

THUMA MINA TEACHING

Accelerating Access to Quality Education



M&ESURE
RESEARCH AND EVALUATION

Process Evaluation

Full Report

Thuma Mina Teaching Video lesson Programme

FINAL REPORT
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1 BACKGROUND AND PILOT OVERVIEW

Thuma Mina Teaching (TMT) requested M&E support from M&ESURE Research and Evaluation from September 2021 to November 2022 in the form of developing an M&E framework and conducting a process evaluation of their pilot programme. The TMT Programme converts school subjects (as per the CAPS) into easy-to-use, accessible and understandable resources that are provided to teachers and learners. The main resources consist of video lessons that are supported by supplementary resources in the form of a slide deck, self-assessment quizzes and Bookmarks containing QR codes that direct users to the resources. Through their video lessons, TMT aims to accelerate access to quality education and to enable career and life opportunities through such accessible learning. The Programme has been piloted in different settings, firstly at the Andrew Murray Children's Home in Wellington where it was well-received by the learners both in terms of learner engagement and content comprehension. More recently, the Programme formed part of an intensive feasibility study conducted in several schools in the second term of 2021 in collaboration with the Western Cape Education Department. The feasibility study focussed on testing TMT's Social Science and Natural Sciences resources at no-fee schools.

The current pilot has a particular focus on the subject of EMS (Economic and Management Sciences), specifically the subject areas of Financial Literacy. The pilot programme and evaluation are funded by Capitec Bank and focuses on the development of video lessons and materials for EMS for Grades 7-9, to be implemented in 2022. The pilot seeks to gauge how teachers and learners receive and engage with the video lessons, as well as the impact it has on curriculum coverage and mastery. The evaluation makes use of treatment and control sites. A total of 6 schools were included in the study; 3 treatment and 3 control schools. Data collection was limited to focus mainly on the treatment schools, with only the baseline and midline tests taking place at all schools (as well as 1 teacher background questionnaire that was administered to all schools).

Through the pilot, it is hoped key learnings will emerge specifically around how teachers are using the resources and whether the rationale underlying the programme theory holds true and whether the programme theory is resulting in expected changes (as conceptualised in the Theory of Change). To this end, a theory of change was developed and, from here, the development of a logic model and measurement framework which guided data collection. The main data collection activities therefore consisted of questionnaires with teachers and learners; classroom observations as well as interviews/focus groups with teachers. In addition, user data relating to the YouTube downloads, self-assessment quizzes and use of Bookmarks, was also analysed. These data collection activities are mainly concerned with gaining a better understanding of how teachers at the different schools have accessed and implemented the resources. In addition, learners are required to write a series of tests (baseline, mid-line and end-line¹) in order to gauge whether the video lessons have had an impact on their learning outcomes grades. This report provides an overview of progress in Term 1 and Term 2 of the pilot's implementation and, should it be deemed necessary to continue with the evaluation of the pilot, additional data collection activities will take place in term 4.

¹ Proceeding with the end-line test is contingent on the availability of funding.

2 THE THUMA MINA TEACHING VIDEO LESSON PROGRAMME

Due to the vast inequalities that exist in the South African education system, learners who go to under-resourced schools do not have access to the same quality of education as their wealthier counterparts, which further entrenches inequality and other social ills. Even though learners have access to devices and the internet, they still encounter barriers to learning such as paid subscription services which make these resources unfeasible. For Thuma Mina Teaching (TMT), the dream of good, free quality education via the internet was born. The launch of their first video lessons coincided with the Covid-19 pandemic which has disrupted business as usual globally, and in South Africa, due to lockdown restrictions brought in from March 2020 until early into 2022, the traditional schooling system was also negatively affected. Within this climate of uncertainty, Thuma Mina Teaching were able to make use of the catalysing effects the pandemic has had on internet connectivity and online engagements and launched their video lessons to a broader audience.

TMT hope to have the core subjects completed for Grades 5 - 12, by 2025². They started developing lessons for Mathematics, Natural Sciences, History and Geography. The development process of these have largely been self-funded and they have received good feedback on their video lessons from the Western Cape Education Department. Their lessons are aligned to CAPS; free of charge and easily accessible and quality controlled³ which make them an attractive resource to consider for use in schools. Currently, the focus is on grades 7-9 where there is almost universal enrolment. After grade 9 and 10, drop-out rates are high and, it is hoped, through use of the video lessons, learners would be able to adequately consolidate the required curriculum concepts to motivate them to stay in school and complete their high school certificate.

The following (contained in the diagram below) shows how TMT wishes to impact society including:

- Providing resources to teachers that assist them in planning and teaching;
- Providing resources to learners that are engaging and relevant and assist them to improve their school performance when used as a self-directed learning tool;
- Providing resources and training to facilitators at aftercare centres.

How do we impact society?



Our resources serve as a self-directed learning tool for learners



It improves teacher content knowledge and exposes teachers to innovative teaching techniques



Schools use the resource as a tool in the classroom



We make the resources available to aftercare centres to enrich their programmes

² Obtained from the Thuma Mina Teaching website [<https://www.tmteaching.co.za/home>]

³ Obtained from the Thuma Mina Teaching website [<https://www.tmteaching.co.za/home>]

The current evaluation focuses on the impact on the teacher and the extent to which teachers are able to use the resources as a co-teacher in the classroom in order to motivate learners to use the resources.

The video lesson provides the information (which is aligned with the CAPS curriculum) in a fun and interesting way, as it is designed to foster learner engagement, and the teacher is able to use this to elicit discussions in the classroom. In this way, the teacher becomes the facilitator of the lesson. The underlying rationale is therefore, through using the video lessons as a co-teacher in the classroom, teachers are exposed to different styles of teaching in a classroom setting. This retains the attention and focus of learners and, to add to this, the video lessons are produced with interesting and helpful visual aids in order to keep it interesting for learners. Because the teacher is assisted in this way, it is hoped this will promote learning among learners.

The current strategy of dissemination involves placing videos on YouTube for consumption amongst the general public. Access to these resources is dependent on access to internet connectivity and a suitable device which may prevent the resources from reaching certain groups. There is therefore also a offline version which provides the video lessons on a USB card that can be used at schools with poor connectivity and can be inserted into most TVs produced after 2003 (for use within households or schools).

2.1 Aims and objectives

The video lessons can be used as a self-directed tool that enhances teaching and learning. Learners can use the resources to study or revise concepts, and teachers can improve their subject content knowledge as well as their teaching techniques by watching the video lessons and going through the corresponding self-marking assessments and slides. The video lessons therefore enrich teaching and learning in inside and outside the classroom. This is done, firstly, by providing teachers with an opportunity to see how the presenter in the video teaches difficult concepts which assists teachers to improve their own teaching skills and contributes to improving the standards set. It is therefore hoped that teachers are upskilled (in terms of educational technology) and have improved content knowledge. It also allows teachers to grow more confident and become more motivated and inspired to teach better. This leads to teachers being able to create an environment more conducive for teaching which enables learning to take place. This results in learners that are engaged in the lessons, interacting more in class which eventually translates into improved marks. TMT's resources can be used in a variety of technological settings (i.e. low- to high-tech) and, as it is designed with low tech environments in mind, the low-tech uses of the lessons and materials are made easy.

Thuma Mina Teaching hopes to primarily reach teachers and learners from no-fee schools across South Africa. These schools would be familiar with having access to resources but what is not familiar would be having a video lesson where they could pause and discuss content as needed during class. Traditionally, the teacher is seen as the main source of information and facilitation in the classroom but, through having access to the TMT resources, learners can play a key role in accessing the resources for their own learning as well as dissemination and sharing with peers and other teachers.

The key objectives of the Thuma Mina Teaching Video Lesson Programme are therefore:

1. To provide resources to teachers that assist them in planning and teaching; and
2. To provide resources to learners that are engaging and relevant and assist them to improve their school performance.

2.2 Programme Theory of Change

The TMT organisational Theory of Change (TOC) diagram below shows the holistic view of how the organisation believes their activities will translate into intended outcomes. In terms of navigating and interpreting the accompanying graphical representation of the TOC, it should be noted that the TOC is structured to read from the top, down, starting with the objectives. The TOC then shows the alignment between objectives (which contain the main activities) and resultant outcomes. The progression of outcomes is shown in red for short-term outcomes, green for medium-term and yellow for long-term outcomes. For the pilot programme, the key activities are solely focusing on providing the resources to teachers at schools and, due to this, providing the resources to the learners and therefore the part of the theory of change diagram with the red border highlights this part of the programme TOC which is being evaluated. The accompanying narrative description of this smaller part of the theory of change, is provided here through a series of 'if... then...' statements.

At a high-level, Thuma Mina Teaching believes that IF resources and support are provided to teachers, facilitators and learners, THEN

- Teachers, facilitators and learners will have improved content-knowledge, educational technology skills, AND THEN
- Curriculum coverage and access to quality curriculum materials will be improved, AND THEN
- Teachers and facilitators are more adaptable to learner needs and can deliver more relevant and engaging lessons, AND THEN
- Learners are more confident to take ownership of their learning and their school performance improves.

At a more detailed level (and limited to the part of the TOC with the red border around it, as shown in the diagram below), with a focus on the two main target groups, the first set of statements of the TOC is focused on the outcomes associated with activities relating to teachers being provided with resources. The second set of statements of the TOC is focused on outcomes associated with activities relating to learners who, as a result of the teachers being provided with the resources, also gain access to and/or awareness of the resources. The TOC therefore states:

For teachers

IF TMT provides resources to teachers that assist them in their planning and teaching,

THEN teachers have improved content knowledge and are upskilled with regards to EdTech methods (teachers have an appreciation of the resources provided by TMT).

AND THEN Teachers are able to apply what they've learned and have improved ability to gauge the progress of learners due to having improved understanding of using appropriate assessment in classroom and are confident to access additional online resources if needed (in medium-term)

AND THEN teachers can incorporate acquired content, knowledge and skills into their teaching practice and deliver more relevant and engaging lessons (in long-term)

For learners

IF learners are provided with resources that are engaging, relevant and able to assist them in improving their school performance,

THEN learners have improved content knowledge and are upskilled with regard to EdTech methods,

AND THEN learners are able to apply what they've learned and become more engaged in learning (in medium-term)

AND THEN learners are more confident to access additional online resources if needed (in medium-term)

AND THEN learners take ownership of their learning (in long-term)

AND THEN learners become self-directed and improve their school performance (in long-term)

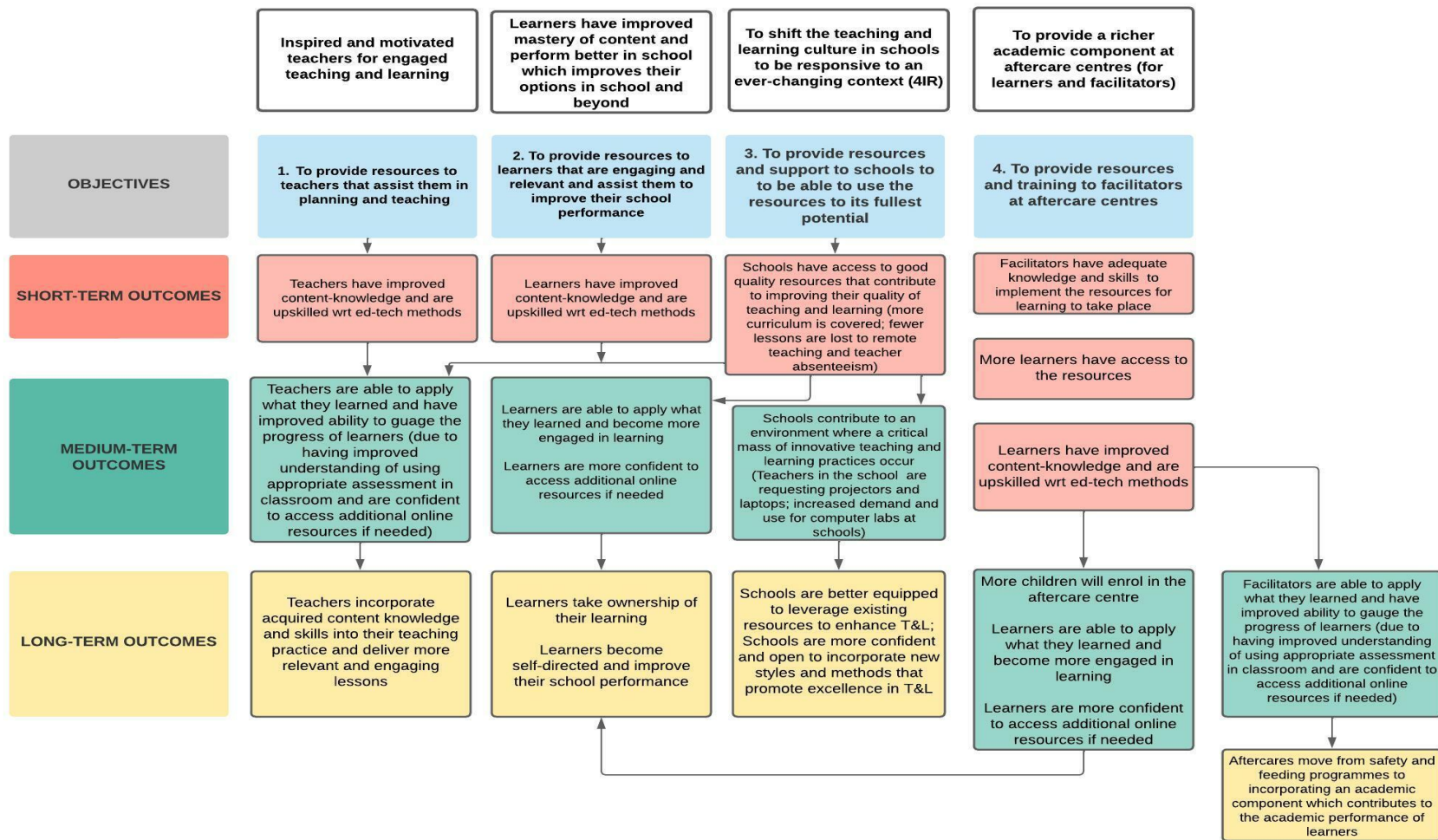


Figure 1: TMT Theory of Change

Some critical assumptions underpinning the programme’s current design (on which the pilot is based) relate to:

Table 1: Pilot programme design assumptions

Focus	Assumption
The overall programme	<ol style="list-style-type: none"> <li data-bbox="448 387 1399 488">1. Relevance – it is assumed that the programming will remain responsive to the needs of learners and teachers, as the TMT video lessons are aligned with CAPS which is the required framework used for assessment. <li data-bbox="448 488 1399 685">2. Role-player buy-in and commitment to implementation – the pilot tests a specific model of implementation by TMT (as outlined above) where teachers are expected to access the resources and show them in the class to learners (as part of the teachers’ teaching plan). Through this, it is hoped that learners will see the value of the resources and access the resources by themselves (outside of the EMS classes). <li data-bbox="448 685 1399 976">3. It is also assumed that the teachers involved in the programme’s implementation will continue to buy-in to the Programme and deliver the video lessons in their classes. In addition, it is assumed that there would be buy-in from school leadership (such as HoDs, the principal, other relevant school-based staff, etc.) which would strengthen the work of the teachers as this would act as facilitators of access to and use of TMT resources by teachers at schools. The buy-in by school leadership into the Programme strengthens accountability among teachers and also contributes to the prioritisation of teacher tasks as they understand that the school leadership views this as a priority.
Access to the internet and use of Educational Technology for teaching and learning	<ol style="list-style-type: none"> <li data-bbox="448 976 1399 1137">4. Access to the internet and devices/ offline use of the resources - access to the internet and appropriate devices on which to show the TMT resources to learners during class were available at all schools. An offline version of the resource was also made available and teachers could use this when they experienced challenges with internet connectivity at schools. <li data-bbox="448 1137 1399 1171">5. The resource is easily accessible on YouTube. <li data-bbox="448 1171 1399 1238">6. Resistance to Educational Technology and resources such as TMT video lessons, will decrease over time, and access to devices will increase over time.
Teachers access and use of the resource	<ol style="list-style-type: none"> <li data-bbox="448 1238 1399 1305">7. Teachers will see the value of the resource and use the resource during class and also promote the resource among learners in their classes. <li data-bbox="448 1305 1399 1368">8. If a resource is simple and easy to use, teachers will use it.
Learners’ access and use of the resource	<ol style="list-style-type: none"> <li data-bbox="448 1368 1399 1469">9. As most learners would have had exposure to the resources in the classroom and have access to smart devices at home, it is expected that learners will be able to improve their marks through accessing the resources available. <li data-bbox="448 1469 1399 1536">10. Most learners will access and use the resources during exams to assist with revision. <li data-bbox="448 1536 1399 1597">11. If learners start to use the resource during class, it will lead to them accessing and using the resource in their own time, at home.

2.3 Programme development process and components

Thuma Mina Teaching have been producing video lessons one subject at a time and are in the process of growing their repertoire of video lessons. They started with History as, strategically, this made the most sense since the co-founder is a History teacher. The development of the video lessons follows a broad process, as depicted in the graphic below:

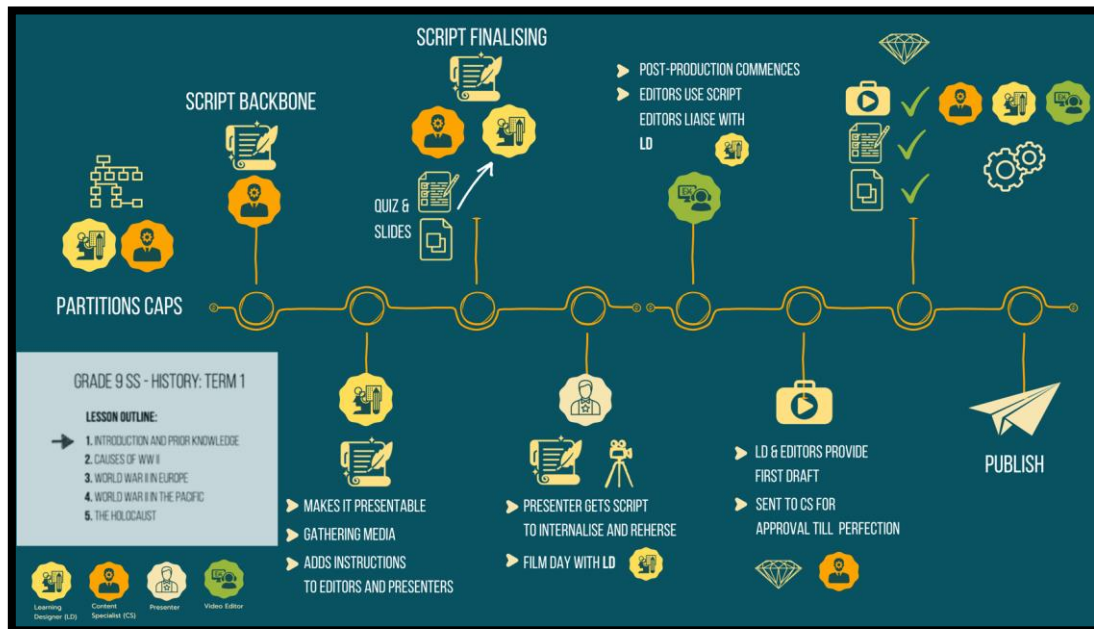


Image 1: TMT video lesson development process

- A subject is identified for a specific grade (this is determined by funding made available or specific requests which result in the video lessons being implemented at the targeted site, such as a school or aftercare facility)
- Teachers who are a good fit with the organisation and come highly recommended by subject advisors or school principals, are identified and, from here, the CAPS (Curriculum and Assessment Policy Statement) curriculum and teacher framework is broken down into quarters, one per term of the school year. Each term contains between 5 and 10 video lessons, depending on the subject and grade. Each video lesson is accompanied by a slide deck as well as a self-marking assessment.
- Often, the teacher acts as the content writer and the presenter. However, this also depends on other factors, such as diversity aspects to ensure the presenter is relatable for learners. The video lessons are compact and cover the fundamental building blocks of the curriculum. Visual aids are used in the video production process to strengthen the lesson with the idea that learners will replay it more than once. The aim is to make the video lessons hard-hitting.
- A script is produced from this process and this script is used for final editing and inputs. Once it is finalised, it is used by the presenter during the filming of the video lessons.
- Once filmed, the video lessons are sent to the editor who aims to limit the lessons to a maximum of 13 minutes each. It is intentionally designed to be short and impactful so that it can be watched on mobile phones as well.

- Once the final lessons are ready, they are quality checked during a final round of quality assurance and then uploaded to YouTube and disseminated via relevant social media channels.

The minimum requirements for schools to be able to benefit from the video lessons is to have a projector or a television with a USB port (where the offline version of video lessons can be used) along with a sound system. The video lessons are accompanied by a PowerPoint presentation as well as self-marking assessments and gamified quizzes that can be completed online which makes the marks available instantly (for the pilot, a Bookmark was produced which contains a QR code to be able to better track users within the treatment schools' group). The self-marking assessment marks provide formative feedback to the teachers in terms of how learners have engaged with the content and where additional input is needed. Use of the video lessons and self-assessment quizzes can only take place if learners have access to a device connected to the internet (and this can either be via laptops/ cell phones/ tablets that learners have access to or through the computer lab at the school, where such a facility is available). The assessment can also be used in a low-tech setting and is not dependent on the availability of internet and devices. When only a projector is at hand, the teacher can flight the assessments on the projector screen and have the learners complete it in class, or do it as a class activity. The assessments can also be printed and written on paper.

Currently, tracking the use of the TMT resources is limited to YouTube data analytics. The data analytics provided by YouTube is very helpful overall and provides high-level information on the age and gender of users, watch time per lesson, and trends over time. TMT are able to determine the extent of use via comments on YouTube but need more specific, in-depth information. In future, they hope to develop an LMS to be able to track not only high-level data such as viewer statistics, but also detailed data such as content areas that learners struggle with most, and to collect data to gain a better understanding of how teaching and learning with the use of these resources is taking place.

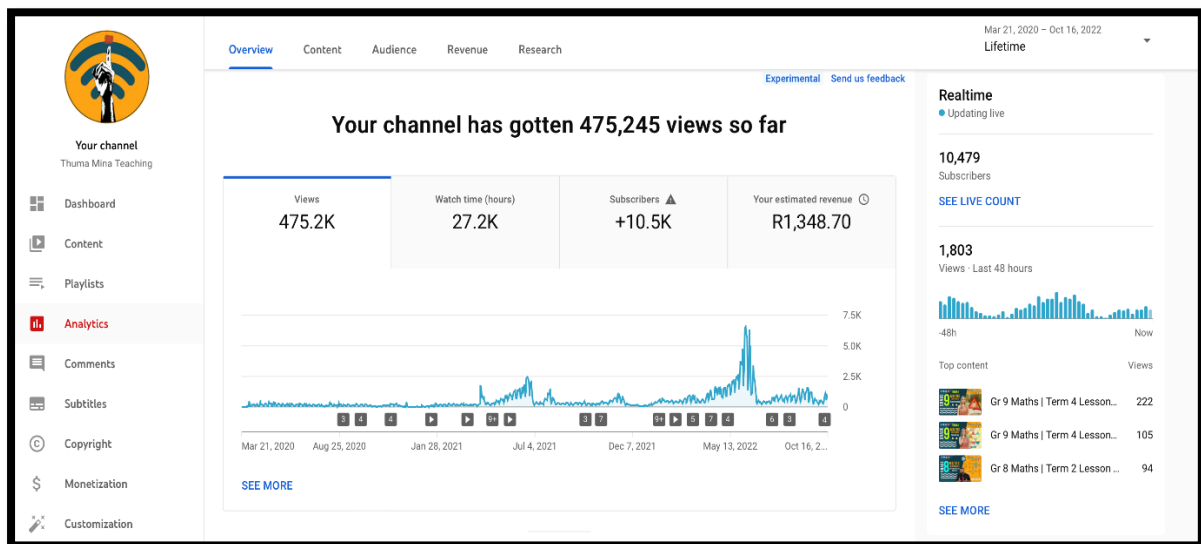


Image 2: TMT YouTube Analytics

2.4 Overview of implementation

The pilot programme implementation started in January 2022, with preparatory work taking place towards the end of 2021. The preparatory work included the selection of schools, meeting with prospective schools and obtaining their buy-in and, once final schools were selected, there was a stakeholder meeting that took place in November 2021 where identified champion teachers and their accompanying HOD or school principal attended and were provided with the MOUs to participate in the pilot. As a parallel process, the TMT team were also involved in an M&E framework development process, in preparation for the pilot kick-off in January 2022. The development of the M&E framework assisted the TMT team to gain more clarity on the conceptualisation of their pilot, through articulating a theory of change and also determining measurable outcome indicators with accompanying data collection methods that would be used during the evaluation.

In addition to the selection of schools and M&E process, the development of the EMS Financial Literacy video lessons took place, which included curriculum mapping and planning, script writing, filming, editing, reviews at completion of each major phase, all of which was assisted by a curriculum specialist who is well acquainted with the CAPS used by the Western Cape Education Department (as part of the national curriculum).

The main components of the programme therefore consist of the video lessons, slide deck, self-assessment quizzes and QR coded bookmarks. These were provided to the teachers during an onboarding session at each school by Thuma Mina Teaching. During this session at the school, teachers and relevant management representatives were informed about the resources and main objectives. An opportunity for questions was also provided. In addition, regular support visits took place throughout the terms where the Thuma Mina Teaching representative visited teachers to provide assistance, if needed. Once on-boarded, teachers were expected to use the videos and quizzes as they saw fit in their classes.

3 EVALUATION SCOPE, METHODOLOGY AND LIMITATIONS

The pilot evaluation kicked-off in 2021 with the development of an M&E framework and the draft version was delivered to TMT in December 2021. This process contributed to a deeper understanding of the scope of outcomes to be achieved as well as how their causal pathways flow from the activities to the different identified outcomes. The draft M&E framework will be revisited and revised at the end of the evaluation process in order to ensure that any changes that were identified during the course of implementation and data collection, can be applied in order to ensure a more accurate representation of the programme's results chains. In addition, through developing the M&E framework, key indicators were identified, and subsequent data collection instruments were identified and developed.

The second step in the process entailed the process evaluation which consisted of a number of different data collection activities at different points in programme implementation which will be outlined in the section below. The data collection instruments were developed, in line with the requirements from the M&E framework and fieldwork arrangements were made accordingly.

3.1 Evaluation scope

Due to the relatively short timeframe of the assignment, a process evaluation was proposed. The initial timeframe of implementation of the pilot was for a term in Term 1. However, due to a number of factors that occurred during Term 1, teaching time was significantly shortened and an extension of the pilot activities into Term 2 was requested and granted⁴.

A process evaluation addresses the effectiveness and efficiency of programme operations, service delivery and whether it is successful in reaching the target group as planned (in terms of dosage and coverage). In addition, it can also assess the extent to which the programme achieved its short-term outcomes. The evaluation is also concerned with highlighting lessons learned and areas for improvement going forward. The key objective is to obtain a better understanding of how teachers use the resource in their classes and what their main barriers are to use. The table below shows the key evaluation questions addressed in the evaluation:

Table 2: Evaluation questions

Focus	Questions
Programme design	<ul style="list-style-type: none"> • How does the programme's logic translate into its activities? • Do these activities connect/relate to the programme's outcomes?
Programme implementation	<ul style="list-style-type: none"> • How has the intervention been implemented in terms of its delivery? • Have the implementing partners done what they undertook to do? • Have they done it well? i.e. an appraisal of the quality of project implementation
Programme achievement of short-term outcomes	<ul style="list-style-type: none"> • To what degree have the programme's expected results been achieved? • To what extent do the objectives of the programme address the needs of beneficiaries?
Learnings	<ul style="list-style-type: none"> • What were the strengths and successes of the programme? What were the weaknesses or failures? • What lessons learned from this programme inform the planning and implementation of similar initiatives in future?

The evaluation took the form of a quasi-experiment. "Like a true experiment, a quasi-experimental design aims to establish a cause-and-effect relationship between an independent and dependent variable. However, unlike a true experiment, a quasi-experiment does not rely on random assignment. Instead, subjects are assigned to groups based on non-random criteria"⁵. Therefore, a comparison group is selected that is as similar as possible to the treatment group in terms of certain identified characteristics. To estimate the treatment effect of a quasi-experiment, a Difference-in-Differences calculation is used which "compares the changes in outcomes over time between a population that is enrolled in a program (the treatment group) and a population that is not (the comparison [or control] group)"⁶.

⁴ The key factor included the end of rotational timetables that had been implemented as a result of the Covid-19 restrictions from 2020. The change in timetables was only announced after Term 1 had already commenced. This resulted in many schools having to re-schedule their timetables in order to transition to the new (or old) way of teaching. This also resulted in significant adjustments for staff and learners. In addition, some teachers and learners were also ill with Covid-19 and, under the regulations at the time, this required isolating and therefore more valuable teaching time was lost (this happened at Treatment school 1 during Term 1). An additional factor impacting negatively on the teaching time was a very heavy loadshedding schedule which dominated Term 2.

⁵ White, H., & S. Sabarwal. 2014. Quasi-experimental Design and Methods, *Methodological Briefs: Impact Evaluation 8*, UNICEF Office of Research, Florence.

⁶ Gertler, P., Martinex, S., Premand, P., Rawlings, L. & Vermeersch, C. 2011. *Impact Evaluation in Practice*. The International Bank for Reconstruction and Development / The World Bank. Pg. 96

This type of evaluation design usually requires considerable fieldwork activities and associated costs. So, in order to keep costs down, M&ESURE collaborated with Thuma Mina Teaching to cover all of the data requirements of this evaluation design. Due to their expertise in designing the assessments that test the extent to which learners have gained the required knowledge through the video-lessons, Thuma Mina Teaching was responsible for designing the baseline and midline tests (and, will potentially also design the endline tests, should this be required) for learners⁷ as well as the outcomes data analysis. M&ESURE was responsible for the arrangements related to administering the tests as well as for the administration of the tests.

Three treatment and three control schools were selected for the evaluation⁸. Relevant schools were selected using set selection criteria, informed by Programme staff. Data collection for the evaluation took place in two different stages:

- Stage 1: Baseline data collection and baseline test data
- Stage 2: Ongoing monitoring data collection and midline test data

A third stage of data collection was included in the proposed scope but will only be implemented should the funder agree to provide funding for this (which would include the endline tests for learners).

3.2 Selection of treatment and control schools

The total number of schools included in the pilot was 6 (instead of 4 initially included). As mentioned, an additional set of schools were added; one treatment and one comparison in order to safeguard against non-implementation of the TMT resources at any of the treatment schools. The schools were jointly selected by TMT and the WCED.

In terms of the treatment schools selected to form part of the pilot, the 3 schools were purposively selected due to certain criteria, such as their no-fee status, the language of instruction, quintile, their location, physical environment, access to internet and technology at the school as well as relationships with principals/ teachers at the schools. Since the schools in these two groups need to be similar for the results to be comparable, it was decided to include only no-fee schools in the study. Schools that formed part of the control school group also shared these same characteristics and have been offered free access and use of the resources once the pilot is completed in exchange for their involvement in the pilot. All schools are also dual medium schools.

The following schools were therefore included in the study as either treatment or control schools:

- Apex High School;
- Bergrivier High School;
- Luckhoff High School;
- New Orleans Secondary High School;
- Noorder-Paarl Secondary High School;
- Wellington High School.

⁷ The tests were externally moderated by an education expert from the Western Cape Education Department.

⁸ The initial evaluation scope of the evaluation only included 4 schools (2 treatment and 2 control). However, TMT self-funded the inclusion of an additional two schools as a mitigation measure in case one of the treatment schools were not able to implement as expected).

3.3 Evaluation data collection methodology

The key data collection activities and instruments that were identified for the evaluation as part of the M&E framework development process were captured into a [data collection plan](#) (including specific instruments as well as further information relating to who would collect and when to collect the data, included in Annexure 6.1). The monitoring data collection timeframe initially only included Term 1 but this was extended halfway through Term 1 to include Term 2 so that more time would be available for teachers to be able to use the video lessons and the monitoring thereof⁹. Key data collection activities included:

- interviews with TMT programme staff;
- interviews/ focus groups with teachers;
- termly feedback questionnaires for teachers;
- a classroom observation in term 2 and self-administered questionnaires completed by learners during the classroom observations.
- Additional data included 'systems data' that could be obtained through YouTube user statistics and the self-assessment quizzes and bookmarks provided to learners.

The data collection activities mainly took place at treatment schools and consisted of the following:

Stage 1: Baseline data collection and baseline test data

- Baseline tests for learners at 6 (treatment and comparison) schools. This included some background questions such as language and mobile phone and internet access, as well as test questions.
- Background questionnaire for teachers per school at 6 treatment and control schools. This obtained some information with regards to the experience and qualification of teachers and also asked which aspects the teachers struggled with most when they teach Financial Literacy.

Stage 2: Ongoing monitoring data collection and midline test data

- Classroom observations conducted at treatment schools. This consisted of 6 classroom observations conducted in Term 2, one per Grade at each treatment school.
- Focus group interviews/ interviews were conducted with teachers at treatment schools at 3 schools
- Self-reported data via structured questionnaires (termly feedback questionnaires from teachers) and feedback via WhatsApp groups from teachers at treatment schools
- Self-reported data via structured questionnaires from learners (administered by the evaluator during the classroom observations)
- Mid-line tests for learners at 6 schools

Stage 3: End-term data collection (to be determined)

- Focus group interviews with 2-3 teachers per treatment school

⁹ The main factor influencing this decision related to the end of the rotational schedule that was used during Covid-19 which was announced during term 1. This resulted in schools having to re-work their teaching schedules which caused delays in teaching. Another factor that negatively impacted on teaching time was continuous Loadshedding.

- Focus group interviews with learners at treatment schools
- End-line tests for learners at 6 schools

3.3.1 Teacher background questionnaire

Teachers from treatment and control schools were asked to complete a questionnaire asking about their fields of study, when they graduated, how long they have been teaching in general and also specifically for Grade 8s and 9s. It can be seen that teachers' years of experience overall and within the EMS context vary.

Table 3: Teacher qualifications and teaching years

School ¹⁰	Graduation from HEI	Qualifications & Majors	Year started teaching	How long teaching EMS (Gr8&9)
TS1	2019	B.Ed Senior and FET Economics and Business Studies	2020	3 years
TS2	2015	B.Com (Major in Economics)	2016	2 years
TS3	2019	B. Ed Honours, Mathematical Literacy / B. Ed. Accounting + Mathematical Literacy	2014	8 years
CS1	1985	Teacher Diploma Commerce	1986	15 years
CS2 ¹¹	2011; 2017; 2020	PGCE: Business Studies & EMS; PGCE, Accounting & EMS; BComm & PGCE, Accounting & Mathematical Literacy	2018; 2018; 2012	2 years; 4 years; 9 years

3.3.2 Classroom observations and learner feedback forms

Classroom observations for one class each per treatment school and grade took place during the second term. The purpose of the classroom observations was to observe how teachers utilize the TMT resources in the classroom, and how learners engage with the resources. Observations were aimed at getting a deeper insight into how the resources are being used in the classroom; the benefits it adds, as well as the challenges it can pose, especially in low-income schools with limited resources. The table below summarises the dates on which the classroom observations took place at each school and for which grade.

Table 4: Classroom observation summary

School	Date	Grade	TMT Video lesson
Treatment school 3	12 April 2022	Grade 8	Term 2: Lesson 5
Treatment school 3	12 April 2022	Grade 9	Term 2: Lesson 8
Treatment school 1	13 April 2022	Grade 8	Term 2: Lesson 5
Treatment school 1	17 May 2022	Grade 9	Term 2: Lesson 9
Treatment school 2	18 May 2022	Grade 8	Term 2: Lesson 7
Treatment school 2	18 May 2022	Grade 9	Term 2: Lesson 9

Dates were scheduled with teachers at each school according to their teaching schedules. Due to the number of public holidays in the second term resulting in many school days being missed, as well as

¹⁰ No data provided by CS3.

¹¹ 3 teachers responded to this questionnaire.

technological issues experienced as a result of load shedding some classroom observations had to be rescheduled (Treatment school 1 grade 9) or could only take place late in the term (Treatment school 2). As a result of the logistical challenges with scheduling classroom observations, and schools following their own independent annual teaching plans, it was not possible to observe lessons where teachers used the same TMT videos for each grade at all the schools. The same evaluator conducted all the classroom observations for all the schools and grades to ensure consistency of the data collected.

During classroom observations, an observation [checklist](#) was followed that focused on the following:

- The physical learning environment of the classroom including the size of the classroom, the number of learners in the classroom, and the teaching aids available to teachers, including technology.
- The strategies teachers used to incorporate the TMT resources in their classroom.
- Learners’ engagement with the TMT resources during the class; both during the use of the TMT videos, as well as the self-assessments if used.
- The extent to which the TMT resources contributed or not to a conducive teaching and learning environment.

3.3.3 Termly teacher feedback

Termly teacher feedback discussions were held with teachers at all three schools at the end of term 1 and again at the end of term 2. The purpose of these feedback discussions was to gain insight on the teachers’ experiences of using the TMT resources in the classroom, its usefulness and the challenges they experienced with it. Dates and times were scheduled with the schools in the last week of school in term 1 and term 2. The dates for these feedback discussions are summarized in the table below.

Table 5: Teacher feedback summary

Term	Date	School
Term 1	23 March 2022	Treatment school 2
	24 March 2022	Treatment school 1
	24 March 2022	Treatment school 3
Term 2	22 June 2022	Treatment school 1
	22 June 2022	Treatment school 2
	22 June 2022	Treatment school 3

The feedback sessions for term 1 mainly focused on the teacher’s initial experiences of using the TMT resources in the classroom for the first time. The opportunity was also used to give feedback to TMT on how they experienced using the resources, how they perceived learners’ experiences of using the resources, and how the implementation of the resources can be improved for term 2. The discussions after term 2 expanded on this, adding questions about how contextual factors outside the classroom are perceived to impact teaching and learning.

3.4 Baseline and Midline Test data

The six schools that formed part of the pilot were divided into two groups. The control group did not receive the resource in Term 1 and 2 of 2022 and went about its teaching routine as per usual.

The treatment group received the Thuma Mina resources, which includes the video lessons, slides and self-assessment quizzes.

A baseline test was written by all treatment and control schools at the beginning of term 1. The midline test was written by all treatment and control schools at the end of term 2 and was administered as an appendix to each schools' own EMS June Exam. It was hoped that by administering the midline tests in this way, it would allow for a standardised way of administering the tests across the 6 schools and it would also ensure that learners were equally prepared for the test across the 6 schools. The programme targeted the English classes at the schools and therefore only English learners were asked to write the tests (as only the English classes at the Treatment schools would form part of the pilot).

3.4.1 Standardised tests for Grade 8 and 9 EMS Financial Literacy

The tests were set by experienced EMS teachers and were moderated by Dr Antoinette Venter who is the Deputy Chief Education Specialist at the Western Cape Education Department for EMS. Due to uncertainty regard how well the learners would perform, the baseline test was set at a relatively easy level, so as to avoid floor effects. A floor effect is a "situation in which a large proportion of participants perform very poorly on a task, thus skewing the distribution of scores and making it impossible to differentiate among the many individuals at that low level. For example, a test whose items are too difficult for those taking it would show a floor effect because most people would obtain or be close to the lowest possible score of 0"¹². The baseline test was thus set at a slightly lower level than the learners' grade level, as it included some basic concepts that would have been well covered in previous years. The midline test, however, was set at a slightly more Grade appropriate level. Without an intervention, one could expect learners to perform slightly worse on the midline test due to the difference in difficulty levels. The baseline and midline tests did not count out of the same number of points and scores were therefore normalised. By normalising the scores, the values measured on different scales were adjusted to a common scale, in this case, it was normalised to 100. The tests seem to have been set at a good level since the scores range from the 40% to 62%.

3.4.2 Technical notes related to the test data¹³

Cleaning and coding of test data

Apart from the test questions for learners, the test also included a section with question items related to socio-economic factors that could impact on the access to and use of resources by learners from no-fee schools. These included how often English is spoken at home, what the home language of the learner is, as well as access to mobile phones and Wi-Fi. The question item on Wi-Fi access points listed several free Wi-Fi access points, such as at school, or at an aftercare center, and learners were able to select all that applied. In terms of the cleaning and coding of the data from this question, the following was done:

- if they selected any source of free Wi-Fi they were counted under 'Free Wi-Fi' even if they also indicated accessing the internet via mobile data;

¹² Obtained from [APA: <https://dictionary.apa.org/floor-effect>]

¹³ Please note that Thuma Mina Teaching was responsible for the data analysis of the outcomes data, in collaboration with M&ESURE Research and Evaluation.

- if learners regularly access the internet, but only do so via mobile data (no Wi-Fi), they were counted under ‘Regularly access via mobile data’;
- if neither of these applied, they could choose ‘none of the above’. Importantly, the option for Wi-Fi at home via a home router was not added in the questionnaire and it was later learned that Wi-Fi at home was applicable to some of these learners (who had then selected none of the above, which makes it seem as though they do not have any access to the internet).

Data analysis techniques

When analysing the baseline and midline test data, the difference in the gain/loss between the data points estimates the effect the resource had in the intervention school. To calculate the estimated size of the impact of the intervention, a difference-in-difference calculation was done. A difference-in-difference analysis calculates the effect of a treatment (in this case the use of TMT resources in a school context) on an outcome (learning gains) by comparing the average change over time in the outcome variable for the treatment group to the average change over time for the control group. The test data was analysed using this calculation and the results have been presented in Section 4.3.

The table below shows the numbers of learners who wrote the standardised tests per school and grade. A total of 478 Grade 8 learners wrote the test and a total of 471 Grade 9 learners wrote the test, thus constituting the sample of learner marks that were analysed. Only learners where pre- and post-scores were generated were included in the analysis.

Table 6: Sample size, by treatment and control school-type

School		Grade 8	Grade 9
Treatment	Treatment school 1	86	83
	Treatment school 3	99	93
	Treatment school 2	66	81
Control	Control school 1	32	36
	Control school 2	99	82
	Control school 3	96	96
Total sample size (total learners who wrote both base- and midline tests)		478	471

3.4.3 Socio-economic characteristics of the treatment and control schools

In terms of the socio-economic factors that may affect access and use of the TMT resources, information was obtained from learners at the treatment and control schools on their home language and frequency of speaking English at home, access to mobile phones and the internet. The following emerged:

- Frequency of speaking English at home: learners from the treatment schools appear to speak English more frequently at home compared to those in the control schools.
- Home language: treatment schools predominantly have more English home language speakers than control schools (where isiXhosa is more predominant).
- Access to mobile phones: the majority of Grade 8 and 9 learners from both treatment and control schools reported having access to mobile phones, with most having access to their own phone or sharing a mobile phone with a sibling.

- Access to the internet: most Grade 8 and 9 learners from both treatment and control schools reported having access to the internet either through free Wi-Fi or mobile data.

Figure 2: Grade 8 Frequency of speaking English at home

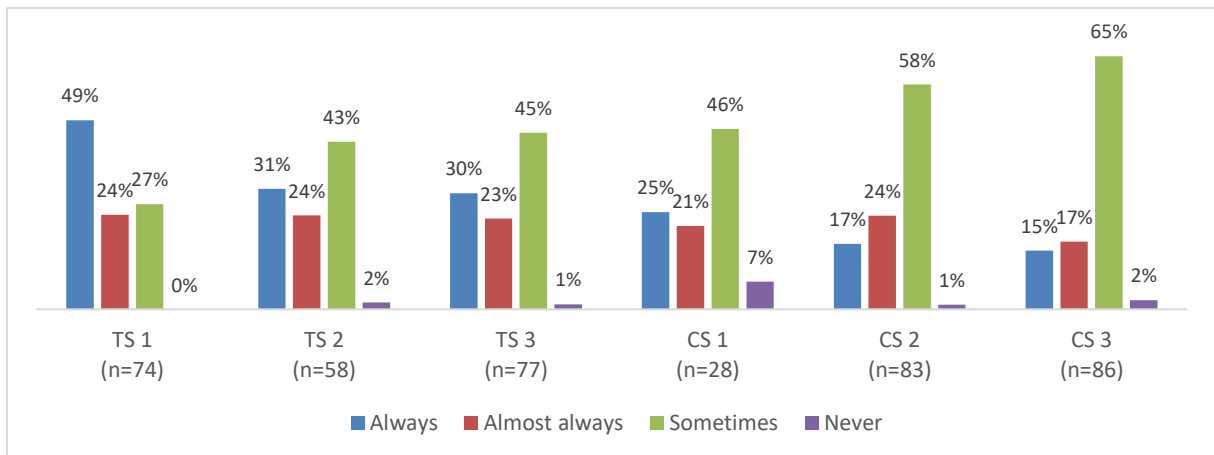


Figure 3: Grade 9 Frequency of speaking English at home

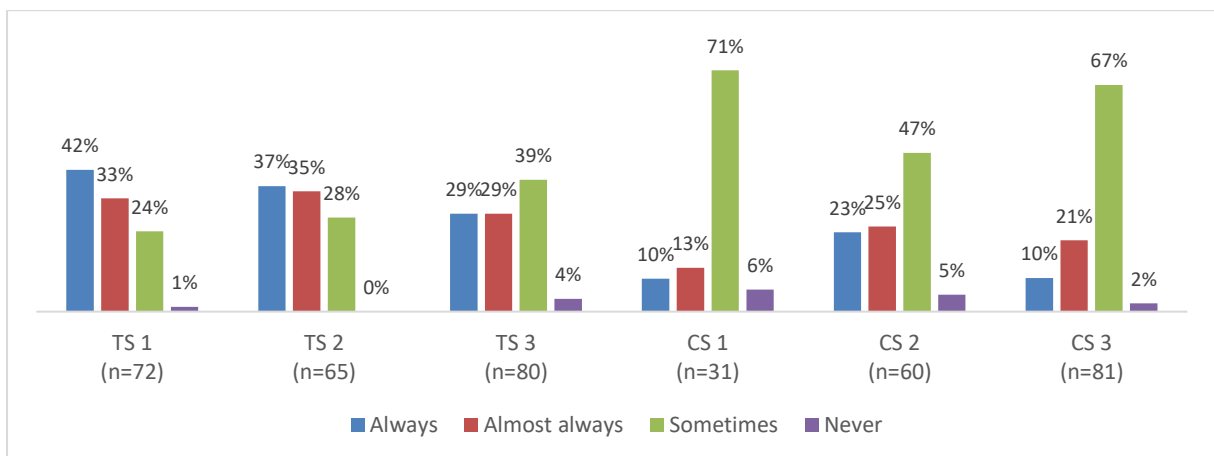
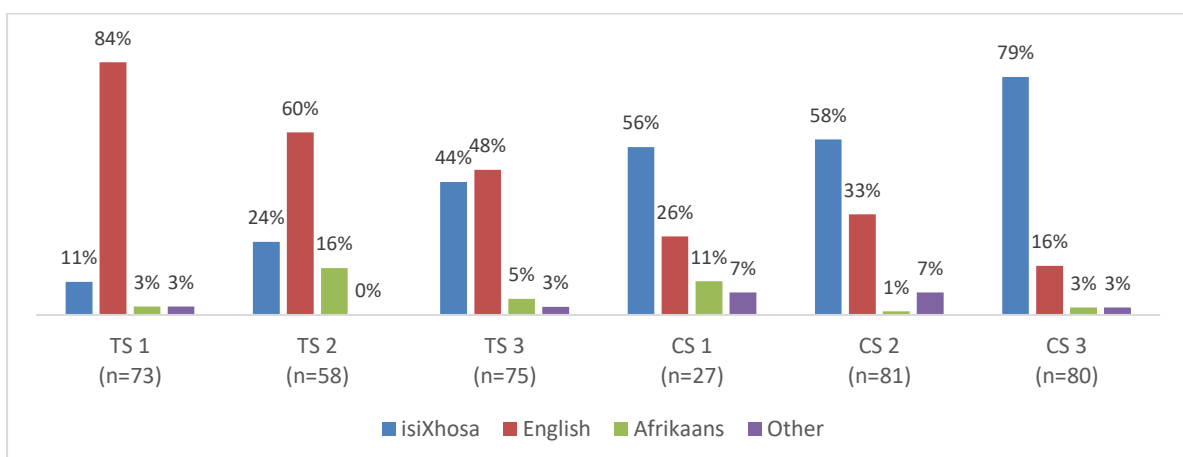


Figure 4: Grade 8 home language distribution across all schools¹⁴



¹⁴ 'Other' languages include Shona and isiZulu

Figure 5: Grade 9 home language distribution across all schools¹⁵

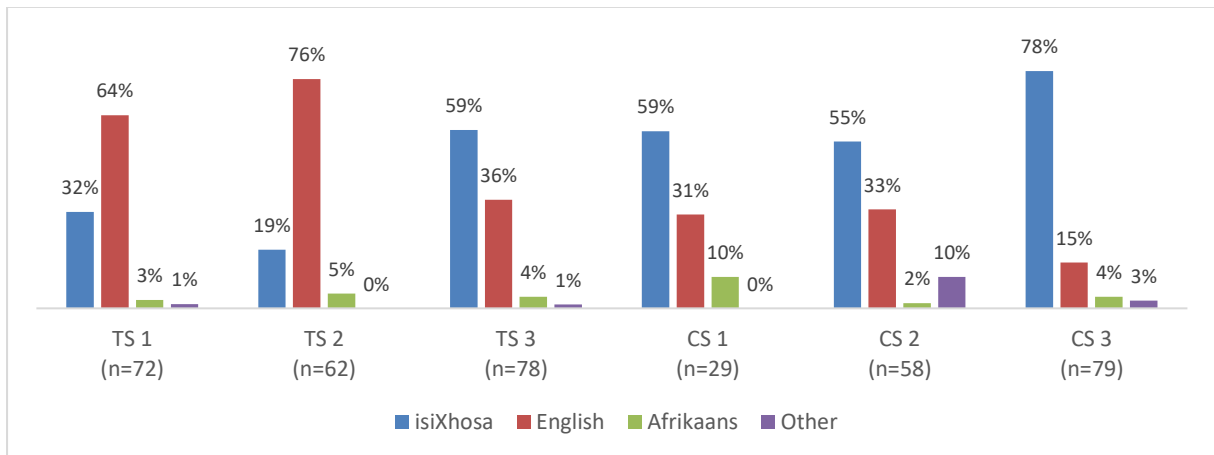


Figure 6: Grade 8 access to mobile phones

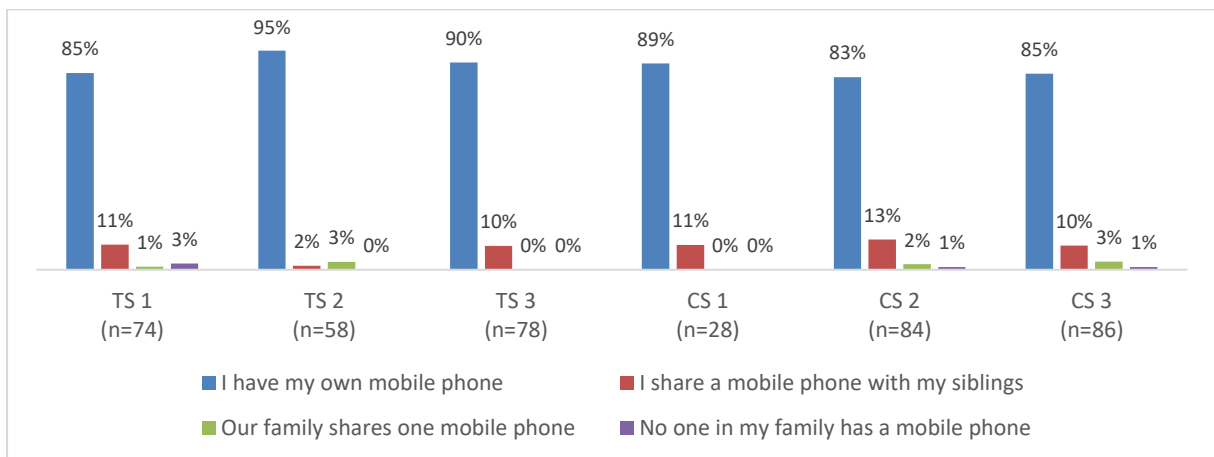
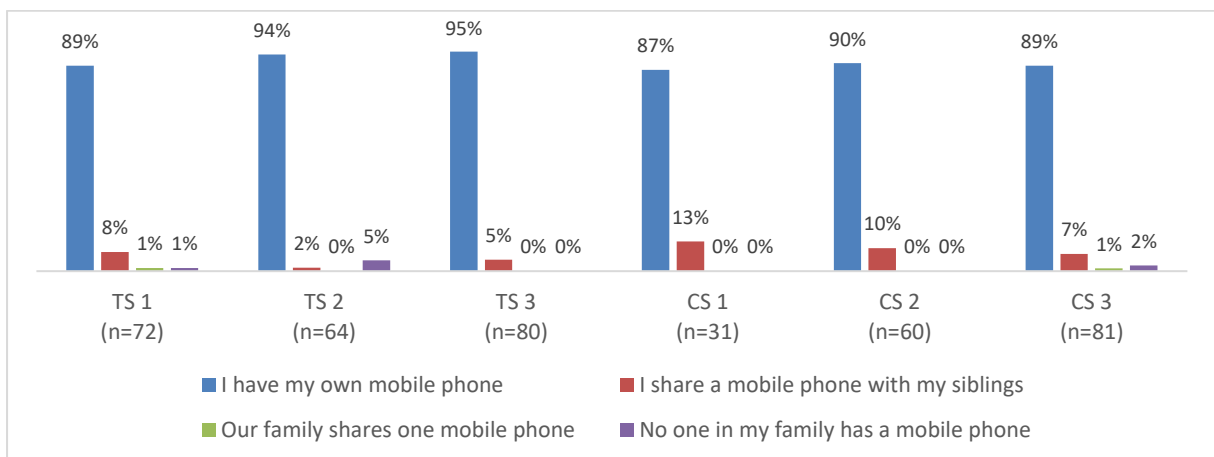


Figure 7: Grade 9 access to mobile phones



¹⁵ 'Other' languages include Shona and Sotho

Figure 8: Grade 8 access to the internet¹⁶

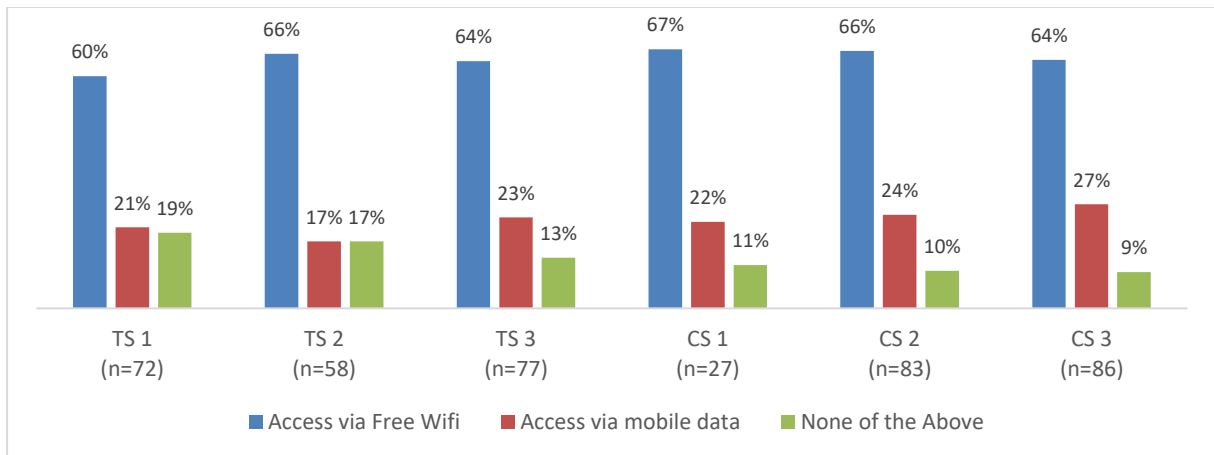
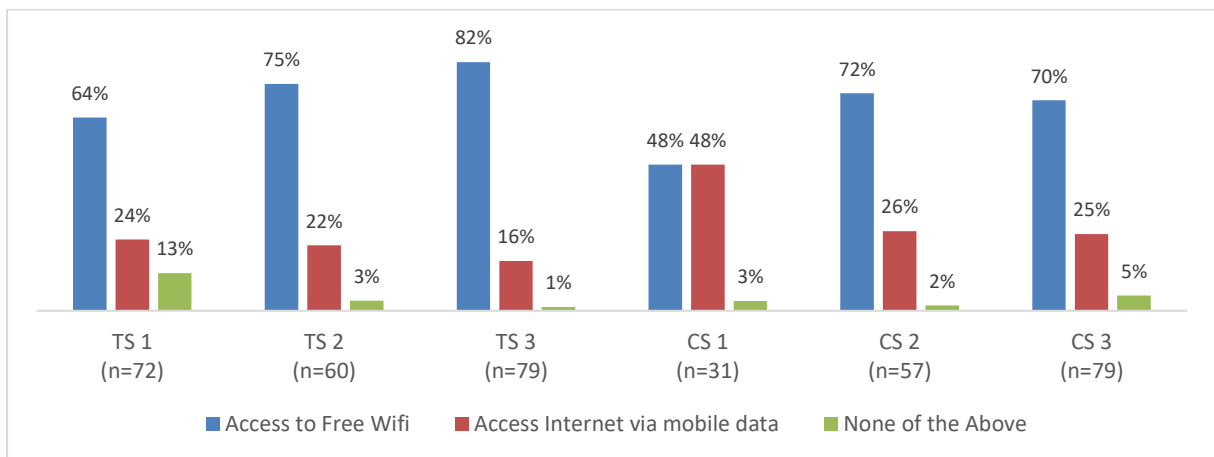


Figure 9: Grade 9 access to the internet



3.5 Limitations

- Limited evaluation budget – the pilot was completed within a limited evaluation budget which meant that data collection activities were prioritised to focus on the treatment schools and mainly collected data from teachers and to a lesser extent, data was obtained from learners. No monitoring data was collected from control schools.
- Limited availability of real-time data – this specifically referring to the usage data collected from teachers and learners. The data available via YouTube cannot be disaggregated so it is not possible to determine whether the users who interacted with the resources during the timeframe of the pilot were part of the pilot. In addition, most of the data on usage by teachers in the classroom is self-reported data. This was triangulated and verified as far as possible.
- Limited use of statistical techniques – the statistical analysis that was conducted could be further enhanced by applying additional statistical techniques which would require a

¹⁶ Figure 6 and 7: The option for Wi-Fi at home via a home router was not added in the questionnaire and it was later learned that Wi-Fi at home was applicable to some of these learners (who had then selected 'none of the above', which makes it seem as though they do not have any access to the internet). In addition, the wording of the Grade 8 and 9 questionnaires are different for this question item.

statistician and relevant statistical package. The limited sample size and evaluation budget did not allow for this.

4 EVALUATION FINDINGS

In line with the [evaluation questions](#), this theory-based process evaluation report provides:

- An assessment of the Programme's design
- An assessment of the implementation of the Programme's activities
- An assessment of the achievement of the Programme's outcomes
- A summary of key challenges and successes emanating from the evaluation

4.1 Programme Design

This section presents the key findings related to the design of the programme as well as an analysis of the assumptions underlying the design of the programme.

PROGRAMME DESIGN: OVERARCHING EVALUATION QUESTIONS
1. How does the programme's logic translate into its activities?
2. Do these activities connect/relate to the programme's outcomes?
Overarching findings and assessment

In terms of examining the extent to which activities that were delivered during the pilot are aligned with what was set out in the TOC, the implementation of activities could take place as planned as per the design of the intervention. Therefore, the main elements of the design as it relates to the activities is sound. In addition, the pilot socio-economic data obtained from learners shows that there is adequate access to mobile phones and internet for learners to use and access the resources.

Further, the current programme design as examined through conducting the pilot, holds true, particularly in terms of the short-term outcomes for teachers as well as learners. In terms of **short-term outcomes for teachers**, it seems these are being achieved as there is an appreciation of the TMT resources insofar as they provide teachers with opportunities to acquire skills and knowledge on not only the content but also on using online resources for teaching. In addition, it has also provided them with a standardised measure (in the form of the quizzes) to gauge learner progress which, it is hoped, will assist teachers to be able to teach in ways that addresses learning backlogs more effectively (thereby achieving the medium-term outcome). In terms of **short-term outcomes for learners**, it appears that these are being realised as learners are using the resources outside of the classroom and, in analysing the baseline and midline test results, learners in the treatment schools who formed part of the pilot have performed better than those in the control schools, indicating that the resources have contributed to increased content knowledge and also improved performance among learners.

In terms of the Theory of Change as detailed in Section 2, the evaluation findings suggest that the TOC remains relevant, and no significant changes are needed. However, the following aspects will be added to the design of the programme (and the TOC) in the hopes of further enhancing teacher and learner access to and use of the resources:

- A greater focus will be placed on teacher training in the TMT resources where a best use case can be shared with teachers.
- Learners were not a target group of the intervention, but learners will be included in further iterations of the programme and will be onboarded directly. It is hoped this will contribute to greater access to and use of the TMT resources by learners if this were done and it hopes to circumvent instances where teachers do not or are not able to use the TMT resources as planned during class time.
- The learner self-assessment quiz marks will be made more readily available to teachers and learners so that learners’ knowledge gaps can be ascertained and addressed (by both teachers and learners).

In terms of the assumptions that were identified at the start of the pilot, the following analysis provides more information on each assumption:

Programme assumption	Insight from pilot
The overall programme	
<p>1. Relevance – it is assumed that the programming will remain responsive to the needs of learners and teachers, as the TMT video lessons are aligned with CAPS which is the required framework used for assessment.</p> <p>2. Role-player buy-in and commitment to implementation – it is assumed that the teachers involved in the programme’s implementation will continue to buy-in to the Programme and deliver the video lessons in their classes. In addition, it is assumed that there would be buy-in from school leadership (such as HoDs, the principal, other relevant school-based staff, etc.) which would strengthen the work of the teachers as this would act as facilitators of access to and use of TMT resources by teachers at schools.</p>	<p>1. Feedback from learners and teachers has indicated the relevance of the TMT resources therefore the relevance of the resources has been confirmed.</p> <p>2. This has proven to be a very important assumption. Data from the pilot has shown that commitment from teachers is not enough but should be enforced by support from school leadership. Teachers may be very committed to the TMT resources and understand the value this brings to their teaching in class but may find it challenging to implement the TMT resources, due to the challenges faced by teachers at quintile 1-4 schools, such as over-crowded classrooms, limited resources (such as calculators), limited access to working technology/ internet connectivity in the classroom and low morale (because of being over-worked and confronted with the ill-discipline of learners). A conceptual framework¹⁷ shared by TMT, exploring the intersection between Standards (‘what is expected’), Selves (‘what I value’) and Situations (‘what can be done’) provides a helpful framework within which to understand this dynamic. The framework highlights the interplay between these different factors, shedding light when understanding how leadership buy-in and support impacts on the teacher and what they value as well as the extent to which the conditions in the class may hinder or facilitate activities by the teacher. This assumption requires more reflection and discussion.</p>
Access to the internet and use of Educational Technology for teaching and learning	
<p>3. Access to the internet and devices/ offline use of the resources - access to the internet and appropriate devices on which to show the TMT resources to learners during class were available at all schools. An offline</p>	<p>3.i. Use of resources by teachers in the classroom: Experience with regards to this has been mixed in terms of use in the classroom by teachers as many factors have acted as barriers, e.g. physical barriers: loadshedding (which also affected the offline use of the resources),</p>

¹⁷ Yue-Yi Hwa. 2022. *Teacher professional norms in the Global South: Intersections between selves, situations, standards, and society.*

Programme assumption	Insight from pilot
<p>version of the resource was also made available and teachers could use this when they experienced challenges with internet connectivity at schools.</p> <p>4. The resource is easily accessible on YouTube.</p> <p>5. Resistance to Educational Technology and resources such as TMT video lessons, will decrease over time.</p>	<p>challenges with stable internet connectivity (as well as others related to non-internet related aspects such as limited teaching time available due to rotational timetabling; competing priorities of teachers and buy-in and support from school leadership).</p> <p>In addition, it needs to be noted that at schools where it was understood they had functioning tech hubs/ computer labs and electronic devices available for completing the tests and self-assessment quizzes electronically, this did not take place as expected. Therefore, going forward, the technological readiness of schools should be carefully considered and monitored as these conditions seem to be dynamic (as they are also dependent on school management structures/ decisions as well as external factors such as load shoothing).</p> <p>This assumption has proven to be significant and has resulted in changes to the design of the intervention. The first change relates to an addition of a teacher training session/ workshop that provides more opportunities for learning about use of the resources and, secondly, to include an onboarding session with the learners at the start of school-based programmes so that TMT can directly market the value of the resource to learners (without needing to rely on the teachers to do this).</p> <p>ii. Use of resources outside of classroom by learners: From the data obtained from learners as part of the tests, the socio-economic factors that were focused on included language and access to mobile phones and the internet, the latter being the most pertinent to this assumption. The data showed that in terms of access to mobile phones and the internet, most learners have access to these and it appears as though these were not barriers to access and use outside of the classroom. This further reinforces the importance of including a direct onboarding session with learners so that they become aware of the resource as early as possible.</p> <p>4. Some learners accessed the resource via YouTube which means this assumption is valid.</p> <p>5. It is difficult to comment on this assumption at this stage. Should data collection among teachers be included by the end of Term 4, there may be some more data available that could speak to this.</p>
Teachers access and use of the resource	
<p>6. Teachers will see the value of the resource and use the resource during class and also promote the resource among learners in their classes.</p> <p>7. If a resource is simple and easy to use, teachers will use it.</p>	<p>6. This has largely taken place, particularly in Treatment School 1 and 3. But, reflecting on the limited implementation that has taken place at School 2, the pilot data is pointing to the need for additional focus and unpacking of this assumption (which relates to adding in a stronger focus on how the resources could be effectively promoted to learners by means of a teacher training session or workshop that will be added to the design of the programme).</p> <p>7. The concept of 'ease of use' may be more complex and requires more reflection and discussion. Ease of use as a construct is determined by other factors (relating to</p>

Programme assumption	Insight from pilot
	teacher buy-in; physical infrastructure; leadership support at schools). This needs to be further examined.
Learners' access to and use of the resource	
8. As most learners would have had exposure to the resources in the classroom and have access to smart devices at home, it is expected that learners will be able to improve their marks through accessing the resources available.	8. This assumption is valid as can be seen from the data obtained during the pilot. At 2 Treatment schools, learners used the resources in the classroom and also outside of class and there has been an increase between their base- and midline test scores which shows the intervention has had an effect on their performance.
9. Most learners will access and use the resources during exams.	9. Use of the resources peaked during exam times, so this assumption holds true.
10. If learners start to use the resource during class, it will lead to them accessing and using the resource in their own time, at home.	10. From the self-assessment data and data obtained via the bookmarks (that were used exclusively for the pilot), it could be seen that this assumption holds true. Use during class at Treatment School 1 and 3 was good which also positively impacted on use outside of the classroom.



Photo 2: Grade 8 Luckhoff learners writing the baseline test, 26 Jan 2022

4.2 Programme Implementation

The evaluation examined Programme implementation in so far as it related to the activities undertaken by TMT. The following presents the relevant implementation-related evaluation questions with a summary of the high-level findings. A detailed discussion and supporting evidence on implementation are provided in [Annexure 6.2](#) and [Annexure 6.3](#).

PROGRAMME IMPLEMENTATION: OVERARCHING EVALUATION QUESTIONS

1. How has the intervention been implemented in terms of its delivery? Was it implemented as intended?
2. Have the implementing partners done what they undertook to do?
3. Have they done it well? i.e. an appraisal of the quality of project implementation

Overarching findings and assessment

The key evaluation questions identified above have guided the enquiry with regards to programme implementation. This section provides an analysis of data, and based on this, key findings have been articulated. The section unpacks implementation of the pilot in terms of three sections:

- gaining insight into whether the pilot was implemented as planned in terms of the key activities that were earmarked,
- gaining insight into the factors that impact on teaching and learning at the 3 treatment schools, and,
- providing an overview of usage of TMT resources by teachers and learners.



Photo 3: Grade 9 Bergrivier learners writing the midline test, 13 June 2022

4.2.1 Planned and actual implementation

[Please consult [Annexure 6.2](#) for details and supporting evidence]

In terms of whether implementation took place as planned, the following key activities were implemented:

- *Selection of 3 control schools and 3 treatment schools* – this took place as planned. The funder only required 2 control and 2 treatment schools, but 2 additional schools were included in the pilot from the start as a precautionary measure to ensure adequate data to be collected during the pilot programme. The pilot was originally planned to take place only in Term 1 but due to a number of challenges that resulted in limited teaching time available in Term 1, it was decided to extend the timeframe to include up to the end of Term 2. In the end, this worked out well as the endline test could then fall together with an examination.
- *The development of video lessons* took place largely as planned, with a total of 7 Video lessons and accompanying self-assessment quizzes developed for Grade 8s and a total of 10 Video lessons and accompanying self-assessment quizzes developed for Grade 9s. These were completed within a time and financially constrained environment yet still delivered to a high quality. Some of the lessons were only completed by TMT a week before the schools needed them which meant that teachers did not have much time to access the resources before implementing them. In future, this would not be a challenge as the EMS resource are now complete and can be accessed well in advance when teachers to their planning and preparation.
- *The development of an M&E framework and designing the pilot evaluation study* took place as planned. A draft theory of change and M&E framework was developed and finalised by

November 2021 before the pilot commenced in January 2022. Findings and recommendations from the evaluation will be used to refine the draft M&E framework which will be finalised towards the end of 2022.

- *Onboarding of schools* took place as planned by identifying teacher ‘champions’ at each school who were implementers and the main points of contact. An onboarding event took place before the pilot kicked-off in January 2022 where dates and key implementation aspects were shared. Before the term commenced, teachers were provided with an orientation session, introducing the EMS Financial Literacy video lessons (and additional resources) and showing a demo in order to address any questions from champion teachers.



Photo 4: Onboarding session, November 2021

- *Baseline and midline tests* were implemented as planned and a total of 478 Grade 8 and 471 Grade 9 learners wrote both tests.
- *Support to teachers throughout the terms* - TMT provided varying levels of support to the different treatment schools. For instance, Treatment school 2 received support in terms of technology to implement the programme and other schools received check-ins conducted telephonically or in-person (as per availability of the TMT team). A WhatsApp group was also created for the treatment schools where information was provided, and some feedback was obtained by teachers. At the end of Term 1, the TMT team were available for a feedback session with each champion at the treatment schools (which coincided with the evaluator interview).

4.2.2 Access to and usage of TMT resources by teachers and learners

[Please consult [Annexure 6.3.1](#) (termly feedback data) and [Annexure 6.3.2](#) (classroom observation data) for details and supporting evidence]

The following key factors were considered when gaining insight into how the TMT resources were used in the classroom by teachers: use of video lessons per grade and school, the extent to which everything worked well during class, use of the video in the classroom by teacher, learner engagement with the video and lesson, and use of the self-assessment quiz in the classroom by teacher. Based on the analysis of this data, it became apparent, particularly in Term 2 that one of the treatment school

teachers was struggling to access and use the TMT resources (treatment school 2). From the implementation data, it became clear that Treatment school 2 was not implementing as expected, which has provided rich learnings for the TMT team but, unfortunately, meant that Treatment school 2 had to be excluded from the outcomes data analysis (which can also be seen in the results, discussed in section 4.3). This limited implementation was due to non-resource related challenges.

Each of the implementation factors is discussed in more detail below:

- **Use of video lessons per grade and school** – At Treatment school 1, overall usage of lessons during classes was 57% for Grade 8s (or 4/7 lessons) and 80% for Grade 9s (or 8/10 lessons) across Term 1 and 2. At Treatment school 2, overall usage of lessons during classes was 57% for Grade 8s (or 4/7 lessons) and 40% for Grade 9s (or 4/10 lessons) across Term 1 and 2. At Treatment school 3, overall usage of lessons during classes was 86% for Grade 8s (or 6/7 lessons) and 60% for Grade 9s (or 6/10 lessons) across Term 1 and 2. The impact of the video lessons are enhanced when consecutive lessons are completed as the lessons build on each other.
- **The extent to which everything worked well during class** – on the day of classroom observations, School 1 did not experience any challenges while School 2 had a slight challenge with availability of speakers while School 3 also experienced some technical difficulties with their projector.

Use of the video in the classroom by teacher – All schools made use of accessing the videos via the YouTube link and also combined this with accessing the video via an off-line version provided by TMT. School 1 and 3 reported using the videos mainly as part of revision. Teachers had different ways of using the videos in class. At Treatment school 1, the video was played at the end of the lesson. At Treatment school 2, the whole video was played during the lesson, and it was used as an additional resource, with the video being played and paused to provide additional explanations. At Treatment school 3, it was played and paused throughout the lesson to check-in whether learners were understanding the concepts. The Grade 8s seemed to struggle with the new concepts while it worked well for the Grade 9s.

In the beginning I just thought that I did not have time for this. But the videos are short, and the sound is excellent. When I started playing them, I noticed that it helped the children. And it helps me.

Teacher 2, Term 1 feedback

- **Teacher feedback on use of videos in class** - Teachers reported largely positive ratings, particularly in Term 1. However, the Treatment school 2 feedback was no longer as positive as in Term 1. Treatment school 3 reported positive ratings during Term 1 and 2. All teachers reported that they had accessed the resources before class in order to prepare for their lessons.
- **Learner engagement with the video and lesson** – across the 3 schools, learners were focused on the screen while the video was playing. At School 1, there was only time to watch the video and no additional time for discussions. At School 2, Grade 8s only watched the video during class, while the Grade 9s were able to have a group discussion. At School 3,

Grade 8s were interactive and among Grade 9s, most learners appeared to understand the work and were confident to complete the class exercise.

- **Use of the self-assessment quiz in the classroom by teacher** – Across all treatment schools, the self-assessment quizzes were completed in both hard copy and electronically. During the observations, this was completed by School 1 and 2 but not by School 3. For Grade 8s at School 1, there was not enough time for engagement or feedback on the quiz. For Grade 8s at School 2, the learners seemed to know most of the answers to the work covered during class, as observed by the evaluator during the classroom observations.
- **Has the self-marking assessment helped teaching** – Most teachers from treatment schools reported that the assessments assisted their teaching. Treatment school 2 was not very positive.
- **Positive Feedback from teachers on video lessons and self-assessments** – Generally positive feedback from Treatment school 1, and commented that learners could go home and complete the assessments as self-study and fill in any gaps they had when they were in class. Treatment school 2 had generally positive feedback on videos in Term 1 but less positive feedback in Term 2. Treatment school 3 teachers commented that learners who used the quizzes were able to answer revision questions in class and said the quizzes were helpful.

The following key factors were considered when gaining insight into how the TMT resources were accessed and used by learners: completion of self-assessment quizzes, learner use of Bookmarks, learner rating of video lessons, and types of devices and locations used to access video lessons and resources by learners. *[Please consult [Annexure 6.3.3](#) for details and supporting evidence]*

It is a very productive tool that learners can use in their own home, but also in class when you want to explain something from a different point of view and showing a visual concept. It is an important resource to incorporate.

Teacher 1, Term 2 feedback

Each of these factors is discussed in more detail below¹⁸:

Completion of self-assessment quizzes – The systems data obtained shows that, in terms of Grade 8s, most completing the self-assessments were from Treatment school 3, followed by Treatment school 1 and then Treatment school 2; and the quizzes completed by the most learners are Quiz 7, 5 and 6. In terms of Grade 9s¹⁹, most completing the self-assessments were from Treatment school 1, followed by Treatment school 2 and then Treatment school 3. Quiz 7, 9 and 10 were completed the most by Grade 9 learners. It should be noted that this data excludes any cases where the teacher projected the test onto the screen and completed it as a class exercise.

The fact that high numbers of learners completed the quizzes, shows there is an appetite of learners to access these resources and use them. This also highlights that the learners are able to access these additional TMT resources of their own volition by accessing these quizzes outside of the classroom.

¹⁸ No data was obtained from Grade 9 learners at School 2

¹⁹ Due to some technical challenges experienced, such as the incorrect linking of quizzes or not adding the school names to the quizzes, data for Quiz 4-6 cannot be used.

Completion of self-assessment quizzes as obtained from self-reported data – Overall, a total of 67% of learners reported completing the self-assessment quizzes. Of these, 76% (88) are Grade 8s and 56% (48) are Grade 9s. Of these Grade 8s, most were from treatment school 3 (87%), followed by treatment school 2 (83%). Of the Grade 9s, the largest proportion were from treatment school 1 (62%) (shown in Table 18). Most of the learners across treatment schools reported the self-assessment quizzes were helpful (78%).²⁰ Of these, 76% (65) are Grade 8s and 80% (36) are Grade 9s. Of these Grade 8s, most were from treatment school 2 (88%), followed by treatment school 3 (76%). The Grade 9s were equally distributed between treatment school 1 and 3 (80% for both). Where it appears as though learners were ‘unsure’ as to the usefulness of the self-assessment, their perception of this is determined by the way in which they engaged with the assessment, in other words, did the learner complete the quiz, did they mark it, where they got answers incorrect, did they find the correct answers, etc. For those learners who only completed the quizzes in class, there may not have been enough time for the teacher to facilitate this whole formative process which would affect the perceived usefulness of the quiz (particularly as most of the quizzes completed in class were done so in hard copy which means learners had to manually mark the quizzes and may not have had enough time to do so during class).

Use of Bookmarks - A total of 392 Grade 8 bookmarks from the 3 treatment schools were scanned, while a total of 407 Grade 9 bookmarks from 3 treatment schools were scanned. This is an extra layer of access provided to learners and means the learners accessing the resources via the Bookmark, have made additional effort to access the resources via this method. Two of the treatment schools also indicated using WhatsApp groups where the links to the resources were shared and it is assumed that most would have accessed the resources via the links on a WhatsApp group as this would be the easiest way of accessing the resources.

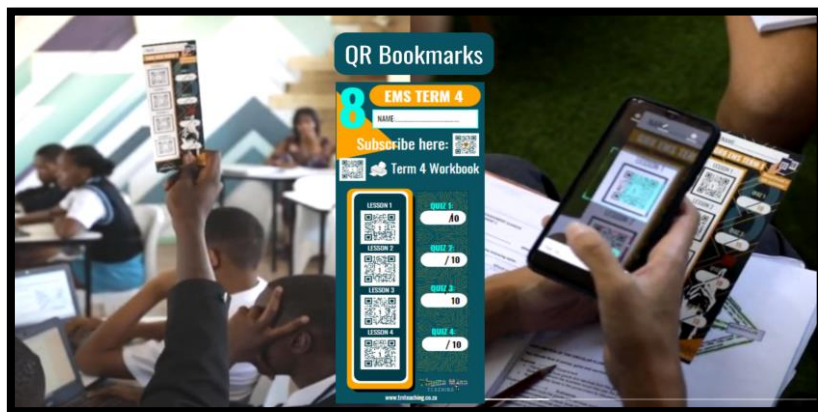


Photo 5: QR Bookmarks in action

Learner rating of video lessons – learners across the 3 treatment schools largely provided positive ratings in terms of the different aspects enquired about. At School 1, there were several aspects that were not rated as highly as others among both Grade 8 and 9 learners. At the other 2 schools, most aspects were rated positively by more than 70% of learners. At all three schools, both Grade 8 and 9 learners provided lower ratings of the statement: *I could keep up with the pace of the video* (Grade 8: 68%, Grade 9: 52%) These lower ratings could stem from the reported difficulty Grade 8 learners

²⁰ Please note, in the analysis of the data related to this questionnaire item, only responses indicating that the self-assessment had been completed, were included. A number of ‘N/A’ responses were excluded from the analysis and it is assumed that these were erroneously selected by participants. These were not many and added to a total of 6 out of 136 responses.

generally have with understanding the concepts within Financial Literacy (as a result of this being the first school year of being exposed to EMS and Financial Literacy). It could also be related to the pace that is set by the teacher in the classroom where the video and quizzes must be completed within a limited time, whereas when learners access the resources outside of the classroom, they are able to set the pace themselves.

Usefulness of having videos for other subjects – across all 3 treatment schools and Grade 8 and 9 learners, most indicated having videos for other subjects would be useful.

Types of devices and locations used to access video lessons and resources by learners – at Schools 1 and 3, learners reported mainly accessing video lessons at home, either via cell phones or laptops. At School 2, Grade 8 learners reported mainly using a school computer in the school’s computer lab.

Using video lessons outside of class – Across the 3 treatment schools, 59% (119) of learners reported using the video lessons outside the classroom. Use at Treatment school 1 was quite varied between the Grade 8s and 9s (61%, and 43% respectively). Similarly, at Treatment school 3, there was almost 40% difference between Grade 8 and 9 usages (84%, and 48% respectively). Across the 3 treatment schools, only 6 learners reported that they felt the video lessons were not helping them have a better understanding of Financial Literacy. It should be noted that there were relatively high proportions of responses that selected ‘unsure’ as a response category with regards to whether the videos outside of class were helping them. This may be since, at the time of completing the questionnaire, they had not had any opportunities for gauging their own knowledge levels and were uncertain as to whether they were gaining a better understanding of Financial Literacy through using the video lessons. About one-third of learners who used the video lessons outside the classroom reported having some level of difficulty using this resource outside the classroom, this warrants further exploration to better understand the challenges learners face when trying to access these resources on their own. These difficulties did not, however, deter the learners from the resource altogether as approximately 90% of all learners indicated that they would find it useful if such resources were made available to them for other subjects (table 23).

In summary, the presentation of the data here provides an overview of implementation throughout the pilot. The main findings, based on the analysis presented here is therefore:

- Actual implementation was closely aligned to the planned implementation – TMT was able to implement their planned activities (as outlined above). The most significant challenges with regards to this component of the pilot was related to the development of the video lessons, self-assessment quizzes and other resources which were completed within limited time and budget constraints. In addition, the turn-around time between completing the videos, making them available to teachers and providing the bookmarks (only halfway through term 2) was very tight and was not optimal. This had some impact on access and usage of teachers and will be discussed in more detail below. This also had some impact on the data that was generated through the quizzes as some quizzes were not linked to the schools, so it was not possible to track this at school level for all the quizzes. However, these resources have now been developed and are available for use.
- In terms of the factors impacting access and use of the TMT resources, School 1 and 3 have been most successful in navigating the barriers to access and use that they encountered. This is despite having larger class sizes than School 2. It is the view of evaluator that one of the critical success factors that have contributed to the successful usage of the TMT

resources at these schools during the pilot have to do with the leadership support and buy-in that has assisted teachers to be able to better implement the video lessons. Apart from the commitment from teachers to participate in a pilot such as this, with all the barriers negatively impacting on access and use, the support and buy-in from the school leadership serves as a facilitator to access and use. This assessment is based on the following:

- Throughout the evaluation team’s engagements with the 3 schools, School 3 and, to a lesser extent, School 1 always involved their HoDs in the planning and discussions. School 3’s HoD attended the evaluation feedback focus groups where they could communicate challenges/ needs to the HoD, where relevant. This is evidenced in the use of the video lessons by teachers at School 1 and 3 and the completion of self-assessment quizzes at School 3, as discussed here:
 - Both schools 1 and 2 had technology and internet connectivity readily available, in theory. However, School 3 reported implementing the most video lessons for Grade 8s and, for Grade 9s, just 1 less video lesson than School 1. School 2 implemented very few video lessons and, technically, received more infrastructure support as part of the pilot (with the donation of a projector and speakers at the start of the pilot).
 - Despite School 3 not having access to technology and internet connectivity, the system data shows the most self-assessment quizzes were completed by Grade 8s from School 3. The Grade 8 teacher provided the learners with her own personal devices so that learners had access and could complete the self-assessment quizzes.
- At schools where the resources were used in the most successful way with the most favourable results, teachers promoted the importance and use of the resources outside of the classroom, thereby motivating learners to access and use the resources outside of the classroom. This is evidenced in the large numbers of learners who accessed the video lessons and quizzes.
- As mentioned in section 4.1, a conceptual framework shared by TMT, highlights the intersection between Standards (‘what is expected’), Selves (‘what I value’) and Situations (‘what can be done’) which forms the basis of motivation for teachers to implement activities/ interventions in their classes.

It is available in YouTube. You type in ‘Thuma Mina’ and the lesson you want to access, and it comes up. I also like the description in the YouTube link – you can access the PowerPoint and the self-marking assessment in the description. This makes it easier for the learners to access the work – it is all in one place.

Teacher 1, Term 1 feedback

The next section incorporates the outcomes data with the analysis of implementation data.

4.2.3 Factors impacting access and use of TMT resources at treatment schools

[Please consult [Annexure 6.3.4](#) for details and supporting evidence]

In order to gain an understanding of the extent to which the teachers were able to use the TMT resources, it is important to identify some of the key factors that would contribute to uptake and use of the TMT resources. By gaining more insight into factors facilitating use or barriers to use, it is hoped the TMT team gains more understanding in terms of how they can better support teachers and learners in accessing and using their resources. To this end, the following factors impacting on access and use of the resources have been identified: the school context in terms of contributing to a conducive learning environment, accessibility of technology and internet, the extent to which the treatment schools were equipped to participate in the pilot, number of teachers teaching EMS in the pilot per school, leadership support and buy-in, and learner discipline and behaviour.

Each of these factors is discussed in more detail below:

- **Conducive learning environment** – in terms of school infrastructure (and by extension, the classroom), one of the treatment schools is relatively new which means the school and classrooms are still in good condition, the classrooms are also larger and can accommodate more learners. The other 2 treatment schools are older, in need of maintenance and have smaller classrooms. School 2 has fewer learners than School 3 and therefore cramped classrooms is more a feature of School 3. School 2 must close the curtains in their classroom which requires their windows to be closed, limiting ventilation in the classroom. Due to the cramped conditions at School 3, learners must sit right in front of the classroom which prevents them from fully being able to see the projected screen. There appeared to be no language barriers at any treatment schools. The approaches of teachers across the 3 treatment schools varies; School 1's teacher is very strict at the beginning of the class and, as the lesson progresses, this changes. The teacher also has a very interactive teaching style. School 2's teacher seemed very tired and worn out. At school 3, the teachers seemed very stressed-out about the limited teaching time and covering all the required aspects of the curriculum within this limited class time available. In addition, teachers appear very aware of how any disruptions in the class can potentially spark unruly behaviour among learners.
- **Accessibility of internet and technology** – School 1 makes use of tablets at their school and has internet access. School 2 has a computer lab (or tech hub). School 3 does not have adequate internet or devices for online learning (their computer laboratories do not have enough computers and the internet speed is very slow so they struggled with viewing the videos).

They have the bookmark. Many use the bookmark. I put the video and self-assessment on our WhatsApp group. In the final week, I had two of my laptops and my mobile and the learners did the assessment on my laptop and ticked it off. That is how we did it. Many of the learners do not have access to a mobile and data.

Teacher 4, Term 2 feedback

- **Extent to which classrooms equipped for pilot** – School 1 and 3 have projectors in the classroom with sound. School 2 did not have a projector and was provided a projector with sound as part of the pilot. The projector has been caged into the classroom, but the sound has not which has resulted in the speakers being used across different classrooms.
- **Number of teachers teaching Grade 8 and 9 EMS (as part of pilot)** – School 1 had one teacher teaching EMS. School 2 had one teacher teaching EMS. School 3 had two teachers teaching EMS.
- **Leadership support and buy-in** – School 1’s participating EMS teacher seemed to be actively supported by his HoD. It is unclear as to the extent of support provided to the participating teacher from her HoD at school 2. At school 3, the two participating EMS teachers were clearly well-supported by their HoD.
- **Learner discipline and behaviour** – At school 1, learner discipline and behaviour at this schools seem to be under control. At school 2, learner discipline and behaviour are more challenging. At school 3, learner discipline and behaviour at this schools seem to be under control but due to very large class sizes, there is a sense that things may get out of control quite quickly.



Photo 6: New Orleans learners writing the baseline test, 21 Jan 2022

4.3 Achievement of Outcomes

The section that follows presents a summary of the key findings relating to the achievement of the outcomes, with a specific focus on answering the following questions:

PROGRAMME SHORT-TERM OUTCOMES: OVERARCHING EVALUATION QUESTIONS

1. To what degree have the programme’s expected results been achieved?
2. To what extent do the objectives of the programme address the needs of beneficiaries?

Overarching findings and assessment

The graphs below show the Grades 8 and 9 base- and midline test scores of the control schools and treatment schools²¹. For the control schools, the graphs for Grade 8 and 9 on the left suggest that

²¹ Treatment School 2 was removed from the outcomes data. This is due to the limited implementation of resources during the pilot, as explained in section 4.2.2.

without an intervention one can expect a 6% and 4.5% decline in learner marks between the base- and midline tests for Grade 8 and 9, respectively).

Figure 10: Grade 8 base- and midline test results for control and treatment schools

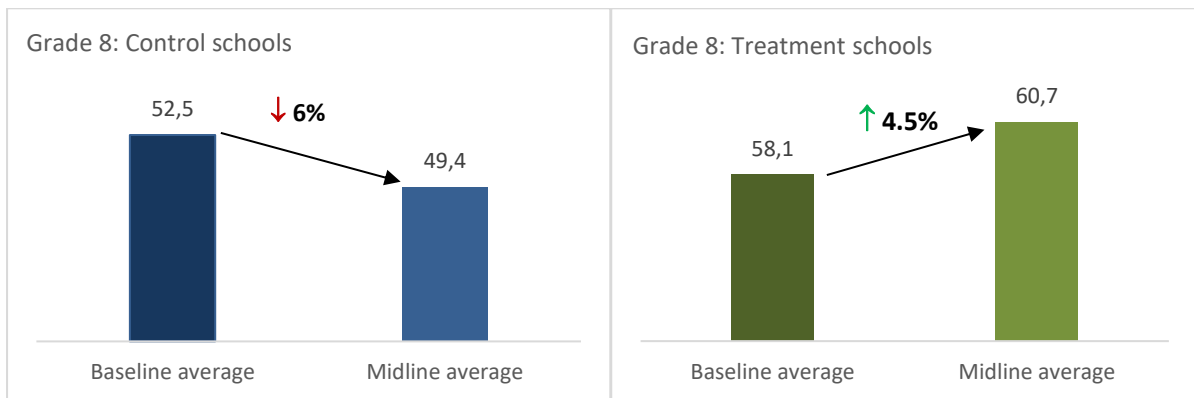
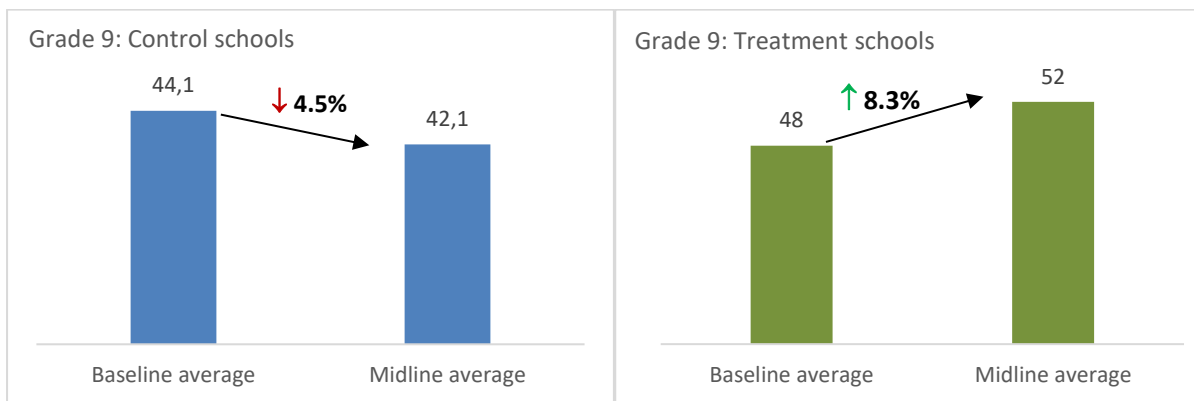


Figure 11: Grade 9 base- and midline test results for control and treatment schools



Assuming that the control and the treatment schools have similar trends, the control schools' difference in their base- and midline scores can be interpreted as the change the treatment schools would have experienced, **had they not received the treatment**. The graphs on the right showing the treatment schools, show that instead of seeing a decline (as with the control schools), we see an improvement in test scores of the schools that received the treatment with an increase in average scores of 4.5% for Grade 8 and 8.3% for Grade 9.

The estimated average treatment effect²² can thus be calculated by subtracting the pre-intervention score difference (D1) from the post-intervention score difference (D2), shown in the graphs below. Based on this calculation, an average treatment effect of 5.7 points was obtained for Grade 8s which is equivalent to a **10% improvement in marks**²³ between base- and midline when expressed as a percentage of the initial average baseline result. An average treatment effect of 5.9 points was obtained for Grade 9s which is equivalent to a **12% improvement in marks**²⁴ between base- and midline when expressed as a percentage of the initial average baseline result.

²² Calculated as: (Treatment_post - Control_post) - (Treatment_pre - Control_pre) = Diff-in-Diff estimate

²³ 5.7/58 = 9.8% (5.7 points expressed as a proportion of the Treatment baseline scores)

²⁴ 5.9/47.9 = 12.3% (5.9 points expressed as a proportion of the Treatment baseline score)

Figure 12: Difference-in-difference – Grade 8 control and treatment schools

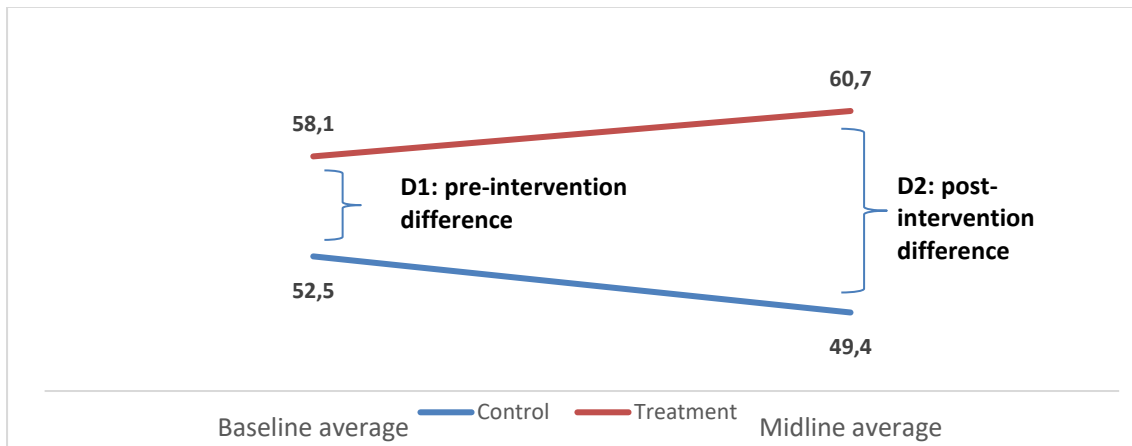
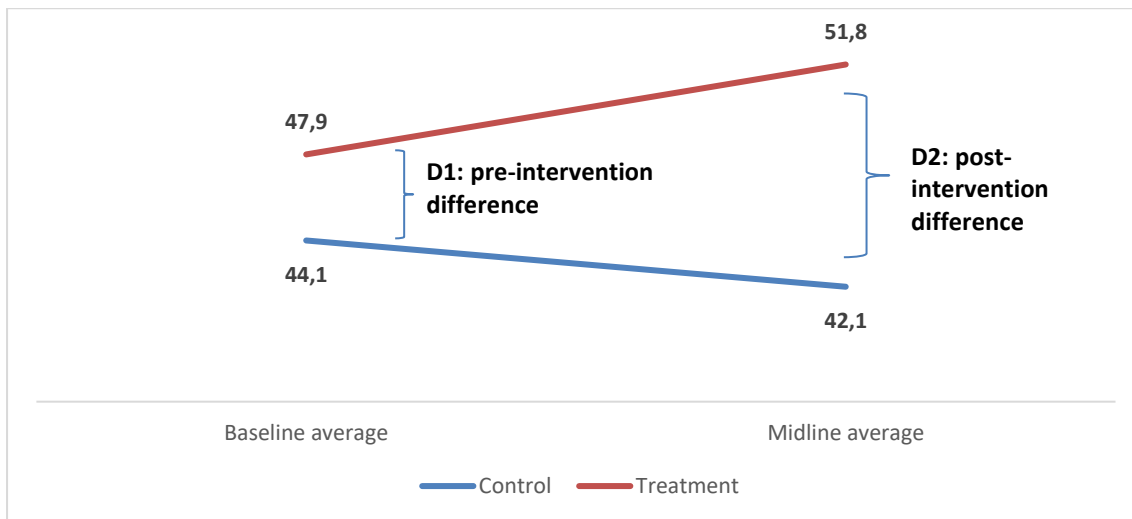


Figure 13: Difference-in-difference – Grade 9 control and treatment schools



In order to calculate the Average Treatment Effect (ATE) of the TMT intervention, a difference-in-differences calculation was performed. The calculation below shows how the ATE was calculated in the figures above.

Average Treatment Effect (ATE) = D2 – D1	
Grade 8	Grade 9
D2 = 60.7 – 49.4 = 11.3 points	D2 = 51.8 – 42.1 = 9.7 points
D1 = 58.1 – 52.5 = 5.6 points	D1 = 47.9 – 44.1 = 3.8 points
ATE = 11.3 – 5.6 = 5.7 points	ATE = 9.7 – 3.8 = 5.9 points

In light of the analysis of the test data, which shows there has been improvement in test results between the base- and midline marks at the treatment schools, key aspects that must be examined relate to the use of the video lessons in the class as well as the completion of the self-assessment quizzes (in or outside of class):

- For both Grade 8 and 9s, video lessons were implemented relatively well at Treatment school 1 and Treatment school 3. In terms of the learner tests, the data from these two schools follow the same trend with regards to their learner test results (with an increase

between baseline and midline test scores). Treatment school 2 has followed the same trend as the control schools, and this is the school where implementation in terms of using the video lessons in class was poor.

- When it comes to the completion for the self-assessment quizzes for Grade 8s, the same trend is observed as above. Most Grade 8 quizzes were completed by learners from School 3, followed by School 1 and then School 2. Interestingly, for Grade 9 this differs. Most quizzes were completed by learners from School 1, followed by School 2 and then School 3.

With the information obtained from the pilot within the timeframe, it would appear the intervention is rendering a positive result in terms of learning outcomes. If one considers that there has been a minimum of 10% improvement across the grades, this can have a significant impact on individual learners in terms of improved motivation, less repetition of the same grade, less dropouts, higher uptake of higher-grade subjects such as Accounting.

The red bars of the following figures show the results we would expect had no intervention taken place. These estimations are based on the percentage decline we see in the control schools between the base- and midline tests. The control schools had a decline in their midline result of 6% which would also be expected for the treatment school, had there not been an intervention. This reinforces the results achieved.

Figure 14: Grade 8 Estimated results with and without treatment

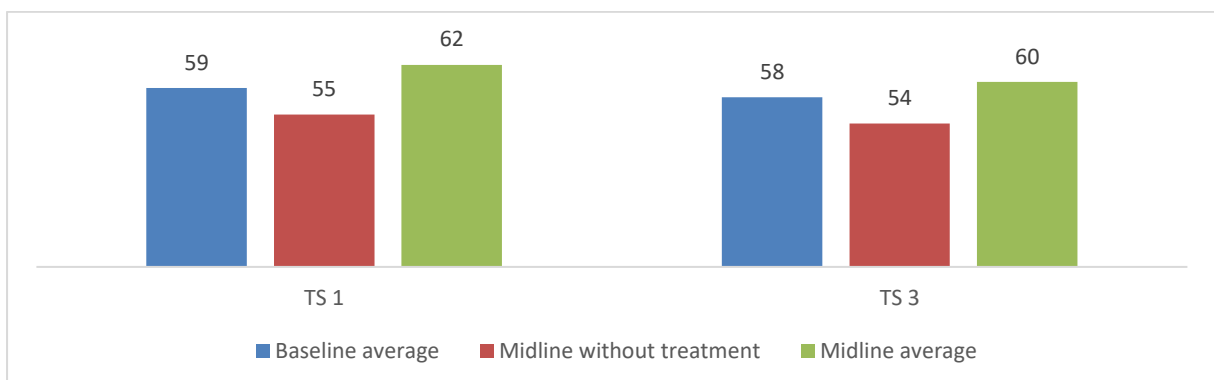


Figure 15: Grade 9 Estimated results with and without treatment

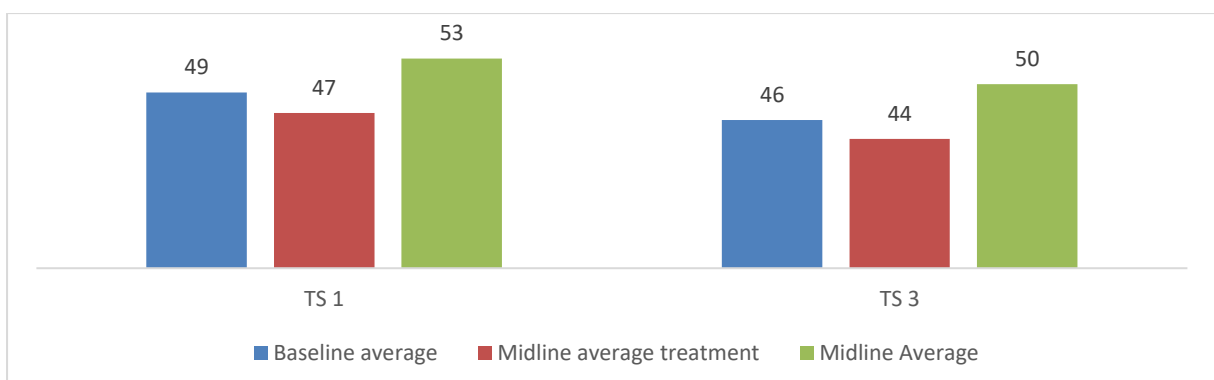




Photo 7: Grade 8 Wellington learners writing the baseline test, 24 Jan 2022

4.4 Key challenges and successes

This section presents the high-level challenges and successes identified through the course of the evaluation.

4.4.1 Key challenges

[Please consult [Annexure 6.4](#) for details and supporting evidence]

One of the most significant challenges experienced by all 3 treatment schools was the limited time available for teaching (which is due to several factors, e.g., changes in Term 1's scheduling with rotational timetables used in Covid-19 being replaced by pre-Covid scheduling which resulted in some delays in commencing with the teaching plan for the year. Other challenges that impacted on time available was loadshedding, public holidays and learners taking longer to grasp certain

During Covid it was difficult to teach and to contextualize and you had learners who did not study as they should have. Now we see a slight improvement. The first term was a difficult term – it was the first time they were all back in the full class setting.

Teacher 1, Term 2 feedback

concepts which may also be due to learning gaps resulting from Covid-19). Where there were some challenges with regards to accessibility of technology or the internet, these further negatively impacted on the extent to which the TMT resources were used by teachers. At some of the treatment schools, calculators are limited and only provided to learners during class which restricts the time they have available to complete their exercises with a calculator.

Below follows a high-level summary of the challenges experienced overall:

- Related to the context of communities where learners come from (socio-economic factors)
 - A lack of soft skills and role models impact on learner behaviour and outcomes

- Socio-economic circumstances that impact on learning (e.g. not having access to a calculator)
- Lack of parental involvement in learners' learning outcomes
- Ending of Covid-19 rotational schedules at schools which resulted in delays at the start of the school year and many subsequent adjustments that have had to take place because of this.
- Limited teaching time available to cover all expected curriculum outcomes and use TMT resources in class
- Related to learners' motivation, and psychosocial aspects and academic performance
 - Low personal motivation of learners results in poor uptake and utilization of resources
 - Poor self-discipline negatively impacts learners' results
 - Learners' low level of knowledge and academic abilities – learning backlogs
- Related to classrooms at schools
 - Lack of availability of technology in the classroom
 - General state of physical disrepair of schools and their classrooms
 - Large numbers of learners in small classrooms (overcrowding)
 - Maintaining good classroom management and discipline
- Related to use of the TMT resources
 - Limited teaching time available to use the video lessons in the classroom
 - Technology challenges that impact on the use of TMT resources in the classroom
 - Accessing the TMT resources
 - The pace of the videos can be too fast for learners

Despite all these (mostly) external challenges, the TMT resources are able to bring about large learning gains of between 10% and 12%. This is a noteworthy achievement and provides a good introduction to the key successes identified during this pilot.

4.4.2 Key successes

- Use of practical examples through using visuals and real-life examples
- Learners engaging with the TMT resources used during class
- TMT video lessons are helping teachers with their teaching (they can model their teaching on the presenter's teaching)
- TMT resources assist learners with the curriculum and workload
- Ease of accessibility of TMT resources
- High personal motivation contributes to learners reaping the benefits of the TMT resources

It is interesting for the learners. It is interactive between the presenter and the lessons, and they could work together. They did enjoy it – they could see in practice how transactions are done. When you explain it on the blackboard it is not as clear as the concepts on the video and in practice.

Teacher 3, Term 2 feedback

- Useful to Learners who already have a good level of knowledge
- Financial Literacy (contained in EMS) is a difficult subject and to have developed a resource for this has been an accomplishment.

They don't have time at the end of the term to do revision and that is why the Thuma Mina videos were so important at the end of the term. I gave them the work to do – to look at the videos and revisit the topics. They checked the videos, and this helped them, and I received positive feedback from most.

Teacher 1, Term 2 feedback



Photo 8: Grade 9 Apex learners writing the baseline test, 21 Jan 2022

5 RECOMMENDATIONS

The following recommendations for improvement have been identified by TMT and a number of role players:

Recommendation	Details
<p>Rethinking the way in which the content is facilitated, e.g. Having a web-based portal where data can be stored, housed and analysed</p>	<p>The ideal would be to have a website that houses the video lessons (bearing in mind that this may result in barriers to access, e.g. people who do not have email addresses and therefore who would not be able to login to access resources) and they hope to have their website operational in a years' time so that they will be able to collect more accurate data on use and what support is required. You can gather more data this way and glean what support is required. They would also like to appoint a school liaison person who would drive the video lessons on the internet, target teachers on social media and school groups and also go out and do training and social media campaigns (TMT team).</p>
<p>Improving the usability of the TMT resources in the classroom</p>	<p>These were mentioned by teachers and relate to:</p> <ul style="list-style-type: none"> • Scheduling a specific time after school for learners to use the resources to help them learn was seen as beneficial and recommended for future use.

Recommendation	Details
	<ul style="list-style-type: none"> ● Teachers generally felt that it is a good resource which they could continue to use in the classroom. ● Having more material available could be helpful for learners who need more in-depth explanations to understand the work and have opportunities to practice applying the concepts (especially those who have learning backlogs). ● With the limited time available to teachers for EMS, some commented that having all the resources available upfront would be helpful to them. Then they can identify what material they want to use where, when and how and they would be better able to plan for their use in the classroom in advance. However, this was limited to the pilot as these resources are now developed. ● Giving teachers access to learners' self-assessment results will also help teachers to track their learners progress.
Addressing the pace of the video lessons	1. Incorporate some classroom management principles into the training to show how the pace could be adapted based on the learners' own level of knowledge
Providing more structured guidance to learners on how to navigate/ work with the material/ resources	2. To include more detailed instructions; and/or use of arrows/ diagrams to assist in navigating the resources
Investigating options of funding TVs rather than projectors and screens	3. Taking theft into consideration, consider options of funding TVs going forward (which can be more easily secured within the school) 4. TVs do not need external sound and are generally 'plug-and-play'
Considering amendments to teacher training and support	5. It will be useful if training happens in a workshop form. With external support for schools, teachers mention peer support and exchange of ideas to cope with challenges 6. Training should include elements of classroom management that can assist teachers with facilitation skills and small group learning techniques. 7. Consider including teaching demonstrations in the training session so teachers can see and experience the classroom management strategies. 8. Provide information to teachers timeously. 9. It would be good if the teachers can access the assessments.
Considering making user data and statistics on use more easily available	10. TMT to decide what are the key pieces of data needed and to focus on being able to generate these

In terms of the analysis above, a best use case has been constructed, which provides key guidelines with regards to use of the resources in low technology environments for no-fee schools:

- A teacher training session takes place with teachers where a number of different aspects are covered with teachers, such as using of resources, educational technology, classroom management techniques and how to best use the resources to address the knowledge gaps among learners. This training could be conducted by a TMT school liaison who would also be available to provide on-site support to teachers, when needed.
- Teacher obtains the resources before teaching and uses the videos, slide deck and self-assessment quizzes to prepare their lesson and their quarterly lesson plan. Teacher has a clear sense of which aspects to focus on during the lesson. Teacher is able to adapt the slide deck to suit their context and needs.

- Teachers test the video in class without learners to ensure all aspects work well before learners enter the classroom.
- Teacher uses the video in class as well as the slide deck, mainly to revise key concepts. Teacher also uses the self-assessment quiz in the class to test the key concepts covered during the class and learners mark their tests in order to gain an understanding of which aspects they struggle with. Teachers also have access to these marks so that the teacher understands the knowledge gaps existing in the classroom.
- Teacher encourages learners to use the resources by themselves, out of the classroom. Either in preparation of the lesson (flipped classroom) or as revision. This is done using different methods of encouragement/ reminders via WhatsApp group, printing the slides and quizzes and even running little competitions to encourage learners to use the quizzes.
- Onboarding learners in addition to the onboarding of teachers - All learners will be exposed to the resources by a TMT representative to ensure that learners buy-in so that they will access and use the resources outside of the classroom. This, in turn, may increase the overall uptake of the entire resource inside and outside the classroom.

6 ANNEXURES

This section contains the main data collection annexures.

Additional annexures are available on request and include the following:

- Base- and Midline test papers
- MOUs with teachers from all participating schools
- WCED support letter for pilot

6.1 Data collection plan

Table 7: Data collection plan

Output/Outcome Indicators	Data collection instrument (SOEs)	Tool purpose	Frequency – who/ when to administer
Onboarding session materials; relevant participants are present	1. Onboarding Attendance registers	To record who attended all the onboarding sessions (which teachers, etc)	TMT completes during each onboarding activity
<p>Outputs: Video lesson use is tracked by teachers;</p> <p>STO Indicator: Subject teachers are able to provide their plans in terms of how and when they will use the video lessons, ppt and assessment provided</p> <p>MTO Indicator: Teachers can adapt their lessons based on the formative feedback obtained via the self-marking assessments (they are able to see which aspects need to be covered more)</p>	2.1 Video lesson & self-assessment tracking logs (Term 1 and 2) & data from the system	<p>2.1 To collect information on date, which lesson covered, any challenges, comments on learner engagement experienced</p> <p>2.1 Teachers report on whether they have been able to administer the self-marking assessments and, if so, how they've experienced it</p>	Teachers print and complete every time the video lessons and self-assessments are used during classes
<p>STO Indicator: Teachers have an improved understanding of how to teach certain concepts; Teachers have a better understanding which concepts to focus on (in terms of what must be covered in the curriculum); Teachers are more confident to answer learner questions in class/ explain concepts/ access additional online resources, if needed; Teachers are more confident to use ed-tech based resources</p> <p>STO Indicator: More engagement from learners during class – more asking questions/ providing input</p>	3. Teacher self-reporting questionnaires: 3.1 background questionnaire; 3.2 feedback questionnaire 1 3.3 feedback questionnaire 2	<p>Self-reporting questionnaires: 3.1 Teacher background (treatment and control); 3.2-3.3 Teachers report they have a better understanding of how to teach certain concepts (after they have engaged with the <i>video lessons</i>); Teachers report they feel more confident, etc</p> <p>Teachers report on whether they have administered the <i>self-marking assessment</i> and, if so, how they have been able to use the results from the formative assessment and reflect on whether this has assisted them in their teaching</p>	Teachers complete a questionnaire that obtains their background as well as some additional information; Teachers complete a feedback questionnaire to obtain their feedback on the lessons; Teachers provide informal feedback on WhatsApp at the end of the week (when they have used the video lesson in class)

Output/Outcome Indicators	Data collection instrument (SOEs)	Tool purpose	Frequency – who/ when to administer
	4. Classroom observations	To observe how teachers engage with the learners - what would the expected ways be in which the teacher engages (per specific lesson) and how does this unfold during the class (with the assistance of the video lesson); levels of teacher confidence in the class; learner engagement (asking questions/ giving more input)	Conduct classroom observations in Term 2 – 1 of each grade (8 and 9) at each treatment school
MTO Indicator: Learners incorporate the video lessons into their learning; Learners know which aspects they need to work more on and can access the necessary resources to address their knowledge gaps; Learners are more confident to access additional online resources if needed	5. Learner self-reporting questionnaire (this is to be incorporated with the classroom observation)	Learners are asked to reflect on their experiences of having the video lessons in class; whether they were able to access the resources online by themselves; whether the resources have helped them; whether it has impacted on their confidence, etc	Administered during the classroom observation in Term 2
LTO Indicator: Learner test scores show improvement over the year	Baseline vs midline vs endline test results	Tests developed by TMT	Baseline at the start of Term 1; midline at the end of Term 2 (endline planned for end of the year) administered by evaluators
LTO Indicator: Schools are better equipped to leverage existing resources to enhance T&L; Schools are more confident and open to incorporate new styles and methods that promote excellence in T&L; Teachers in the school are requesting projectors and laptops; increased demand and use for computer labs at schools	Focus group with teachers at the end of every term	Reflections from teachers on how the video lessons have been implemented and whether they think this has made a difference to the learning outcomes and teaching practices	Focus group with teachers - facilitated by evaluators at the end of Term 1 and Term 2 at treatment and control schools

6.2 Planned and actual implementation

The table below presents an overview of the planned implementation and actual implementation of the TMT programme, grouped according to key phases and their corresponding activities. Each phase is discussed in more detail in the section below the table, in terms of reflections on challenges, lessons and achievements.

Table 8: Summary of planned versus actual implementation of the programme

PROGRAMME ASPECT	PLANNED IMPLEMENTATION	ACTUAL IMPLEMENTATION
Selection of schools	<p>The initial planning of the pilot programme aimed to select 4 schools (2 treatment and 2 control schools). A number of criteria were considered for selection into the pilot, including:</p> <ul style="list-style-type: none"> - The quintile of the school (non-fee paying schools) - Existing relationships with the school to facilitate access and buy-in - Some level of technology readiness (e.g. access to tablets; computer labs) 	<p>In the end, 6 schools were included in the pilot programme. The TMT team decided to include 1 additional treatment and control school each as a precautionary measure to ensure that adequate data could be collected during the pilot programme and minimise risks of only having 2 treatment schools included in the study. Therefore, 3 treatment and 3 control schools were selected.</p>
Development and preparation of video lessons, quizzes and bookmarks	<p>As funding was secured for the pilot programme, the development of the video lessons and associated resources would commence. An EMS Educational curriculum expert (who is familiar with the Curriculum Assessment Policy Statements (CAPS) for the Western Cape Education and National Education systems) was identified to assist with mapping the TMT video lessons against the CAPS. Once the scope of the video lessons is determined, the video content is developed (through script writing and preparing appropriate visuals). This content is reviewed by external reviewers and amended as needed. Once this is finalised, the videos are produced and then edited and then ready for distribution.</p> <p>Apart from the video lessons, the resources also include a slide deck, self-assessment quizzes and bookmarks containing QR codes that would direct users to the resources.</p>	<p>In terms of the planned vs actual development of the video lessons, this took place largely as planned and, up until the end of Term 2, the following video lessons, with their associated slide decks, self-assessment quizzes and Bookmarks (containing QR codes) were developed:</p> <p>Grade 8 – a total of 7 Video lessons; Grade 9 – a total of 10 Video lessons.</p> <p>The video lessons and additional resources were produced within time and resource restrictions.</p>
Development of M&E framework and designing of the pilot evaluation study	<p>As part of the pilot programme evaluation, an M&E framework was to be developed to assist with articulating the programme theory of change as well as the measurement framework to be used for the evaluation,</p>	<p>A draft theory of change and M&E framework was developed and finalised by November 2021 before the pilot commenced in January 2022. Findings and recommendations from the evaluation will be used to refine the draft M&E framework which will be finalised towards the end of 2022.</p>

PROGRAMME ASPECT	PLANNED IMPLEMENTATION	ACTUAL IMPLEMENTATION
Onboarding of schools	<p>Information sessions to be held with the broader group of interested schools (control and treatment) and onboarding to take place at treatment schools.</p> <p>At each school, a champion teacher would be identified who would form part of the EMS teaching team. The champion would work together with representatives from the school management/ leadership (either HODs or other managerial position).</p>	<p>An information session was held with prospective schools where a number of aspects were discussed, e.g. the current trends in EMS Financial Literacy achievement data and concerns related to this; an introduction to the TMT programme and overview of the pilot study (which included introducing the evaluator to the schools); providing the MOUs for control and treatment schools and highlighting key aspects for their attention.</p> <p>The teacher champions were identified at each school, as well as their relevant support representatives (at management level) from each school. The champions and other school representatives were provided with an opportunity to ask questions and further information was provided. Next steps and tentative dates were discussed for implementation commencement in January 2022.</p> <p>In January 2022, TMT visited each of the treatment schools and assessed their readiness to start with the programme. Where required, additional equipment was provided (such as a projector and speakers to Treatment school 2). Teachers were also provided with an orientation session, introducing the EMS video lessons and showing a demo in order to field questions.</p>
Baseline and midline tests	<p>Baseline and midline tests would be conducted at all control and treatment schools. The tests had to be administered to all grade 8 and 9 EMS classes at the same time, at each school.</p> <p>The midline tests had to be written at the same time as the June exam paper so that learners had an opportunity to study for the exam and, inadvertently, the midline test as well.</p>	<p>In January 2022, all schools were contacted to finalise the details of the pilot study. Most importantly, dates were secured and arrangements made for the baseline tests that took place at the beginning of the school year, which started towards end January and ended by mid-February. At some schools, all grade 8 and 9 EMS learners wrote the baseline (however, at midline test, only those classes who had received video lessons wrote the midline tests). Across the 6 participating schools, it was ensured that all participating grade 8s and 9s per school wrote the baseline and midlines at the same time, and also, for the midlines, that they wrote in the same sequence. In order to accommodate this with adequate space and personnel, grades 8 and 9 wrote their baseline and midline tests on different days. At all schools, the midline tests followed directly after the exams, which was as intended.</p>
Support to teachers throughout the terms	<p>Ad hoc support to be provided to those schools who require it.</p>	<p>TMT provided varying levels of support to the different treatment schools. For instance, Treatment school 2 received support in terms of technology to implement the programme and other schools received check-ins conducted telephonically or in-person (as per availability of the TMT team). A WhatsApp group was also created for the treatment schools where</p>

PROGRAMME ASPECT	PLANNED IMPLEMENTATION	ACTUAL IMPLEMENTATION
		<p>information was provided and some feedback was obtained by the teachers.</p> <p>At the end of Term 1, the TMT team were available for a feedback session with each champion at the treatment schools (which coincided with the evaluator interview).</p>
<p>Usage of the tools by teachers and learners</p>	<p>Teachers would use the video lessons in class as a tool to enhance the teaching and learning of EMS Financial Literacy. Teachers would also use the self-assessment quizzes in class as formative exercises that provided learners with the status of their own progress. Teachers were also encouraged to promote among learners the use of a Bookmark which contains a QR code where learners can access all the resources.</p> <p>Learners would access the video lessons and resources outside of the classroom and address their financial literacy knowledge gaps.</p>	<p>Implementation of the video lessons and resources varied greatly among the treatment schools. This was due to a number of factors, discussed below.</p> <p>No teachers at any of the treatment schools showed all the video lessons for Term 1 and 2 in their classes. Therefore, in order to make sense of the learner data emerging from the baseline and midline tests, a more detailed understanding of implementation per school is required. Out of the 3 treatment schools, for grade 8s:</p> <ul style="list-style-type: none"> - Treatment school 3 was able to implement the programme most successfully with 6 out of 7 lessons implemented (across both terms); followed by - Treatment school 1 with 4 out of 7 lessons; and - Treatment school 2 with 4 out of 7 <p>For grade 9s:</p> <ul style="list-style-type: none"> - Treatment school 1 implemented the programme most successfully with 8 out of 10 lessons implemented (across both terms); followed by - Treatment school 3 with 6 out of 10 lessons; and - Treatment school 2 with 4 out of 10 lessons <p>There is some evidence that learners have accessed the videos outside of class and also that they have made use of the self-assessment quizzes (particularly by accessing them through the Bookmarks, containing a QR code that is a unique identifying code for the pilot study).</p>

6.3 Implementation Data

In terms of gaining more insight into how teachers accessed and used the TMT video lessons and resources, the following section details how this took place at each treatment school. The first section describes how the resources were used in class by teachers and the second section provides an overview of access to and use of resources not only in the class but also out of the class (by teachers and learners).

6.3.1 Teacher access and usage data – Termly feedback data

The following key factors were considered when gaining insight into how the TMT resources were used in the classroom by teachers: use of video lessons per grade and school, the extent to which everything worked well during class, use of the video in the classroom by teacher, learner engagement with the video and lesson, and use of the self-assessment quiz in the classroom by teacher.

Use of video lessons per grade and school²⁵

- At Treatment school 1, overall usage of lessons during classes was 57% for Grade 8s (or 4/7 lessons) and 80% for Grade 9s (or 8/10 lessons) across Term 1 and 2.
- At Treatment school 2, overall usage of lessons during classes was 57% for Grade 8s (or 4/7 lessons) and 40% for Grade 9s (or 4/10 lessons) across Term 1 and 2.
- At Treatment school 3, overall usage of lessons during classes was 86% for Grade 8s (or 6/7 lessons) and 60% for Grade 9s (or 6/10 lessons) across Term 1 and 2.

²⁵ Data provided in the Termly Feedback Google form completed in Term 1 and Term 2.

Table 9: Grade 8 Teacher log sheets and termly feedback (Term 1 and 2) showing usage of Video Lessons

SCHOOL	GRADE 8: TERM 1				GRADE 8: TERM 2			TOTAL
	Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5	Lesson 6	Lesson 7	
Treatment school 1	Yes	No	No	No	Yes	Yes	Yes	57%
Treatment school 3	Yes	Yes	Yes	No	Yes	Yes	Yes	86%
Treatment school 2	Yes	Yes	No	No	Yes	No	Yes	57%

Table 10: Grade 8 Teacher log sheets and termly feedback (Term 1 and 2) showing usage of Video Lessons

SCHOOL	GRADE 9: TERM 1						GRADE 9: TERM 2				TOTAL
	Lesson number						Lesson number				
	1	2	3	4	5	6	7	8	9	10	
Treatment school 1	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	80%
Treatment school 3	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	No	60%
Treatment school 2	Yes	Yes	Yes	No	No	No	No	No	Yes	No	40%

Ways videos were accessed by teachers

- At Treatment school 1, for both grades, the teacher accessed the link via YouTube.
- At Treatment school 2, for both grades, the teacher made use of a combination of accessing videos via YouTube or an off-line version provided by TMT
- At Treatment school 3, for both grades, the teachers made use of a combination of accessing videos via YouTube or an off-line version provided by TMT

Ways of using the videos in class by teachers

- Teachers had different ways of using the videos in class, at Treatment school 1, the video was played at the end of the lesson. At Treatment school 2, the whole video was played during the lesson and at Treatment school 3, it was played and paused throughout the lesson to check-in whether learners were understanding the concepts.

Teacher feedback on use of videos in class

- Teachers reported largely positive ratings, particularly in Term 1. However, the Treatment school 2 feedback was no longer as positive as in Term 1²⁶. Treatment school 3 reported positive ratings during Term 1 and 2.

Teacher use of video lessons outside of classroom

- All teachers reported that they had accessed the resources before class in order to prepare for their lessons

Has the self-marking assessment helped teaching

- Most teachers from treatment schools reported that the assessments assisted their teaching. Treatment school 2 was not very positive (and could be related to the teacher's personal circumstances).

Use of self-assessment quizzes by teachers in class

- Across all treatment schools, the self-assessment quizzes were completed in both hard copy and electronically.

Positive Feedback from teachers on video lessons and self-assessments

- Generally positive feedback from Treatment school 1, and commented that learners could go home and complete the assessments as self-study and fill in any gaps they had when they were in class.
- Treatment school 2 had generally positive feedback on videos in Term 1 but less positive feedback in Term 2.
- Treatment school 3 teachers commented that learners who used the quizzes were able to answer revision questions in class and said the quizzes were helpful

²⁶ The teacher at Treatment school 2 was not able to fully utilise the resources. This was due to non-resource related challenges.

6.3.2 Teacher access and usage data - Classroom observation data

Notes were taken during the classroom observations and expanded on during reflection immediately after the observations. A thematic analysis was conducted of the observation checklists and written up together with the termly teacher feedback. Please refer to the tables overleaf below for more detailed data.

The extent to which everything worked well during class²⁷

- In terms of any challenges experienced with use of the video lessons in the classroom during the observations that took place as part of the pilot, no challenges were observed for the Grade 9 classes across the three treatment schools.
- At Treatment school 2, there was a slight challenge with the Grade 8 class as there are not enough speakers to use with the projectors and the speakers are not fixed to the caged projector, so these are therefore shared among teachers. In addition, the focal point of the projector did not neatly fit onto the white board which may have impacted the visibility of the videos for some learners.
- At Treatment school 3, the Grade 8 lesson was executed differently than planned as they experienced some technological challenges which took some time to resolve.

Use of the video in the classroom by teacher²⁸

- At Treatment school 1, for both grades, the videos were used to assist in revising concepts and work that had already been taught. The slide deck was used together with the projector and the learners had printed out ppts and were using these to add additional notes during class. The teacher played the whole video during both Grade 8 and 9 classes.
- At Treatment school 2, the video was used as an additional resource for Grade 8s. The learners seemed to struggle to grasp the concepts, particularly as they had not covered this in detail in class before. The whole video played during the lesson. For Grade 9s, it was also used to introduce new concepts. The teacher regularly paused the videos to explain concepts in more detail and provide additional information. This seemed to work well as an introductory session however additional information and explanations seem helpful.
- At Treatment school 3, the video was used as part of the revision of key concepts for both grades. The Grade 8 teacher regularly paused the video, allowing for questions however, the lesson ended before the video lesson was finished. The Grade 9 teacher used a downloaded video on the projector. The teacher had made an accompanying exercise for learners to practise the lesson content. The teacher paused the video to allow the learners to test their understanding by doing the exercise and checking their answers when the video continues playing.

Learner engagement with the video and lesson²⁹

- At Treatment school 1, learners in both grades focused on the screen. For Grade 8s, some were taking notes while in the Grade 9 class, most learners were not taking notes. For Grade 8s, there were a few distracted learners towards the back of the classroom. There was also

²⁷ Data from classroom observations conducted at treatment schools with Grade 8 and 9 learners in April and May 2022.

²⁸ Data from classroom observations conducted at treatment schools with Grade 8 and 9 learners in April and May 2022.

²⁹ Data from classroom observations conducted at treatment schools with Grade 8 and 9 learners in April and May 2022.

not enough time to allow for much learner/teacher engagement in class, particularly during the video lesson.

- At Treatment school 2, learners in both Grade 8 and 9 classes were actively watching the screen and taking notes. The Grade 8s only watched the video during class and did not discuss any other work during class. The Grade 9s also used the video for the whole class and were able to do a group discussion and give feedback to the class. The Grade 9 EMS class seemed to cope better with EMS due to having a Grade 8 foundation in the subject (unlike the current Grade 8s).
- At Treatment school 3, most learners were attentive to the screen and focused on the lesson. During the non-video parts, the Grade 8 learners were interactive, questions were asked by the teachers and learners answered. This part of the class did not necessarily require note-taking because it was revision (a few of the learners seemed to have lost concentration and looked sleepy half-way through the lesson). For the Grade 9 learners, only a few had calculators and some used their cell phones (which could have led to distractions). Most learners appeared to understand the work and were confident to complete the class exercise.

Use of the self-assessment quiz in the classroom by teacher³⁰

- At Treatment school 1, for both grades, the self-assessment quizzes were completed and used as part of a revision activity. For Grade 8s, there was no time for engagement/feedback on the quiz as the lesson ended. For Grade 9s, a few questions had to be explained by the teacher and some of the questions in the quiz, they had not yet covered in class.
- At Treatment school 2, both grades completed the self-assessment quizzes. Grade 8s seemed to know most of the answers of the work that was covered during class.
- At Treatment school 3, the self-assessment quizzes were not completed by either Grade 8 or 9 class. It was reported for Grade 9s that the quizzes were not yet available at that time.

³⁰ Data from classroom observations conducted at treatment schools with Grade 8 and 9 learners in April and May 2022.

The table below provides the data obtained from teachers from the Termly feedback questionnaire per school:

Table 11: Summary of usage by school (Termly Teacher Feedback)³¹

Treatment Schools	Treatment school ³²	Treatment school 2	Treatment school 3
Ways videos were accessed by teachers	Teacher accessed the link via YouTube	Teacher used a combination of accessing videos via YouTube or off-line version provided by TMT	Term 1: Teachers used a combination of accessing videos via YouTube or off-line version provided by TMT Term 2: downloaded videos
Ways of using the videos in class by teachers	Teacher played the video at the end of the lesson.	Teacher reported playing the whole video during the lesson	Teachers played the video and paused it throughout the lesson to check-in whether learners were understanding the concepts
Teacher feedback on use of videos in class	Term 2: Teacher disagreed with the following statement: the learners were engaged during the class Term 2: Teacher thinks the video lessons helped convey the key concepts to learners	Term 1: Teacher agreed with the following statements: learners understood the concepts conveyed during the videos; the learners were engaged during the class; the teachers felt more confident about how to convey concepts to learners and also felt more confident to answer questions from learners. Term 2: Teacher does not think the video lessons helped convey the key concepts to learners Term 2: Teacher disagreed with the following statements: learners understood the concepts conveyed during the videos; the teacher felt more confident about how to convey concepts to learners and also felt more confident to answer questions from learners.	Term 1 and 2: Teachers agreed with the following statements: learners understood the concepts conveyed during the videos; the learners were engaged during the class; the teachers felt more confident about how to convey concepts to learners and also felt more confident to answer questions from learners. Term 2: Teachers think the video lessons helped convey the key concepts to learners
Teacher use of video lessons outside of classroom	Term 2: Yes (accessed before class, in preparation)	Term 1 and 2: 1 Yes (accessed before class, in preparation)	Term 1 and 2: 2 Yes (accessed before class, in preparation)

³¹ Teacher Termly feedback data (Term 1 and 2)

³² Only data for Term 2 was obtained. The other two schools provided data for both Terms 1 and 2. Where differences were reported between the Term 1 and Term 2 feedback forms, this is indicated in the table.

Treatment Schools	Treatment school ³²	Treatment school 2	Treatment school 3
Use of self-assessment quizzes by teachers in class	Term 2: Teacher gave the learners the self-assessment to complete after watching the video.	Term 1 and 2: Yes	Term 1 and 2: 1 Yes; 1 No (not enough time for this)
Ways of completing the self-assessment quizzes	1 both hard copy and electronically	1 both hard copy and electronically	1 Electronically; 1 Self-study
Has the self-marking assessment helped teaching	Term 2: Yes (It provided useful data about the different areas of financial literacy the learners were struggling with, especially when the learners completed the assessments at the end of the topic).	Term 1: Yes (learners felt challenged and engaged) Term 2: No (doesn't really align with CAPS)	Term 1: 1 Yes (Learners were able to answer revision questions in class); 1 Unsure (some learners said it helped them) Term 2: 1 Yes; 1 Unsure
Teacher further comments	Term 2: Not enough time to get through all the content and watching the videos in the classroom due to learners' very slow pace of work, but the success of it was that the learners could go home and complete the assessment as self-study and fill in any gaps that they had when they were in class.	Term 1: Grade 8 learners are still getting used to the videos, financial literacy, etc. It would be advised to slow down the pace or expand more on concepts Term 2: Resources	Term 1: Videos and self-assessment links were sent to learners via WhatsApp. Learners who don't have access to a phone / computer did self-mark assignments during intervals on teacher's phone. Term 2: The learners loved the lessons. Some of them watched it at home too.
Positive Feedback from teachers on video lessons and self-assessments	<ul style="list-style-type: none"> - Generally positive feedback on videos – video lessons helped convey the key concepts to learners - Quizzes provided useful data about the different areas of financial literacy the learners were struggling with, especially - The success of it was that the learners could go home and complete the assessment as self-study and fill in any gaps that they had when they were in class. 	<ul style="list-style-type: none"> - Generally positive feedback on videos in Term 1 and less positive feedback in Term 2 - Not sure whether the quizzes were helpful 	<ul style="list-style-type: none"> - Generally positive feedback on videos - Learners who used the quizzes were able to answer revision questions in class and said the quizzes were helpful
Challenges mentioned by teachers	Not enough time to get through all the content and watching the videos in the classroom due to learners very slow pace of work	The pace of the videos is too fast for the learners.	

Table 12: Summary of usage by school (classroom observations)³³

Key school dimensions	Treatment school 1	Treatment school 2	Treatment school 3
Did everything work well during the class? (Classroom observation)	<p>Grade 8: No challenges observed (although the projector has the tendency to disconnect but there were no challenges on the day of observations).</p> <p>Grade 9: No challenges observed.</p>	<p>Grade 8: The projector is not neatly fitted onto the white board. It sounds like there are not enough speakers in the school for all the classrooms. They need to borrow it from each other. The Afrikaans EMS teacher also wanted to show the videos to learners and wanted to borrow the speakers. Apart from the focal area on the screen everything worked well. The teacher stopped the video periodically to focus learners' attention on differences in concepts, to ask questions and check learners' understanding.</p> <p>Grade 9: No challenges observed.</p>	<p>Grade 8: The lesson was executed differently to planned. The teacher had to adapt to the tech challenges. Another teacher's lesson was displayed on her projector, and it took time to try and identify who the teacher is and how she can display her lesson on the projector. As a result, the teacher started to review the key concepts that are covered in the video lesson that they have discussed before. She then introduced the topic of the video lesson and started playing it.</p> <p>Grade 9: No challenges observed.</p>
How was the video used in the classroom? (Classroom observation)	<p>Generally, the teacher accessed the link to the video lessons via YouTube. The teacher accessed the video before class in preparation.</p> <p>Grade 8: They started the lesson by reviewing homework. Continued with a PPT that explains the work. The PPT was used with the projector. Learners took additional notes on their printed PPTs. The video was played from start to finish, towards the end of the lesson. The lesson was used as a revision of what was explained previously in the class. Questions and student engagement was not encouraged during the video lesson. This was encouraged during the previous teaching part of the class. After the video lesson they did the self-assessment and then the bell rang. There was no more time for</p>	<p>The teacher used a combination of accessing videos via YouTube or an off-line version provided by TMT. The teacher accessed the video before class in preparation.</p> <p>Grade 8: It was a very quick introduction to the video, not saying much. It was used as an additional resource. Teachers seem to teach work in different sections based on what they believe helps the learners the most. The content in the videos can be taught in different lessons. Students then appear to struggle with the content when they have not covered it in depth in class. Such as the differences in equations: owner's equity=assets-liabilities; assets=owners' equity -liability. The video used all the class time.</p>	<p>The teachers used a combination of accessing videos via YouTube or off-line versions provided by TMT as well as downloading the videos before classes. The teachers accessed the video before class in preparation.</p> <p>Grade 8: The teacher introduced the lesson, doing revision and asking revision questions about terms learned previously (term 1). The video was regularly paused, and questions asked. Learners were actively participating. They were instructed to take out their notebooks and not to copy from the screen, but to make short notes for themselves. A few students left their books closed; others were taking notes. There was no time for the teacher to elaborate on the content of the video. The bell rang before the</p>

³³ Data from classroom observations conducted at treatment schools with Grade 8 and 9 learners in April and May 2022

Key school dimensions	Treatment school 1	Treatment school 2	Treatment school 3
	<p>engagement. They used the video more as a review of what has been learned /taught. They were predominantly watching and adding notes to what they already have.</p> <p>Grade 9: The homework was finished and then the lesson was introduced as looking at the general ledger. The video followed up on concepts used in the homework activity and was played towards the end of the lesson. He also handed out the quiz to follow-up on the video. The answers on the assessment were explained with the help of a summary of transaction analysis. The teacher has a very interactive teaching style and regularly engages with the learners, using examples and activities. Asking the learners to share their own understanding and explain and reiterate concepts to them.</p>	<p>Grade 9: The teacher used the video lesson as an introduction to the class to introduce the new concepts. She regularly paused the video to give additional information and explain the concepts in more depth. For an introductory session it appeared to work well but additional information and explanation seems helpful.</p>	<p>video lesson was finished. The learners did not ask questions. This could partially be related to the periods being too short for learners to ask questions.</p> <p>Grade 9: The video lesson was downloaded. A speaker and projector were used to show learners the video. The teacher made an accompanying exercise for the learners to practice the lesson content. Learners appeared to understand the content and could do the exercise. The teacher paused the video to allow the learners time to test their understanding by doing the exercise and then checking their answers when they continue to explain it in the video. The teacher asked a few questions, but the learners' responses were lethargic.</p>
<p>Learner engagement with video during class (Classroom observation)</p>	<p>Grade 8: Learners were mainly focused on the screen. Some were making notes as instructed/requested. There were a few distracted learners towards the back of the classroom. There is also not enough time to allow for much learner/teacher engagement in class. The bell rang before the self-assessment was marked, so there was no time to give feedback.</p> <p>It gave them the opportunity to review their work and complete the self-assessment.</p> <p>Grade 9: Most were focused on the screen with only a few learners appearing distracted. It was more passive than with the homework and exercises. There is more opportunity for distraction. Most students were not taking notes.</p>	<p>Grade 8: Learners were actively watching the screen and making notes. They only watched the video during the class and didn't discuss any other work. Much of the content was new specially to grade 8 learners for whom a lot of the content is new.</p> <p>Grade 9: The video used the whole period. Learners were actively looking at the screen and taking notes. They did a group discussion and gave feedback to the class. Grade 9 appears to cope better with EMS because of their foundation in Grade 8. In Grade 8 most concepts are new.</p>	<p>Grade 8: Learners were very attentive to the screen, and most were taking notes. Most students looked at the screen and some students appeared to avoid eye contact when questions were asked. A few, minority of learners, lost concentration half-way through and appeared disengaged – they also looked very tired and sleepy. During the non-video parts, learners were interactive, questions were asked by the teachers and students answered. This part of the class did not necessarily require note taking because it was revision.</p> <p>Grade 9: Approximately less than half were taking notes. Most were very focused on the lesson. 2 learners appeared very tired and sleepy. 2/3 were distracted by their phones. Only a few learners had calculators, some used</p>

Key school dimensions	Treatment school 1	Treatment school 2	Treatment school 3
			their phones, but this can become problematic with distractions. Most seemed to understand and were/appeared confident in doing the exercise. The learners who appeared tired and sleepy were less engaged and appeared to only copy and correct answers from the video. It seemed to grab learners' attention. Eyes were focused on the screen. Even the sleepy and tired looking learners were appearing attentive at times.
Use of self-assessment quiz in class (Classroom observation)	<p>Grade 8: The teacher used this as an activity but there was no time to give feedback.</p> <p>Grade 9: It was used, and a few questions had to be explained and he put up a summary of the transaction analysis. Q5,6,9,10 they have not yet completed the work in the class, so those questions did not count for marks.</p>	<p>Grade 8: The teacher used the self-assessment and students appeared to know most of the answers of the work that was already covered in the class.</p> <p>Grade 9: Students wrote the self-assessment</p>	<p>Grade 8: Not used in the classroom.</p> <p>Grade 9: Not used. It was not yet available online.</p>

The tables below show the detailed data collected during the 6 classroom observations that took place in April and May 2022. The first table includes the data for the Grade 8 observations and the second table shows the data collected as part of the Grade 9 observations.

Table 13: Grade 8 classroom observations

Key Dimensions	Treatment school 1 - Grade 8 13 April 2022	Treatment school 2 - Grade 8 18 May 2022	Treatment school 3 - Grade 8 12 April 2022
<p>1. Physical space/ environment</p> <p>a. Is the classroom decorated? If yes, how is it decorated? If not, what do the walls etc look like?</p>	<p>Classroom is still very new. It is neatly painted. Well ventilated (this was noticeable compared to the overcrowded classrooms from Treatment school 3). The classroom was not overly decorated. Minimalism, neat and tidy.</p>	<p>There is a massive hole in the ceiling that looks rotten and must have severe water damage and potentially mould. The classroom is sparsely decorated with learner's posters. Walls are a bit dirty, and desks are old but in decent condition.</p>	<p>The classroom is very nicely decorated with lots of EMS material and core values, e.g. How to choose your career. Everything was neat and looked well taken care off.</p>
<p>2. Number of learners in class</p> <p>a. How many learners are in the class?</p> <p>b. How crowded is the class?</p> <p>c. How does this appear to impact learning?</p>	<p>39 learners were present. In total there are 43 learners in the class. The class is more spacious than the classes at Treatment school 3. It might be related to the school building being newer and build according to current classroom sized.</p> <p>Learners are not that cramped on top of each other, and the class appear to be more relaxed. There is more fresh air and there is space to move around, and learners could possibly see better on the screen/board.</p>	<p>28 learners in the classroom. Two were absent: Lauren Saffir and Matthew Adams. There was plenty of space for everyone in the classroom.</p>	<p>There are 46 learners in the class. There was one learner without a desk and chair. He had to go fetch one for himself. The class suddenly having more learners than desks indicated to the teacher that previously there was someone absent because they used to have enough desks in the classroom for everyone.</p> <p>The classroom is very full and crowded. I do not know if all the learners can see clearly on the screen, especially the ones sitting in the front of the classroom on the sides. With the classroom being so full and learners being on top of each other, I think learners can get easily distracted by their peers.</p>
<p>3. Teaching aids/ resources available</p> <p>a. Are there any available? Does the teacher make use of these?</p>	<p>Reviewed homework. Continued with PPT that explains the work. PPT was used with the projector. They took additional notes on their printed PPTs.</p>	<p>Projector and speakers: the projector is not neatly fitted onto the white board. It sounds like there are not enough speakers in the school for all the classrooms. They need to borrow it from each other. The Afrikaans EMS teacher also wanted to show the videos to the learners and wanted to borrow the speakers. There appears to be a tension between TMT's focus for results of the video lessons and the schools being focused on learning outcomes</p>	<p>The teacher made use of a projector and a speaker installed in the classroom. With all the challenges with the projector there was not enough time to cover the whole lesson or use other teaching aids.</p>

Key Dimensions	Treatment school 1 - Grade 8 13 April 2022	Treatment school 2 - Grade 8 18 May 2022	Treatment school 3 - Grade 8 12 April 2022
		for all the learners, not just interested in the impact of the video lessons.	
4. Language a. Does there appear to be language barriers in the classroom?	No, when individual learners were asked questions, they were able to communicate in English without any apparent challenges.	No	The learners appeared to all be able to understand and communicate with the teacher in English.
5. Description of how the teachers have used the video lesson			
a. Are they using the lesson online / off-line?	Online	Online – She had to buy data for the lesson because the school’s Wi-Fi is too slow, and it buffers and interrupts the lesson.	They use the lesson offline.
b. How do they introduce the video to learners?	They completed their revision and new content and then the lesson was introduced as a revision to recap what they had learned. They had the opportunity to make additional notes.	It was a very quick introduction to the video, not saying much	I think the lesson was executed differently to planned. The teacher had to adapt to the tech challenges. Another teacher’s lesson was displaying on her projector, and it took time to try and identify who the teacher is and how she can display her lesson on the projector. As a result, the teacher started to review the key concepts that is covered in the video lesson that they have discussed before. She then introduced the topic of the video lesson and started playing it.
c. Has everything worked well (in terms of the tech side)? i. If not, what challenges occurred? ii. If not, how did the teacher adapt to manage these challenges?	Yes, the projector does apparently have the tendency to disconnect but there were no challenges on the day of observations.	Yes, apart from the focal area on the screen everything worked well. The teacher stopped the video periodically to focus learners’ attention on differences in concepts, to ask questions and check learners’ understanding.	There was another teacher’s lesson displaying on the projector which caused a significant disruption. It took much time to try and identify who the teacher is and how to override his lesson with the video. It shortened the teaching time and time to play and discuss the video content.
d. How did the teacher use the video in the class to teach the required content? i. Did they pause the video to elicit a discussion?	He played the video from start to finish. The lesson was used as a revision of what was explained previously in the class. Questions and student engagement was not encouraged during the video lesson. This was encouraged	It was used as an additional resource. Teachers seem to teach work in different sections based on what they believe helps the learners the most. The content in the videos can be taught in different lessons. Students then appear to	She introduced the lesson, doing revision and asking revision questions about terms learned previously (term 1). The video was regularly paused, and questions asked. Learners were actively participating. They

Key Dimensions	Treatment school 1 - Grade 8 13 April 2022	Treatment school 2 - Grade 8 18 May 2022	Treatment school 3 - Grade 8 12 April 2022
ii. Did the teacher encourage questions? iii. How did the teacher manage participation or the lack thereof? iv. Did the teacher further elaborate on the content of the video (e.g. using own examples)? v. Was the teacher able to answer questions?	during the previous teaching part of the class. After the video lesson they did the self-assessment and then the bell rang. There was no more time for engagement.	struggle with the content when they have not covered it in depth in class. Such as the differences in equations: owner's equity=assets-liabilities; assets= owners' equity -liability	were instructed to take out their notebooks and not to copy from the screen, but to make short notes for themselves. A few students left their books closed; others were taking notes. There was no time for the teacher to elaborate on the content of the video. The bell rang before the video lesson was finished. The learners did not ask questions. This could partially be related to the periods being too short for learners to ask questions.
6. Learner engagement with the video lesson/ self-assessment			
a. How did the learners engage with the video lesson/ self-assessment?	They were mainly focused on the screen. Some were making notes as instructed/requested.		They were very attentive to the screen, and most were taking notes.
b. Were learners focusing on the screen?	Yes, mostly. There were a few distracted learners, mainly towards the back of the classroom.	Yes, they were actively watching the screen and making notes.	Yes, the majority of almost all learners were focusing on the screen.
c. How did this interaction compare to the parts of the class without video?	They used the video more as a review of what has been learned /taught. They were predominantly watching and adding notes to what they already have.		Most students looked at the screen and some students appeared to avoid eye contact when questions were asked.
d. Were the learners taking notes? How did this compare to teaching the rest of the period?	Yes, they were but fewer notes were taken than in the previous parts of the lesson because they used the video as a review.	Yes, they only watched the video and didn't discuss any other work.	Yes, during the non-video parts learners were interactive, questions were asked by the teachers and students answered. This part of the class did not necessarily require note taking because it was revision.
e. Did the learners show any non-verbal signs that they were understanding the content of the video lesson?	No, the struggle is more the keep their attention and maintain quiet and discipline in the class though the class environment is much calmer and less tense than at Treatment	No, but much of the content was new specially to grade 8 learners for who a lot of the content is new.	A few, minority of learners lost concentration half-way through and appeared disengaged – they also looked very tired and sleepy

Key Dimensions	Treatment school 1 - Grade 8 13 April 2022	Treatment school 2 - Grade 8 18 May 2022	Treatment school 3 - Grade 8 12 April 2022
	school 3. One is not constantly on edge to expect rowdiness to erupt in the classroom.		
f. Did the learners ask any questions or make comments? How did this compare to engagements without the video?	No, there is also not enough time to allow for that much learner/teacher engagement in class. The bell rang before self-assessment was marked.	The video used all the class time. Periods are 30-40 minutes long. It takes learners 5 minutes to enter the classroom and settle. It takes another 5 minutes to get notebooks out and get them to focus on what the teacher wants to do. There is very little time in a period to do multiple things.	No
g. Observations on the self-assessment, if used (how did the teacher frame the self-assessment; how did the learners react to the self-assessment; what was their feedback on the self-assessment)?	As an activity they were going to do in class. There was no time to give feedback.	Students appeared to know most of the answers of the work that was already covered in the class.	Not used
7. Learning environment a. To what extent has the video lessons contributed to creating a conducive learning for learners?	It gave them the opportunity to review their work and complete the self-assessment.	Balancing the challenges of implementing the video lessons with the needs of learners in the classroom.	The tech problems caused much disruption. Due to the delay in being able to teach the class before the tech is sorted out, one could say it was not conducive to learning but this is not because of the content of the video, but because of tech problems associated with teaching with video aids.
b. Were there any aspects that the learners found challenging?	Not from what I could observe. Disinterestedness and not doing homework appeared to have bigger influences on learners not understanding the work or being able to answer questions.	The new concepts they have not discussed in class previously.	None
8. Additional Comments	None	None	The day of the class observation also coincided with a film crew being in the class for TMT. This added to additional time spent on the arrangements for this.

Key Dimensions	Treatment school 1 - Grade 8 13 April 2022	Treatment school 2 - Grade 8 18 May 2022	Treatment school 3 - Grade 8 12 April 2022
9. Teacher Morale a. How would you describe the teacher's morale after talking to him/her and the class?	The teacher was very strict and stern with the learners in the beginning of the lesson. As learners settled in the class, started to focus and became more responsive, the teacher appeared to become more relaxed.	It looked like she is very tired. It is the end of term and she looked worn out and tired.	With the teachers being very stressed out about teaching time and covering the curriculum in the limited class time available, as well as the stress it appears to cause teachers when there are disruptions in the class – disruptions in the class appear to be a potential spark for learners' behaviour to become unruly,

Table 14: Grade 9 classroom observations

Key Dimensions	Treatment school 1 - Grade 9 17 May 2022	Treatment school 2 -Grade 9 18 May 2022	Treatment school 3 - Grade 9 12 April 2022
1. Physical space/ environment a. Is the classroom decorated? If yes, how is it decorated? If not, what do the walls etc look like?	Not enough fresh air. It is winter, colder and the windows were not all open. It was a little tight in the classroom with two extra learners in front. The schools seem to be at full capacity.	There is a massive hole in the ceiling that looks rotten and must have severe water damage and potentially mould. The classroom is sparsely decorated with learner's posters. Walls are a bit dirty, and desks are old but in decent condition.	There are many slogans and posters on the walls. Many of the posters are old and damaged. It reflects a sadness of a teacher really trying to educate and motivate learners, but who appears to be overwhelmed / pushed down by circumstances.
2. Number of learners in class a. How many learners are in the class? b. How crowded is the class? c. How does this appear to impact on learning?	There were 45 learners in the classroom. It can comfortably fit 43 learners. Two learners had to sit in the extra seats in the front against the wall. It could be difficult for them to see.	33 learners in the class. The classes are smaller so there is more space in the classroom. To close the curtains, the windows are closed too. Limiting fresh air coming into the classroom.	There are 42 learners in the class. It is packed but everyone has a desk and chair. There is not space to move around in the class. There are many opportunities for distractions in the class because the learners are so on top of each other. The powerlessness of the teacher to discipline, teach etc, with the constraints of the system appears to create a tension of nervousness for the teacher, leaving her on the edge. Some learners simply appear to not be interested and there

Key Dimensions	Treatment school 1 - Grade 9 17 May 2022	Treatment school 2 -Grade 9 18 May 2022	Treatment school 3 - Grade 9 12 April 2022
			is nothing the teacher can do to motivate them to participate or pay attention other than asking them to not make a noise.
3. Teaching aids/ resources available a. Are there any available? Does the teacher make use of these?	They had a homework activity which they reviewed. It was about calculating cost prices and cost of sales.	Projector, speakers, Laptop and personal data due to slow school connection.	The video lesson was downloaded. A speaker and projector was used to show learners the video. She made an accompanying exercise for the learners to practice the lesson content. Learners appeared to understand the content and could do the exercise. She paused the video to allow the learners time to test their understanding by doing the exercise and then checking their answers when they continue to explain it in the video.
4. Language a. Does there appear to be language barriers in the classroom?	No	No	No, it appears that tiredness and disinterestedness is a bigger challenge.
5. Description of how the teachers have used the video lesson			
a. Are they using the lesson online / off-line?	Online	Online	Offline, downloaded the night before.
b. How do they introduce the video to learners?	The homework was finished and then the lesson was introduced as looking at the general ledger. The video followed up on concepts used in the homework activity. He also handed out the quiz that will follow up on the video.	As a visit from TMT.	The periods are very short. Even shorter when time is used to settle them, introduce a visitor and do a feedback form and attendance. Consequently, there was a very brief introduction and handing out of the exercise because they don't have time to spend, introduce explain, etc. They have to get going immediately. Their second lesson for the week was cancelled because of a Public Holiday.
c. Has everything worked well (in terms of the tech side)?	Yes, the quality of the image and sound is clear.	Yes	Yes, everything worked well, no challenges.

Key Dimensions	Treatment school 1 - Grade 9 17 May 2022	Treatment school 2 -Grade 9 18 May 2022	Treatment school 3 - Grade 9 12 April 2022
i. If not, what challenges occurred? ii. If not, how did the teacher adapt to manage these challenges?			
d. How did the teacher use the video in the class to teach the required content? i. Did they pause the video to elicit a discussion? ii. Did the teacher encourage questions? iii. How did the teacher manage participation or the lack thereof? iv. Did the teacher further elaborate on the content of the video (e.g. using own examples)? v. Was the teacher able to answer questions?	The answers on the assessment were explained with the help of a summary of transaction analysis.	Grade 9 appears to cope better with EMS because of their foundation in grade 8. In grade 8 most concepts are new. She used it as an introduction to the class to introduce the new concepts. She regularly paused the video to give additional information and explain the concepts in more depth.	She made an exercise for them to do the exercise explained in the video. Watched the video, then paused to give learners the opportunity to complete it. Then checked their answers with the video. She asked a few questions, but learners' responses were lethargic.
6. Learner engagement with the video lesson/ self-assessment			
a. How did the learners engage with the video lesson/ self-assessment?		Learners were actively looking at the screen and taking notes. They did a group discussion and gave feedback to the class.	Approximately less than half were taking notes. Most were very focused on the lesson. 2 learners appeared very tired and sleepy. 2/3 were distracted by their phones. Only a few learners had calculators, some used their phones, but this can become problematic with distractions.
b. Were learners focusing on the screen?	Yes, most were focused on the screen with only a few learners appearing distracted.	Yes, most were focused on the screen.	Yes, mostly

Key Dimensions	Treatment school 1 - Grade 9 17 May 2022	Treatment school 2 -Grade 9 18 May 2022	Treatment school 3 - Grade 9 12 April 2022
c. How did this interaction compare to the parts of the class without video?	It was more passive than with the homework and exercises. There is more opportunity for distraction.	The video used the whole period.	There was no time for a part of the class not around the video lesson.
d. Were the learners taking notes? How did this compare to teaching the rest of the period?	Most students were not taking notes.	NA	Some were taking notes. A number of students were using glue to stick things. The teacher stopped and asked what they were busy pasting with the glue. There was no need for them to be doing that.
e. Did the learners show any non-verbal signs that they were understanding the content of the video lesson?	No, they rather seemed generally tired. It was after 12 which is a long day for a grade 9 learner.	No	Most seemed to understand and were/appeared confident in doing the exercise. The learners who appeared tired and sleepy were less engaged and appeared to only copy and correct answers from the video. Two learners in the back, I was not even sure if they bothered to copy from the video to complete the exercise.
f. Did the learners ask any questions or make comments? How did this compare to engagements without the video?	No, there was not much opportunity. This could be related to the limited time available due to all the activities and feedback.	Responded to questions and participated in group discussions.	Not really, there was also not enough time for questions and discussions in the period.
g. Observations on the self-assessment, if used (how did the teacher frame the self-assessment; how did the learners react to the self-assessment; what was their feedback on the self-assessment)?	A few questions had to be explained and he put up a summary of the transaction analysis. Q5,6,9,10 they have not yet completed the work in the class, so those questions did not count for marks.	Students wrote the self-assessment	Not used. It was not yet available online.
7. Learning environment a. To what extent has the video lessons contributed to creating a conducive learning for learners?	The teacher has a very interactive teaching style and regularly engages with the learners, using examples and activities. Asking the learners to share their own understanding and explain and reiterate concepts to them.	For an introductory session it appeared to work well but additional information and explanation seems helpful.	It seemed to grab learners' attention. Eyes were focused on the screen. Even the sleepy and tired looking learners were appearing attentive at times.

Key Dimensions	Treatment school 1 - Grade 9 17 May 2022	Treatment school 2 -Grade 9 18 May 2022	Treatment school 3 - Grade 9 12 April 2022
b. Were there any aspects that the learners found challenging?	None	None	Not in this lesson
8. Additional Comments	None	It seemed that TMT did not align with their lesson planning, or the public holidays impacted on their original planning, and they did not get to these parts of the work.	
9. Teacher Morale a. How would you describe the teacher's morale after talking to him/her and the class?	I think the teacher has become more relaxed about the process and our presence.		The teacher appeared to be nervous to answer the question. The teachers appear to be under a lot of pressure for learners to perform in school. Yet, they are limited in what they can control in the learners' lives and outcomes. The teacher appeared quite nervous throughout the visit, from meeting her to the end. Though she might have looked slightly less nervous after finishing the lesson.

6.3.3 Learner access and usage

The following key factors were considered when gaining insight into how the TMT resources were accessed and used by learners:

- completion of self-assessment quizzes,
- learner use of Bookmarks,
- learner rating of video lessons,
- types of devices and locations used to access video lessons and resources by learners; and
- using video lessons outside of class.

6.3.3.1 Completion of self-assessment quizzes

The systems data obtained shows that, in terms of Grade 8s, most completing the self-assessments were from Treatment school 3, followed by Treatment school 1 and then Treatment school 2; and the quizzes completed by the most learners are Quiz 7, 5 and 6. In terms of Grade 9s³⁴, most completing the self-assessments were from Treatment school 1, followed by Treatment school 2 and then Treatment school 3. Quiz 7, 9 and 10 were completed the most by Grade 9 learners. It should be noted that this data excludes any cases where the teacher projected the test onto the screen and completed it as a class exercise.

The fact that high numbers of learners completed the quizzes, shows there is an appetite of learners to access these resources and use them. This also highlights that the learners are able to access these additional TMT resources of their own volition by accessing these quizzes outside of the classroom.

Table 15: Gr 8 learner quiz completion summary – systems data

SCHOOL	GRADE 8: TERM 1				GRADE 8: TERM 2			TOTAL
	Quiz 1	Quiz 2	Quiz 3	Quiz 4	Quiz 5	Quiz 6	Quiz 7	
Treatment school 1	8	0	0	0	62	107	140	317
Treatment school 2	24	5	0	0	30	0	0	59
Treatment school 3	96	78	41	16	95	58	121	505
Total	128	83	41	16	187	165	261	881

Table 16: Gr 9 learner quiz completion summary – systems data

SCHOOL	GRADE 9: TERM 1						GRADE 9: TERM 2				TOTAL
	Quiz 1	Quiz 2	Quiz 3	Quiz 4	Quiz 5	Quiz 6	Quiz 7	Quiz 8	Quiz 9	Quiz 10	
Treatment school 1	2	0	1	n.d.	n.d.	n.d.	130	n.d.	89	56	278
Treatment school 2	22	5	2	n.d.	n.d.	n.d.	0	n.d.	0	0	29
Treatment school 3	3	3	2	n.d.	n.d.	n.d.	3	n.d.	2	3	16
Total	27	8	5	n.d.	n.d.	n.d.	133	n.d.	91	59	323

³⁴ Due to some technical challenges experienced, such as the incorrect linking of quizzes or not adding the school names to the quizzes, data for Quiz 4-6 cannot be used.

Completion of self-assessment quizzes as obtained from self-reported data

- Overall, a total of 67% of learners reported completing the self-assessment quizzes. Of these, 76% (88) are Grade 8s and 56% (48) are Grade 9s. Of these Grade 8s, most were from treatment school 3 (87%), followed by treatment school 2 (83%). Of the Grade 9s, the largest proportion were from treatment school 1 (62%) (shown in Table 18).
- Most of the learners across treatment schools reported the self-assessment quizzes were helpful (78%).³⁵ Of these, 76% (65) are Grade 8s and 80% (36) are Grade 9s. Of these Grade 8s, most were from treatment school 2 (88%), followed by treatment school 3 (76%). The Grade 9s were equally distributed between treatment school 1 and 3 (80% for both) (shown in Table 18).
- Where it appears as though learners were ‘unsure’ as to the usefulness of the self-assessment, their perception of this is determined by the way in which they engaged with the assessment, in other words, did the learner complete the quiz, did they mark it, where they got answers incorrect, did they find the correct answers, etc. For those learners who only completed the quizzes in class, there may not have been enough time for the teacher to facilitate this whole formative process which would affect the perceived usefulness of the quiz (particularly as most of the quizzes completed in class were done so in hard copy which means learners had to manually mark the quizzes and may not have had enough time to do so during class).

Table 17: Learner feedback (obtained during classroom observations) related to completion of self-assessments

Completion of self-assessments (self-reported)	Grade 8						Grade 9					
	Yes		No		Total		Yes		No		Total	
Treatment school 1	24	59%	17	41%	41	100%	26	62%	16	38%	42	100%
Treatment school 2	25	83%	5	17%	30	100%	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Treatment school 3	39	87%	6	13%	45	100%	22	50%	22	50%	44	100%
Total	88	76%	28	24%	116	100%	48	56%	38	44%	86	100%

³⁵ Please note, in the analysis of the data related to this questionnaire item, only responses indicating that the self-assessment had been completed, were included. A number of ‘N/A’ responses were excluded from the analysis and it is assumed that these were erroneously selected by participants. These were not many and added to a total of 6 out of 136 responses.

Table 18: Learner feedback (obtained during classroom observations) related to whether the self-assessments have been helpful

Have self-assessments been helpful?	Grade 8								Grade 9							
	Yes		No		Unsure		Total		Yes		No		Unsure		Total	
Treatment school 1	15	65%	3	13%	5	22%	23	100%	20	80%	2	8%	3	12%	25	100%
Treatment school 2	21	88%	0	0%	3	13%	24	100%	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Treatment school 3	29	76%	3	8%	6	16%	38	100%	16	80%	0	0%	4	20%	20	100%
Total	65	76%	6	7%	14	16%	85	100%	36	80%	2	4%	7	16%	45	100%

6.3.3.2 Learner use of Bookmarks³⁶

A total of 392 bookmarks were used by Grade 8 learners from the 3 treatment schools, while a total of 407 bookmarks were used by Grade 9 learners from 3 treatment schools. This is an extra layer of access provided to learners and means the learners accessing the resources via the Bookmark, have made additional effort to access the resources via this method. Two of the treatment schools also indicated using WhatsApp groups where the links to the resources were shared and it is assumed that most would have accessed the resources via the links on a WhatsApp group as this would be the easiest way of accessing the resources.

Table 19: Grade 8 usage of bookmarks

GRADE 8: TERM 1				GRADE 8: TERM 2			TOTAL
Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5	Lesson 6	Lesson 7	
156	108	40	18	33	18	19	392

Table 20: Grade 9 usage of bookmark

GRADE 9: TERM 1						GRADE 9: TERM 2				TOTAL
Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5	Lesson 6	Lesson 7	Lesson 8	Lesson 9	Lesson 10	
102	40	10	7	4	3	53	55	85	48	407

6.3.3.3 Learner rating of video lessons

The learners' ratings of several different aspects relating to the video lessons are summarised as follows (please see Table 25 for the response categories and ratings provided). The table below provides a summary of the data:

Table 21: Summary of learner ratings of video lessons

School	Grade 8	Grade 9
Treatment School 1	<p>Responses were generally positive (above 70%) in terms of their rating of different aspects of the video lessons, apart from the following statements where their 'yes' responses were below 70% for the following statements:</p> <ul style="list-style-type: none"> • The example/s used in the video helped my understanding (68%) • I could keep up with the pace of the video (68%) • The presenter in the video was good at keeping my attention (63%) • Do you think the video will help you in your understanding of your financial literacy work? (56%) 	<p>Responses were a bit more divided, with only 3 statements receiving just below or on 80% 'yes' responses, while the following statements received 'yes' responses of below 60%:</p> <ul style="list-style-type: none"> • The presenter in the video was good at keeping my attention (57%) • The way the teacher used the video in class, helped me to better understand the work (55%) • I could keep up with the pace of the video (52%) • I could understand what the presenter was saying in the video (50%)
Treatment School 2	<p>Responses were generally positive (above 80%) in terms of their rating of different aspects of the video lessons, apart from the following statement where their 'yes' responses were below 70% for the following statement:</p>	No data

³⁶ System data obtained via the QR code (which is unique to the 3 treatment schools forming part of the pilot).

School	Grade 8	Grade 9
	I could keep up with the pace of the video (47%)	
Treatment School 3	<p>Responses were generally positive (above 70%) in terms of their rating of different aspects of the video lessons, apart from the following statements where their 'yes' responses were below 70% for the following statements:</p> <ul style="list-style-type: none"> I could keep up with the pace of the video (58%) The visual quality of the video was good (51%) 	<p>Responses were generally positive (above on or above 90%) in terms of their rating of different aspects of the video lessons, apart from the following statement where their 'yes' responses were below 60% for the following statement:</p> <ul style="list-style-type: none"> I could keep up with the pace of the video (59%)

Table 22: Learner feedback (obtained during classroom observations) related to the video lessons³⁷

Rating of Video Lesson ('Yes' and 'Unsure' responses)	Treatment school 1				Treatment school 2 ³⁸		Treatment school 3			
	Grade 8 (n=41)		Grade 9 (n=42)		Grade 8 (n=30)		Grade 8 (n=45)		Grade 9 (n=44)	
	YES	UNSURE	YES	UNSURE	YES	UNSURE	YES	UNSURE	YES	UNSURE
The sound quality of the video was good	98%	0%	81%	14%	97%	3%	69%	20%	98%	2%
The visual quality of the video was good	73%	15%	81%	17%	87%	3%	51%	31%	95%	0%
I could understand what the presenter was saying in the video	88%	10%	50%	33%	93%	3%	73%	27%	95%	2%
The presenter in the video was good at keeping my attention	63%	20%	57%	12%	70%	13%	76%	18%	89%	7%
The example/s used in the video helped my understanding	68%	27%	62%	19%	83%	17%	76%	20%	95%	0%
I could keep up with the pace of the video	68%	20%	52%	7%	47%	17%	58%	20%	59%	23%
Do you think the video will help you in your understanding of your	56%	41%	67%	24%	87%	10%	73%	27%	84%	14%

³⁷ Please note, the columns do not add up to 100% as the table excludes the 'No' response to improve ease of navigation.

³⁸ No forms were received from Treatment school 2, Grade 9

Rating of Video Lesson ('Yes' and 'Unsure' responses)	Treatment school 1				Treatment school 2 ³⁸		Treatment school 3			
	Grade 8 (n=41)		Grade 9 (n=42)		Grade 8 (n=30)		Grade 8 (n=45)		Grade 9 (n=44)	
	YES	UNSURE	YES	UNSURE	YES	UNSURE	YES	UNSURE	YES	UNSURE
financial literacy work?										
The way the teacher used the video in class, helped me to better understand the work	80%	17%	55%	31%	83%	10%	71%	24%	89%	11%
The teacher was able to answer my questions	80%	20%	79%	12%	87%	7%	76%	22%	73%	23%

Suggestions for improvement (coded open responses)	Treatment school 1		Treatment school 2	Treatment school 3		Total
	Grade 8	Grade 9	Grade 8	Grade 8	Grade 9	
The visual/ sound quality of the video could be improved	4	1		9	1	15
It needs to be more fun and engaging	2	2				4
The pace of the video needs to be slower	1	7	7	2	4	21
Classroom factors: switching off lights to improve the visual quality	1					1
Classroom factors: the class could be quieter to better hear the video	1				1	2
Classroom factors: better introduction to the video before showing it		1				1
Classroom factors: the board was too small to show the whole video			1			1
Classroom factors: the teacher could have paused the video to provide more time for learners to take down notes			1			1
More examples are needed	0	4			2	6

Usefulness of having videos for other subjects

Across all 3 treatment schools and Grade 8 and 9 learners, most indicated having videos for other subjects would be useful.

Table 23: Learner feedback (obtained during classroom observations) related to whether videos for other subjects would be useful

Would videos for other subjects be useful?	Grade 8						Grade 9					
	Yes		No		Total		Yes		No		Total	
Treatment school 1	35	85%	6	15%	41	100%	33	79%	9	21%	42	100%
Treatment school 2	27	90%	3	10%	30	100%	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Treatment school 3	42	93%	3	7%	45	100%	43	98%	1	2%	44	100%
Total	104	90%	12	10%	116	100%	76	88%	10	12%	86	100%

6.3.3.4 Types of devices and locations used to access video lessons and resources by learners

At Treatment school 1, Grade 8 and 9 learners both reported mainly accessing video lessons at a home, via a cell phone or laptop. Fewer learners mentioned the school's computer lab. At Treatment school 2, Grade 8 learners reported mainly using a school computer in the school's computer lab. At Treatment school 3, Grade 8 and 9 learners both reported mainly accessing video lessons at home, via a cell phone or a laptop. A few mentioned accessing it at school, using their own or someone else's device. Some also mentioned using the QR code to access the video lessons.

Table 24: Learner feedback (obtained during classroom observations) related to the type of devices used and locations to access video lessons³⁹

Type of devices used and locations to access video lessons	Treatment school 1		Treatment school 2	Treatment school 3	
	Grade 8 (n=24)	Grade 9 (n=17)	Grade 8 (n=17)	Grade 8 (n=37)	Grade 9 (n=20)
In the school's computer lab, using a school computer	5	2	11	1	3
In the school's computer lab, using my own/ someone else's device (laptop, tablet/iPad, cell phone)	3	3	2	3	2
At school, using my own or someone else's device	3	3	0	5	3
At my home/ someone else's home, on a laptop	7	6	2	0	8
At my home/ someone else's home, on a tablet/ iPad	3	1	2	3	1
At my home/ someone else's home, on a cell phone	5	8	5	22	9
I used the bookmark with the QR code to access the video lessons	1	2	0	7	4
Other	1	0	0	0	0

³⁹ This item was a 'multiple-response' question.

6.3.3.5 Using video lessons outside of class⁴⁰

- Across the 3 treatment schools, 59% (119) learners reported using the videos outside of class. Use at Treatment school 1 was quite varied between Grade 8s and 9s (61%, and 43% respectively). Similarly, at Treatment school 3, there was almost 40% difference between Grade 8 and 9 usages (84%, and 48% respectively).
- Across the 3 treatment schools, 55% (119) learners reported the videos outside of class are helping them have a better understanding of Financial Literacy. The majority of Grade 8 and 9 learners at Treatment school 3 reported the videos used outside of class are helping, while Grade 8 and 9 learners at Treatment school 1 had different experiences, with only 33% of Grade 9 learners reporting this helped them. A small percentage (18%) of Grade 8 learners at Treatment school 2 indicated the videos outside of class were helpful. It should be noted that there were relatively high proportions of responses that selected 'unsure' as a response category with regards to whether the videos outside of class were helping them. This may be since, at the time of completing the questionnaire, they had not had any opportunities for gauging their own knowledge levels and were uncertain as to whether they were gaining a better understanding of Financial Literacy through using the video lessons. This may also be due to the phrasing of the questionnaire item which may have been vague and could have resulted in the learners being unsure of how to answer the question.
- Learners who reported experiencing most challenges with the videos outside of class, are the Grade 9s. Treatment school 1 Grade 8 learners reported the smallest percentage (28%) of challenges with the videos outside of class.

The tables overleaf present a detailed overview of each of these aspects.

⁴⁰ It should be noted that the percentages reported should be interpreted with care as some of the group sizes are very small.

Table 25: Learner feedback (obtained during classroom observations) related to usage of video lessons outside the class

Use of video lessons outside class	Grade 8						Grade 9					
	Yes		No		Total		Yes		No		Total	
Treatment school 1	25	61%	16	39%	41	100%	18	43%	24	57%	42	100%
Treatment school 2	17	57%	13	43%	30	100%	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Treatment school 3	38	84%	7	16%	45	100%	21	48%	23	52%	44	100%
Total	80	69%	36	31%	116	100%	39	45%	47	55%	86	100%

Table 26: Learner feedback (obtained during classroom observations) related to whether videos out of class are helping

Are videos out of class helping?	Grade 8								Grade 9							
	Yes		No		Unsure		Total		Yes		No		Unsure		Total	
Treatment school 1	13	52%	1	4%	11	44%	25	100%	6	33%	2	11%	10	56%	18	100%
Treatment school 2	3	18%	0	0%	14	82%	17	100%	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Treatment school 3	27	71%	3	8%	8	21%	38	100%	17	81%	0	0%	4	19%	21	100%
Total	43	54%	4	5%	33	41%	80	100%	23	59%	2	5%	14	36%	39	100%

Table 27: Learner feedback (obtained during classroom observations) related to challenges experienced using videos out of class

Challenges using videos out of class?	Grade 8						Grade 9					
	Yes		No		Total		Yes		No		Total	
Treatment school 1	7	28%	18	72%	25	100%	10	56%	8	44%	18	100%
Treatment school 2	7	41%	10	59%	17	100%	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Treatment school 3	14	37%	24	63%	38	100%	11	52%	10	48%	21	100%
Total	28	35%	52	65%	80	100%	21	54%	18	46%	39	100%

6.3.4 TMT Pilot Treatment Schools Contextual factors

The selected treatment schools share similar characteristics but are also quite different in many ways. In order to gain an understanding of the extent to which the teachers were able to use the TMT resources, it is important to identify some of the key factors that would contribute to uptake and use of the TMT resources. By gaining more insight into factors facilitating use or barriers to use, it is hoped the TMT team gains more understanding in terms of how they can better support teachers and learners in accessing and using their resources. To this end, the following factors impacting on access and use of the resources have been identified: the school context in terms of contributing to a conducive learning environment, accessibility of technology and internet, the extent to which the treatment schools were equipped to participate in the pilot, number of teachers teaching EMS in the pilot per school, leadership support and buy-in, learner discipline and behaviour as well as highlighting any challenges experienced by teachers during the pilot.

Generally, the schools are quite different in terms of several aspects but share the fact that they are all no-fee schools within quintiles 1-4. The learners from the schools who participated in the TMT pilot appear to be coming from different socio-economic conditions. Although all the schools are non-fee-paying schools, the schools, especially Treatment school 3 and Treatment school 2 have hidden costs, related to school transport. Treatment school 1 appears to have fewer transport costs as they only accept learners from a 5km radius around the school. Treatment school 1 is a highly sought-after school in the area and the school has a waiting list of approximately 2000 learners. For Treatment school 2 and Treatment school 3, learners come from areas further away from the schools which appear to be home to people living in poorer socio-economic circumstances than the areas immediately surrounding the schools. Treatment school 1 is the only school where learners are from within a certain geographic area around the school and where they have a policy to not take learners from further away due to the challenges with transport.

In terms of the contextual factors that play a role in acting as facilitators or barriers to for teachers' use of the TMT resources, the following has emerged across the 3 treatment schools:

Table 28: Summary of contextual factors affecting teachers' use of TMT resources

Factors	Details
Conducive learning environment	<ul style="list-style-type: none"> ● In terms of school infrastructure (and by extension, the classroom) <ul style="list-style-type: none"> ○ School 1 is relatively newly built while Schools 2 and 3 are much older and in need of some repairs. ○ Classrooms at School 1 appeared clean, neat and tidy but minimal in terms of décor. ○ School 2 has classrooms in need of repair (water damage to one classroom) and décor is old and needs some updating. ○ School 3's classrooms are in a satisfactory condition; the grade 8 classroom has inspirational posters and is neat and well taken care of. The grade 9 classroom also has inspirational posters but many of these are old and damaged. ● In terms of physical classroom space <ul style="list-style-type: none"> ○ School 1's Grade 8 classroom had adequate space to accommodate the 39 (out of 43) learners who attended class while the Grade 8 classroom was cramped as 45 learners attended class and two learners had to sit in extra seats in the front of the class, against the wall which may have impeded their line of sight to the projector screen. ○ School 2's learner class sizes were smaller than the other 2 schools (Grade 8: 28; Grade 9: 33) and therefore learners could fit comfortably in the class.

Factors	Details
	<p>However, the Grade 9 classroom must close the curtains to be able to see the screen, which means the windows must be closed too which limits fresh air into the classroom.</p> <ul style="list-style-type: none"> ○ School 3's learner class sizes are very large, with 46 learners in Grade 8 and 42 learners in Grade 9. The classrooms are very full (and in Grade 8, one learner had to find an additional desk and chair as there wasn't one available). It is unclear whether all learners can see the screen clearly and, due to the crowded classroom, learners are easily distracted. ● In terms of language <ul style="list-style-type: none"> ○ Language did not appear to be a barrier to learning at any treatment schools. ● Teacher's approach and classroom management <ul style="list-style-type: none"> ○ School 1's teacher is very strict at the beginning of classes and, as the lessons progress, the teacher started to relax. The teacher also has a very interactive teaching style. ○ School 2's teacher appeared tired and worn out. ○ At School 3, the teachers seemed very stressed-out about the limited teaching time and covering all the required aspects of the curriculum within this limited class time available. In addition, teachers appear very aware of how any disruptions in the class can potentially spark unruly behaviour among learners.
Accessibility of internet and technology	<ul style="list-style-type: none"> ● School 1 makes use of tablets at their school and have internet access. ● School 2 has a computer lab (or tech hub). ● School 3 does not have internet or devices for online learning.
Extent to which classrooms equipped for pilot	<ul style="list-style-type: none"> ● School 1 and 3 have projectors in the classroom with sound. ● School 2 did not have a projector and was provided a projector with sound as part of the pilot. The projector has been caged into the classroom, but the sound has not which has resulted in the speakers being used across different classrooms.
Number of teachers teaching Grade 8 and 9 EMS (as part of pilot)	<ul style="list-style-type: none"> ● School 1 had one teacher teaching EMS. ● School 2 had one teacher teaching EMS. ● School 3 had two teachers teaching EMS.
Leadership support and buy-in	<ul style="list-style-type: none"> ● School 1's participating EMS teacher seemed to be actively supported by his HoD. ● It is unclear as to the extent of support provided to the participating teacher from her HoD at school 2. ● At school 3, the two participating EMS teachers were clearly well-supported by their HoD.
Learner discipline and behaviour	<ul style="list-style-type: none"> ● At school 1, learner discipline and behaviour at these schools seem to be under control. ● At school 2, learner discipline and behaviour is more challenging. ● At school 3, learner discipline and behaviour at these schools seem to be under control but due to very large class sizes, there is a sense that things may get out of control quite quickly.

The table below provides an overview of selected factors that influence teacher ability to use the video lessons and self-assessment quizzes optimally in classrooms:

Key school dimensions	Treatment school 1	Treatment school 2	Treatment school 3
Learning environment – Infrastructure of school⁴¹	<p>This is a relatively newly built school; however, it seems as though the school is at capacity.</p> <p>Grade 8: The classroom had minimal décor and was neat and tidy.</p> <p>Grade 9: There was not enough fresh air, due to the cold winter, the windows were closed.</p>	<p>This school is older and in need of some repairs. The classroom requires maintenance, and the size of the classroom is very small – it cannot comfortably accommodate the number of learners.</p> <p>Grade 8: The classroom has décor, but the décor is old and needs to be updated. The walls are a bit dirty, and the desks are old but in decent condition.</p> <p>Grade 9: There is a massive hole in the ceiling that looks rotten and must have severe water damage and potentially mold. The classroom is sparsely decorated with learner’s posters. Walls are a bit dirty, and the desks are old but in decent condition.</p>	<p>The school is older and in need of some repairs.</p> <p>Grade 8: The classroom has been decorated with inspirational posters with mottos and these are in fairly good condition and contains EMS material and core values, e.g., how to choose your career. Everything was neat and well taken care of.</p> <p>Grade 9: There are inspirational posters with mottos but many of the posters are old and damaged.</p>
Learning environment – physical classroom space⁴²	<p>Grade 8: Learners are not cramped on top of each other, and the class appears to be more relaxed. It is well-ventilated and there is space to move around, and learners could possibly see better on the screen/board. There were 39 out of 43 learners present.</p> <p>Grade 9: There were 45 learners in the classroom. It can comfortably fit 43 learners. Two learners had to sit in the extra seats in the front against the wall. It could be difficult for them to see.</p>	<p>Grade 8: There was enough space for everyone and 28 out of 30 learners were present.</p> <p>Grade 9: 33 learners in the class. The classes are smaller so there is more space in the classroom. In order to watch the videos, the windows have to be closed in order for the curtains to remain closed, limiting fresh air coming into the classroom.</p>	<p>Grade 8: There were 46 learners present in class. There was one learner without a desk and chair, and he had to fetch one for himself. The classroom was very full and crowded, it is unclear whether all learners can see clearly on the screen, especially the ones sitting in the front of the classroom on the sides. With the classroom being so full and learners being on top of each other, learners can get easily distracted by their peers.</p> <p>Grade 9: There are 42 learners in the class. It is packed but everyone has a desk and chair. There is no space to move around in the class. There are many opportunities for distractions in the class because the learners are so on top of each other.</p>

⁴¹ Data from classroom observations conducted at treatment schools with Grade 8 and 9 learners in April and May 2022.

⁴² Data from classroom observations conducted at treatment schools with Grade 8 and 9 learners in April and May 2022.

Key school dimensions	Treatment school 1	Treatment school 2	Treatment school 3
Learning environment – language barriers ⁴³	When individual learners were asked questions, they were able to communicate in English without any apparent challenges.	Language did not appear to be a barrier to learning.	Language did not appear to be a barrier to learning.
Learning environment – Teacher’s approach and classroom management ⁴⁴	The teacher was very strict and stern with the learners in the beginning of the lesson. As learners settled in the class, started to focus and became more responsive, the teacher appeared to become more relaxed.	It looked like she is very tired. It is the end of term and she looked worn out and tired.	With the teachers being very stressed out about teaching time and covering the curriculum in the limited class time available, as well as the stress it appears to cause teachers when there are disruptions in the class – disruptions in the class appear to be a potential spark for learners’ behaviour to become unruly.
Accessibility of Internet and Technology ⁴⁵	They make use of tablets at their school and have internet access.	There is a computer lab (or tech hub) at the school.	They do not have internet or devices for online learning.
Extent to which classrooms equipped for intervention ⁴⁶	They have a projector in the classroom with sound.	They did not have a projector and were provided a projector with sound as part of the pilot. The projector has been caged but the sound has not which has resulted in the speakers being used across different classrooms.	They have a projector in the classroom with sound.
Number of teachers teaching Grade 8 and 9 EMS (Financial Literacy) ⁴⁷	1 teacher teaching Grade 8 and Grade 9 EMS (for English classes participating in TMT)	1 teacher teaching Grade 8 and Grade 9 EMS (for English classes participating in TMT)	1 teacher teaching Grade 8 and 1 teacher teaching Grade 9 EMS (for English classes participating in TMT)
Leadership buy-in ⁴⁸	The participating EMS teacher seemed to be actively supported by his HoD.	It is unclear as to the extent of support provided to the participating teacher from her HoD.	The two participating EMS teachers were clearly well-supported by their HoD.

⁴³ Data from classroom observations conducted at treatment schools with Grade 8 and 9 learners in April and May 2022.

⁴⁴ Data from classroom observations conducted at treatment schools with Grade 8 and 9 learners in April and May 2022.

⁴⁵ Interviews with TMT implementing team

⁴⁶ Interviews with TMT implementing team

⁴⁷ Interviews with TMT implementing team

⁴⁸ Interviews with TMT implementing team

Key school dimensions	Treatment school 1	Treatment school 2	Treatment school 3
Learner discipline and behaviour ⁴⁹	Learner discipline and behaviour at these schools seem to be under control.	Learner discipline and behaviour at these schools seem to be difficult to control. The teacher has had her cellular phone stolen by a learner in one of her classes and discipline needs attention.	Learner discipline and behaviour at these schools seem to be under control but due to very large class sizes, there is a sense that things may get out of control quite quickly.
Challenges experienced by teachers during pilot ⁵⁰	Across all schools: Two weeks into the start of the first term of the 2022 school year, it was announced that the rotational timetable that was implemented during Covid-19 had come to an end. This resulted in many schools needing to scramble to revise their school timetables. This caused delays in the start of the academic school year and resulted in a very short teaching term within which to cover all the planned lessons. In addition to the change in scheduling, teachers had to adapt to having full classes again. For almost two years, schools had implemented the rotational timetable which divided the classes into smaller groups, with alternate weeks of teaching per group, to allow for Covid-19 restrictions. In addition, learners had to adapt to these larger classes as well as having more structured classes every week as opposed to every second week. Another very important negative consequence of this rotational system is that due to limited teaching time, some learners have missed critical aspects of their curricula and are bringing with them some learning backlogs which is affecting their overall academic performance. There have also been reports (in the media) about challenging learner behaviour that have intensified since the Covid-19 restrictions. This is therefore adding an additional layer of complexity for teachers in managing their classrooms.		
	The teacher was ill with Covid-19 and had to be booked off for an extended amount of time during term 1 which also contributed to loss of teaching time.	Due to the delays caused by the change in timetable, there was not enough time for the full implementation of the video lessons and self-assessment quizzes.	The numerous public holidays in Term 2 have resulted in many lost periods.
	Severe loadshedding that took place during term 2 had an impact on being able to access any electronics during this time, e.g. no internet connectivity (as many of the cellular towers providing cellular-based internet connectivity are not operational during loadshedding).	The teacher was away during the first term which also contributed to loss of teaching time.	Due to the challenging nature of some of the concepts and the fact that Grade 8s are new to high school and EMS, they do not always get through the work in one period.
	The use of tablets is over-subscribed at the school – it is difficult to coordinate and book tablets for classes, particularly, where TMT required the completion of the self-assessment quizzes online.	Students struggle to grasp financial literacy and therefore a topic that would take two periods for example takes an extra period.	In the Grade 8 class, the tech problems caused much disruption. Due to the delay in being able to teach the class before the tech is sorted out, one could say it was not conducive to learning but this is not because of the content of the

⁴⁹ Termly interviews with teachers per school

⁵⁰ Communication received on WhatsApp group during implementation (15 May 2022)

Key school dimensions	Treatment school 1	Treatment school 2	Treatment school 3
	<p>There was a paper shortage. The school's delivery of paper had been delayed and therefore there was no additional paper to print self-assessment quizzes.</p>	<p>They have also experienced challenges with Wi-Fi (intermittent as well as being very slow and buffering the whole time which slows it down), loadshedding and resources.</p>	<p>video, but because of tech problems associated with teaching with video aids.</p> <p>The periods are very short. Even shorter when time is used to settle them, introduce a visitor and do a feedback form and attendance. Consequently, there was a very brief introduction and handing out of the exercise because they don't have time to spend, introduce, explain, etc. They have to get going immediately. Their second lesson for the week was cancelled because of a Public Holiday.</p>
		<p>Periods are 30-40 minutes long. It takes learners 5 minutes to enter the classroom and settle. It takes another 5 minutes to get notebooks out and get them to focus on what the teacher wants to do. There is very little time in a period to do multiple things.</p>	

6.4 Challenges

Overarching challenges	Sub-aspects	Discussion
<i>Related to the context of communities where learners come from (socio-economic factors)</i>	A lack of soft skills and role models impact on learner behaviour and outcomes	<ul style="list-style-type: none"> - Discipline is not only important for teaching and learning to take place in the classroom. Discipline also has a learning function to develop the necessary soft skills needed for learners to learn how to conduct themselves professionally to prepare them for the workplace after completing school. The opportunities and structure for developing these soft skills outside school appear to be limited in low-income areas where learners lack role models. - This is often referred to as the ‘hidden’ curriculum which often takes up teaching time in the class and further impacts on the productive use of time in the classroom for academic teaching and learning.
	Socio-economic circumstances that impact on learning	<ul style="list-style-type: none"> - Although teachers were unable to say to what extent learners’ socio-economic circumstances impact on their learning outcomes, there is some visibility of it having a negative impact, the most evident being that many learners do not have calculators. EMS learners do not need specialised calculators as for maths from grade 10-12. However, learners not having calculators does appear to impact on their ability to learn and practice the application of EMS formulas during class. Many have to work out the formulas manually which takes longer and reduces how much they can practice in the classroom and slows down the learning process.
<i>Related to parents of learners</i>	Lack of parental involvement in learners’ academic outcomes	<ul style="list-style-type: none"> - All teachers reported that parental involvement is absent in many learners’ lives and that this reflects in their marks.
<i>Related to the impact of Covid-19 restrictions on teaching and learning</i>	Ending of rotational schedules	<ul style="list-style-type: none"> - The Covid-19 pandemic and associated fall-out (e.g., restrictions on number of learners per classroom which resulted in rotational schedules being implemented; as well as learners’ experiences in their households, outside the classroom; the time available in the classroom; the changes in their routine and structure; etc.) all appeared to have had a negative impact on learners and their learning outcomes. During Covid-19 learners had less time available in the classroom for learning. This appeared to impact both on their learning outcomes, which has resulted in learning backlogs among some learners. - A difference was also noticed by some teachers on the impact of Covid and grade 8 and 9 learners. Grade 8 learners are perceived to struggle more with learning the new concepts and mastering their understanding of the equations. They are believed to have a bigger learning backlog coming from Grade 7 than the Grade 9s, coming from Grade 8. - Lower income schools, such as those where TMT was piloted, may have experienced the impact of Covid-19 on teaching and learning more as these schools and learners had fewer resources to help them navigate the challenges of Covid-19. - Moving back to full capacity (away from the rotational scheduling) has been another adjustment for learners. - Teachers are faced to teach in a challenging context with large classroom sizes with learners with learning backlogs, as well as other additional classroom management challenges which renders them unable to give the necessary individual attention to learners who are struggling.

Overarching challenges	Sub-aspects	Discussion
<i>Related to the curriculum and workload</i>	Limited teaching time available to cover all expected curriculum outcomes and use TMT resources in class	<ul style="list-style-type: none"> - The EMS curriculum consists of extensive content to be covered and this is specifically challenging because EMS consists of three different subjects in one. The workload in the curriculum further impacts the learner's ability to learn, remember and successfully apply their knowledge and understanding during tests and exams. - The limited teaching time available to teachers and learners in the school timetable and calendar also limits the extent to which the TMT resources can be used in the classroom.
<i>Related to learners' motivation, and psychosocial aspects and academic performance</i>	Low personal motivation of learners results in poor uptake and utilization of resources	<ul style="list-style-type: none"> - Learners' attitude towards school was seen as a bigger driver for their academic outcomes than their socio-economic circumstances (although one could argue that the socio-economic circumstances also inform learner attitude). - During the classroom observations, most learners adhered to the teachers' instructions and took notes or did the activities as requested of them. In most classes there were a few learners who appeared completely disinterested and did not participate. In such big classes, it is not always possible for teachers to constantly address these learners and motivate them to participate because it negatively impacts on the other learners. What was also notable is that learners did not appear to easily take their own initiative to, e.g., take notes, unless the teacher overtly instructed them to do so.
	Poor self-discipline negatively impacts learners' results	<ul style="list-style-type: none"> - Learners also appear to lack self-discipline to study which impacts on their academic results. - At one school the challenge with learners not doing their homework was addressed at a school level and the school day was adjusted to ensure that learners have time and opportunity to do their homework.
	Learners' level of knowledge and academic abilities – learning backlogs	<ul style="list-style-type: none"> - Not all learners have acquired the grade-appropriate knowledge in the subject which results in varying levels of knowledge in one class. This becomes even more pronounced in very large classes as the teacher is unable to address learners' knowledge gaps. - All the schools reported that learners' results at the end of term 1 were very poor and that they saw an improvement in the results in term 2. - Some thought that this difference in results could be related to learners developing a better practical and theoretical understanding of the concepts they learned in term 1 and building on this and learning how to apply it in term 2.
<i>Related to classrooms at schools</i>	Lack of availability of technology in the classroom	<ul style="list-style-type: none"> - Classroom and teaching conditions impact on how teachers can implement TMT. Many low-income schools do not have access to the necessary equipment to easily use technology in the classroom. They face challenges such as not having enough projectors or speakers in the school. There is also the additional challenge that the equipment cannot stay in the classrooms because of high crime rates and theft in the area. As a result, teachers must mount the equipment, including projectors before a class, and take it off again afterwards. This impacts on the time available to teach. There can also be the challenges of different classes having to use limited equipment at the same time. - Most classrooms have a lot of natural light coming in through the windows. In most of the classes, teachers used curtains to dim the natural light and make the projected image crisper. However, this comes with the unintended consequence that because of the style of windows used in the classroom, the windows need to

Overarching challenges	Sub-aspects	Discussion
		<p>be closed when they close the curtains. Then, fresh air in the classroom is reduced and the classroom can become very stuffy and learners, some of whom enter the classroom looking tired and sleepy can start feeling more tired and sleepy because there is not enough fresh air in the room. School 1 was the only school where this was not a challenge. They have a more modern school building with different windows that allow for enough fresh air, but there is less bright light coming in through the windows and they do not need to use curtains.</p>
	General state of physical disrepair of schools and their classrooms	<ul style="list-style-type: none"> - Limited resources available to schools is not only visible in the availability of technology, but also in the general appearance of the school and the classrooms. This was especially apparent at School 2 and 3 which have fewer resources available than School 1. Even though all the teachers made a visible effort to decorate their classrooms to create a conducive learning environment, there are conditions beyond their control that creates or reaffirms the experience of being poor and the daily disadvantages and conditions of poverty. Classes are more cramped with less personal space for learners. Buildings are not as well maintained, e.g., walls need to be re-painted, crumbling walls, holes in the ceilings, etc. The desks are old with more graffiti on them. Important maintenance, such as water damage on ceilings is also not maintained which can have an impact on learners' health, such as conditions facilitating the growth of mould.
	Large numbers of learners in small classrooms	<ul style="list-style-type: none"> - Many of the classes have over 40 learners in the class. For older school buildings, the classrooms appear to be smaller and 40 plus learners in a class is very cramped. As a result, some learners must sit very close to the front and look at the board at an angle which is difficult to see. This is a challenge in all classrooms, even School 1 where the classrooms appear to be slightly larger and can comfortably fit up to 43 learners. However, if there are more than 43 learners in the classroom, the rest have to sit right in front of the class, against the board and cannot clearly see what is being projected. - Overcrowded classrooms are considered to be one of the most serious challenges confronting teaching and learning in South African classrooms and it negatively affects curriculum delivery. Class size is strongly related to learner performance and overcrowded classrooms negatively influences learner's academic performance. In overcrowded classrooms teachers cannot give adequate attention to individual learners. Overcrowded classrooms also impact on classroom management and discipline and can result in teachers spending more time on classroom management than teaching.
	Maintaining good classroom management and discipline	<ul style="list-style-type: none"> - Classroom management and discipline is a big challenge for teachers, especially with the fall-out caused by Covid-19 which resulted in little structure, stability or certainty in the lives of many learners. - As a result, challenges with discipline in schools have been reported across South Africa. Prega Govender reported that "South African schools are being crippled by a spike in rude, delinquent pupils who threaten, intimidate, insult and even attack teachers and other pupils". Educational psychologists believe that it is the result of "residual stress and trauma from Covid and the lockdown has damaged the mental wellbeing of pupils". Educational psychologists have seen an increase in learners referred to them with behavioural issues, compared to pre-Covid-19. Aspects, such as witnessing the financial stress their families experience/d,

Overarching challenges	Sub-aspects	Discussion
		<p>dealing with the loss of loved ones, and falling behind in school worsened the impact of Covid-19 and lockdown on learners. Returning to the classroom at full capacity has also impacted on learner behaviour with them not being used to social interactions with others post-lockdown. In addition to this, the National Professional Teachers' Organisation of South Africa has also reported an increase in the number of teachers inquiring about assistance with their mental health.</p> <ul style="list-style-type: none"> - Teachers' challenge with discipline and classroom management also appears to add much stress to their teaching experience. During classroom observations, teachers' anxiety that the learners can get rowdy and out of control were visible in all the classes.
Related to use of the TMT resources	Limited teaching time available to use the video lessons in the classroom	<ul style="list-style-type: none"> - Time to cover all the work, do revision and provide the learners enough time to practice and master the work is a challenge for teachers. There are only a few periods available in the school timetable for EMS and the periods are short. Although using electronic and online resources has advantages, it also requires more time. - Limited teaching time available in the classroom impacts on teachers' ability to fully utilise the TMT resources as they would ideally like to do. However, another teacher felt the videos were short enough to incorporate and use in a lesson. - Learners who need assistance with making sure they understand the concepts, and differences in how questions can be asked, appear to struggle more with the video content.
	Technology challenges that impact on the use of TMT resources in the classroom	<ul style="list-style-type: none"> - Fast, reliable internet is a challenge in many schools. Some of the teachers used the downloading option to overcome this challenge. - Although downloading the resources for offline use for learners is useful, it does not come without its challenges, especially if the resources need to be downloaded onto multiple devices for learners to use. - In addition to not all the classrooms being set up for the use of projectors and sound, classroom size and the number of learners in the class can also create learning barriers.
	Accessing the TMT resources	<ul style="list-style-type: none"> - At the schools in Paarl, especially School 2, learners appear to have more barriers to access the internet. Even though there is apparently a tech hub where they can access free Wi-Fi, the demand for this service is very high. As a result, learners only get approximately 10 minutes of free Wi-Fi access which is not enough to watch the videos and use the assessments. At School 3, it was also believed that not all learners have access to the internet. A teacher also questioned whether it will be helpful to make data available to learners for TMT, because the data is likely to be used for other uses and not TMT. - The teachers at School 3 used different strategies to make the resources more accessible to learners. In addition to sharing the videos on WhatsApp, the one teacher also brought two laptops to school and made her mobile available to learners to do the assessments. It is unclear how many learners are estimated to have access to mobile technology and data, but not all. Thus, some learners can still be left behind. There is also the risk that the ones unable to access the resources are also the ones who are most in need of it because they could also have a history of barriers to accessing education and educational resources.

Overarching challenges	Sub-aspects	Discussion
		<ul style="list-style-type: none"> - Schools with fewer resources also have limited capacity to provide learners with access to computer labs to use the resources in school time. Schools have a limited number of laptops in their computer labs that learners can use, and it is not always available to teachers and learners. - Even though many, even most, learners have access to a smartphone they can use to access the resources using the school's Wi-Fi, they often don't bring their phones to school due to the potential security risk this poses.
	Pace of videos can be too fast	<ul style="list-style-type: none"> - The teachers at school 2 share that the pace of the videos can be too fast for the learners