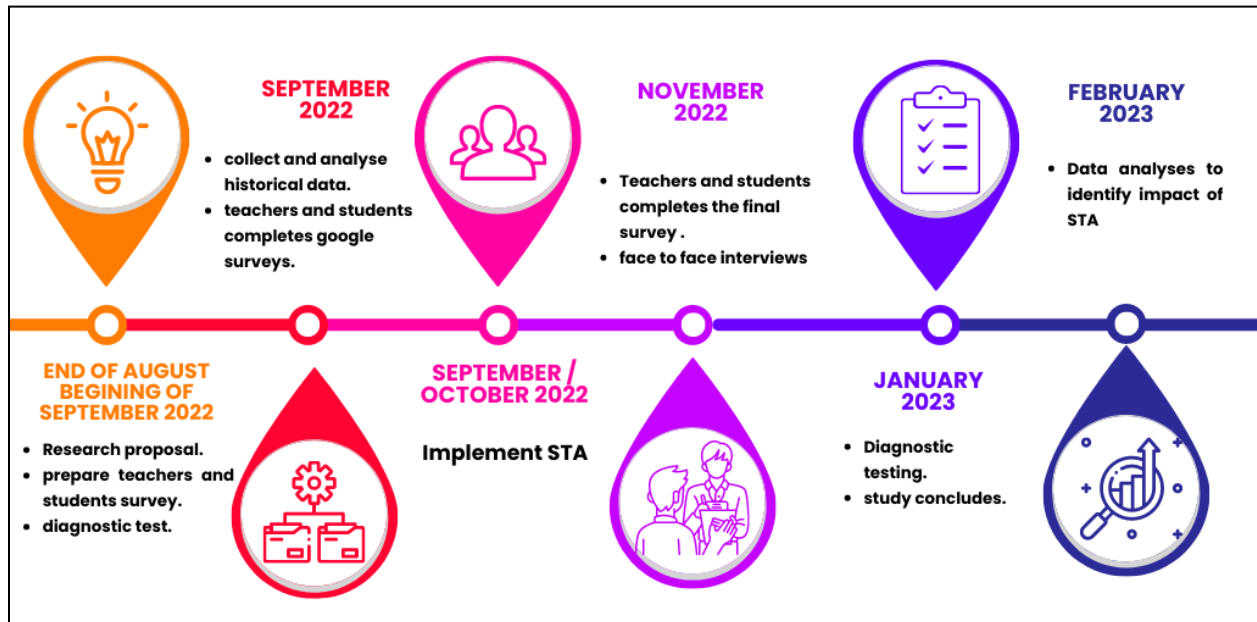
Findings

Using a STA with students who had different needs was challenging. Many factors impacted upon the use of the application such as school closures, illnesses linked to pandemic, social emotional wellbeing, general attendance and overall attitude towards learning.

The measurement of skills mastered through the application was an easy method of seeing how students grew and also how they engaged. When compared to diagnostic testing data and qualitative data from students and teachers further insight can be gained. Attitudes towards STA's were demonstrated both by students through verbal communication and where possible through survey completion. Teachers' attitudes and perceptions of the STA were positive.
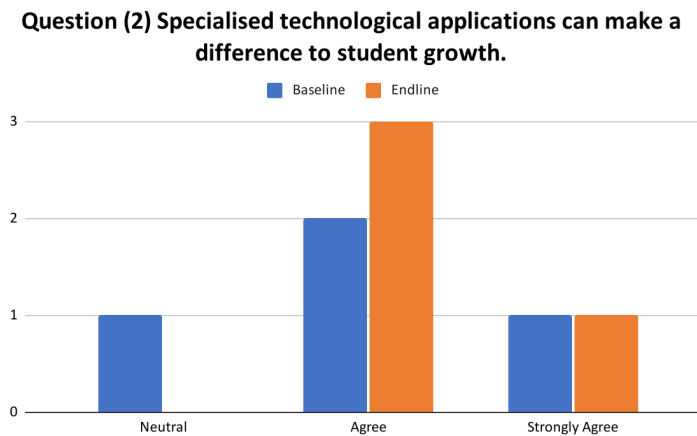
Baseline and Endline Survey Results:

Teacher Survey Results

Question (1) I have previously used a specialised technological application

Baseline ◼ Endline ◼
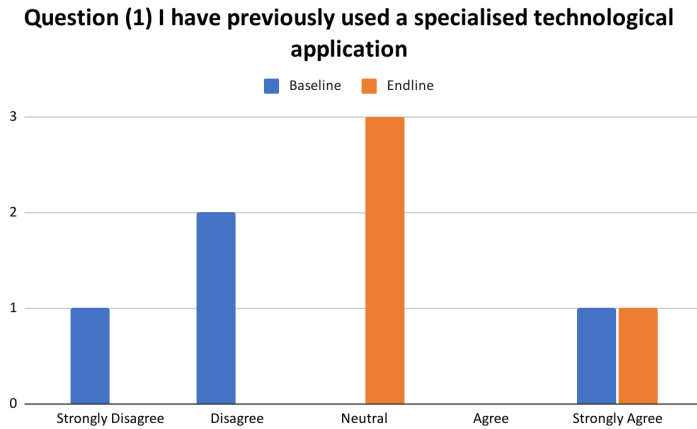
Figure 1: *Question (1)*

Question one demonstrates that the teachers assigned partially engaged in the use of the STA with some showing that they did not agree that they yet had enough access to the STA to show full understanding.

Question (2) Specialised technological applications can make a difference to student growth.

Baseline ◼ Endline ◼

Figure 2: *Question (2)*

Based upon the above responses it is possible to see that there is a shift in attitude from the teacher towards the STA.

Question (3) Students are able to demonstrate mastery of skills rapidly

Baseline ◼ Endline ◼
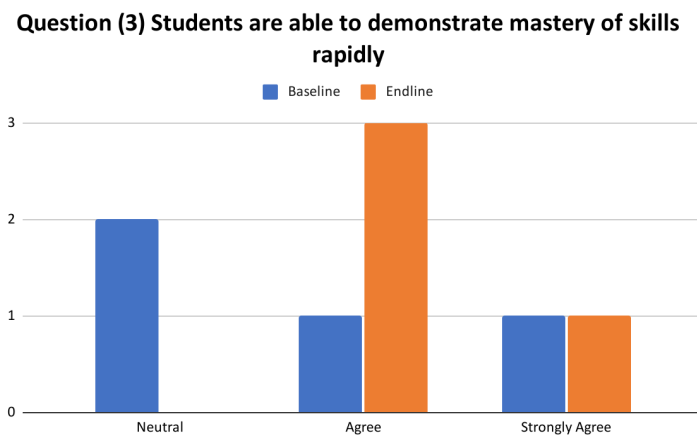
Figure 3: *Question (3)*

There is a shift in perception and attitude towards the ability of the STA. Teachers felt that their students were able to demonstrate rapid mastery of skills with the STA.
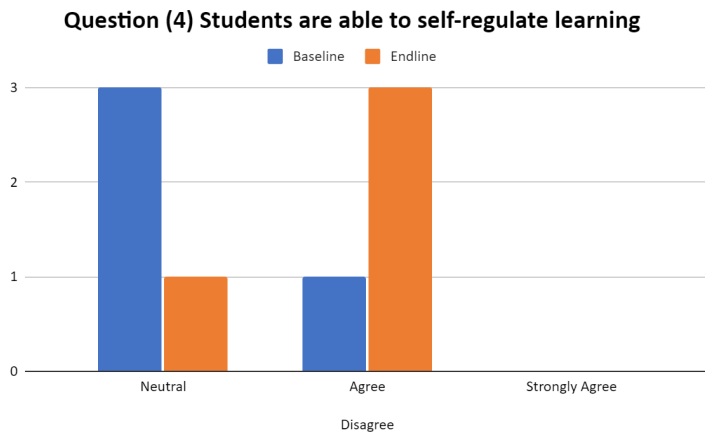
Figure 4: *Question (4)*

There was a slight shift in the perception that students were able to regulate their learning more. The STA is set up in such a way that is self-directed, although self-regulation is a skill in itself that requires explicit teaching.
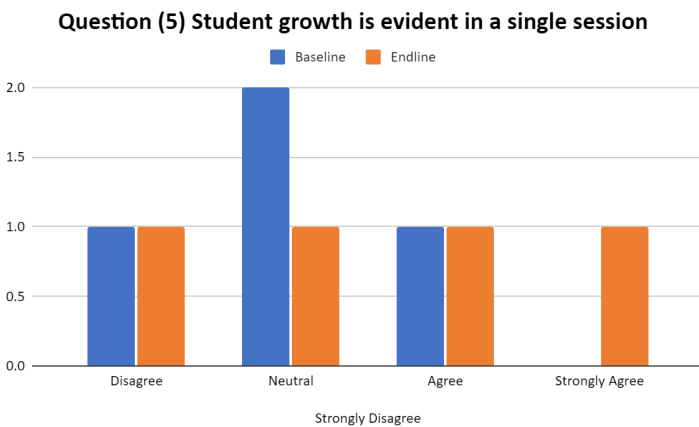
Figure 5: *Question (5)*

A slight shift in perception with single lesson growth is evident from this question. This perception could be based upon seeing how much a student engages in a session rather than actual mastery of skills.

Although there were differences in opinion as to whether students were able to regulate and grow in a single session, teachers felt that there was a more rapid mastery of skills with the STA. Self-regulation however even when directed by the STA to follow a process is still a skill that students have to develop.

Student Survey Results

Question (1) I have previously used a specialised technological application
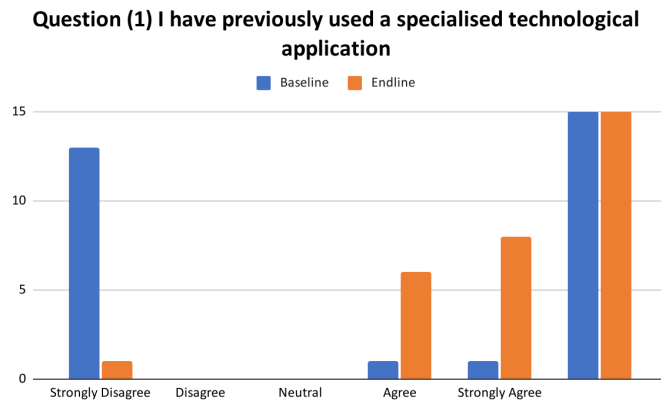
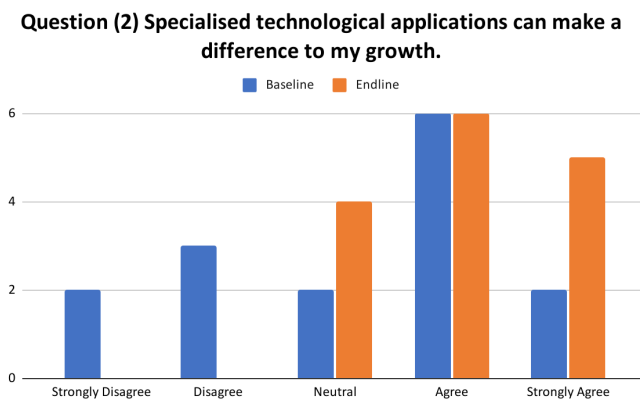**Figure 6:** *Question (1)*

Some of the students felt comfortable saying that they had worked with an STA. However, after the endline survey, this attitude changed which showed a move towards understanding of what an STA was.

Question (2) Specialised technological applications can make a difference to my growth.

Figure 7: *Question (2)*

The perception of students shifted when focusing on their own growth. Students felt that with the STA they were able to grow more through the ability to learn on their own and repeat information that they did not understand.

Question (3) I am able to demonstrate mastery of skills rapidly.
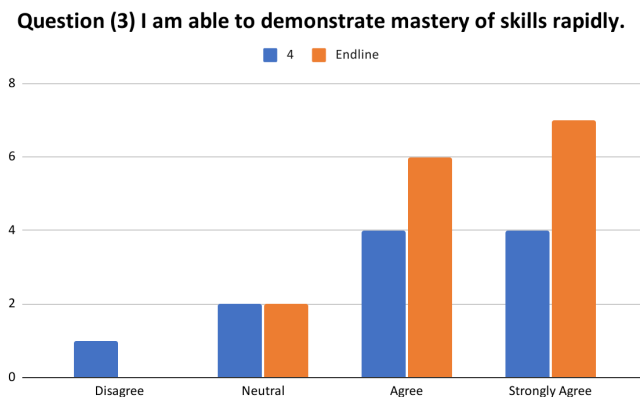
Figure 8: *Question (3)*

Students' perception and attitude both changed after using the STA. There is a clear jump towards a mindset that skills can be developed rapidly.
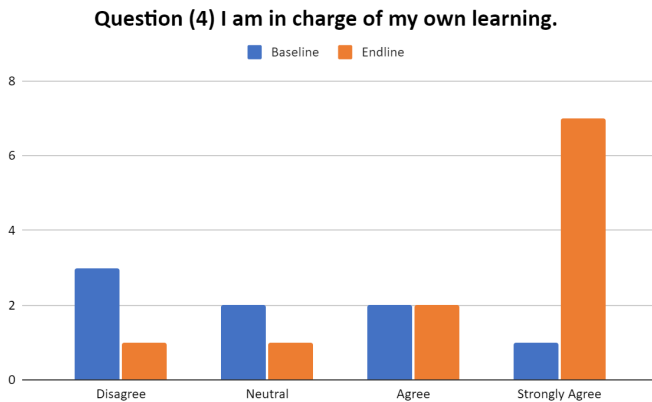
Figure 9: *Question (4)*

This is an area of development and understanding for students. Although data is not vast, it shows that although there is a mindset shift, there are still students who do not take charge of their learning.

Figure 10: *Question (5)*

After using the STA students perceived that they were more able to see growth in their learning within a single session than they had previously.

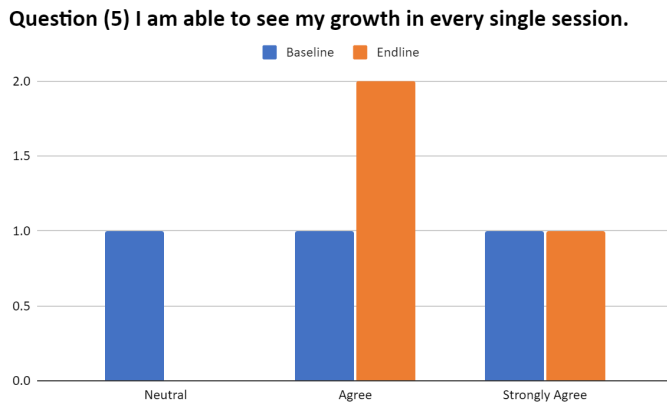Surveys were conducted in all three schools with students, however due to circumstances including examinations, it was not possible to collect endline data for children in School B and some in School C. Student attendance also impacted upon children being present at either the baseline survey point or endline survey point. .

Verbal feedback from students as they were using the program was helpful in identifying that it was good to work through the skills in such a way. Reading a piece of text, answering questions and demonstrating the understanding of the read text was thought to be faster than the usual classroom delivery. Some students did comment that the STA delivery method was sometimes dry and boring, but it was noted that this has also been commented against classroom teaching.

Baseline and Endline Data

Figure 11: School A Diagnostic Data

Student	October 2021 Scores	February 2022 Scores	October 2022 Pre-Test Score	February 2023 Post-Test Score	October 2021 - February 2022 Change	October 2022 - February 2023 Change	Skills Mastered
A S-1	181	172	173	191	-9	18	7
A S-2	183	180	167	175	-3	8	6
A S-4	171	-	183	184	-	1	0
A S-5	180	164	167	178	-16	11	1
A S-6	188	190	188	184	2	-4	0
A S-7	183	-	173	184	-	11	0
A S-8	176	172	181	182	-4	1	3
A S-9	205	-	212	209	-	-3	0
A S-10	205	172	185	181	-33	-4	0
A S-11	165	187	170	183	22	13	6
A S-12	192	182	191	189	-10	-2	2
A S-15	187	-	213	209	-	-4	3

Figure 11 shows that not all students completed both baseline assessments within school A in both 2021 to 2022 and also 2022 to 2023.

From Figure 11, October to February 2022 - 2023, 58.3 % of the students who participated showed growth from baseline to endline assessment in 2022-23. There is some evidence that students who mastered skills grew, however, it is not possible to fully identify whether the growth was directly linked to the STA. To do this would require using the STA over a larger period of time with more engagement within the school. It would also require identification of attendance and behaviour impact.

However, figure 12 below does show a difference in a large number of the students' growth in 2022 to 2023 compared with 2021 to 2022.

Figure 12: School A Diagnostic Data Comparison

Student	October 21 - February 22 Change	October 22 - February 23 Change	Year on Year Difference	Skills Mastered
A S-1	-9	18	27	7
A S-2	-3	8	11	6
A S-4	-	1	-	0
A S-5	-16	11	27	1
A S-6	2	-4	-6	0
A S-7	-	11	-	0
A S-8	-4	1	5	3
A S-9	-	-3	-	0
A S-10	-33	-4	29	0
A S-11	22	13	-9	6
A S-12	-10	-2	8	2
A S-15	-	-4	-	3

Figure 13: Difference between October 2021/February 2022 and October 2022/February 2023
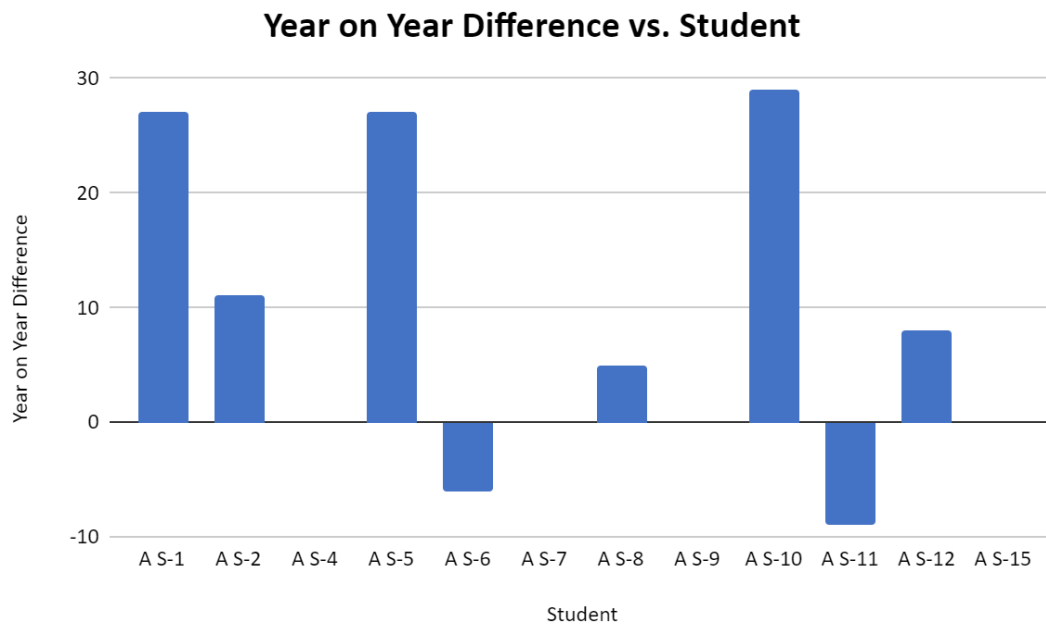
Figure 14: **Year on Year change compared to skills mastered**

October 21 - February 22 Change, October 22 - February 23 Change and Skills Mastered
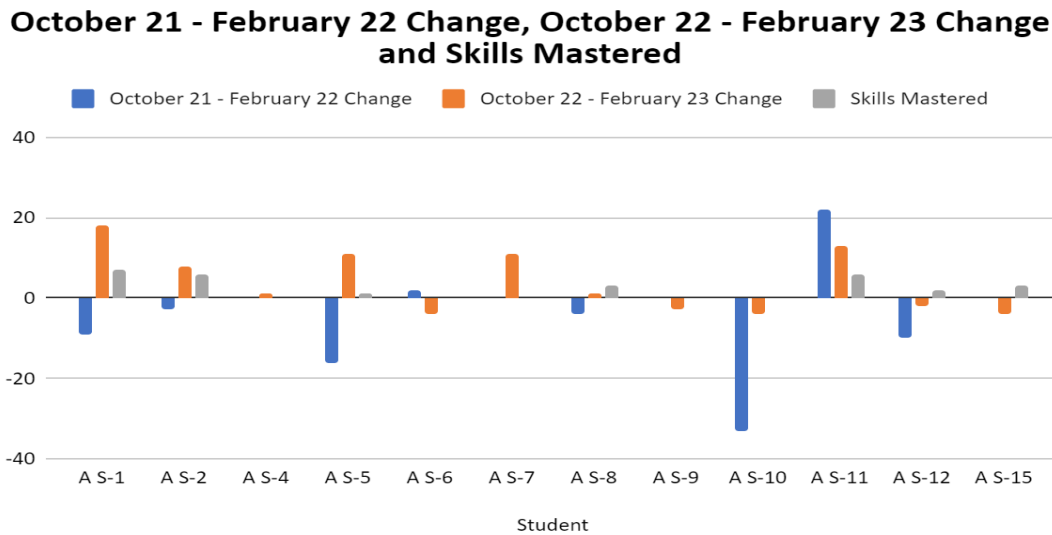
When looking at the data from the perspective of skills mastered compared to year on

year, there is more evidence that growth may have taken place with STA learning even though

skills may not have been mastered. Compared to the previous year leads to the perception that

growth has occurred more in 2022-23 than it did in the previous academic year.

School B

Due to the nature of the school, diagnostic testing was not completed at the usual

midpoint of the academic year. This meant that comparison endline data was not produced within
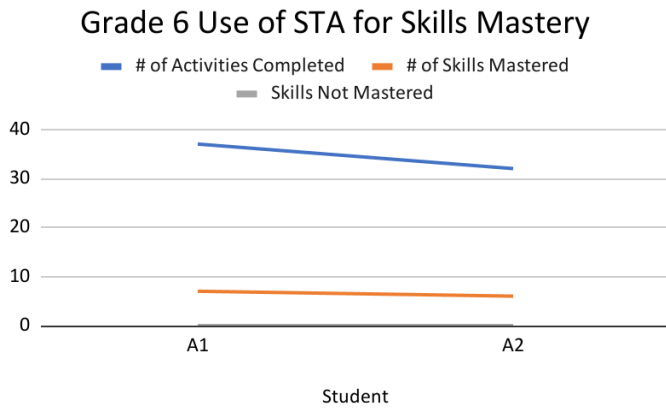
the school.

School C Diagnostic Data

Due to school Arabic exams taking place, it was not possible to take a second diagnostic

assessment within school C.

STA Mastery Data

School A

Grade 6 Use of STA for Skills Mastery

— # of Activities Completed   — # of Skills Mastered
— Skills Not Mastered

Student

Figure 15: *Grade 6 - Two Students*

Students in Grade six have less skills gaps than in higher grades and are able to master more skills compared to activities completed.

Grade 7 Use of STA for Skills Mastery

— # of Activities Completed   — # of Skills Mastered
— Skills Not Mastered
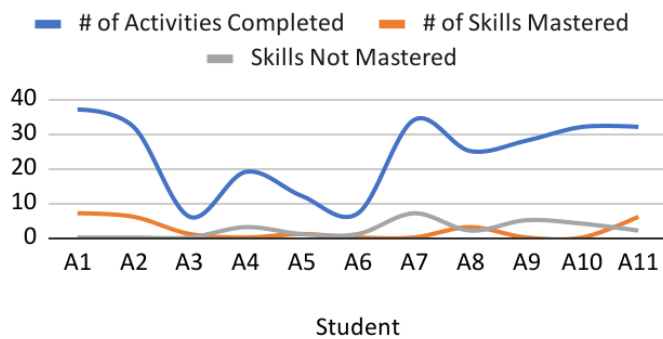
Student

Figure 16: *Grade 7 - Eleven Students*

Skills mastered can directly be seen as linked to the number of skills activities completed.Students in Grade 7 with learning needs were not consistent in their working commitment.

Grade 8 Use of STA for Skills Mastery

— # of Activities Completed   — # of Skills Mastered
— Skills Not Mastered
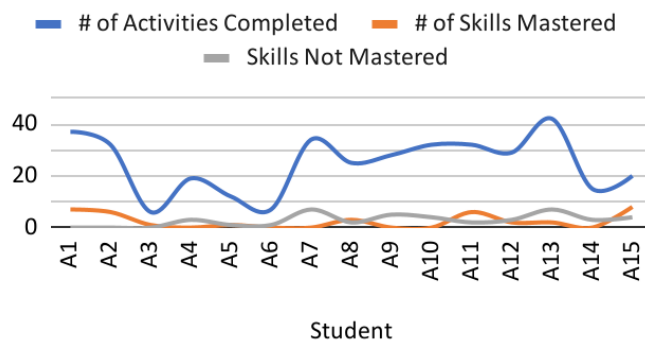
Student

Figure 17: *Grade 8 - Fifteen Students*

Some Grade 8 students did not commit enough time and focus to the program to demonstrate skills mastery. Students who did commit time, struggled with only having the opportunity once per week due to timetable commitments.
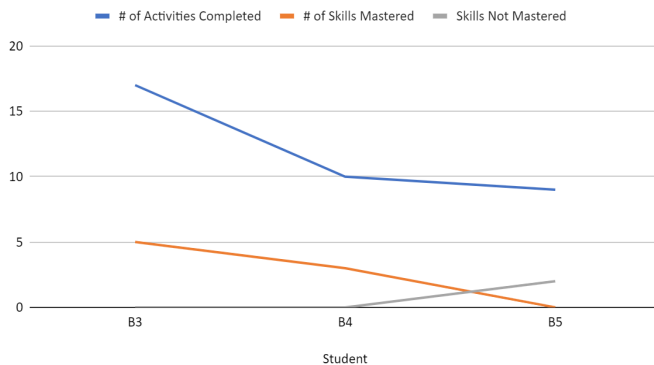
School B

Grade 9 Use of STA for Skills Mastery

— # of Activities Completed   — # of Skills Mastered
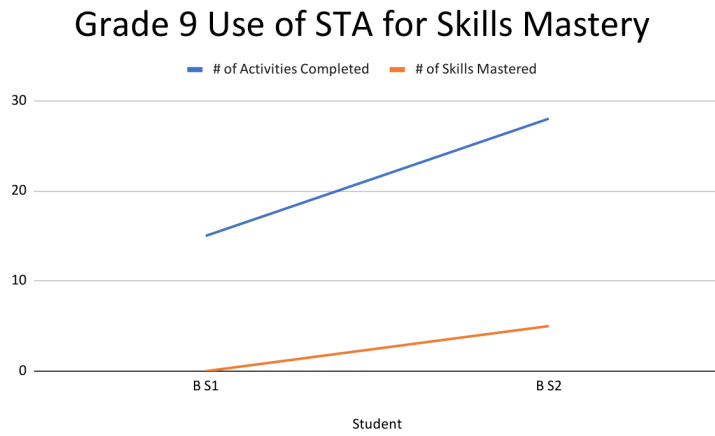
Figure 18: *Grade 9 - Six Students*

Although all students participated, not all students were able to show skills mastery. This could be due to the nature of the students, the engagement whilst using the STA or the actual level of ability of the students.

Grade 10 Use of STA for Skills Mastery

— # of Activities Completed   — # of Skills Mastered   — Skills Not Mastered

Figure 14: *Grade 10 - Three Students:*

Student engagement in Grade 10 directly links to skills mastered, the less engagement in the program, the lower the skills mastery.

School C

Grade 6 Use of STA for Skills Mastery

— # of Activities Completed   — # of Skills Mastered   — Skills Not Mastered
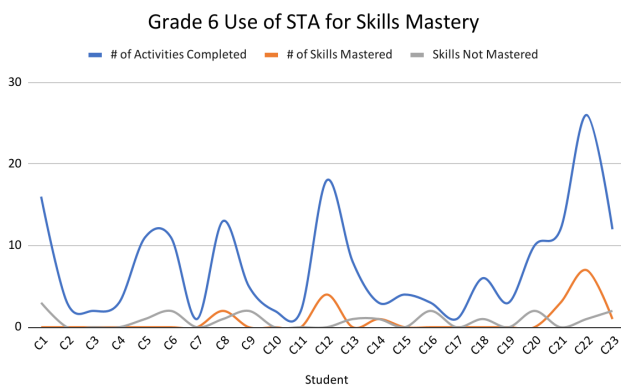
Grade 6 - Twenty Three Students:

Spikes in mastery and skills gained can directly be seen linked to activities completed. More activities, more mastery.

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 between 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 was 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 period. This not only prevented observed and teacher supported use of the STA for the research, but in addition, students became more disengaged and 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.

Other Project Considerations

Conclusion and Recommendations for Further Study

It was hoped that engagement within the STA would lead to higher engagement within the classroom due to increased unsderstanding. This is an area that still requires further contemplation and research in order to give a more concrete base for understanding. There was also an expectation of higher engagement from teachers across the schools, however, within the private schools this was not so due to internal company factors affecting staff morale, attitudes and willingness to participate. Due to unwillingness of staff, a decision was made not to use the STA with a wider collective of students and teachers. This also meant not including them within the surveys and the overall research as they would potentially impact upon the successful outcomes of the survey. The impact of doing this meant smaller numbers of students and a smaller teacher base from which to carry out the research.

Added to this complication with the research was the added factor of school calendar changes and the impact that it had upon students physically being in the building. Not only did Covid impact upon students attending school, but also the World Cup meant that schools closed completely for a period of over six weeks. This slowed and stopped student engagement over a longer period of time. The impact of this initially landed within classrooms where student engagement levels dropped, attendance fell and students generally did not settle back into school as easily as expected.

In the process of school closure, both private schools were also impacted upon by the introduction of new firewall system settings which had a negative impact upon accessing the

STA. Although access was possible, it was not consistent and students were not always easily able to log in to the system. This was also on a random basis with no pattern to students being able to log in or even being able to open different sections within the STA.

A further challenge within the research lay with the schools themselves. As each of the schools were different in nature. School A being mainstream with students having learning needs, School B being full special education and school C being governmental meant that the application of the STA was not able to be applied consistently across the schools. Time allocated to the STA was different within each. School A was able to apply the STA more consistently, having two thirty minute sessions weekly, whereas the other two schools were only able to deliver the STA session once per week. It is apparent that some students did embrace the program and spent more time working on it than their peers.

Putting the length of time out of school and the amount of time that was able to be allocated to students together, it was difficult to see how students would be able to achieve not only within the STA but also within a classroom. However, from the diagnostic data that was able to be collected including historical data, and the skills mastery data, alongside the teacher and student data, it is possible to see impact. Global research indicates that STA's have a place in education as they can be tailored to meet the needs of the student. With the particular STA that was applied, this would with further application and engagement potentially be the case. Taking into consideration that the STA was able to take individual baseline data for each student and create individual learning pathways with identify skills gaps, there is definitely potential.

However, the question remains as to whether this particular STA was effective and further implementation and teacher and student buy-in would be required to fully understand the impact that it could have. Teachers who used the STA have demonstrated a deeper belief that it is

capable of helping students learn faster and in such a way that mastery can be achieved quicker. However, students still require teacher input when their level of academic ability is so low that they are not able to achieve it easily.

To fully understand the benefit and impact of the STA, further long term studies would be beneficial. This would allow a more integrated classroom process to be implemented. Through this manner, students would then be linking their gap filling learning to the actual classroom learning. Connecting those two areas together would allow the research to gain deeper insight into the actual impact of the STA on classroom engagement and learning growth.

Having applied the STA and having had most effect within school A, due to the nature of the school being mainstream and dual language, further application has already been discussed and identified as a method of supporting whole school reading development with a daily session set aside. The focus of the session will be on supporting all children with English and Math learning needs. Those who have the most needs and are failing these subjects which equals approximately 20% of the school will be given direct STA intervention. Within school B and C, further investigation of the STA will take place to identify its viability for use. As school B is special needs, the program has merit, however, its delivery method may not be as suitable to the required learning capability level as it is in mainstream. School C as an Arabic government school found the use of the STA as intriguing as they had not contemplated supporting learning with technology in such a way. The second factor to its success also lay in the English language ability of the students compared to the STA higher level of American English.

Overall, the STA did demonstrate that students were able to achieve skills mastery potentially faster than in a classroom day to day learning. This, according to the STA research, is down to the fact that it is able to identify exact gaps in learning, and target those skills that are

required to improve. This compared to a classroom where it is often impossible to focus on each

individual skill gap at its root with every single child every single time.

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