CENTRES FOR EXCELLENCE IN MATHS

Leicester College

EDUCATION & TRAINING FOUNDATION

How can teachers develop effective strategies that help students learn independently?

Written by George Higgitt, John Chatterjee-Woolman, Neil Gill and Kedia Paye. Contributions from Samia Patel and Sohel Gadiali.

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About CfEM

Centres for Excellence in Maths (CfEM) is a five-year national improvement programme aimed at delivering sustained improvements in maths outcomes for 16–19-year-olds, up to Level 2, in post-16 settings.

Funded by the Department for Education and delivered by the Education and Training Foundation, the programme is exploring what works for teachers and students, embedding related CPD and good practice, and building networks of maths professionals in colleges.

Abstract

The aim of this research is to look at developing effective strategies that help students to learn independently, with a focus on flipped learning and growth mindset. It will use a mixed methods approach with both quantitative and qualitative data.

We begin by reviewing some existing research discussing the growth mindset, its application in Mathematics education and how this fits in with our flipped learning approach. We next consider students' relationship with mathematics, their learning and practice using a mixed method approach of qualitative and quantitative data. A learning plan is applied and following the impact of this, the data is recorded and analysed.

Initial results showed that some students were suitable for independent learning and appeared to have a growth mindset, whereas the majority were/did not. It was demonstrated that the majority students understood what a growth mindset was and what was needed to work independently, but the application of these needed support from the teacher. The research showed how strategies could be implemented over the course of the academic year to support students to develop a positive mindset more conducive to learning, pass their exams and develop soft skills.

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Background

Leicester College is a Post-16 Further Education College with three large campuses based in the centre of Leicester.

As a college we offer both GCSE and Functional Skills. GCSEs are offered to all 16 - 18 study programme learners entering with a grade 3 and are available on all main campuses. 16 – 18 years-old students without a grade 3 are provided with an opportunity to sit an entry assessment to verify readiness for GCSEs if they wish to study this instead of Functional Skills. Most of our learners are in this age group and on a full-time study programme but we also make provision for students aged 19 and over. We also offer an online GCSE in mathematics. We encourage our staff to engage in a wide variety of CPD to support improvements in pedagogy and vocational knowledge. Being a Centre for Excellence in Mathematics has afforded Leicester College to carry out research projects to investigate Teaching & Learning Strategies, share good practice and improve outcomes for our learners, those in our network, and beyond.

A recurring theme for students in GCSE Resits is lack of motivation and engagement. This is a difficult area to properly crystallise and has been tackled at Leicester College and elsewhere from different perspectives. This action research project investigates effective strategies that help students to learn independently.

Literature Review

Introduction

Since the 2020/2021 academic year, the teaching of Maths at Leicester College had been developed to make greater use of the concept of flipped learning. The main aim was to try and support students developing their independent learning skills. The flipped learning approach was used as a strategy as a consequence of the COVID-19 pandemic and the subsequent lockdown measures between January and April 2021. As most lessons were carried out online during this period, and students were only given one virtual lesson a week, via Microsoft Teams, more emphasis was placed on the student to carry out work in preparation for their next lesson.

As most of these students had already achieved a grade 3 previously, and therefore their maths was of a reasonable level, the idea that they could carry out basic revision on different topics seemed acceptable. This proved more difficult than thought because many students struggled with having to complete work without direct teacher support. Most of these students have recently left school with a GCSE grade in maths below the required Grade 4. Evaluating their approaches to flipped learning last academic year, it seems that they characteristically lack the skills and qualities required for independently learning, including self-motivation, setting own goals, time management and working to deadlines, persistence, and passion. Therefore, to develop the independent learning skills of maths resit students in FE, there needs to be a focus on introducing particular aspects of learning and teaching.

Consequently, what is being examined in this research project are strategies to support students developing an understanding of how particular abilities can be developed to strengthen their independent learning skills. Furthermore, if flipped learning is to become an integral part of the education process in FE, there needs to be an evaluation of what it entails and how effective it can be for encouraging GCSE maths resit students to learn independently. As such, this literature review focuses on growth mindset and blended learning (with a focus on flipped learning).

The Growth Mindset

Limeri et al (2020) argue that the factors that support the success of learners is not only cognitive, but also non-cognitive ones such as their values, beliefs, and attitudes. This agrees with Lepper and Woolverton's (2001) argument that lasting improvements in students' achievement can be related to how they view their own abilities, their school experiences as

well as the relationships they have with their peers, teachers and learning tasks. A non-cognitive factor that influences learners' beliefs about their intelligence is mindset (Dweck, 1999). Learners' beliefs about mindset can either be fixed or growth. On the one hand, learners with fixed mindset believe that are likely to believe that intelligence is a stable trait that when they struggle with the lessons, it is because they are intellectually incapable. On the other hand, learners with a growth mindset believe in the flexibility of intelligence and the persistence through new challenges support their growth (Dweck, 1999).

Recent research by Limeri et al (2020) with nearly 900 upper-level undergraduate students at a university in the United States using latent growth modelling indicates that learners who persistently struggle with their study task tended to shift toward a stronger fixed mindset. The researchers argue that factors such as formal learning, societal cues, academic experiences, observation of peers and logical deduction were key in influencing learners' beliefs about mindset (Limeri et al, 2020). While this research corroborates prior work on the role of mindset in academic performance, it does not provide a clear link between the five factors above and learners' belief about mindset. It is also quiet about how these factors can be used to develop growth mindset in learners.

Yeager et al (2016) focussed on intervention that develop growth mindset among first year high school students in the United States. They tweaked the original mindset intervention to a user-centred design and their result shows intervention with support learners' growth mindset 'was effective in changing proxy outcomes such as beliefs and short-term behaviour'. The intervention also led to increases in learners' course grades especially for low-achieving learners (Yeager et al, 2016, pp. 387-388). This result can be linked to expert tutors in which an expert in a field provide tuition that supports the development of a learner (Lepper et al 1993). Replication of this research in our UK FE maths classes would require ensuring that the specific demographics of learners is known so that their challenges and motivations can be incorporated into the intervention process. Without such specific information, designing an intervention in growth mindset that supports the diverse students studying GCSE and Functional Skills Maths in the research cohort present insurmountable challenges.

Growth mindset can be linked to specific subjects and Boaler (2015, p.34) attributes this to mathematics by indicating the need to instil a mathematical mindset in students from their first experiences of maths'. This involves developing their sense of the patterns and relationships as well as the connections between and among different concepts. Gray and Tall (1994) in their study with learners aged 7 to 13 in the UK found that high-achieving learners develop a sense of numbers. In other words, they were flexible in their approach to solving problems. It

is in this light that Feikes and Schwingendorf (2008) argue the need for learners' reflection on the mathematical mindset which involves making sense of numbers and quantities as the foundation for higher level mathematics.

Blended Learning and Flipped Learning

Blended learning has become more apparent due to the advancement of technology and integration of technology in the education sector (Halasa, 2019). Blended learning in literature refers to the grouping or 'blend' of face-to-face lessons and online instructions (Graham, 2013). Blended learning has been shown to improve academic performance over traditional methods (Halasa et al, 2019).

A newly emerging type of blended learning is known as Flipped Learning (FL). Here, learners interact with online lectures or other educational material outside of class followed with Face-to-Face lessons (Talbert, 2017). FL can incorporate videos around topics that will be looked at and explored in the classroom (de Araujo, Otten & Birisci, 2017). FL has become utilised at an increasing rate in mathematics around secondary and higher education (de Araujo, Otten & Birisci, 2017. Lee et al (2017) looked at how FL can develop students mathematical understanding and reflections. De Araujo et al (2017) looked at different ways of applying it in the classroom. The first looks at lecture videos which usually consist of explaining mathematical concepts and looking at mathematical problems with the worked solutions (de Araujo, Otten & Birisci, 2017). The idea here is that learners schedule time to watch videos to prepare for next lesson (Lee, Lim & Kim, 2017).

Halasa et al (2019) found that students became more familiar with the content of subsequent lessons which in turn could have been the reason for increased academic performance. Whilst this has been shown to be effective in students learning, van Alten et al (2021) discusses how there needs to be support and guidance from the teacher. This, in addition to immediate feedback, helped promote learning (Moyer-Packenham et Westenskow, 2013). De Araujo (2017) found that lecture videos were most commonly used in FL, though he also considered motivation/set-up video that act to motivate students using problems potentially outside the mathematical context which prompts students to ask questions about the topic and see the relevance of using mathematics. This seemed to be less frequently used in the classroom, but may help student learning through motivating students as student behaviour plays a factor in learning (de Araujo et al, 2017); this will be discussed later in the effectiveness of FL.

Effectiveness of Flipped Learning

De Araijo et al (2017) went on to deliberate how aspects of the lecture video are important to enhancing learning. One of the core components that stuck out in guiding students learning came from when students were able to manipulate and interact with the content (Moyer-Packenham et Westenskow, 2013), De Araujo et al (2017) later supplemented this idea when discussing how interactive elements in these lecture videos increased the quality and provided better learning opportunity for the viewer. Lee et al (2017) supported the quality of the video is important as well as the interactive component, conversely, he emphasised for FL to be effective it has to be closely linked with the face-to-face lessons. This idea is that the online lecture incorporates explanations of mathematical concepts and worked examples (de Araijo et al, 2017) followed by a F2F lesson which goes over more complex problems around the mentioned topic.

One factor that plays a big part in the success of BL and FL comes with students' behaviour and self-regulated learning (van Alten et al, 2020). In a recent study van Alten et al (2021) found that students with low activity and less self-regulating learning (SRL) strategies did worse than those students with high activity. De Araujo et al (2017) endorsed this, reviewing how the behaviour of students watching these videos and engaging in it can play a big part in learning. A study done in a Secondary School saw FL improve students' motivation and participation in mathematics (Belmonte et al, 2019). Halasa et al (2019) supported this finding students partaking in blended learning instead of traditional learning had better scores in attitude and motivation. While FL may increase motivation with some students, val Alten et al (2021) discussed how even when flipped learning is incorporated, students still have different SRL profiles. The majority had medium to high activity, however some students had low activity and motivation resulting in lower grades.

Concluding remarks

By referring to the issues highlighted in the literature review, this research will examine strategies that help students learn independently. The literature that has been reviewed suggests that flipped learning can be effective and can improve motivation amongst students. It was noted that students have different SRL profiles: some medium; some high; some low. Furthermore, students with low-activity and self-regulated learning do worse than those with high activity.

It must be noted that students studying maths in FE are mainly resit students who had previously failed to achieve a GCSE grade 4 or higher in mathematics. Furthermore, these

students come from a variety of different socioeconomic and cultural backgrounds. This means this research will need to consider the different needs to support intervention and develop appropriate independent learning strategies. Also, it is important to recognise that a many of these students will still be developing the independent learning skills required to achieve a grade 4 level in GCSE maths, or equivalent. In addition to this, these students are also improving their problem-solving ability in mathematics.

The emphasis of the research will be placed on students carrying out Level 2 Functional Skills Maths (students who have not achieved a grade 3, or equivalent), and students carrying out GCSE Maths who had previously achieved a grade 3. This research will aim to determine how supportive flipped learning is as an independent learning strategy, and how students respond to it. This research will also evaluate and provide interventions that deal with fixed and growth mindsets, with the aim of looking to improve student independent learning skills. Concerning SRL profiles, this research will also determine what high, medium and low profiles mean in terms of FE students, with the aim of giving a more balanced understanding of the effectiveness of independent learning strategies used. A ‘Low’ SRL profile could mean a Functional Skills Maths student, ‘Medium’ could mean a GCSE maths student who achieved, or is working at, a ‘low’ grade 3 score, and ‘High’ could mean a GCSE maths student who achieved, or is working at, a ‘high’ grade 3 score.

Methodology

As a teacher, in the context of the research question, it is important to be able to assess a student's relationship, not only to learning and developing mathematical skills, but also learning strategies as a holistic skill.

Points to consider when reflecting on a student's ability to learn mathematics independently:

- Do students respond, 'mechanically and deterministically as products of their environment, or as initiators of their own actions?' (Higgitt, 2022, p. 19; Cohen, 2018, p. 5). This could be the difference between the actions of a learner with a fixed mindset, or a learner with a growth mindset.
- Resit students probabilistically find GCSE maths difficult to attain at the recommended level, i.e., a grade 4 or higher. As such, it could also be assumed that FE maths students would struggle to work independently and would eventually respond to their environment during the course of the academic year, in a predetermined manner.

Mixed methods research (MMR) will be employed, using qualitative and quantitative data. The idea is to provide a more useful analysis of understanding how to develop effective strategies to help students learn independently. This will be carried out by comparing learner experience and understanding with results they achieved from their resit exam in November 2021, and the work they completed using the online educational tool, Hegarty Maths. 'Utilizing both qualitative and quantitative methods in studying a single phenomenon' (Hussein, 2004, p.4) can 'cancel out inherent bias in methods of data collection and sources of data' (Higgitt, 2022, p. 21; Johnson et al, 2007, p.115).

Sampling and Participants

Leicester College entered 427 students for the GCSE maths exam in November 2021. Of these, 156 passed with a grade 4 or higher. These students' results and the work they completed (on Hegarty Maths) will be compared with the grades and Hegarty Maths work of a sample of 36 students, taught by 5 different teachers, who did not pass the November 2021 resit GCSE maths exam. Six randomly selected students (of the 36 who did not pass the November resit) will be interviewed near the beginning of the research period (shortly after the November resit exams). Towards the end of the research period, in April/May 2022, a differently 6 randomly selected students will take part in questioning and growth mindset

sessions, to gain an understanding of student opinions and attitudes towards independent learning.

Research Methods

The results from the November resit GCSE maths exam (quantitative data) will be used to compare the results of those who passed with a grade 4 or higher, with 36 students who did not pass with a grade 4 or higher; these students all sat the Foundation Tier exam. The exam scripts of the 36 who did not pass will also be used to support identifying areas where students struggled.

Six interviews (qualitative data) will be carried out shortly before the November resit exams. They will be interviewed to ascertain their understanding of directed study within GCSE Maths and the extent to which they think improving their independent learning skills is important, and why.

Exam analysis reflections (qualitative data) will be used. Session/s where students get to reflect and discuss their approaches to exams will be carried out towards the end of the research period (after Easter break), during the weeks from April 25th to May 20th. The use of exam analysis reflections will take part in conjunction with a session on student perceptions on growth mindset in contrast to fixed mindset.

Ethical Considerations

When referring to assessments, interviews, exam data and Hegarty Maths data, all data was anonymised, using pseudonyms as appropriate, i.e., Student 1, Student 2, Student 3 etc. Hegarty Maths is password protected, which means that only authorised persons have access to student data. Exam scripts, as they are paper-based documentation were secured in a cabinet when not required. The sample of students in this research were all aged between 16 and 19, so safeguarding issues were dealt with in accordance with college safeguarding procedures.

Aims

We use the following points to help answer our key question, which is: *How can teachers develop effective strategies that help students learn independently*?

- Identify the amount of work completed on Hegarty Maths, on average and evaluate its significance as an influence on the exam grade.
- Assess different experiences and understandings of independent learning.
- Assess student understanding of a growth mindset compared to a fixed mindset.
- Evaluate the appropriateness of flipped and online learning for different students.
- Reflect on the challenges of complex problem-solving identified from the exam scripts.

Results

Interviews October/November

The 6 students interviewed had some understanding of the importance of independent learning. The different levels of complexity of the language used by different students suggests some students have a greater ability to work independently than others. The students who demonstrated higher cognitive abilities, gave clearer and better-quality answers. The interviews also suggested that students that appear to have lower cognitive abilities required extra questioning to be able to give clear responses to questioning.

One response was *"…to prepare you for further study like university where you carry out self-study and research…skills for jobs…need to develop continuously"*. This is in contrast to another student who, when asked why they thought independent learning was part of the college, needed time and further questions within the interview to be able to offer a response; their response was *"To show you are committed to doing well in the subject".*

Therefore, these interviews showed that there are students who are less likely to struggle with independent learning and are more likely to pass the November resit exam. The interviews also suggest that more than half the students would require support with their ability to learn independently.

Hegarty Maths (HM) during the period leading up to the November resit exam (September to November)

HM was used as part of the flipped learning process. Therefore, most of the tasks completed on HM by the students were done so outside of the classroom, as part of independent study.

Of the 142 who passed, 25% carried out no revision on HM, 27% completed 4 hours or more revision, and 11% completed over 10 hours of revision. The mean hours of work completed was 3.8 hours. The most hours completed by a student was 48.4 hours.

Of the sample of 36 students who did not pass with a grade 4 or above, 15% completed no revision, 20% completed at least 4 hours revision and 1 person (which equates to less than 3%) completed over 10 hours. The mean hours of work completed by this group was 1.88 hours. The most hours completed by a student was 12.9 hours.

These figures suggest that carrying out independent work, outside of normal maths sessions, can give students more chance of passing. The averages are higher for the students who

gained grade 4 or higher in the exam. It is important to take into account different factors which can affect the outcome of the results:

- Some students may have completed maths work without using HM and still gained a grade 4 because they already had decent independent learning skills.
- Some students do not have decent access to the internet so may not be able to use HM effectively (socio-economic challenges with learning).
- Some students may have had a personal tutor to support revision.
- Some students may have medical or learning conditions which hinders their ability to learn, for example, dyscalculia, dyslexia, anxiety.

Exam Scripts raw marks inputted into the exam analysis on AQA

After the exam results were given out, the exam scripts of the 36 students in this research who did not pass with a grade 4 or higher were taken to analyse reasons for why they did not pass. Analysing the exam data illustrated the difficulties students had with algebra and geometry, as well as the challenges posed by the 'common questions', which are questions that appear on both the Foundation and Higher Tier exam papers. Below is the data from the exam analysis spreadsheet from AQA, which details the average marks attained by the students for Paper 1 (Foundation). It shows the difficulties that students had with geometry and algebra in comparison with the other topics. It also shows the difficulties students had with common questions, but this would be expected considering these are questions also seen on the Higher Tier paper and therefore the more difficult Foundation Tier questions.

Image 1 – The average marks students attained for paper 1 (Foundation). It shows a breakdown the different types of questions based on topic, assessment objective and common questions.

	Max Mark	National Mean Mark	National Facility %	Total Class Mean Mark	Class Facility %
AO1	33	13.59	41.17	12.77	38.71
AO2	30	11.80	39.32	12.04	40.12
AO3	17	6.49	38.18	5.58	32.81
Number	16	8.87	55.43	8.88	55.51
Algebra	18	5.47	30.38	4.83	26.85
Ratio	18	7.18	39.86	6.16	34.22
Geometry and measures	16	4.47	27.94	4.60	28.73
Probability and statistics	12	5.89	49.07	5.92	49.31
Common Questions	21	3.36	16.00	2.89	13.76
TOTAL	**80**	**41.03**	**51.29**	**30.39**	**37.99**

Exam analysis reflection

As part of analysis, and this research, six students carried out 3 questions from November resit, Foundation paper 1 (common questions). The students had completed some work based on the basics for these questions, prior to the session on the analysis. The students were able to answer them with some confidence and mostly accurately. Questioning them, the students explained they understood the questions due to some revision beforehand. One of the students if they had answered these 3 questions the same way in the exam would have gained a grade 4.

The exam paper analysis/reflection sheet (Appendix A) was designed to support students understanding their next steps on their learning journey – strong topics, next steps, techniques I used, techniques I plan to use. Developing the right mindset towards prior planning (what does it mean? How do you do it?). Linking to employability/transferable/independent learning skills.

During this session I also delivered a section on developing a growth mindset. This involved show a short YouTube clip, ‘Growth Mindset vs. Fixed Mindset’ and carrying out a card sort activity (Appendix B) to stimulate discussion. As a result, we had the opportunity to reflect on how motivation and engagement in a maths class can support a greater understanding of how important it is to the wider world, for example, self-motivation, skills associated with working independently, that failure is part of the process of improvement, taking risks and focusing on

relevant tasks. The students showed an understanding of the difference between a fixed mindset and a growth mindset. This activity highlighted learners' experiences with online and independent learning, including difficulties with focusing, too many distractions, limited help due to not working with the tutor face to face, working on mobile phones using mobile data and limited or no access to the internet or a laptop/desktop computer.

Discussion and Analysis

At the beginning of the research period, the interviews carried out showed that all students had some understanding of the importance of independent study. What was highlighted was the differences in levels of understanding and approaches to it. Some interviewees were more capable of giving a clearer understanding than others and some did not carry out independent study.

The next phase of the research, the results of the exams were received and were compared with the amount work students carried out online using HM leading up to the exam. The data illustrated that a student was more likely to pass the more they used HM. It must be noted that there were students who passed that completed very little or no work on HM and this suggests that they could have preferred revising using other resources, or already had independent learning skills suitable for undertaking GCSE maths exams. Also, there were students who completed more work on HM than the average student who passed the exam but failed to achieve a grade 4 or higher. As such, it is important to consider a number of factors which would impact on the results of this research. These include, amongst other factors:

- Access to digital technology. Some students prefer to use paper-based resources compared to online educational tools. Some students may not have effective access to digital technology due to socio-economic circumstances.
- Pedagogical issues. Some students show an aptitude for independent learning and given the right support can be better placed to successfully pass the exam. Some students may have found independent learning challenging and required further support when considering and implementing their own learning strategy.
- Demographics. Factors such as age, ethnicity and socio-economic background may impact on the ability to carry out independent learning successfully. Students from affluent families may have greater access to learning due to financial status, for example, personal tutors and more up-to-date digital technology.

Furthermore, the research looked at students analysing their own performance and reflected on their next steps. Six students, as part of this research were asked to reflect on their exam results and exam papers, online revision carried they out on HM, and evaluate their approaches to independent study with the section on motivation and engagement. The students responded well to the idea of analysing their own performance as part of

understanding the importance of independent study, in this case, reflecting on their exam result and some of the questions they did not answer or answer correctly, and interpreting their data on HM and comparing it with their peers. What was noticeable was when they completed the exam reflection and analysis sheet. When reflecting on what they needed to do to improve their chances of passing the maths exam, students mostly focused on the topics they needed to cover. There was less emphasis on soft skills such as problem-solving, independent learning and thinking skills.

As these students are mostly GCSE resit students who had achieved a grade 3 previously, the main issue seemed not to be an understanding of the basics of mathematics but approaches to revision, or the ability to work independently. From the point of view of the teacher it would seem, therefore, that there needs to be more emphasis in the classroom on developing student independent learning.

Some of the issues raised during the session motivation and engagement could be dealt with by supporting improving learner engagement and motivation through appropriate schemes of work, lesson plans and access to resources in the classroom that reflect a better understanding of the working environment.

Conclusions and Recommendations

Conclusion

As GCSE maths, technically speaking, is taught in schools over a two-year period (Years 10 and 11), there is an emphasis at Leicester College to teach as much of the specification as possible, as it is taught in less than one year. There is less emphasis on developing soft skills associated with learning. There are a number of factors why many students have to resit GCSE maths in FE such as socio-economic background, a lack of mathematical skills required for gaining a GCSE Maths grade 4 or higher, and a lack of self-determination required to learn independently and critical thinking skills. This research has highlighted that there are students who can work independently using the flipped learning process, as well as many who struggled.

Furthermore, there was a positive response when students could analyse their own performance in the classroom, in comparison to their peers, and how they use, or should be using, HM. This was used in conjunction with a section of the session evaluating the difference between a growth and fixed mindset, as well as their approaches to independent learning.

Recommendations

- As there were some students who were able to work independently using flipped learning and some who struggled, the scheme of work and lesson plans will be changed accordingly. Lessons will also be adapted to differentiate between these two types of learners. This will give students more capable of independent learning the opportunity to evaluate their own performance and set their own targets with more flexibility. This will also ensure that other students will still get the support they require to improve their maths skills.
- Learners will receive 2 lessons of 1 hour 45 minutes each week. Therefore, it will be possible to adapt some lessons throughout the academic year to incorporate sessions on soft skills, that go beyond mathematics, such as developing a growth mindset, critical thinking, revision techniques and reflecting on what it means to be an independent learner.
- Where possible, maths in the classroom should focus more on independent learning skills and common questions (with only a small amount of covering of basics). Students should be continuously encouraged to prepare for sessions using flipped learning, but still given support as they develop this skill.

- Teachers will be offered CPD with the aim of effective use of data analysis and online educational tools in the classroom.
- A Master's Degree in Education Practice is a good opportunity (for those who want to) to develop the skills required for working in education and can provide extra stimulus to research improving education practices.

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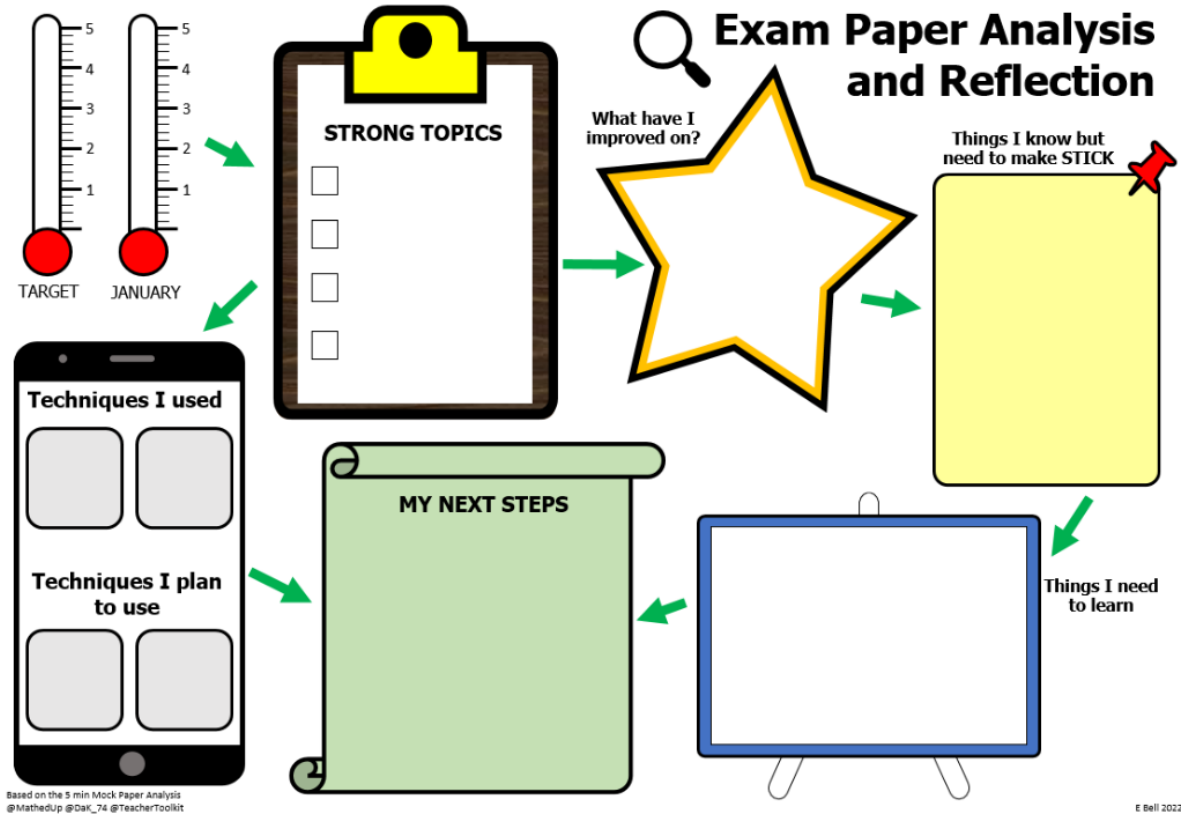
Appendix/Appendices

Appendix A



Appendix B – Taken from Ashley, J., et al, (2021), Motivation and Engagement Toolkit, Centre for Excellence in Maths.

Growth Mindset Resource Sheet – 'What can I say to myself to help my mind grow?

I'm not good at this	This is the best I can do; it will have to do	This might take some time and effort	I made yet another mistake
One step at the time, what do I understand or recognize about this problem?	I give up	This is useless - I just can't do maths	What am I missing?
What strategies could I use to get un-stuck?	I can't do this yet, but with some more effort I will be able to do this	This is way too hard for me	I think I am on the right track
I can't think of any other way to solve this problem, and it is not working	How could I improve this further?	Mistakes are the best tools to learn from. What did I do wrong?	