



Griffey, Harriet (2024) GCSE Maths is holding me back! Supporting student progression to T Levels. Doctoral thesis, The University of Sunderland.

Downloaded from: <http://sure.sunderland.ac.uk/id/eprint/18640/>

Usage guidelines

Please refer to the usage guidelines at <http://sure.sunderland.ac.uk/policies.html> or alternatively contact sure@sunderland.ac.uk.

GCSE Maths is holding me back!

Harriet Griffey

**GCSE Maths is holding me back! Supporting student progression to T
Levels**

Harriet Griffey

A thesis submitted in partial fulfilment of the requirements of the University of
Sunderland Master of Philosophy

April 2024

Contents

Abstract.....	5
Chapter 1: Context and Problem.....	8
<i>Context</i>	9
Maths and English Re-sits	10
Technical Levels (T Levels)	13
Transition programmes.....	14
<i>Problem</i>	15
Chapter 2: Literature review	29
<i>Introduction.....</i>	29
<i>The perception of maths in education</i>	39
<i>The perception of technical qualifications in Further, Adult and Vocational education</i>	47
<i>How contextualisation can support teaching maths in Further, Adult and Vocational</i> <i>education.....</i>	51
<i>Conclusion.....</i>	58
Chapter 3: Methodology.....	59
<i>Introduction.....</i>	59
Research approach.....	60
Ontological approach.....	60
Epistemological approach	62

Methodological assumptions.....	65
Reflexivity	66
<i>Research questions</i>	68
<i>Ethical considerations</i>	71
Minimising harm.....	72
Protecting privacy	73
Respecting autonomy	74
<i>Research methods</i>	75
Questionnaires.....	76
Group Interviews	77
Individual Interviews.....	78
Reflective journals	79
Conclusion.....	80
Chapter 4: Data Analysis	82
<i>Introduction</i>	82
<i>Data collection methods</i>	82
Questionnaires.....	84
Group interviews/ focus groups	84
Interviews	86
Field notes.....	87

Participant selection	87
<i>Trustworthiness of the research</i>	91
Credibility	92
Transferability	93
Confirmability	93
Audit trails	93
Reflexivity	94
<i>Process of data analysis</i>	95
Findings and Key Themes	97
Themes from the questionnaire	97
Themes from the student interviews	99
Themes from field notes	122
Summary of what has been found:	124
Conclusion	124
Chapter 5: Data Analysis	126
Research question 1: How do students view maths in relation to their educational progression?	126
<i>Research question 2: How has curriculum and policy change affected the experience of studying maths?</i>	135
Research question 3: To what extent do students engage with and see the relevance of contextualised maths lessons?	145

<i>Conclusion</i>	153
Chapter 6: conclusions and recommendations	155
Conclusions.....	155
Opportunities for enhancing this research:	166
<i>Recommendations:</i>	167
<i>Impact the research has had on me and my practice.</i>	169
Closing remarks.....	170
References	173
Appendix	179
Baseline questionnaire: summary of responses	179
Full interview responses and their corresponding codes	182
Field journal.....	191

Abstract

This research project investigates how students view maths in relation to their educational progression during a period of curriculum reform in Further, Adult and Vocational Education (FAVE).

Since 2014 students have been subject to a “condition of funding” (Wolf, 2011) which requires every learner under 19 to continue to study GCSE maths and English until they

achieve a grade 4 or above. In September 2020, Technical Levels (T-Levels), were introduced to replace current Level 3 vocational qualifications at FAVE institutions. These new courses are intended to be more rigorous to improve the perception of the value of vocational education. T-Levels came with a requirement of a minimum standard for English and maths to achieve full certification (gov.uk, 2020).

Prior to the implementation of T-Levels, colleges were asked to design “Transition” programmes to help learners achieve the minimum maths and English standards before embarking on a T-Level. The institution involved in this research created bespoke Transition Programmes with supplementary, contextualised maths and English lessons. These Programmes were established as pre-requisites for all students wishing to undertake T-Levels.

However, a year after T-Level implementation, the minimum standards for maths and English were removed in response to concerns that they were impacting on T-Level enrolment (Department for Education, 2021).

This small-scale research project follows approximately 40 students enrolled onto maths “Transition” Programmes at a large FAVE institution. The project uses focus groups, interviews, and reflective observations to gain their perspective on policy change and resultant curriculum reform. The project aims to determine whether mandating the study of maths has an influence on motivation and engagement and will also assess student perception of the importance of maths to their future careers.

Key words: T Levels, GCSE maths re-sits, policy reforms, contextualisation

GCSE Maths is holding me back! Supporting student progression to T Levels.

Chapter 1: Context and Problem

The contentious issue of GCSE resits has become one of the biggest challenges for Further, Adult and Vocational Education (FAVE) institutions. Thousands of students retake these qualifications every year in the hope that gaining a grade 4 will lead to greater opportunities further down the line. Most GCSE resit students have low grade profiles and begin their college life re-sitting full GCSE level programmes. But, despite their low academic achievements many still aspire to progress within Further Education. One appealing route for young people is the new T Level, equivalent to three A Levels but focusing on a key vocational area. These T Levels will replace current Level 3 technical qualifications and are designed to be more rigorous and improve the perception of technical qualifications. The rigour of T Levels has compelled FAVE institutions to set minimum standards of GCSE maths and English as a point of entry, since re-sitting these alongside is virtually impossible. 50% of students who start college are lacking one or the other of these qualifications (Wolf, 2011), therefore a significant proportion of students will either not be able to enrol onto T Levels. This research project investigates ways in which we can help students who do not yet have the minimum standard in GCSE maths and have been enrolled onto supportive “Transition” years.

Context

This first section of Chapter One establishes the context in which this research is grounded. This is done to illustrate important factors that are closely bound to the problem at hand, which will be explored later in the Chapter. The research project takes place in a post-16 college in England. In 1970 the college became the first Tertiary college in England, combining typical Further Education (FE) with a sixth form college. The secondary schools within the immediate area do not have sixth form provision, therefore the college acts as the only state Further Education institution for the local region. Currently students living in the immediate area make up for about a third of the student population. Due to the rural nature of the county, the other two-thirds come from the surrounding areas. It has a large catchment area, and it is not uncommon for a student to travel over an hour to get to college. Therefore, unlike many other FE colleges, it does not have a key area of focus or specialism. The college aims to cater for a vast range of learner demographics and offer a variety of courses. Serving the community and its needs is a fundamental part of the college's mission statement. The college is one of the largest in its region and provides tertiary education for around 12,000 – 14,000 learners. This is divided into about 7000 16-18-year-olds on a mix of A level and vocational courses, 2000 apprentices and 5000 studying on a mix of Higher Education and other post 19 programmes. The college is predominantly based in a city centre, with buildings spread out on mini campuses. There are 13 different sites and 14 teaching faculties. There are a handful of sites outside of the city centre that teach

technical qualifications and a further site at the local airport. Due to the expansion of the college several civic buildings in the city are rented and used for lessons.

Maths and English Re-sits

Maths and English are a compulsory part of a learners' programme if they are 16-19 and have not yet achieved a minimum standard. The college currently has around 3500 students enrolled to Maths and English programmes. These students are a mostly 16-19 studying a range of vocational programmes, but many are adults studying part time. This makes the college a large provider of Maths and English. The college considers development of learner's maths and English skills a key priority in its strategic plan. The current condition of funding states that every student aged 16-19 (or up to 25 with an Education and Health Care Plan) on a full-time programme who does not hold a GCSE (General Certificate in Secondary Education) in Maths or English grade 9 to 4 must continue to study them until they do. Students with a grade 3 are expected to repeat their GCSE, but students with a lower grade can do an alternative qualification (gov.uk, 2020). This research project focuses on students who are re-sitting their GCSE in maths. The college has around 900 16-19-year-olds enrolled to GCSE maths, and it is taught to students from every curriculum area on every college site. Within my current role I both deliver and support curriculum design for GCSE and Functional Skills maths. GCSE Maths is the biggest course at the college in terms of the number of students enrolled. It also has the greatest number of staff teaching it. GCSEs are a level 2 qualification that are usually taken by students aged 14-16 whilst in secondary schools, and ordinarily take two years to complete (Pearson, 2021). GCSEs are frequently used

as a benchmark to judge student ability in the workplace and for further study. In FAVE institutions, the GCSE is typically taken in 9 months as a short course over one academic year. The curriculum is currently designed around the assumption that students have already taken the subject, finding gaps in knowledge, and focusing on these skills. There is not the time to teach the whole GCSE syllabus, so the classes are fast paced. Students are given 3 hours a week for GCSE maths over three lessons. At school they would have been allocated more time than this for their maths lessons. It is typical for a student of maths to be streamed by ability when studying GCSE maths at school, within this institution this was also the case for the beginning of this research project in 2021, but this was phased out by September 2023. When students join college, they were streamed based on their prior attainment. Now all students who come to college without a grade 4 in maths and are on a full-time course re-sit their GCSE.

There is an expectation that a student who has a grade 3 in GCSE maths can achieve a 4 in one year, but any lower will take longer to get up to this standard. Up until recently colleges have not been receiving extra funding for maths and English lessons but have still been required to ensure every student is enrolled where appropriate. However, in the academic year 2020/21 the government began awarding £750 per student on a 2-year course and £375 for a student on a one-year course (Gov.uk, 2019). This funding is to encourage the improvement of maths and English attainment. In 2024 it was announced that this funding was set to increase again, along

with the requirement to teach a minimum of 4 hours a week for GCSE maths (Gov.uk, 2024)

The “re-sit” policy was first introduced to help students progress to further study, training, and skilled employment but it has been documented as a particular area of challenge for FE colleges, where teachers face apathy, disengagement, and low motivation (Bellamy, A. 2017). In 2011 a report conducted by Professor Alison Wolf found that less than 50% of students had both English and Maths GCSEs at a grade C (now 4) or above and that was limiting their ability to progress when in Further Education. It was this report that proposed that English and maths should be a required component of study programmes for students without good GCSEs in the subjects. Funding and performance measures have been adjusted to promote the focus of English and maths (Wolf, 2011). Since 2015 all colleges have had to adjust to the re-sit policy and ensure that classes are accessible to those who need them. This has required a huge logistical challenge, especially in a college where there is no main campus. Therefore, maths teachers are required to move between buildings to support students as a centralised location would not be accessible. This institution believes that teaching maths in the faculty where learners have the rest of their course is beneficial to their engagement. There is usually a maths teacher tied to each faculty for ease of communication with tutors and to support embedding maths into the curriculum and vice versa. It is common for a teacher to spend their morning at one side of town teaching one faculty, then make a 5-mile journey to the other side of town to teach a different faculty in the afternoon. The maths team even have a faculty bike.

Technical Levels (T Levels)

In 2020 the college was selected as one of the pilot colleges for T Levels. T Levels are a 2-year course that are equivalent to 3 A Levels. They have been developed in collaboration with employers to meet the needs of industry and prepare students for work and further study. T Levels were originally structured with 3 compulsory elements:

- A technical qualification
- An industry placement
- A minimum standard in maths and English if students have not already achieved them (Department of Education, 2020).

When T Levels were introduced, full certification for a T Level could not be awarded to a student if they had not met the minimum standard in maths and English by the end of the T Level. This carried significant implications for both learners and institutions and represents a marked shift from the current guidelines for Level 3 vocational programmes. Currently the only other qualifications that requires a minimum standard in maths and English for certification are apprenticeships. One year after their implementation, this policy was scrapped. However, T Levels have proven to be so challenging this institution made the decision to make maths and English GCSEs at a 4 of above a minimum requirement for participation anyway.

This research project follows the journey of students who hope to progress onto a T Level qualification but do not yet have the minimum standard required in maths.

Transition programmes

In response to the T Level pilot, this institution made the decision to increase the number of hours dedicated to helping students progress in their maths and English by introducing supplementary contextual lessons. This research project focuses solely on students on maths programmes. These extra lessons are called “Transition Maths” lessons as the aim is to support students to transition onto a T Level. These are in addition to the mandatory GCSE maths lessons and are being taught by vocational tutors in some areas, and maths specialists in others. The hope is that with more hours dedicated to maths the students will have a better chance of achieving their GCSE by the end of one year of college. Unlike their GCSE maths lessons, the “Transition” maths lessons will be taught to everyone enrolled to the full-time programme. For example, a student who is studying a Level 2 in Childcare will do “Transition Maths” lessons regardless of their prior attainment. These mixed ability groups contrast with the historic strategy of streaming GCSE maths students. The content of the lessons will be relevant to their area of interest but aim to support the maths they need to achieve a grade 4.

This focus on maths (and English for the majority) means a level 2 student studies more maths and English than any other element on their programme. It also means that lower ability students are often given more contact time than their more able peers, which is set to increase again in September 2025. It is these students, and their experience of studying maths, that this research project investigates. This research follows two cohorts of approximately 20 students who are involved in the curriculum changes and aims understand how these changes affect students’ motivation and engagement.

The college places a focus on the learner voice conducting two surveys per year asking for feedback on their experience of learning. The college promotes continuous feedback from staff and students, and it was part of its mission statement in 2021 when this research project began. Learner voice is a key priority for the college where there is an expectation for all staff to understand the areas of strength and development for their courses. It is particularly important for the college to understand the effectiveness of new programmes such as the Transition year. Therefore, this research will aim to address the priorities of the college surrounding the focus on learner feedback.

The college operates in a unique context due to its geographical location, the demographic of learners and the number of students enrolling onto GCSE maths. The delivery of maths and English re-sits are a challenge for all colleges and the introduction of T Levels adds another layer of complexity to the journey of a re-sit student. It is these complexities that the college hopes to address with increased contact time for re-sit students. It is unknown what the response will be from students and whether it will result in a better pass rates, greater motivation and understanding of the importance of maths to a student's future. It is these issues that I wish to investigate during the research project.

Problem

T Levels were introduced to FE in 2020/21 as a credible alternative to A Levels. Following the Sainsbury report in 2016 (Gov.uk, 2016) a need for more highly skilled

people to raise productivity was identified as a major challenge for the country. There is a fear that greater international competition and faster technologies may put roles that currently exist at risk. The report proposed that a new vocational option at college was needed to prepare students for the skills required for employment which include both practical and technical skills. These industry standards create the expectations and structure of the new T Levels. In September 2020 some colleges began teaching T Levels. This has required major planning and restructuring since the expectation is that T Levels will replace current vocational classroom-based qualifications. The Sainsbury panel state that the new T Level structure “needs to work for all groups of students. This will include ensuring that individuals who are not ready to access a route at age 16 can access up to a year of tailored and flexible support based on their prior attainment and aspirations” (2016:8). Therefore, colleges have had to prepare a new curriculum for students enrolling to T Levels and design “transition” years for those who do not yet have the required qualifications to enrol onto a T Level. The new structure means students will ultimately have the choice between a T Level, 3 A Levels, an Apprenticeship or complete a Transition year preparing them for one of the first 3 options.

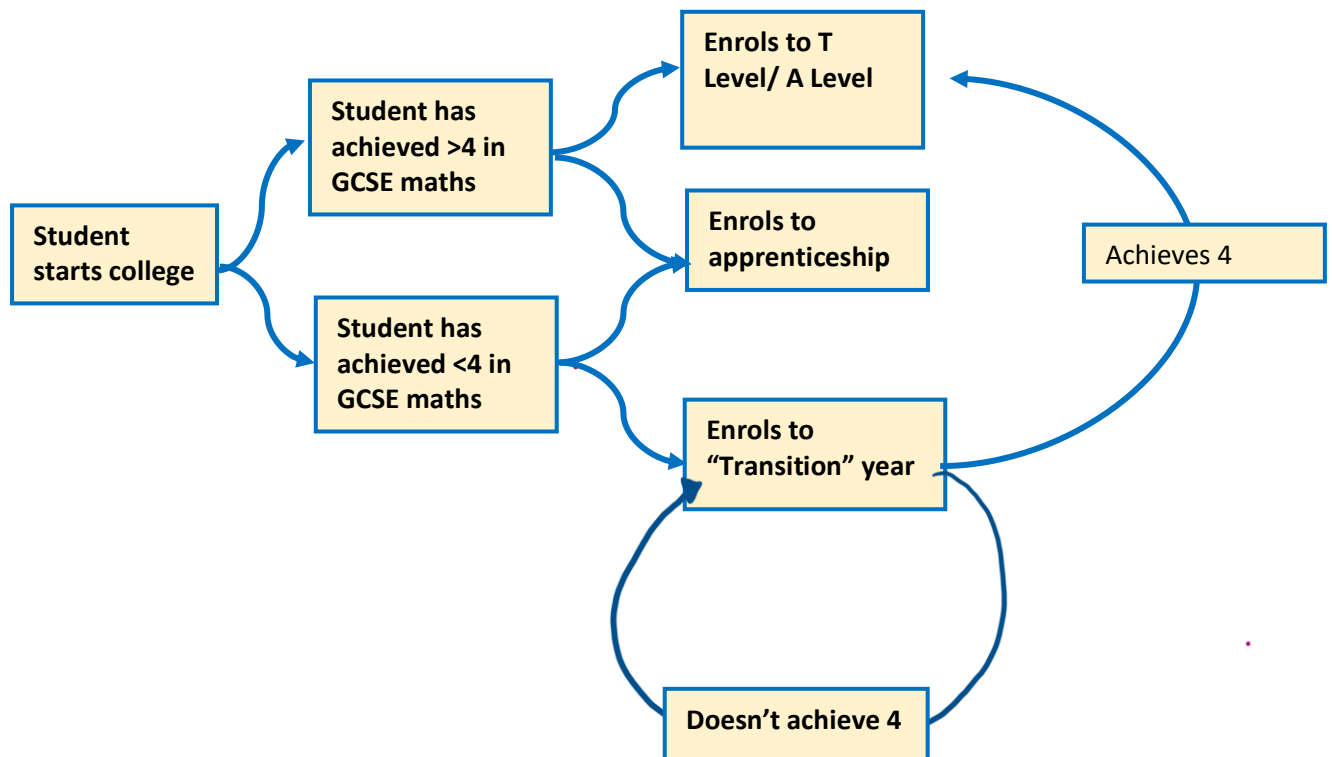


Figure 1: College progression routes

Maths and English are a barrier for progression. The condition of funding aims to support progression and was directly influenced by conversations with employers who indicated that students were coming to them with lower skills that were required for the workplace (Wolf, 2011). The implementation of this policy has been controversial with many believing that “forced” resits do more harm than good, with Anna Bellamy likening resits to Jo Boaler’s (2005) notion of “psychological prisons” (2017,4). Others welcome this change and acknowledge even with low pass rates a great number of students are given better prospects through the resit programme (as acknowledges in the Sainsbury Review (2016). Further investigation into the perceptions of re-sits from an academic perspective will be explored later in this thesis.

For colleges, re-sits and minimum entry points mean that students can get stuck in a cycle of repeating GCSE level qualifications unable to progress because they fail to improve their grade year after year. The logistics of implementing this policy has been a major challenge. Colleges have had to quickly employ and train teachers to support re-sit students with no extra funding (until 2020/21) and deliver a new style of teaching that requires staff to teach a 2-year course in 9 months. The GCSE reforms in 2017 increased the rigour of GCSEs which has unfortunately meant fewer students achieve a 4 or above at school. The task of upskilling these learners then falls onto colleges. The number of GCSE enrolments a college receives is dependent on the quality of education students receive within the catchment area. Therefore, colleges with a greater number of students from a lower economic background enrol more GCSE students. Sometimes schools have bad years, and this makes planning for GCSE enrolments unpredictable. This brings challenges for teacher recruitment and finding essential teaching space. It has now become commonplace for large colleges to enrol over 1000 students onto GCSE maths and English programmes. Arranging exams for such high numbers of students creates logistical difficulties. Although the GCSE re-sit policy has been criticised, The Sainsbury report does raise the point that it has led to thousands more students every year securing the qualification. Despite these successes, an important question might be at what cost have they come at, to both the students involved and the wider college community?

The new T Levels expect a good grounding in transferrable skills which include Maths, English, and IT, which has been led by employer input into the qualification. In order that these qualifications can successfully replace their predecessors, there needs to be enough students with good GCSEs in these subjects, however those achieving a 4 or above in colleges remain low. Current GCSE Maths “pass rates” in FE sit at around 16.4% (Joint Council for Qualifications, 2023). This raises the concern for colleges that students on “Transition” programmes or courses aimed at students not yet ready for T Levels will have limited success in bringing them to the level required. It was the nominally low grades in GCSE maths and English that led to the College introducing extra maths and English lessons to give students a better chance of progression. The lessons also aim to introduce learners to common maths and English problems that they are likely to come across in the workplace. This curriculum change is well-intentioned, but it is unknown what impact extra maths lessons will have on the morale of learners. Unlike their GCSE maths lessons, their contextual maths lessons will be taught to the whole cohort. The hope is that this will eliminate some of the feelings of being singled out or being left behind. However, students will be doing more maths and English than any other aspect of their programme which could be demoralising for a student who hopes to leave school level qualifications behind. We are in a situation where students who are less academic have their choices taken away from them. The Social Mobility Commission’s report “The Road Not Taken” (2021) states that this can have a detrimental impact on a student’s confidence and life aspirations.

To support student confidence, supplementary maths lessons aim to be fully contextualised to a student's area of interest, whilst also linking to their GCSE classes. Each T Level will have a set of maths and English "standards" that students are expected to meet. The "transition" maths and English lessons have used these standards as a starting point for curriculum design. The theory behind this is to ensure learners understand the value of maths and English. It is often seen as best practice in FE since learners have chosen a career path and now have a "context". The notion of best practice is not without its complexities however, as we will see below. Ireland (2019) lists "Use of realistic contexts" as one of the more effective teaching strategies. But from experience this is a challenging way to motivate as it is also not possible to contextualise every aspect of the Maths GCSE to every industry, so there is a risk of "shoehorning" maths in where it doesn't make sense. I also feel that maths should be valued as a standalone subject rather than attempting to make it more palatable. The value of contextualised maths lessons will be explored later in this thesis. Coffield (2008) describes "best practice" as "the unspoken assumption that we can all recognise and disseminate 'best practice' without any difficulty" and that "best practice" also assumes a level of consistency. This is problematic as consistency of delivery is hard to establish in a large institution. Moreover, a consistent and unified approach to teaching maths to a vast number of students, each with their own motivations, learning needs and dispositions towards the subject, is difficult if not impossible to resolve. Ultimately Coffield (2014) asserts that "there's no such thing as best practice" (2008: 16).

Some of the purported intentions of contextualising maths lessons is to make them more engaging, fun, and interesting to the learners. This is because maths is often seen as an unappealing subject. The negative perception of maths is a continual challenge for maths re-sit teachers, which is only aggravated by educating 16-year-olds who are required to re-sit something that they deem to have previously “failed”. I have always loved teaching re-sit maths. For me it feels like the greatest achievement in teaching to help a student through the hatred of a subject to believing that it’s OK and achievable. The confidence growth that you see in students makes the challenge of negativity, apathy, and low motivation worth the effort. However, from a student perspective this journey can be demoralising and there are some students I fail to reach. Students bring “maths scars” to college quoting their negative experience at school. Anna Bellamy (2017) found that when asking students about their experience of maths, every student commented on what set they had been put in. There currently is a national shortage of maths teachers and students often recall that their brilliant maths teacher at school was reallocated to higher ability as students who are unlikely to achieve a 4 aren’t as valuable to the school’s statistics. There are tales of non-maths specialist teachers being reassigned to low ability maths groups as “crowd control”. Whilst these observations are only anecdotal, it is nonetheless important in understanding what some students experience prior to them joining FE study.

These scenarios can lead to students feeling like failures and adding to their negative perception of maths. This is a huge barrier to overcome when they are at college. Higton et al (2017) note in their guide to “Effective practice in the delivery and

teaching of English and Mathematics to 16–18-year-olds” that for those who did not achieve the accepted standard in maths and English, the apparent ‘failure’ can lead to contrasting attitudes and different levels of motivation. Many students I observe in the GCSE maths classroom are generally apathetic to the experience. Before T Levels, not having a GCSE in maths would not stop them from progressing to a level 3 technical qualification, however the rigour of T Levels means this will no longer be the case for within this institution. Students will have to achieve a grade 4 prior to starting their T Level or they risk being stuck in the repeated cycle of failure, repeating level 2 course after level 2 course with no progress. The Sainsbury report (2016) also comments that student and teacher expectations of the minimum standard is too low and recommends after a period this should be increased in line with other technical international leaders.

Regardless of student perception of maths all Government reports and policies make clear that maths and English upskilling remain a priority. Employers have been quoted as wanting students to leave FE with improved maths skills such as estimating, probability and statistics. Having a large proportion of society without these low-level skills has a social impact. The Sainsbury report (2016) claims that skilled employment leads to prosperity and security for individuals and unskilled work often leads to the opposite. However, occupational segregation needs to be addressed to ensure students see that all paths are open to them regardless of their background. Technical education also needs to be aspirational to high attaining students and their parents. Vocational education should not be an alternative for students who do not achieve high level qualifications. Currently around 50% of students choose either an apprenticeship or

classroom-based vocational qualification. If the current vocational options are viewed as inferior to A Levels, this fails half of the population of students.

The perception of technical education remains a difficulty when encouraging students to take vocational courses. Students and parents believe that an A Level course is the best way to do well and is superior to other courses on offer. This is reflected by the fact that academic courses often facilitate access to Higher Education and therefore higher earnings (Social Mobility Commission, 2021). T Levels aim to counter this and offer a technical equivalent that can be seen by universities as an equivalent. Students enrolling to GCSE maths are mostly enrolled to technical qualifications so believe that their options are inferior. The T Level must combat this negative perception, especially since there is a need for more people to be technically qualified. Students who achieve their GCSE maths and English whilst at college need to see that T Levels are an option that can secure them a good career. This research will investigate the attitudes of these students to technical qualifications and begin to understand how much of a barrier they feel GCSE maths is to their aspirations.

Course selection is often based on a student's prior attainment. Those with lower-level qualifications have limited options. However, the popularity of courses is often influenced by perception of their ability to lead to higher earnings. Gender, parental views, careers advice, economic background, college offering, race, geographic inequalities, and policy implications all play an influence on how a student decides on what course to take. Despite any increased aptitude, female students and

students from a low economic background are more likely to take a technical qualification (Social Mobility Commission, 2021). It is therefore of huge importance that T Levels are treated in line with A Levels so these students are not further disadvantaged.

GCSE maths re-sits are not courses selected by students, and the demographic of the cohort is a significant barrier. Within my own institution as many as 50% of students enrolled to GCSE maths classes require extra provisions in exams due to a special educational need or similar. Research has shown (Social Mobility Commission, 2021) students are less likely to have maths and English GCSEs if they were from low economic backgrounds, had special educational needs, disabled, or came from another disadvantage. In the eyes of the government this makes it even more important that the resit policy continues and ensure that every learner can achieve the basic level qualification (Wolf, 2011). However, with such large numbers enrolling with such varied needs the challenge of delivering an effective curriculum is enormous. When GCSE examinations take place, whole buildings need to be emptied to accommodate the extent of exam provisions and extra examination space must be rented out. Buses are hired to transport students from campus to campus, and every member of teaching staff must come off timetable and be trained to invigilate on exam days. The 5 days in the summer when the GCSE maths and English exams take place require a whole college effort. The cost implications are huge. It has an impact to the studies of the students not taking a GCSE too, and also means that it is impossible for students to practice their exams under full exam conditions prior to their final exam. Students notice this

difference between them and other examined subjects and question why they don't get given the same opportunities for practice.

The impact resitting GCSE maths has on a student's mental wellbeing has been documented by Anna Bellamy (2017), whose research shows that negative feelings towards maths can be reinforced through "forced resits". Every year there are a handful of students who are never able to enter a maths classroom or exam hall because their anxiety around the subject is so great, some now coming to college with a diagnosis of "maths anxiety". Students who are on the "Transition" programmes are being targeted for further intervention and it is unknown what impact this will have on their self-esteem. However, the fact that all students on the course will be given these lessons creates an opportunity for mentoring and peer support. This strategy aims to highlight the importance of maths in industry regardless of prior maths attainment, whilst minimising the stigma of prior failure.

Mental health issues, learning difficulties and disabilities are commonplace in a GCSE maths re-sit classroom. Where success in FE is measured by a student's ability to achieve a qualification and progress, students repeatedly taking their GCSEs can feel like they are being left behind. This feeling is amplified if a student feels they are already at a disadvantage. The requirement this institution has put in place for everyone to have maths and English GCSEs to enrol onto a T Level raises several concerns:

1. Recruiting students onto a T Level who do not already meet the minimum standard in maths and English are at additional risk of failure.

2. Level 2 or students entering college with lower grades could view T Levels as an undesirable route of progression.
3. Students may become stuck in a cycle of repeating GCSE level courses year after year.
4. Students with special educational needs that limit their ability to achieve GCSE maths and English will unfairly be discriminated against for these pathways.

These issues create confusion about the intended target candidate for T Levels. This raises the question, if the traditional vocational student is not qualified to enrol onto a T Level, then who are they designed for?

By this point in time, it is undisputed that mathematics is an essential skill required in the workplace and highly desired by employers. Students are now given every opportunity to develop these skills further when in college in the hope that there will be a general improvement in the workforce and training students to meet skills gaps. Although the idea is simple - make maths mandatory and then more students will succeed, there are huge amounts of complexities that can't be ignored. When a student is 16, they have already had many years of maths education and given that 31% haven't achieved a minimum standard by this point (TES, 2021), it is difficult to not conclude that their maths education has been ineffective in producing basic skills, giving confidence, and reinforcing the value of maths to industry. Colleges are left to pick up the pieces for an inadequate education system. By the time a student is at college these attitudes can already be ingrained.

The resolution of this college to combat the problem of few students “passing” maths is also simple – give them more maths and then they will pass! However, the uncertain value of contextualisation and the multiple barriers these students face mean it may not be that simple. This leads to the overarching question this research would like to answer:

- **How do students view maths in relation to their educational progression?**

It is evident through reading about policy changes that the requirements for students continuing to study maths were not led by feedback from students. In fact, when students are asked about their views on the re-sit policy it is overwhelmingly negative (Bellamy, A. 2017). It is too early to say what the feedback will be on the T Level changes, but consultation with teenagers was not included in the Sainsbury report (Gov.uk, 2016). The decision of the college to increase maths hours came from fear of lower outcomes and lack of student progression. However, students were not asked whether progression was a priority for them. Do students see maths as a barrier to where they want to go in life? If they don't is this view misguided? Is maths a barrier that they feel is easy to overcome? To assist in informing curriculum design collaboration with students and meeting their expectations is essential.

It is for these reasons that I will conduct this research with a student focus and aim to understand further:

- **How has curriculum and policy change affected the experience of**

studying maths?

- **To what extent do students engage with and see the relevance of contextualised maths lessons?**

The implementation of T Levels brings many challenges to colleges. The emphasis on maths and English means that they are more important than ever to ensure student progression. Courses to mitigate the likely outcome of students getting stuck in a failure cycle must be implemented by colleges to ensure the success of T Levels. Maths and English are being brought to the forefront and issues such as low pass rates, poor motivation and demographic challenges must be addressed. The priority for low ability students will be achieving the minimum standards in their GCSEs, resulting less choice in qualification decisions and more time spent on subjects they have previously “failed”. The impact this may have on student morale and enthusiasm for maths are unknown, and this is what the research will investigate.

Chapter 2: Literature review

Introduction

This research aims to understand the following question:

How do students view maths in relation to their educational progression?

To answer this question, it is first important to understand the historical evolution of numeracy in Further, Adult and Vocational Education (FAVE). By knowing the context surrounding current policies and curricula a greater understanding will be gained on the challenges facing educators. The groups of students currently enrolled to “transition” courses are the first students to be given extra maths lessons to support their progression. This strategy has come off the back of huge policy changes and reforms. This review will look at a timeline of the changes to maths education in FAVE over the last 10 years in the hope to understand the current landscape.

This research takes a student focused approach and is interested in documenting the thoughts and ideas of the learners involved in “transition” years. The implementation of the condition of funding requiring every student aged 16-19 to repeat their GCSE has been controversial. Many still believing that it does more harm than good. Students’ thoughts on their maths education are important, as they are usually not consulted when there is a policy change. The study of maths is generally perceived negatively, especially within the UK and it is important to understand why this might be the case. What are the cultural nuances that result in maths having such a poor reputation? What obstacles are brought to both teachers and students when the people trying to learn come to lessons with such baggage? This chapter will look at the

perception of maths in education and try to understand where these views have come from.

The perception of the importance of maths education is a direct result of its ability to help individuals in later life. Currently it is deemed that students are not leaving education with high enough levels of maths to be prepared for the workplace. The same is believed for technical skills generally, which has resulted in the complete overhaul of Vocational qualifications. T Levels are being rolled out with the aim of improving the perception of technical qualifications. The challenge of technical qualifications has been increased to make them a credible alternative to A Levels. It is important to understand why this reform was necessary, and why it was felt that the current technical qualifications available to young people were not doing their job in preparing them for the workplace. The third part of this review will investigate the perception of technical qualifications and the latest reforms.

The institution where the research is taking place is tackling the issue of low maths and English attainment by giving students extra contextualised maths lessons. There is a lot of research that says that contextualisation of maths can help to motivate and inspire learners. This literature review will analyse this research and understand why this institution may have decided to implement a contextualised approach, and whether the literature agrees that it is a motivating strategy for teaching re-sits.

The historical context of numeracy in Further, Adult and Vocational education

This is a country obsessed with reforms. Norris and Adam (2017) found that since the 1980s and 2017 in the Further Education sector there had been 28 major pieces of legislation and 48 secretaries of state. They claim that the high levels of change in FAVE is due to disagreement about what FAVE is for, is it to prepare for the workplace or prepare for further study? Over the last 10 years if you just look at one small aspect of FAVE, numeracy, there have been numerous changes. I have worked in FAVE and taught numeracy for 10 years, and there hasn't been a year since I started that policy has remained the same. Indeed, in the time it has taken to write this thesis there have been 3 different Prime Ministers of the country and 4 further reforms just to the area of numeracy in FAVE. This section will investigate a timeline of these changes and try to understand why they have been implemented.

“if you are not confused by it, then you have not understood it”

(Norris, E, Adam, R, 2017, pp5)

In 2004 Adrian Smith led an Inquiry into Post-14 Mathematics Education following a concern that not enough people in the UK had skills in STEM subject (Science, Technology, Engineering and Maths). He identified several challenges across the sector. These included:

- The lack of understanding of the importance of maths to future careers. The report recommended that the government place more emphasis on recruiting students to STEM (Science, Technology, Engineering and Maths) pathways.
- The national shortage of maths teachers, especially those with a maths related degree.

- The GCSE being a suitable qualification for preparing students for the skills needed in the workplace and stretching those who are more able.

Following this inquiry there was the introduction of the two-tier GCSE. Previously there were three tiers with the lowest tier only able to achieve a D (not considered a “good pass”). The two tier GCSE system remains the same today, with the foundation tier students only able to achieve a grade 5, with a grade 4 considered a “good pass”.

In 2011 Alison Wolf publish the “Review of Vocational Education – the Wolf Report” which resulted in drastic changes in post-16 education. The report found that Vocational Education was not setting young people up for the labour market and that fewer than 50% of students achieve GCSEs in Maths and English at a grade C (now 4) or above when leaving school. Following the findings of this report the age of participation in full time education changed from 16 to 18 and a greater emphasis was placed on achieving maths and English GCSE whilst at college. In August 2014 there was the introduction of a “Condition of Funding”, which stated that any student aged 16-18 without a grade C/4 in maths must enrol onto a GCSE in maths or steppingstone qualification whilst at college (Education and Skills funding agency, 2014). The condition of funding has since changed twice:

1. In August 2015 it became mandatory for any student with a grade D/3 to enrol to a GCSE in maths, other equivalent qualifications were no longer acceptable.
2. In August 2019 students who have achieved a grade E/2 or below were now permitted to study towards a pass in Functional Skills Level 2 instead, and once

achieved there is not further requirement to take further maths or English qualifications (See figure 1)

Student	Programme (all types including traineeships)	What a student must study to meet the condition of funding
All students	Short programmes (less than 150 hours)	Condition of funding does not apply
GCSE grade 3 or grade D	Full time	GCSE
GCSE grade 3 or grade D	Part Time	GCSE or Functional Skills Level 2
GCSE grade 2 or below or grade E or below	Full time or part time	GCSE or Functional Skills Level 2

Table 1: Prior attainment in GCSE maths and how to meet the Condition of Funding (Education and Skills funding agency, 2021).

Students studying on Apprenticeships are not subject to the condition of funding, however there are similar requirements in place. Apprentices who are enrolled to a level 3 course must have a minimum GCSE grade 4/C or Functional Skills Level 2 in maths to complete their course. A student on a level 2 course must have a minimum of an E/2 or Functional Skills Level 1 but must continue to work towards Functional Skills Level 2 for the duration of their course.

The condition of funding did not apply to students studying on a T Level in academic year 2021/22 but started up again in 2022/23.

The sector has experienced huge amounts of policy change in just this small area of curriculum. As it stands, it is very confusing for institutions to recognise which

maths qualification each student should be working towards. This is one of the reasons the institution that I am basing my research has elected to enrol all full-time students onto a GCSE maths programme regardless of their prior attainment so there is consistency in delivery and less confusion during the enrolment process. There are not enough learners who have achieved a 1 or 2 at GCSE for this institution to be able to provide Functional Skills classes for each faculty area, and cross faculty classes are impossible due to the multi-campus nature of the college. The guided learning hours for GCSE maths is double that of Functional Skills, so the college needed to double the teaching provision to support this strategy. OFSTED (2014) state that a culture driven by policies, strategies and documentation is a significant barrier to FAVE institutions being able to provide “Outstanding” teaching and learning.

Year	Reform
2014	All students without a grade 4/C must continue to work towards it or an equivalent qualification
2015	All students with a grade 3/D must continue to study maths until they have a grade 4/C. Functional Skills Level 2 not deemed an equivalent qualification. Reformed GCSEs taught in schools
2016	None
2017	Students enter college with reformed GCSEs, but can still sit the “old style” GCSE
2018	First year of teaching the reformed GCSEs in FAVE
2019	Any student without a grade 2/E or lower can now meet the condition of funding with Functional Skills Level 2. Start of teaching reformed functional skills qualifications.

2020	Students must achieve a 4 in GCSE maths to receive full certification for a T Level
2021	Students no longer need to achieve a 4 in GCSE maths to receive full certification for a T Level, but must continue to work towards it as a condition of funding
2022	Plans announced to prevent students from obtaining a student loan for university if they do not have a GCSE maths and English grade 4 or above.
2023	Announcement that the government plan to introduce a requirement for all to study maths until 19.
2024	Announcement that from September 2025 all students will need to study a minimum of 4 hours of GCSE maths in college when re-sitting.

Table 2: Changes to numeracy policy affecting full time 16-19 learners since 2014.

Note, policies affecting apprentices have also undergone multiple changes.

In 2016 the Post-16 Skills plan led by Lord Sainsbury recommended that Functional Skills qualifications are reformed. The basis for this was that they need to be more stretching and relevant to employers' needs. Functional skills are apparently the highest volume qualification that Ofqual regulate (Department for education, 2016). The teaching of the new Functional Skills qualifications began in 2019 and aimed to support progression to employment and educational progression (Pearson 2019). However, Noyes, A and Dalby D (2020) claim that the new Functional Skills reformed qualification is unsuitable as a 'steppingstone' to GCSE maths, so may not be an adequate alternative to those who struggle with maths.

In 2015 the GCSE in maths underwent a similar reform. The changes included a new scaling from 9 to 1 instead of A* to U; with 9 being the top grade and more demanding content. The aim was to differentiate between the highest and lowest attaining students (Pearson, 2015). The GCSE has seen an increase in content (Pearson, 2015), however a move to numbers rather than grades has meant that lower ability students have less content that they can access. So, although there is greater content and challenge, it is far easier for a student to achieve a grade 2 than a Functional Skills level 1 on some papers (these are deemed as equivalent levels). In June 2023, students only needed to obtain 7% to obtain a grade 1 and 17% to obtain a grade 2 (OCR, 2023), whereas you would require over 50% in a Functional Skills exam to leave with the same level qualification. This has led to colleges opting for GCSE re-sits instead to hedge their bets and focus on “progress” rather than “achievement”. So, there has been a significant reduction in Functional Skills entries, which Noyes et al refer to as the ‘Blanket GCSE’ approach. This can ignore student’s needs and students are very rarely given a choice of maths course (Noyes, A and Dalby, D. 2020). It is also important to acknowledge that although Functional Skills are deemed “equivalent” qualifications, from my experience there is still a lack of understanding of their content and therefore some employers and Further Education routes do not recognise them.

Noyes et al (2020) conclude that colleges take the route of not offering choices of qualifications as enrolling all students to a GCSE can boost a college’s maths progress score. Improving by a grade at GCSE (even if they still haven’t met the condition of funding) gives a college 1 point of success, whereas failing Functional Skills means no

progress. This can be demoralising for students sitting the GCSE who may not recognise their improvement as a positive when they are still being forced to re-sit the GCSE having not met the condition of funding. There is also very little of the GCSE that a grade 1 or 2 student can access, with the grade boundaries being so low. However, it has been found by Noyes et al (2020) that the same percentage of students meet the condition of funding regardless of what qualification they do. They recommend that students are consulted with their preferred option and there should be a consensus on which qualification lower ability students should be taking.

Questions around the appropriateness of the GCSE for post-16 learners have been addressed by many. Smith (2017) claims that FAVE institutions are generally positive about the condition of funding but are concerned about the emphasis it puts on GCSE being the most suitable pathway. The GCSE in maths is a school level qualification with the exam taken by students when they are 16. They are studied full time and take two years to complete (Pearson, 2019). Most secondary schools will give students one maths lesson a day. Within FAVE institutions the GCSE is taught over just 9 months, which results in teachers being selective over curriculum. Higton et al (2017) found that teachers often felt the time pressure of completing the GCSE in a year and didn't find enough time to work on fundamental concepts. Various strategies have been suggested to combat this issue, such as Nixon, L and Cooper J (2020) suggesting a "Less but Better" approach or contextualisation (Higton et al 2017). But the fact remains that those achieving a 4 or above is consistently low despite various interventions, at around 16% (FE Week, 2023).

In February 2024 it was announced that from September 2025 FAVE institutions would be expected to deliver a minimum of 4 hours per week of GCSE maths to combat the issue of struggling to cover all of the content and give learners more of a chance of success (Education and Skills Funding Agency, 2024). The institution where this research takes place has calculated that this would require at least an extra 3 full time maths teachers and are attempting to understand what implications this can have on student timetables, especially those who also have to re-sit GCSE English.

In 2020 Math Education Innovation (MEI) wrote a report which suggests that the GCSE which is studied in school is not fit for purpose for those re-sitting at college. It proposes that a new GCSE is created for these students, which contains more maths seen in the workplace and less of the content contained on the current GCSE which is designed to prepare learners for further study in maths. It claims that 90% of students who sit the GCSE post-16 sit the foundation tier course, therefore the higher tier content is not valuable for them.

Colleges that offer a range of provision for all level of learners are faced with an increased challenge of managing logistics, especially when there are multiple sittings (Noyes, A and Dalby, D. 2020). All colleges run slightly differently due to the different courses and ages that they cater for. Therefore, it is deemed by Noyes et al (ibid) that it is unrealistic to have one model of mathematics delivery (however complicated) rolled out to all institutions. The progress of students is often not fairly reflected when filtered

down to attendance and achievement data. For example, at the institution where this research takes place, the number of students achieving a 4 or above would appear less than an institution where only those with a grade 3 are put forward for the exam.

The frequency of policy change and reform has a big impact on what colleges can offer students. The quality of the education learners receive is reflected in these changes. Since a student is most likely to be repeating GCSE for more than one year at college, they are also likely to see this looking different at each sitting. The constant churn of policy reform leaves little stability and lots of uncertainty for institutions who often must implement strategies at very short notice.

The perception of maths in education

Maths has been set as a priority in education for many years. The 2004 inquiry into post-14 Mathematics, the 2011 Review of Vocational Education (The Wolf Report), the 2016 Post-16 Skills Plan, the 2017 review of post-16 Mathematics and the 2017 Industrial Strategy all put the improvement of mathematics as one of the key priorities for improving productivity and skills in the country. However, one of the issues we face is maths is not a loved subject. Take up is low despite clear evidence that it is an essential skill for employment and life. In the Government's 2017 industrial strategy it identifies that compared to other developed nations take up of maths in England is significantly lower. It claims that better maths skills result in greater productivity and higher individual earnings. The writer observes that maths can be perceived as an exceptional talent rather than a basic skill that can be mastered, and this can be a

barrier to take up. The increase of new technology has made it more important than ever that basic maths skills are improved. Evidence suggests that work needs to go into the improvement of maths teaching to support basic maths skills.

Maths is important “as an intellectual discipline; for the knowledge economy; for science, technology and engineering; for the workplace; and for the individual citizen” (Smith, 2004, pp.3).

Maths in Further Education has an unusual level of priority. Smith (2017) claims that England is one of the few countries where maths is not studied by all students post 16. In Smith’s review of post-16 mathematics (2017) he puts forward a recommendation that maths should become compulsory for all students 16-19 to help improve the labour market. He believes that if everyone were to study maths, students who are re-sitting their GCSE would feel less singled out and therefore it would have an impact on student achievement. It would also emphasise the importance of maths, not just to those who lack the basic skills. However, the roll out of maths teaching for all students would require significant upskilling of teachers and reviewing current qualifications. This recommendation was echoed in 2023 by the Prime Minister Rishi Sunak, who stated that maths would be studied by all until 19.

Maths does not have a good reputation. This is highlighted in Jo Boaler’s “The Elephant in the Classroom: Helping children learn and love maths”. (2015). Students are described as seeing themselves as those who “can do” or “can’t do”, so if they are the ones who “can’t do” they often see little point in studying the subject. Boaler

acknowledges that many children and adults “hate maths” (2015 pp12) and that it often leads to people feeling “helpless and stupid”. The phrase “Elephant in the Classroom” refers to the idea that there is a belief that ability in maths is a sign of high intelligence. Boaler claims that it is the way students are taught maths that creates this negative perception. Teachers feel that it is their job to sort out the ones who “can” and the ones who “can’t”, often starting with the organisation of class sets. Higton et al (2017) found that students believed maths was an ‘elitist’ subject where you either have the aptitude or you do not.

Within the institution that I am researching, students were streamed into mathematics groups based on ability until 2022. The rationale behind it was that maths is studied in a linear way, without the groundwork you can’t hope to study at a further level. For example, without a basic understanding of percentages you can’t hope to understand how to calculate interest rates. It can therefore be a challenge in a mixed ability group to find work that is accessible to all and promotes independent learning if there are multiple skills that need to be taught at each level. However, in 2022 it was deemed more beneficial for learners to be in mixed ability groups, as it was identified that those in the lower sets were making very little progress compared to those in the higher sets. Where mixed ability grouping was necessary, these groups showed that the higher ability students weren’t making less progress, but lower ability were doing better.

Currently in most secondary schools’ (and certainly those in the catchment of this institution) learners are put into sets based on their prior attainment in Key Stage 2. This

is unusual compared to other countries around the world where lack of achievement would result in students repeating their year, whereas higher ability students would move up a grade (William, D, Batholomew, H 2003). According to Boaler, J (2015) 88% of students put into low sets stay there until they leave school. The Education Endowment Foundation (EEF) 2011 believes that setting and streaming has no impact on student progress. Students put into sets make similar progress to those who have not been streamed. Evidence suggests that high ability students make more progress in sets, but low ability students are likely to be left behind.

“Too many maths teachers think that their role is to find the chosen few who are really good at maths, assigning the rest to low level sets and giving them low level work for the rest of their school lives”

(Jo Boaler, 2015)

The negative impact of streaming is noted by the (EEF) who state that confidence and engagement can be affected. These effects are reflected in Anna Bellamy’s (2017) research into the attitudes of learners participating in “forced resits”. She found that all students commented on which set they had been put into when asked about their prior maths education. Students believed they weren’t good in maths if they were put in lower sets. Streaming can be a particular issue for disadvantaged students (EEF, 2011) as teacher expectations can lead to them being placed in lower sets, and often once there it is difficult to move up or down. In a recent industry trip to a local secondary school, I was shocked to learn that the sets were named by students and

teachers “top set” and “bottom set”. Students in lower sets are also more likely to be taught by less experienced teachers, which is further exacerbated by the current recruitment crises in teaching.

Currently there is a shortage of mathematics teachers in the UK. Smith (2004) found that there was a shortage of around 3,400 specialist maths teachers in secondary schools, with a third not having a post A-Level qualification in maths. Often those with a specialism in maths find other career opportunities more attractive, such as working in the finance industry. In 2017 Smith found that the Department for Education had not managed to reach its targets for maths teacher recruitment, falling behind by 16%. There is currently a demographic increase meaning the demand for maths teachers is likely to increase. College leaders raised concerns regarding their ability to recruit high quality teachers of GCSE mathematics. Bellamy (2017) notes that maths teachers in FAVE come with varied experience so there is often a mix of experience for learners. 43% of teaching staff in FAVE do not have an A Level in maths, which compares to 4% in secondary schools (Haward, G, Homer M, 2016). Over 50% of GCSE Mathematics teachers are also over 50, the current level of recruitment will not meet the demand to replace these teachers upon retirement. I can see this reflected in my experience in the workplace. I was recruited as a graduate and trained on the job. In the 10 years I have been teaching within one institution I have remained the youngest re-sit teacher within a team of 15, despite multiple recruitment rounds each year.

Once recruited it is also challenging to keep hold of maths teachers. Currently only 60% of maths teachers remain in their post 6 years after graduating (Nuffield Foundation, 2019). Teachers of high priority subjects are often asked to teach longer hours due to staff shortages (Education and Policy Institute, 2020).

The perception of maths in FAVE is differing. On the one hand you have students who opt to take A Level and Level 3 maths who are motivated and have already experienced success of the subject to qualify for further study. On the other hand, you have thousands of students who are taking maths having been told the level they have previously achieved is not high enough for their chosen vocation. They are therefore asked to re-take the subject they probably didn't enjoy much in the first place. Bellamy (2017) identified many factors that exacerbate re-sit student's negative perception of maths. The first is that maths is seen as an add-on subject, especially compared to what they have experienced in secondary school. Secondly, students can feel that they are not being treated like adults re-sitting a school level qualification. This has also been observed by Dalby, D and Noyes, A (2015) who found students retaking maths qualifications in college associated the GCSE in maths with school and their previous failure. Students look forward to a move to adulthood when coming to college and retaking a school level qualification contrast with this. Their observations note that students were frequently given school like activities in maths lessons and given little opportunities to make decisions about their own learning.

“Motivation is lower in vocational areas where the main progression route is directly into employment and a mathematics qualification is not required”. (Noyes, A and Dalby, D. 2020).

Dalby, D (2015) notes that re-sitting GCSE maths at college can reinforce the inequality between academic and vocational qualifications. Greater value is placed upon achieving a school level academic qualification than Functional Skills, which has been designed to be studied alongside vocational courses and eliminates any maths topic that is not relevant to everyday life. Highton et al (2017) found that in further education the parents of learners had financial success without maths qualifications, so sometimes did not value it. They also found that some institutions had to work hard to convince their own vocational staff the importance of students resitting the GCSE. Parents sometimes complain about the emotional toll that re-sitting these subjects has on their children. They did however find that motivation increased when students felt they needed the grade for a particular goal, aspiration, or progress to a higher-level course.

Bellamy (2017) also found that GCSE learners in FAVE institutions are older and that brings with it a greater degree of responsibility, with just under half of the students interviewed in the research working over 10 hours per week. Most of the students interviewed would not have chosen to do maths had they not been required to do so. Highton et al (2017) found that experience of maths in school was frequently negative

and influenced their feelings today's subjects. Students commented that lessons often moved too fast.

Higton et al (2017) found that students were more motivated in their GCSE maths lessons if they could get their maths "out of the way". They found that institutions who offered early examinations as a reward for good work resulted in more engaged students. Success in these exams would result in students no longer having to attend their maths classes. Although this is a motivating factor it does undermine the message of the importance of maths, but does lead to the question whether students would value the qualification unless it is mandated? Bellamy (2017) found that students believed they would need a C (now 4) in maths more than they would need the skills of maths.

The Intelligent Innovation Consultancy produced a report in 2017 called "teachers behaving badly" which claimed that teachers were often pressured by the importance of results as accountability which led to some "gaming the system". These methods include being selective about student intake and opting for "easier" awarding organisations rather than focusing on what would improve the quality of education for a student. This is reflected in Biesta's (2020) analysis of the "three domains of education". Biesta expresses his concern about the "learnification" of education, where the focus is on "banking education" rather than learners being at the centre of the strategies. The domains of education are "qualification, socialisation and subjectification". These domains acknowledge that there is more to education than gaining knowledge, there is also the important element of "hidden curriculum" learning about cultures, traditions for

example. Education can also “enhance or restrict capacities and capabilities” which Biesta refers to as subjectification. The GCSE maths exam can be seen to limit a learner’s future opportunities, however as Bellamy (2017) identifies it is the qualification not the skill that brings up the barriers. The condition of funding policy forces institutions to find strategies where education is “banked” so students can move on from repeatedly re-sitting. There are limited opportunities to support “socialisation” and “subjectification” when the focus is on getting maths out of the way.

The perception of technical qualifications in Further, Adult and Vocational education

In 2016 the Department for Business Innovation and Skills and the Department for Education released the Post-16 Skills Plan. This plan is known as the Sainsbury report, as Lord Sainsbury led the independent panel advising ministers on the reforms in technical education. The report followed the identification of a major challenge in the UK, a need for more highly skilled people to raise productivity and grow the economy. The report claimed that the problem with the current technical qualifications was that standards were not set by employers and therefore were not good preparation for the skills required in the workplace.

The panel put forward the evidence that current technical qualifications were not “attractive-to everyone” and that technical education was the solution for students who are not academic enough to do A Levels. The panel claims this led to qualifications

without enough rigour and that technical education should not be seen as the easy route.

The Sainsbury panel (2016) made many recommendations to improve FAVE education, and the government stated that they would implement all these recommendations. These included:

1. The development of new technical qualifications that combine class based and work-based elements.
2. Reducing the number of technical qualifications available to only 15 routes. These routes reflect the requirements for employment.
3. Qualifications to only be offered by one awarding body or consortium to avoid confusion for employers.
4. Exit criteria for maths and English for those studying on reformed technical qualifications. These criteria should be raised as learner outcomes improve.
5. Students who are not academically ready to start the reformed qualifications should do a “transition” year to prepare them.

Following the Sainsbury report, the plan to implement T Levels began. The structure of a T Level course includes (Department for Education, 2021):

- A technical qualification
 - o Core Theory, concepts, and skills for industry
 - o Specialist skills and knowledge for an occupation or career
- An industry placement

Students are also required to continue their maths and English as a condition of funding if they have not already achieved them at a grade 4 at GCSE. This is the same for any 16 to 19 programmes at college. This decision followed a government “U-turn” and was not the original plan for T Levels. When T Levels were first introduced it was mandatory that students achieve a GCSE in maths and English at a grade 4 by the end of the T Level, or they would not receive full certification for their course. But this was limiting access to T Levels for many students who had not yet achieved them (Department for Education, 2021), so the change was made in December 2021. FAVE institutions reported concern that this condition would affect the viability of T Levels since those opting to take them tended to be less academic students and lacked these “essential” GCSEs. In fact, the government decided that those currently on a T Level would be exempt from the condition of funding rule for that year to support growth of T Levels.

The choice to do a vocational or academic qualification in Further Education is largely driven by previous achievement in GCSEs. However, there are other drivers for course selection. Currently female students are more likely to start low paid technical qualifications regardless of their aptitude to study towards a technical qualification that leads to a higher pay (Social Mobility Commission, 2021). This is the same for young people from disadvantaged backgrounds, who are more likely to achieve lower grades and therefore go onto low paid/ less skilled jobs. Course choice has an impact of

occupational segregation (Sainsbury, 2016) and although girls currently outperform boys when they leave school, most high paid professionals are men (Sainsbury 2016).

The Social Mobility Commission (2021) also found that attainment in maths (and English) were important aspects for course choice. Not having these qualifications means limited access to level 3 and academic courses. This led to students feeling less confident about their abilities overall, and therefore hold lower aspirations for themselves. Learners from deprived backgrounds are disproportionately effected by this and are less likely to take an academic route.

“ A learners choices are limited by poor prior attainment, leading to an increase in mandatory corrective courses. Some, or all of the choice, is taken away from the learner”.

Social Mobility Commission (2021)

In 1979 the Thatcher administration attempted to tackle youth unemployment by implementing a national curriculum which included a formalisation of technical qualifications. Eventually in 1986 National Vocational Qualifications (NVQs) were introduced. NVQs were designed to “certify competence” and Winch (2021) states that these qualifications were “a signal of ability to operate in the workplace and less about educational status”. However, they were designed to be a rough equivalent to academic counterparts.

Vocational education has seen many updates since the implementation of NVQs (just as we see with the condition of funding) as policy makers have struggled to refine how much theory and workplace content to include. Winch (2008) found that NVQs had been criticised for not including enough of the workplace element, not producing the skills needed for employment and thus the perception that they are easier qualifications.

There was also the concern that these qualifications were not broad enough, with other countries such as Germany offering a more holistic curriculum for technical education, they don't give up maths for example. This instigated the birth of "key skills" the predecessor for the "condition of funding". Winch (2008, pp556) argues that the approach to technical education in England tend to "trap individuals in low-skill sectors of the economy".

"The vocational education route in England traditionally has not enjoyed high status and has been associated with academic failure in a system where general education towards university entry qualification has been upheld as the gold standard"

Winch (2008) pp554

How contextualisation can support teaching maths in Further, Adult and Vocational education

Most learners who come to FAVE without a GCSE in maths begin on a vocational course. Entry criteria on academic pathways limit a student's options (Social Mobility Commission, 2021). For this reason, FAVE institutions often opt to contextualise their GCSE maths lessons to make the course more relevant to the

learners sitting the exam. Within the institution where this research takes place, GCSE maths is taught to students from the same course and faculty to make contextualisation easier. For example, a maths lesson on surface area and volume in the Engineering faculty may include looking at the volume of cylinders in an engine.

In 2014 OFSTED released a document to support FAVE institutions in becoming outstanding providers of GCSE Maths and English. Within this document it recommends that realistic working environments should be used to motivate and inspire learners. Teachers were successful in delivering Outstanding vocational lessons when they used relevant and commercial contexts for the basis of learning (OFSTED, 2014). Maths and English skills were also routinely taught within vocational areas where appropriate. This report has been referenced and used as a basis for further research into contextualisation. The report looked at 19 Outstanding training providers but concluded that even within these institutions maths and English is still not taught well stating that “Relatively little outstanding practice exist in teaching of English and mathematics” (OFSTED, 2014, pp7). This is a confusing message; the OFSTED observer did not see many examples of outstanding maths and English teaching but was still able to make recommendations of best practice based on the sample of lessons seen.

Naturally institutions took this advice from OFSTED and have attempted to implement the strategies, as it is believed to be “best practice”. Every report I have read which advises on how to improve maths and English re-sit results cites contextualised lessons to do this. Frank Coffield (2008) commented that there is an assumption that if

something is considered “best practice” it must be easy to roll out and replicate. This section of the literature review will analyse the validity of these reports and aims to understand the basis of this recommendation.

GCSE Maths is a secondary school academic qualification that was designed to sit alongside other GCSE level courses. It is therefore not easily adapted to fit within a vocational context. However, a study by Dalby, D and Noyes A in 2015 found that when maths was related to a student’s vocational development it had a positive effect on their engagement. But this study found that embedding maths into the vocational area was most successful as it acknowledges that perceptions of maths and cultural divisions between vocational and academic qualifications need to be harmonised. Students take on the values of their vocational course and are resistant to taking a step backwards to a different culture. The study also observes that within vocational settings students are looking towards lecturers to role model the occupation which they are interested in. However, students are not interested in becoming mathematicians so these subjects cannot be taught in the same way. Connections between the subjects can help to bridge these divisions.

In 2018 the group Mathematics Education Innovation created a “Contextualisation Toolkit” for teachers of Functional Skills and re-sit GCSE maths in FAVE institutions, as well as vocational lecturers who wish to embed maths into their own courses. This research was funded by the Department for Education and developed by the Education Endowment Fund. They claim that teaching maths within a

context helps to make maths “less threatening” and “more meaningful” (MEI, 2018, pp1). The report also claims that contextualisation increases student chances of achieving a 4 in GCSE maths but does not mention how they come to this conclusion. They state that contextualisation improves motivation and engagement and from reading the report it seems to be the perfect answer for GCSE re-sit problems. They state that contextualisation is most effective at the beginning of programmes as learners need to be engaged early on, but eventually the teacher must move to theoretical maths to prepare learners for their examinations. The researchers also commented that not everything is easy to contextualise. This is also a challenge in practice, as more recently huge numbers of students have been resitting at the very start of their course due to missed summer exams impacted by the Covid-19 pandemic.

There is a warning against “pseudo-contexts” (MEI, 2018, pp2) where a context is forced into a maths question and can reinforce the view that maths is not useful to real life. In 2015 there was a GCSE maths exam question that went viral as students rushed to social media to comment on the ridiculousness of the question. The question has become notorious amongst maths teachers and is often talked about as an example of how to not contextualise maths.

There are n sweets in a bag
6 of the sweets are orange.
The rest of the sweets are yellow

Hannah takes at random a sweet from the bag.
She eats the sweet.
Hannah then takes at random another sweet from the bag.
She eats the sweet.

The probability that Hannah eats two orange sweets is $\frac{1}{3}$

(a) Show that $n^2 - n - 90 = 0$

Figure 2: Edexcel GCSE mathematics exam question from June 2015 showing an example of “Pseudo-context”

The exam question is an example of a “Pseudo-context” and although it has a real-life scenario is not realistic to what maths learners are likely to use within the workplace, life, or any context. However, the researcher concludes that introducing “pseudo-contexts” although confusing and can lead to further disinterest in maths, have to be introduced as this is realistic to what they may experience in their examination.

Boaler, J (2015) further explains the challenges of contextualisation in the maths classroom asserting that students are asked to leave all common sense at the door. Students are often given money problems in examinations, with numbers unrealistic to the actual cost of things. Students are never asked to contribute their ideas of costs and

relate the maths to their own experiences. And, as I have learnt from my own students if you do ask a learner to contribute their ideas, they are often way off the mark due to their lack of worldly experience. The outcome of this according to Boaler (2015), is that students begin to ignore the contexts and focus on the numbers, making the context and therefore the maths pointless. Boaler (2015) believes Contexts should be based on reality otherwise maths appears nonsense. Problem solving should be the skill of focus in maths.

Although MEI's contextualisation toolkit is still online, accessible and claims to improve attendance, motivation and outcomes in learners, the stakeholder Education Endowment Foundation (EEF, 2019) came to different conclusions about the study. They reported that although the project had helped to raise the profile of maths contextualisation amongst institutions, teachers were concerned about applying contextualised problems to a non-contextual examination. Students sometimes didn't enjoy their main programme of study so contextualising to this area had no benefit on improving their motivation. Real-life examples rather than vocational examples were preferred. Most importantly, they believed there wasn't enough evidence to conclude that the intervention had an impact on outcomes for learners.

Higton et al (2017) analysed ways in which FAVE institutions can improve teaching of re-sit maths and English. They make a small comment about contextualisation that it can have success if you find a "hook" that students are interested in. But it concludes that contextualisation can be a challenge due to

timetabling constraints. Every England college offers a different range of courses, so therefore has varied strategies to implement the condition of funding. Not every institution can organise maths and English lessons by vocational area, which makes it more difficult for teachers to find the relevant “hook”.

In 2020 the report “Mathematics in Further Education” (Noyes, A, Dalby D) commented on the effectiveness of various pedagogies on motivation in maths lesson. They conclude that relevant contexts and using pedagogies that student’s value such as links to vocational learning have motivating effects. The Social Mobility Commission (2021) have also recommended that corrective learning for low ability students should be contextualised to provide interest.

From the analysis of these reports, the effectiveness of contextualisation is questionable. Some experts say that it is ineffective (Boaler, 2015) due to a necessity to use “pseudo-contexts” which redirects the important problem-solving aspect away from the question. Some say it’s motivational but with a caveat that it must be done correctly to have impact (MEI, 2018, D, Dalby 2015), but this is not what learners will see in their exam. Teachers have said it is a lot of work for very little impact and really relies on the logistics of the institution to work (EEF, 2019). It takes full commitment and embedding of teaching staff within the institution. It also relies on students being motivated by their vocational course, which unfortunately is not always the case. Low attaining students are often left with very little choice of courses to pick. The nature of teenagers is that

they make mistakes and poor choices, and course selection is one they often get wrong.

Conclusion

Numeracy education in FAVE has seen a great deal of change in the last 10 years responding to the needs of industry and following reports of England lagging behind mathematically compared to other countries. There have been multiple white papers produced advising government on ways in which to improve both the participation of maths and the teaching. There are many barriers to this success including the perception of maths in education, the perception that those who do “lesser” vocational qualifications are the ones who re-sit and the value of the GCSE itself if it does not relate the workplace maths skills required. It is clear from this research that the negative feelings students have of maths are born from feelings of inadequacy, cultural teaching practices such as streaming and the perceived usefulness of maths in life.

Maths remains of strategic importance for government, and technical education requires a general improvement. Colleges are struggling to keep up to date with policies and quickly implement strategies to support learners re-sitting their maths. This research project attempts to address some of these concerns with learners and understand where they see maths in relation to their educational progression.

Chapter 3: Methodology

Introduction

The aim of this chapter is to introduce my ontological and epistemological position as a researcher, and the benefits and challenges of coming from this viewpoint. The chapter discusses the capability of the approaches to produce meaningful results and how they relate back to the research questions. The decisions made about methodological assumptions inform the research methods used. The chapter goes onto discuss what and how data is collected, in what way it supports answering the research

questions, and how participants have been chosen for this research. It concludes with a discussion on ethical considerations.

Research approach

This research project involves GCSE maths resit students who are aiming to progress onto higher level qualifications, specifically a T Level. The overarching question I would like this research to answer is:

How do students view maths in relation to their educational progression?

The voices of the students who have not been heard through policy redesign are central to my investigation and the fundamental interest for the research. Therefore, a study that removes the human aspect from the research is not appropriate. Quantifiable and numerically measurable data are not compatible with opinion and viewpoints, and student responses cannot be generalised. Therefore, this research will follow an interpretative research paradigm. Coe et al (2021, p 16) states that “interpretivism does not see direct knowledge as possible; it is the accounts and observations of the world that provide indirect indications of phenomena, and thus knowledge is developed through a process of interpretation”. The subsequent discussions will aim to consider a range of research paradigms commonly adopted in educational research and justify this research’s alignment to an interpretivist paradigm.

Ontological approach

The experiences of the students that are involved in the study are intrinsically linked to my own practice. I am their teacher, and their experience of maths is dependent on my input on their lessons. Reality cannot be separated from their perceptions, as is found in a realist ontological approach. Therefore, this research starts from a constructivist viewpoint that assumes our world and truth are formed by our own experience (Coe et al, 2021).

This approach contrasts with a traditional positivist research standpoint, which assumes events are determined external to the will of a person, and therefore every event can be generalised (Usher, 1996). From this perspective, the context should be ignored to create an impartial view of what is being studied. As this is practitioner research, I cannot separate my experiences from that of the participants as I am actively embedded into the context with which I am researching. Usher (1996) states that one of the most important aspects of a positivist approach is that the researcher is “objective”. This is unachievable when aiming to understand the thoughts and feelings of students. It is not appropriate for me to act as an outsider looking inwards, as I am an active participant in the context in which this research is located.

“It is impossible to separate oneself as a researcher from the historical and cultural context that defines one’s interpretive framework”

(Gadamer, 1975, cited in Usher, 1996, p19)

Coe et al (2021) state that in constructivism multiple realities can be constructed by individuals. This is the case for my research where my perception of the challenges of policy change differs from that of my students and again from the stakeholders. To

look at the research objectively would mean ignoring my experience as a teacher and the input I have had on my students' learning.

Epistemological approach

By accepting that I am unable to be truly objective in my research, I also accept that hypothesis testing is not a realistic approach. This is contrary to what I have understood about research previously coming from a technical background that values measurable data. It is often seen in educational settings a preference for data collection that can be analysed to inform change, especially as institutions rely on funding that surrounds student recruitment. Consequently, it is beneficial that a data set can be viewed by any person and the same conclusions made. Assuring the quality of education relies on tried and tested methods being rolled out for teachers to adopt. This research goes against this method of transferring information, but within this research I must consider the complexities of working with humans and the reality that human behaviour is not easily quantifiable. A level of influence is inevitable when gathering data within a place within which I am familiar. It is important to the research that the voices of students are heard and not reduced to numbers and to understand their thoughts on the barriers to their educational progression.

I have my own thoughts and feelings about the rollout of T Levels and how this may affect the ability my students have to make educational progression. The research conducted is within the field in which I am very familiar. To be objective, I would need to disregard my own values and beliefs, which would be challenging to do within a field

which I am passionate. My conclusions to this research must acknowledge my experiences, and it is important to know my values and beliefs to understand the conclusions that I make about my findings. It will also be important upon making conclusions that I acknowledge that I have probably influenced learners' responses. I discuss their futures with them and talk to them about how to overcome barriers.

This viewpoint follows an interpretive epistemological approach which Usher (1996, p18) states "assumes that all human action is meaningful and hence has to be interpreted and understood within the context of social practices". This research is based on experience, so we must use an interpretivist paradigm to answer the research questions. Students often don't get the opportunity to voice their opinions on how they are learning. By adopting an interpretivist approach the research allows them the space to do this. Data that is captured using this approach will be wide-ranging. Teenagers are unpredictable and the data could reflect this with surprising or unforeseen ideas that perhaps would have not been considered if a positivist research approach is used.

Many of the studies reviewed in Chapter Two take a positivist epistemological perspective. It is common for research involving mathematics to prefer quantifiable data. This research has also come about due to a policy change, which was a result of a review of statistics and data in FAVE. The introduction on mandating GCSE maths resits in 2014 came as a direct result of identifying that only 50% of learners leave school with both maths and English GCSEs at a 4 or above (Wolf, 2011). The T Level implementation was due to concerns that the numbers of students who are technically

trained when the leave college would not lead to growth in the economy (Sainsbury, 2016). These government reports rely on a positivist approach of looking at the broader picture, analysing large amounts of data and coming to conclusions based on numbers.

The Education Endowment Foundation (EEF) referenced in Chapter 2 is an organisation that used positivist research to inform practice in education. It was referenced due to its research into the impact of using contextualised lessons to engage learners. It's "Teaching and Learning Toolkit" (2011) summarises studies that have been conducted in the past and makes numerical predictions about what will work in the classroom. It considers the cost of implementation (a score out of 5) against the evidence and reduces its impact down to several months a student could hope to progress using the strategy. This toolkit has been used widely within the institution I am researching to inform curriculum design. But the EEF state that there are limitations including the context of the institution hoping to use the strategies. It states that considering barriers and the needs of students shouldn't be considered separately from the data.

Anna Bellamy (2017) is a researcher who sparked my interest in interpretivist research. Bellamy looked at the voices of students who are re-sitting their GCSE maths and generalised their thoughts and feelings. I found this research to be more influential to my practice than any others I have read, because I could relate to the voices of the students having heard them in my own classroom. Her conclusions were based on my reality and the reality that I see on the ground every day. The generalisations made

about student opinion were surprising and the individual comments recorded from some learners were moving and enabled greater understanding of the challenges they face.

“I was happy with my (grade) D, I thought that was good for me”

(Quote from a student interview in Bellamy, 2017, p5)

Methodological assumptions

By taking an interpretivist theoretical position I also must acknowledge the importance of quantitative data to education and an understanding that this is the data that is of interest to stakeholders. Results data are frequently utilised in media to recruit further students, and attendance data is often scrutinised by OFSTED. Participants involved in this study are part of a pilot scheme curriculum change. Analysing results data could potentially show success of a curriculum change if those involved in the pilot showed a higher average grade than those not involved. However, this data does not consider the contexts in which the extra maths lessons were taught. For example, most of these classes were taught by the same GCSE maths teacher – this teacher could generally achieve better results anyway. Results data in 2022 will also be hard to compare with previous years due to the impact of Covid-19. This is the first time in 2 years that students have had examinations after a long period of disrupted education. Their grades on entry may not be accurate and therefore analysis of their progress based on their grade may not be fair. The exam board also issued advance information in 2022 to help students prepare for their exams, this is something that has never been done before so it is difficult to make comparisons. It is also important to consider the

individual motivations of the learners, starting point and vocational course of enrolment. Therefore, my methodological approach will not attempt to generalise data produced through results and progress or positivist logic, as there have been too many uncontrollable variables that would affect the reliability of this data.

It is especially difficult to make generalisable comments of success based on quantitative data with a sample size so small. Only around 40 learners have been involved in the “Transition” pilot scheme. When dealing with humans (and the temperamental nature of teenagers especially!) it is not possible to create a consistent baseline in which to prove a hypothesis.

Dylan Williams (Times Education Supplement, 2019) argues that research in education is not possible because when humans are involved things get complicated. He claims that the differing contexts in schools and colleges which make generalisable research difficult to universally apply. He also claims that research ignores the natural talent of teachers that cannot be taught. However, from my own experience as a practitioner I have found that listening to learners and considering their thoughts effective in improving my practice. The conclusions I make may not be relevant to every context, but hopefully will highlight the benefit of getting students involved in policy decisions.

Reflexivity

As a passionate and experienced GCSE maths re-sit teacher, the progression and success of my learners is fundamental to my professional satisfaction. I spend a great deal of time with learners who struggle with maths and consider how to best support them daily. I trial creative and alternative classroom strategies as part of my role and gain a lot of enjoyment from watching successes. Throughout my time as a teacher, I have been able to generalise my own practice and informally conclude what works. One element that I feel ensures success in my classroom is attempting to understand the learner and listening to their concerns and fears around studying maths. Listening to students has moulded my practice and I believe there is not enough research to show that their voices have an impact on how we teach. It is for this reason that I decided to conduct research where the students are central and observe and record their opinions.

It is my position as a practitioner of GCSE re-sit maths that enabled me to understand the problem that FAVE institutions are facing. The introduction of new policies without the infrastructure to support them has caused concern amongst the institution where this research takes place. Learners were not consulted in the policy and subsequent curriculum change; and since I have always found value in speaking to learners about their experience, I felt that it would be beneficial to me and other re-sit teachers to understand their perspective. They have not had any say in the curriculum that has been designed from them, this research has come from genuine curiosity of how they feel the curriculum change impacts them.

The fact that I am embedded within the research has the benefit that I have the understanding of the challenges that need addressing. It is in my interest to solve these problems so that I am able to perform well in my job and the learners who I am involved with have greater opportunity for success. My aspirations for the research has affected it's design as what I am researching will add value to me as a practitioner. It also gives me the opportunity to have conversations with my learners, which is a chance that I often don't get and I believe adds real value to my teaching. I am fortunate that I have access to these learners.

I believe being embedded in the research has had a positive impact on the study and my practice, however it has been essential for me to keep in mind that this could add bias to the research and I have attempted to maintain as much impartiality as possible in spite of this privileged position. I attempted to mitigate this by ensuring the gathering of data was impartial and I did not bring my views into interviews. I acknowledged my views in a reflective journal, as I do not think that I needed to separate these completely given that I have full understanding of the impact the curriculum interventions are having in the classroom. I also ensured that participation in the research was voluntary and I did not select the students to participate if they had not volunteered first. I do have to accept that interactions I have had with students outside of the research could have influenced their commentary on the curriculum change they were experiencing.

Research questions

The decision to make the student experience central to my investigation came before the understanding of the problem I wished to investigate. Student voices mould my practice and I believe this is especially important when working with learners who come with a lot of baggage (feelings of failure, special educational needs etc). Therefore, it was easy for me to pick an ontological interpretivist position for my research, as I have the insider perspective and am already rooted into my practice. Deciding on this position helped to create my research aims and questions. It was important that the questions I created allowed for answers that explored human thoughts and feelings and did not limit my research to data collection. I aimed to follow Keith Punch's (2014) criteria for good research questions, which states they should be clear, specific, answerable, interconnected, and interesting/worthwhile investigating (2014, p76 cited in Coe et al, 2021, p35).

The overarching question I aimed to answer was "How do students view maths in relation to their educational progression?" This question was selected because it is an issue I am genuinely curious to understand. It is also a question that I believe needs to be answered at a time of policy change and curriculum redesign in colleges. It is a question that is focused enough that I can answer it in the scope of this research project, but complex enough that it necessitates examination of concepts and sources prior to an answer. I felt that the data collected to answer this question could be generalisable but also have the potential to open debate and possibly lead to further lines of enquiry. The question puts the focus on the students and their thoughts, which supports my methodological approach.

To enable my research to be focused, two further research questions are answered:

- How has curriculum and policy change affected the experience of studying maths?
- To what extent do students engage with and see the relevance of contextualised maths lessons?

These questions I believe will be of interest to other practitioners in FAVE institutions, as maths and English continue to be priority subjects that influence funding and success data. The Education and Training Foundation (ETF) who are supporting this research have already created centres for excellence in maths to help FAVE institutions improve outcomes for maths learners and offer multiple professional development opportunities for teachers. Improvement of maths in FAVE is an important agenda. Frequently research has focused on how to improve motivation and engagement in lessons, and CPD opportunities offered by organisations claim to support practitioners in improving these challenges. Contextualisation is something that has been mentioned by OFSTED, the EFT and MEI (Mathematics Education Innovation) to improve motivation and engagement in GCSE maths re-sit students (more on this in chapter 2). However, the strategy has been debated and very little is revealed about how beneficial the students find this method of teaching to be.

Previous research that I have investigated has looked at strategies to support learners in re-sitting their GCSE maths from a positivist position. The studies have looked at results and attendance data to conclude success from a strategy. However, it is important to my research that an interpretivist position is used to answer these questions. Outcomes will be recorded through listening to the students. Do they believe that the interventions are benefitting them regardless of what their grades say? Do they see the relevance to contextualisation on their educational progression, regardless of whether it comes up on the syllabus? Does what they say match the outcomes which are important to the institution (results and attendance)?

The research questions that I have designed support both my ontological and epistemological viewpoints and lead me to selecting methods of data collection that support an ethnographic research strategy.

Ethical considerations

Coe et al (2021, p58) state that research ethics can be categorised into knowledge (epistemic values) and practical values. It is important for research to reflect the truth and have a commitment to honesty by presenting evidence and unbiased analysis. However, interpretivist epistemological approach acknowledges that truth can never wholly be known due to the nature of working within a social setting. Therefore, it will be essential that the research has practical goals and serves a purpose to the educational community. The research takes place within an educational setting so the

relationship with stakeholders, students and gatekeepers who have allowed access to the students I am observing must all be considered.

The three ethical principles of research are further discussed in Coe et al (2021). These are: minimising harm, protecting privacy, and respecting autonomy. I will discuss how I will address these principles in this section. This research will be conducted in accordance with BERA Ethical Guidelines for Educational Research (2018). The research will include data recorded from interviews, questionnaires, and observations from approximately 40 students aged 16-19. All students selected for the research will be enrolled to both a GCSE maths and a level 2 vocational programme.

Before conducting this research, the institution where this study took place was approached for permission to interview individuals. It was assured of the study's ethical values. The institution has its own policies regarding ethics, GDPR and safeguarding that had to be observed throughout the study.

Minimising harm

The confidentiality of the institution where the research is taking place is important. I have taken care to protect the reputation of this institution and avoid discussion of anything that may link my work to this institution. The participants of the research were treated with care and were not exposed to any new methods of learning that this institution would not have otherwise put in place. This research observes the impact of a change of curricula, but this change would be taking place without the

research. Therefore, the study of what impact this has to the students (and whether this could cause harm) is integral to the research. It is important for the research conclusions to acknowledge that the participants may have an element of bias due to feeling that they are on specialist programmes which other students may not have access to. The additional costs of the interventions need to be considered, as it could be perceived as unfair to those learners who are not receiving the same level of support towards their GCSE maths examinations. The gatekeepers who allowed access to the research participants were made aware that if harm to participants was discovered, it would be immediately reported. The gatekeepers are equally as invested in understanding the impact the curriculum change has on learning and learner wellbeing.

Protecting privacy

The use of participants' data was made to be transparent, with all participants being made aware of how their data will be used, shared and with whom. Data collected was anonymised. The institutions own ethical and safeguarding procedures was adhered to whilst completing this research. The research complies with the legal requirements stated in the General Data Protection Regulation (GDPR) (2018) and that of the institution where the research is being conducted. All data is kept secure, using secure computer networks and password protection. Data was immediately anonymised and kept separate from any names that may link the research back to the individual.

Participants who volunteered to take part in the research were only asked questions within the institution and not in any private setting. The questions given to

students asked generally about their education and thoughts towards policy, there were no questions that expect students to divulge personal or private topics. Where students through natural discussion divulged personal information or anything that may obviously link the comments to that student, the data was retracted and not including in the study. No visual data was used in this research (photographs and videos) as it is essential that students (who are under 18) feel safe to comment on their education without the fear of being identified.

Respecting autonomy

All students gave informed consent before taking part in the study. Students were made aware that they were being studied and were recruited on a voluntary basis. I tried to be as open and honest about what the research entailed before the students took part. Every student who wished to take part was given a participant information sheet and a consent form to sign. All participants were given the opportunity to withdraw their consent should they wish to do so. There were no students involved in the study that had special educational needs or mental health issues which could impact their ability to give informed consent. Participants received no incentives to be involved.

Although great care was taken to ensure all students were aware of what the research was for, who it may benefit and how they students can withdraw their consent, it must be acknowledged that the sample of learners selected included many with poor literacy skills and special educational needs. Research methods and understanding of data collecting was a challenging concept to many learners. Where students struggled

with reading, statements were read out loud and subsequent conversations were had to ensure a level of understanding. However, there are limitations to how fully informed these learners could be. I felt that despite this difficulty it was important to include these learners in the research as they make up a large proportion of those involved in the intervention.

Consent was not gained from lecturers and learners who I observed and recorded in my reflective journal. However, I have been careful to ensure these reflections cannot be linked back to any individual. It was not necessary to gain consent from those observed in the reflective journal since it was authored by me through reflective statements rather than from them directly or indirectly.

Research methods

Because I have decided to take a constructivist viewpoint, I need to ensure that the collected research data reflects the human experience and experience of my students. I chose to collect data in ways that allowed for opinion and reflection. I want to understand the journey of the student and record how opinions and feelings can change depending on their external circumstances. I notice as a practitioner that motivation and confidence dips when students realise what is expected of them, when they come across challenge or when they are tired. I wanted to make sure that my research echoes this inconsistency. Therefore, I decided to include a variety of data collection styles, questionnaires, interviews, and a reflective journal. All styles included opportunities for students' thoughts and feelings to be recorded, positive or negative.

The order in which I collected the data was important, as the thoughts and feelings of students tend to change as the academic year progresses. From my previous observations it is apparent that students feel more positively towards their maths experience at the start of the academic year and most negatively after Christmas. This may be due to the timings of examinations and increased workload as the course progresses, with an element of positivity when starting a new course at college.

Sept 2021	October 2021	Nov 2021	Dec 2021	January 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022
Initial baseline questionnaires					Group interviews			Individual interviews	
Reflective journal									

Table 3 shows a timeline for data collection

These data collection techniques were chosen as I believe they best support answering the research questions and align with my methodological position. Below I will describe in more detail why each of these strategies were taken.

Questionnaires

At the beginning of the research study, I used a questionnaire to gain an overview of student perception from a bigger sample. This questionnaire was given to 40 students. From this questionnaire I hoped to understand and generalise whether students were aware that they were participating in a bespoke pilot course. It also gave

me an understanding in simple terms whether students aspired to progress onto T Levels despite them being streamed into courses that supported this. The questionnaire aimed to support answering how students view maths in terms of their educational progression.

The questionnaire only had 10 questions and I hoped it would be quick to answer so as many students would be willing to answer as possible. Most of the questions were closed questions and were designed to gain a baseline for the starting point of the learners. There was an opportunity for learners to state how they felt about re-sitting maths which helped to get a better understanding of the mindset of learners.

Group Interviews

Within the group interviews it was essential to the research that learners were given the freedom to express their thoughts. This research relies on student feedback and critique of policy change. The overarching aim of this study hopes to understand how students view maths in relation to their progression. Therefore, in these group interviews I asked very open questions and some statements that were used as prompts for discussion.

In my own practice I find listening to student voices influential to designing my own lessons. The interviews were designed so that they could say what they wanted in a safe environment with no judgement. Students have strong opinions of policy in FAVE, and they enjoyed the opportunity to have their voices recorded. It was important

for me when using an interpretive epistemological research approach that I observed human behaviour. I intended for the interviews to feel relaxed and a natural conversation.

Coe et al state (2021, p241) that focus groups/ group interviews can allow people to talk about sensitive or difficult topics more easily than if they were questioned on a one-to-one basis. But they also point out that the researcher has very little control over the outcome of the conversation. For me this is a positive aspect rather than negative as I wanted to reflect on the natural discourse between learners. Coe et al also claim that a negative to a focus group could be that participants are easily swayed to an opinion, and I do feel this is something to consider in analysis especially working with teenagers.

Individual Interviews

Following on from the group interviews I conducted interviews with students one at a time. The reason for conducting individual interviews as well as group interviews is because I felt some of the points raised in the group interviews were worth investigating in more depth. For the group interviews I used prompts to promote discussion, with the individual interviews I asked more specific questions about the learner's journey with maths both at school and at college.

“At the heart of in-depth interviewing is an interest in other individuals' stories because they are of worth”

(Seidman, 2019, p9. Cited in Coe et al 2021, p233)

In-depth 1 to 1 interviews allowed me to discover more about the learner's perspective and gave me greater understanding of the problem being investigated. The responses in the group interviews were reflections and conversations without much detail. These 1 to 1s aimed to draw out some of the interesting points raised. I collected stories from the learners and then analysed patterns in what they said. This will be discussed further in chapter 4.

Reflective journals

Throughout my research I used a reflective journal to record any conversations or actions that I thought would be relevant to the research. I recorded things that were of interest to me sometimes without expectations that it would be relevant. Since I am embedded within my practice, I am an active participant in the research, so I also recorded my own reactions to policy change and curriculum re-design, particularly where I saw an impact on student learning. This type of recording of data would not be possible with traditional positivist research, but I believe essential to answering the research questions. Students can articulate their thoughts and feelings but sometimes their behaviour shows more insight.

Whilst making notes in my reflective journal I also recorded conversations and actions from teaching staff and stakeholders. It added depth to the research to have some perspectives outside of the sample even if they weren't formally interviewed. Teaching staff's opinions on policy change came as particularly interesting, especially

those who strongly felt the T Level conditions for maths and English were unfair as this didn't indicate at the time that the college response could influence a U-turn from policy makers.

The notes made in the journal were recorded with a date and a time, which helps to understand the ever-changing context of FAVE. This is the only data collection source I used that has recorded the evolution of a policy and the immediate implications of its implementation.

Conclusion

This research takes an interpretivist position, due to the nature of research in a social setting. Its ontology assumes that there can be no separation of the mind and the object since they are fundamentally linked. I as the observer of the research cannot be separated from the research itself as I am embedded within the context of the study. The findings of the study are being created as the research happens, knowledge is being created because of what is being observed. Interactions between me and the participants of the research can be produced and refined.

From this research position, I decided to use methods of collecting data that allow for human interaction and opinion. Questionnaires, interviews, and a research journal were used to collect observations of behaviours and interactions. The nature of the research philosophy helped to form the research questions which are answerable through observing and recording communications of learners. The style of the research

led to specific ethical questions, especially understanding what data was suitable for collection.

An understanding of my ontological and epistemological helped to form my methodological standpoint, form my research questions, refine my research methods, and understand any specific contextual ethical considerations.

Chapter 4: Research Methods

Introduction

This study included “persistent observation” (Nowell et al, 2017) of a cohort of approximately 40 learners over two years. The students involved were all recruited from a large FAVE institution and were enrolled to “Transition programmes”. In 2021 these students experienced the impact of sudden policy change. Multiple forms of data collection techniques were used to ensure that results were consistent regardless of the strategy applied to collect the data. These results were first analysed independently and then triangulated and used to inform overarching themes and conclusion. The aim is to find themes in the data that are generalisable to ensure transferability.

This Chapter outlines data collection methods that have been used, the trustworthiness of the research and the process for data analysis before drawing upon themes and conclusions.

Data collection methods

This study used questionnaires, observations, field notes and interviews to collect data. Questionnaires were used at the beginning of the research to understand learner backgrounds and get a base line understanding from a larger cohort. This questionnaire aimed to understand generally the starting point of learners in terms of their previous academic achievements and their ongoing aspirations. The rationale for this was to appreciate the population involved in the study.

Throughout the research project continuous classroom observations were recorded and relevant notes were made in a field research journal. Once students were settled and understood the intentions of the curriculum, they were interviewed. Students were firstly interviewed prior to making decisions about their next steps. Some were chosen to be interviewed a second time upon completion of the course to determine whether their views had changed.



Figure 3: The process of collecting data

Each method of data collection was carefully selected to reveal more about student perspectives:

Questionnaires

A questionnaire was given at the start of the research to help inform how to proceed through data collection with a larger group of students and refine the problem the research aims to investigate. The questionnaire aimed to “describe the population” (Coe et al, 2021, pp 277) and understand the context of the participants. Questions were kept short and simple, with a mix of open and closed questions (Example question in figure 2):

What do you hope to do after you complete your current course?

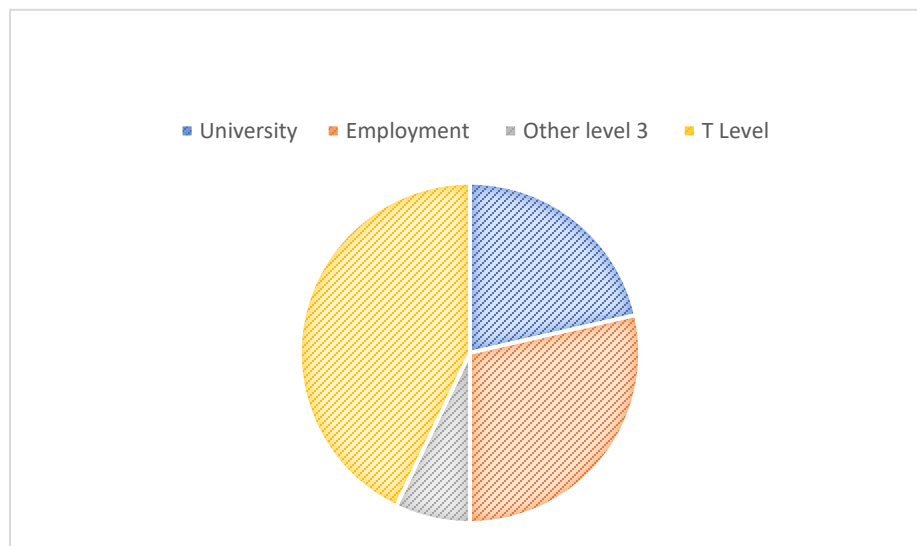


Figure 2: Example of student responses to the base-line questionnaire

Group interviews/ focus groups

“focus groups are not didactic interviews between the moderator and individuals” (Coe et al, 2021. Pp 245)

Ethical considerations when selecting students included risk of losing full confidentiality and fully informed consent (Coe et al, 2022. Pp 243). I made clear to learners that what was discussed should stay within the room and that I would protect their right to confidentiality. However, it was stated that direct quotes could be taken from what they said, and they should consider this when answering questions, even if their identities are not tied to what they say. Group interactions changed the flow and pace I was expecting, but for this research it was important that students were given the lead.

Ideally group research would have reflected the diversity that is experienced in the classroom; however, they were selected from willing volunteers. Since the students struggle with this subject, attendance can often be low and willingness to participate in extra activities can be challenging to encourage students to do. It was also important to consider the special educational needs of a student before inviting them to participate. Some students needs could not be accommodated, or it was not appropriate to invite them to participate due to difficulty of them understanding informed consent. Although a large proportion of GCSE maths students have some form of special educational need and ideally this needs to be represented, it was not always possible to find a way to do this fully ethically.

The focus groups and interviews with students who I knew through teaching were more successful as students seemed to be able to talk more freely.

Interviews

Interviews aim “to discover and record what that person has experienced, what they think and feel about it, and what significance or meaning it might have” (Coe et al, 2021, pp 233)

Interviews are more than a conversation; however, the group interviews were designed to ignite discussion in the group and allow students to feed off each other’s points of view. Open ended and non-leading questions were used. For example, the first question given to the group of interviewees was:

“Tell me about your experience of studying maths, throughout school until now”

This type of open question allows for different interpretations and does not lead the interviewee to a certain answer. It aimed to relate to their lived experience.

Two group interviews and three one-to-one interviews seemed enough to understand the issues once the data had been collected. By this point similar answers were being given by the participants. The students articulated themselves in detail and gave insightful comments on the curriculum change. Field notes and the baseline questionnaire supported what had been found in interviews.

Interviews aimed to be collaborative, I would sometimes clarify terminology or policy when students were unsure. The open questions aimed to eliminate my personal preconceptions and biases, I hoped to not influence student responses. Coe et al

(2021) helped to inform question design and I used suggested question prompts from this literature.

Field notes

A field journal was kept throughout the research journey. This recorded my own observations and reactions to curriculum change, conversations that were had in the classroom relevant to the research and staff reaction to policy. I also kept photos of student work. These notes aim to add validity to students who chose to participate and gave their perspectives. Some students who were not in the study gave valuable insights and I was able to record this through observations.

Participant selection

The basis of this research came about from a drastic curriculum change within the participating institution. Therefore, all participants of this research were selected from the cohort of learners who have been enrolled to programmes effected by this change. Learners selected were from the 2021/22 and 2022/23 cohorts. Every student who was studying on a “transition” course and studying GCSE maths in 2021/22 was approached to participate in the study. It was essential that the student was on a Level 2 course with a curriculum designed around their progression to a T Level. Of those enrolled, 40 students agreed to take part.

Many of the students were taught their GCSE maths by me, they were easier to encourage to participate since a rapport had been established.

Below illustrates the stages of interview and how students were selected:

Baseline questionnaire:

Initially all students who were enrolled onto a “transition” course were approached to take part in the study. They were all given consent forms and a link to a Microsoft form with the baseline questionnaire. 40 students completed the questionnaire and agreed to take part. The questionnaires were completed during lesson time at the beginning of the academic year. At this point students often don’t have full understanding of the curriculum or how realistic their career and educational aspirations are.

Group interviews:

I selected students for the group interviews on a voluntary basis. Of those who completed the baseline questionnaire some had made insightful and more detailed comments. I approached these students and asked if they would like to join a group interview. There was one group of 5, and one group of 3. These interviews were conducted in a classroom at the time of what would have been their GCSE maths lesson. The interviews took place in March and April 2022. It was at a point in the year where they had studied enough to understand the curriculum and have made decisions about their future pathways.

One to one interviews:

Three students were selected for one –to-one interviews. I interviewed two of these students at the end of the 21/22 academic year. One student was selected because he had participated in the group interview and had more to share. Another student was selected because they had an interesting academic background in terms of their progression (they had done 4 years of GCSE maths re-sits!). The final student was interviewed at the beginning of the 22/23 academic year as she had progressed to a “transition” course from a level 1 BTEC, so was part of the third year of this curriculum reform.

Field notes:

I conducted these in the classroom through observation of student interaction. I also recorded any relevant conversations made between lecturers in the staffroom, meetings and occasionally interactions with parents. Selection for field notes was organic and observations were recorded if I felt they may add value to the research, I did not consciously select the participants. However, the observations were only taken from my peers and students that I teach.

Table 3 below gives a profile of the participants involved at each stage of this research:

Participant/s description	Programme/s of study	Age/s and Genders	Timing of interview	Notes
Baseline questionnaire of 40 students studying at	A mix of Level 2 Business, IT and Health and Social Care with GCSE	16-19 Male and female	October 2021	The full cohort of “transition” students were approached in 2021 to support this research. A selection of 40 students agreed to take part. They are a mix of ages,

Level 2 "Transition" courses that aim to support student progression to T Levels	maths (and sometimes English) studied alongside. All do transition maths and English classes			genders, and courses but all are assumed to have the aim to do a T Level in September 2022.
Group interview with 5 students who aspire to progress to a T Level in Childcare or Healthcare	Level 2 Health and Social Care with GCSE maths, transition maths and English	16-19 All female	March 2022	These students have weak attendance and struggle with GCSE maths. Some have made many attempts and for some this is their first attempt at college. These students all started the year with ambitions to progress to a T Level but unfortunately none of them achieved the maths grade they needed to do this. 2 students picked another course, 1 went onto do an apprenticeship at the same level and 2 went into employment. These students were taught by another lecturer
Group interview with 3 students who aspire to progress to a T Level in Business	Level 2 Business and IT with GCSE maths and English, transition maths and English	16-17 2x Female 1x Male	April 2022	2x students with very good attendance and motivation to achieve. Both students are very articulate and generally have a good academic record despite their low grade in maths. 1x student has special educational needs and anxiety, they struggle particularly with anxiety around maths. All are high ability learners and all managed to achieve a 4 in their exam and progress onto a T Level. This interview took place prior to their exam. These students were all taught by me.
1:1 interview with a student who aspires to progress onto a T Level in business	Level 2 Business with GCSE maths, transition maths and English	16 Male	2 weeks after completion of course and final exam in 2022	The demographic of students in this cohort tend to come from low economic backgrounds, 50% have learning difficulties and generally have a weaker academic profile. This student does not fit this mould. The student is very articulate,

				confident, and generally academic. Maths is his weak point but is nonetheless positive about resitting maths. He has good attendance and would be what is considered a model student. This student was taught by me in the academic year 21/22. He was selected for a 1:1 interview as he gave interesting responses in the group interview stage.
1:1 interview with a student who hopes to do a T Level in childcare	Level 2 Health and Social Care with GCSE maths, transition maths and English	17 Female	November 2022	This student has already attempted GCSE maths at college. Unfortunately, in her first year she came in with a grade 2 and completed the year with the same grade. In her first year of college, she completed a Level 1 course where she excelled. This student has learning difficulties which mean she has social difficulties and struggles with reading. She was taught by me in the academic year 21/22. In 22/23 she progressed to a Level 2 “transition” course and unfortunately ended the year with another grade 2 in maths so was unable to progress to a T Level.
1:1 interview with student who has completed a T Level in Business	Level 3 T Level in Business with GCSE maths	19 Male	2 weeks after final exam in June 2022	This student started his college journey in 2018 where he began on a level 1 course. He progressed to level 2, then 3. Each year he sat GCSE maths but did not succeed in getting a 4. Some years he sat it twice, meaning he had attempted the exam 6 times, eventually getting a 4 in summer 2022. He started with a low academic profile but left with a Level 3 T Level and progressed onto a degree apprenticeship.

Trustworthiness of the research

To ensure trustworthiness of the analysis of the data that was collected, Nowell et al's (2017) "Phases of Thematic Analysis" has been used. Thematic analysis is described as "a method for identifying, analysing, organising, describing, and reporting themes found within a data set" (Braun and Clarke, 2006 cited in Nowell et al, 2017). Thematic analysis is frequently used in qualitative research methods, so is a suitable process for this research. As stated in Chapter Three detailed theoretical analysis is not appropriate for research that focuses on the human experience and the research follows an interpretive epistemological approach. Thematic analysis allows for methods of examining perspectives of research participants which is central to the research questions.

Thematic analysis is a flexible approach to understanding a data set, which can bring into question its trustworthiness. Therefore, it is essential to ensure all aspects of the research follow recognised criteria to establish its integrity. I use the criteria set out by Nowell et al. (2017) to ensure the trustworthiness of the research.

Credibility – This is practice-based research. The research came about by responding to a problem witnessed at my own institution. I am embedded within the context in which I am researching. I am therefore subject to my own opinions and beliefs regarding government policy and its impact on education. I also have a vested interest in the students who participate in the research, as I want them to do well. This puts me in a privileged position where I have the access and trust of students that I would otherwise not have, but it could lead to questions over the credibility of the

research. It has therefore been important that observations made were recorded in an unbiased way.

I did this by using a mix of participants that were both known and unknown to me from a variety of backgrounds. I tried to get perspectives from students at different stages of their academic journey, both from the classes I was embedded in and outside. The interview questions were carefully structured and reviewed by peers to ensure they were not leading to an answer that would support my own views.

Transferability – I have attempted to ensure that the data is organised and collected in a way that would lead any researcher to come to the same conclusion. Data is anonymised and organised into themes. It has also been important to me that this research can be understood by practitioners within my field and not just those in the academic world. Descriptions of themes have been attempted to be written in plain English to promote accessibility and understanding of the findings.

Confirmability – The process in which recommendations are made was derived from the data collected. This will be clearly explained later in Chapters Five and Six.

Audit trails – Audit trails have been kept through every step of the data collection journey. Below describes how data was collected at each stage and how this data was stored. This also evidences how data was kept secure and confidential. All documents were given a name with a code and the date the data was collected.

Data collection type	How data was collected	Audit trail
Baseline questionnaire	Students who agreed to participate in the study were first asked to complete a consent form. They were then sent a link to a Microsoft forms questionnaire. This generated a spreadsheet of answers.	Signed consent forms were kept in a locked cupboard. Microsoft form linked to closed institution network. Names were removed from the spreadsheet and it was saved onto a password protected cloud location.
Group interviews	Group interview 1 was recorded using a voice recorder on a laptop. Text to speech software was used to turn this into text to analyse. Group interview 2 was a written record which was then typed up.	All digital documents are saved to a password protected cloud location. Names are removed from text files. Handwritten notes have been photographed and then destroyed.
1:1 interviews	These interviews took place in person using a voice recorder or via teams using the meeting record function. Text to speech software was then used to create data to analyse.	Videos have been deleted as they are not relevant to the research, but voice recordings have been kept on the cloud.
Field journal	Using Microsoft notebook, notes have been made throughout the course of the research on anything that has been said by students or staff that could be relevant. This includes photos of work. This was then put into a table on word and "tidied up" to make it easier to read.	Since this has kept digitally, the progression and development of my notes are traceable. They are also saved to a private file which others do not have access to.

Table 5 shows audit trail evidence for each data type

Reflexivity – throughout the research I kept a field journal to record my personal reflections on the research. This included observations from the classroom, photos of student work, staff comments and my own thoughts and reactions to policy changes.

Process of data analysis

Description of coding and analysis using Nowell et al's (2017) "Phases of Thematic Analysis":

1. Familiarise self with data:

I used multiple methods for collecting data to enable a comprehensive understanding. This aimed to help the validity and credibility of findings. I typed up the data collected and tidied it up to remove anything that could link the statements to the participants. This aided in familiarisation of the data and initial thoughts and hunches towards themes were recorded at this time. I read through all data before embarking on coding.

2. Generate initial codes:

During a second reading through of the data, codes were given to quotes or issues that seemed to relate to the research questions. These helped me to identify things of value for the next steps of thematic analysis. All pieces of data that were of a similar theme were given the same code. The codes were broad, for example whenever a student talked about T Levels the code TL was used.

3. Searching for themes:

After coding I identified themes or issues that were occurring frequently in student responses. I then created a spreadsheet and organised sections of text from the data that were similar, grouping together key themes.

Figure 5 gives an example from the codebook:

<i>Theme description</i>	<i>Student response</i>
<i>Impact of Covid</i>	<p>"exams were cancelled because of Covid so I just like got given a 3. I don't think I learnt much that year as learning at home was hard"</p> <p>"but exams were cancelled again"</p> <p>"But school was in covid and I didn't learn online, I just sat on the computer and pretended to listen."</p> <p>"I asked to be assessed for dyslexia but they never did it because of covid."</p> <p>"I know, because we all missed out on so much "</p> <p>"My teacher made me believe I could get a 4 so I didn't do any revision for the exam. I know covid and everything means teachers couldn't always give the grades they wanted, but I was really disappointed."</p>

Interviews, questionnaires, and notes from the field journal were all organised in the same way on the same codebook.

4. Reviewing themes:

After the creation of initial themes, they were reviewed and refined. For example, the quotes above all link to the impact of covid, however there is an overlap with a lack of support for students with special educational needs. It became apparent that more codes would need to be generated for themes that overlap. I was also required to create some sub-themes where there was an overarching narrative being discussed but smaller themes within that narrative.

5. Defining and naming themes:

I organised themes based on how they link to each of the research questions I was hoping to answer. The name of the theme describes the "story that each theme tells" (Braun & Clarke 2006, cited in Nowell et. Al 2017 pg. 10). The names are short

and aim to give a brief but easy to understand sense of what the theme is about. This was very important to me, and I hope this report will be accessible to other practitioners trying to understand the same problem. Once I had organised these by research question, they were numbered 1-22 with 15 sub-themes.

6. Producing the report:

Below is a summary of key themes found within the data set with links back to the original research questions. These themes have been identified from the initial questionnaire, student interviews and field journal. The type of information gathered from each of these methods is quite different, therefore each data set is analysed separately. There is more detail about how this report has been constructed under each sub-heading for each data collection type.

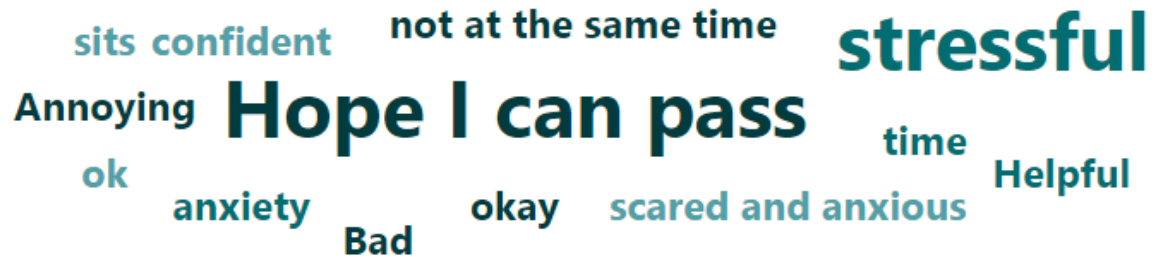
Findings and Key Themes

Themes from the questionnaire

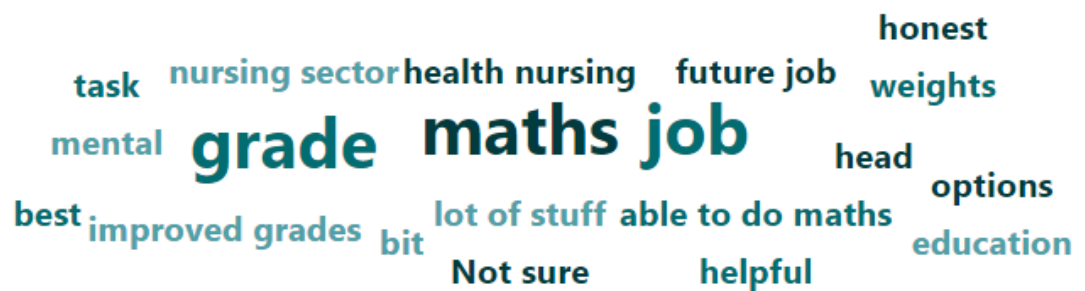
Forty students were given a questionnaire at the beginning of the academic year with the aim of understanding where they were currently at. The full results of this questionnaire can be found in the appendix. but below is a summary of some themes that informed the question development for the interviews (The larger the writing the more a response occurred)

These were the common responses from the question “what are your feelings towards re-sitting GCSE maths this year.” These responses made me want to

understand this at a deeper level. What was causing the anxiety? Why was it stressful?
What made some students feel OK about resitting?

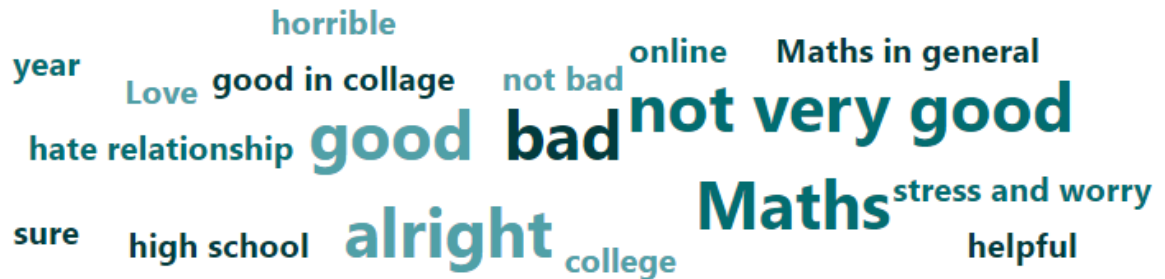


One of the questions given to students asked how students felt re-sitting GCSE maths could help with their educational and career aspirations. Most of the mentions included references to jobs and grades, but some were unsure. From these responses I wanted to understand what specific topics students felt were beneficial and how they felt the current maths curriculum supported them in gaining the skills required for their destination aspirations.



Below are the responses to the question “when you think about your maths education so far, what comes to mind?” These responses are very similar to the mind maps created at the beginning of the academic year in their “transition” classes where students were asked to express how they felt about maths (see field notes analysis). It is not a particularly good feeling as a practitioner of maths education to see responses

such as these. However, it gives me the motivation to understand the student perspective in a deeper way. It also explains why it is so important to hear from these students who seem to be deeply impacted by a curriculum they feel forced into.



Themes from the student interviews

Below includes data from student interviews arranged into themes. These themes link back to the research questions I hope to answer. These are direct quotes from the students interviewed. This is not an exhaustive list of quotes from students, but a selection from the data set that best reflects the theme discussed. For a complete data set of quotes from students, please see appendix.

The overarching question I hope to answer with this research is:

How do students view maths in relation to their educational progression?

➤ **Theme 1: The impact of covid-19 on student progression**

When discussing their maths education in school and in college, it was common for students to refer to the disruption caused by lockdowns and the covid-19 virus. Students reference the fact that exams were cancelled, and teachers gave results based on predicted grades.

"exams were cancelled because of covid, so I just like got given a 3. I don't think I learnt much that year as learning at home was hard"

"School was in covid and I didn't learn online, I just sat on the computer and pretended to listen."

"My teacher made me believe I could get a 4 so I didn't do any revision for the exam. I know covid and everything means teachers couldn't always give the grades they wanted, but I was really disappointed."

It was clear students felt the impact of lockdowns and felt their schooling had been interrupted. These quotes show that there was some feeling that they might not have had to repeat their maths had they not been impacted by this disruption and their grades were out of their control.

➤ **Theme 2: Student feelings towards repeating GCSE maths after “failing” first time around.**

○ **Sub-theme 1: Feelings of disappointment**

Students shared their thoughts on having to re-sit their GCSE maths after not achieving a grade 4. Most students expressed disappointment towards having to re-sit:

"I was disappointed because I thought I worked hard but it was a lot in a year you know"

"Annoyed (at getting a grade 3) and like kind of feel like frustrated because I thought I would actually pass it because I did really good."

"I don't want to do it again.....again!"

"A bit (worried about having to repeat the exam). Not really. I felt confident in the exam because I feel like I have learnt a lot this year. But then I felt confident last time. I would be really upset if I failed again. It would be hard to try this hard again."

- **Sub-theme 2: Positive feelings about re-sitting**

Some students were positive about re-sitting their maths exam again:

"Now I think it's a good thing that I had to do it again. At college I've realised how much I didn't know. I can see how much I have improved in one year. "

"We use maths every day so it might be beneficial to pass. "

"I think it's a good thing because if you did pass you would get more job opportunities. But they should make it easier for you to pass. If you failed so many times, you're not realistically going to get it are you? "

These responses were unexpected especially after conducting a literature review where many authors describe the negative feelings FAVE learners have towards re-sitting their maths.

- **Sub-theme 3: Surprise at re-sitting**

Some students commented that they felt confident with maths and were surprised to resit.

"I was too confident I could pass really because I found maths easy. I was well shocked when I failed man, (laughs) gutted!"

"I was confident I could pass when I was at school. I was absolutely sure I had passed."

Of all the subjects maths was the one that I felt confident about. So I was really surprised when I got a three. "

The levels of confidence varied from group to group. There were some groups who appeared more disenfranchised than others. The business and IT students were more likely to be positive or have more self-belief about their ability. They were more likely to feel like they had the aptitude, but something went wrong with the exam, whereas the Health and Social care students had negative attitudes.

This led me to wonder whether the attitudes are to do with the students being able to see the relevance in maths in the future careers or whether the Health and Social care students were feeling more negatively towards their college education generally due to other experiences. Was this a trend that applies across different subject contexts beyond those that were observed in this study?

➤ **Theme 3: Student career and educational goals**

Students shared a variety of career and educational goals. Most were related to Business, IT, Health and Social Care and Childcare, as these were the vocational areas that piloted T Levels during the research project.

"Health care assistant. But I need my biology as well as my maths."

"I don't really know, but I wanted to do a Level 3 because then I would be able to do anything in like the hospital."

"I want to be a nurse. "

"I want to get a job. I want to be a bartender so I just need to know money really"

Despite the fact all students interviewed were enrolled to "transition" maths courses aiming to prepare them for a T Level, aspirations to go onto a T Level were less common than other routes. Students were less likely to want to go onto a T Level if they were doing Health and Social care. I believe this could be because many of the students actually wanted to do Childcare, but that course did not run for that academic year. Therefore, students felt ill prepared to do the T Level in childcare.

"we all want to do a T level in business"

"I want to do a T Level next year and we have been told we have to pass maths. I want to do business. I am not sure what I want to do when I leave college though"

"I would like to do the T Level but they won't accept you unless you have a 4 in maths"

"I want to do level 3 Health and Social care, not the T Level."

➤ **Theme 4: The usefulness of GCSE maths to career and educational aspirations.**

Students shared their opinions of the usefulness of GCSE maths to their next step. No students commented on the content of the maths being useful, but rather the usefulness of having the qualification:

"I just think it is better to have it than not"

"we need a GCSE to actually do that course (as opposed to needing it for life)"

"You need it for so many jobs and courses and everything. I would want to do it again anyway. I think we should be forced to do it again because it's meant to open more doors isn't it?"

"I think you need maths to get the job you want but you don't need the maths to actually do the job. "

Some students did not see the qualification as being useful even to open other opportunities:

*"My mum never got her GCSE and she has her own business. There are loads of people without GCSE maths who earn ****loads"*

"It's not useful unless you want to go into maths and that. "

This leads to the question about what impact parental influence and other role models have on students' likelihood to want to engage with maths in college?

➤ **Theme 5: perceived consequences of not achieving a grade 4**

○ **Sub-theme 4: Not achieving a grade 4 is a barrier to progression**

Many students shared that they would not be able to go onto the next level of qualification or their desired employment route without a GCSE grade 4 in maths:

"I won't be able to do this apprenticeship. It's one of those degree type apprenticeships so I really want to do it. I want to work too so it's perfect for me"

"I was thinking of changing my course next year because I didn't think I was going to get my maths. Because if I don't ever get my maths I can't be a nurse without my maths. If I

don't get my maths I am wasting my time now. What's the point of doing something in the long run if you're not going to get it?"

"I sometimes worry about not being able to get a job. Like, I work hard and then I am just not clever enough or too dumb to get a good grade and then not get a job"

"What worries me is that I might not ever get on the course. I wouldn't mind doing a T Level and resitting maths alongside the T Level. What worries me is that I don't get that maths and I can't do the T Level. I don't mind doing maths again and again and again"

- **Sub-theme 5: The impact students have already experienced from not achieving a grade 4**

Some students shared that they had already experienced consequences from not achieving a grade 4:

"I wasn't sure what I wanted to do this year without my maths. I wanted to do a T Level but obviously couldn't"

"I was going to do Level 3 childcare but I couldn't because I have to have maths for it. So that obviously stopped me and now I am doing Health and Social. But I wanted to do childcare."

- **Sub-theme 6: Concern about repeating maths again**

Some students were most concerned about re-sitting maths for a third time:

"I really want the GCSE because my mum said that she had to do hers to get a job when she was older. She had to come back to college when she was like 40, so

embarrassing! I would rather get it out of the way. And if we go to college next year don't we have to do it again anyway?"

"It worries me because I am an adult and I would have to go on an adult course. I think you have to pay because I have done my 3 years free. I don't know if I can afford it, I don't know how much it is. With the times of doing maths if I have a job as well, can that fit together? If I want to do bartending that's usually in the evenings"

➤ **Theme 6: Opinions on university**

Although not directly asked about their feelings towards university, some students shared their opinion that university wasn't for them.

"uni isn't for me. It's a waste of money I think. I just want to work and get paid"

"Yeah, I wanted to be a paediatric nurse, but then that means I have to go to uni. (its) just expensive. it would just take a long time to pay it off (loans)"

"I have never thought about going to uni because I am not like, academic, so I haven't thought about it."

Those interviewed frequently felt that university wasn't for them because they were not "academic". Their understanding was that university was for people who do A Levels and not those on vocational routes such as them. This led me to wonder about their perception of vocational education and the narrative that they are telling themselves which leads them to believe higher education is only for certain people.

➤ **Theme 7: student perception of the government “U-turn” on mandating maths for T Levels and where this institution sits with that decision.**

It is no longer necessary to have a 4 to do a T Level, but the institution where this research is taking place has made the decision to keep this standard due to the rigour of the qualification and the difficulty students would have completing both qualifications. The policy needed some explanation.

Some students believed the institution’s decision to be unfair:

"but that's unfair! You don't need it for a T level"

"I think that it's not fair. Are you saying other colleges are accepting people?"

"It gives students more of a challenge and hope if they can keep doing maths"

One student agreed with the college’s policy:

"Well it's made no difference has it because college still want us to have maths? I don't think I would be able to do a harder course and GCSE maths at the same time. I have done quite a lot of hours extra. I have done extra maths lessons with you for the last month and come to every lesson. I have done a lot because I really want it. I don't think I could do it again and definitely not if my course was more hard. "

One student interviewed was enrolled onto a T Level and benefitted from the government changing the mandatory requirements that meant no T Level certification without a 4 in maths:

"the T level changes have worked for me because it means I can do it without maths. I wouldn't get the qualification otherwise"

➤ **Theme 8: student thoughts on the requirement for GCSE maths and English at a grade 4 or above to obtain a student loan at university.**

During the academic year where data was gathered, there was an announcement from government which stated that students without a 4 in maths and English would not be able to obtain a student loan. Although students generally commented that they did not feel university was for them, they still had opinions regarding this policy change. The reactions were mixed, many expressing that creative degrees shouldn't have this requirement:

"I didn't know about that. I mean if you're doing business I think you need to have maths"

"what if you want to do, I dunno, dance, do you need a GCSE in maths?"

"I'm not sure. It's a hard one because GCSE maths is not like hard is it? I failed because I was an idiot and didn't try. I was too cocky I guess. It's our own fault if we don't really do well at it. If you can't even pass your maths, should you really go to university?"

"I think it's a joke. Not giving a loan to someone for not having their maths and English. Imagine if I wanted to do like, dance or music or something artsy like that and I can't go to university to do something completely irrelevant to maths and English because they won't pay for it because I don't have my maths and English. Or (you can go if) you have the money. "

Some however did not see it as applicable to them:

"I don't really know. I hadn't heard about it, but it doesn't apply to me so I dunno."

"I am not sure really. You're supposed to be clever though aren't you if you want to go to uni? I've never thought about going because I am not like academic or whatever."

➤ **Theme 9: the study of maths in school compared to that in college**

Interviewees were asked to talk generally about their experience of studying maths so far. Most took this as an opportunity to compare the maths they had experienced in school with that at college. Students seemed to have very mixed experiences of their study of maths in school.

○ **Sub-theme 7: Negative experiences of maths in college**

Students who felt negatively about their maths experience in college often quoted timetabling challenges and unexpected group merges.

"It's completely different. You didn't really get as much help. because like. Because you're younger when you're in high school, so you get more like 1 to 1 help."

"I find the times annoying. I travel so far to get here and my business teacher lets me arrive when I want. If I miss maths I miss a whole topic if you know what I mean. We do so much in a lesson."

"we didn't constantly have other students like in college flooding in our classroom. Like it's too loud and it's too much. Because in high school it was more like our class."

"We just had a few new students joining, so I would say about like 15 to almost 20. I think"

- **Sub-theme 8: Positive experiences of maths in college**

Others felt like they were gaining more in college, often mentioning smaller group sizes:

"I get a lot more help at college and there aren't many people in the class"

"I think college is good, like I have a smaller class and more help and that. It's good that no one wants to go to maths because then we get more help when we do come to the lesson."

"yeah I like the small classes here"

- **Theme 10: The number of maths teachers students have had through their maths education**

Although not directly asked, students commented on the changeover of staff both at school and at college. This institution has often struggled to recruit and retain maths teachers, which was reflected in student responses.

*"urm... although we now have a small group at the beginning it was a bit crazy. I had like 5 different teachers until I was put in your group. I also didn't get put in for the November exam which p***ed me off."*

"In my high school I actually learnt something. We did have quite a lot of different maths teachers but it was a nice small environment"

*"I don't really know why (there were so many teachers). I was at ***** school. I think the teachers didn't like it there or something"*

"I don't know, like it's the same our teachers were constantly changing, and they all had different ways of teaching"

➤ **Theme 11: Thoughts on streaming GCSE maths lessons by ability.**

Students were asked if they thought streaming by ability benefitted their progression. Most students did not feel that there was much benefit. It was also concerning how many students commented that the teachers treated them like they were a child or stupid.

"Well I remember, I went to two secondary schools. And the first one I was put in a bottom set and....it's going to sound really rude now but the people in there were (offensive term used here) they were like...I don't know how to explain it...they were like....not bright at all. When I went to the other high school they put me in a middle set and it was completely different. Even though I may not have understood as well the teacher wouldn't talk to me as if...I'm stupid"

"the teacher treats you like you're stupid. Because like, you're in that bottom set and they're trying to explain to the people who don't care, like. It's like you're a child or a baby."

"I don't think it makes a difference, we've all failed haven't we? Being put in a different group depending on how much you failed by doesn't really, I don't think it really matters."

One student commented that moving between sets created another opportunity for a change in teacher:

"Mine changed because lots of times I went like, up a maths class. So, we had like sets, bottom set, top set, and if you got like a certain grade in one of the like tests you would go up. So, it would be a different teacher for that set. "

This research also aimed to understand:

How has curriculum and policy change affected the experience of studying maths?

Below are the themes relevant to this research question:

- **Theme 12: Current confidence level in maths**
 - **Sub-theme 9: High levels of confidence**

Students were asked how confident they feel about maths and their ability to achieve a grade 4 this academic year. Many were feeling good about where they were at:

"I have always thought I would get maths by the end"

"but we have to be confident this time guys! Manifest what we want"

"you have to believe you can do it or you'll just fail again"

"I feel confident going into the next exam as we have practiced the questions loads."

- **Sub-theme 10: Low levels of confidence**

Some students found “failing” once had affected their confidence and were feeling the pressure to succeed second time around. Students always described not achieving a grade 4 as “failing”.

"I was confident last time and look where that got me! I am going to be less confident this time"

"I have been looking at other options. I've just tried twice now to get my maths and am worried I won't get it. I have been looking at (another college) at an equine course because I love horse riding and you don't need maths."

"But I just know that I am not going to pass maths."

"It affects your confidence though because obviously I have done it for lots of years. And each time my confidence just goes like down."

➤ **Theme 11: Frequency of GCSE maths lessons in college**

There were mixed responses towards re-sitting GCSE maths and the value of the lessons they were receiving. Many commented that the number of lessons they have in college was not enough or less frequent than at school:

"We don't get as much lessons in college as we did in school"

"we got a lot of lessons in maths in High School"

"I used to have a lesson like, every day."

"I think we would be more likely to like pass if it was set out the way it was at school. If you think about it. Because at school I never really thought....I didn't really care enough"

about it. Then obviously now I have come to college it has kicked me up the bum a little bit because obviously I can't get certain jobs and stuff unless I get a 4. And like, having two lessons a week in maths, you're not going to realistically going to pass in maths with two lessons a week are you? And the start of the week by Friday you've forgotten."

➤ **Theme 12: Access to support**

An unexpected result from interviews was students commenting on the lack of support they have had at college and the access to testing for special educational needs. The institution made the decision to only give exam access arrangements to students who were given this provision in school. This was due to the fact that there were so many unused exam access arrangements and a relative cut in funding meant support services were struggling to cater to every student who needed the support. Unfortunately, due to the lockdowns following the pandemic, many exam support provisions were not put in place.

"My dad paid for me to be assessed privately (for dyslexia) because college wouldn't do it."

"They said I was dyslexic but like, could write at a normal speed and everything but was really slow to read. That's why I did well at my English because I am not thick, I am just really slow to read. They said I need to have rest breaks and have my work on yellow paper. I will have this in the GCSE maths exam now which is good. I hope it will make a difference."

"Because I didn't learn anything and I didn't get the help I needed."

"They should give you more support to get that grade not just say you've got to keep re-

sitting until you're 19 and not help you. Obviously, their way of helping you is giving you two lessons a week, but if you didn't pass in school with 4 lessons a week, you're not going to pass with two lessons. "

➤ **Theme 13: How to improve transition lessons**

Some students gave feedback as to how the college could improve transition maths lessons:

"I would rather have more GCSE lessons (than transition) to be honest and then we would be more likely to pass and then do a T Level"

"It's just like, want them to be more based on like what we want to do."

➤ **Theme 14: How to improve GCSE maths lessons in college**

Students also gave feedback about how to improve their GCSE maths lessons and the curriculum. Some students commented on how they would change the GCSE generally:

"go slower, do less stuff and stuff that I will actually use. Like mortgages and that."

"I just think it needs to be easier! I don't think we need to do all the algebra and trig and everything to pass"

"I think we need more lessons at college. I would also get rid of shapes. I hate shapes! "

"Make it easier for you to pass!"

Students' perception of what they thought to be "useful" subjects was interesting.

➤ **Theme 15: Thoughts on GCSE maths teaching**

- **Sub-theme 11: Teacher's perception of student ability**

Students made comments on the teaching that they have had at school and college. There seemed to be a perception that teachers felt students were stupid if they could not do an aspect of maths. These responses were particularly enlightening.

"I think they (teachers) get fed up with you quite quickly if you don't get it"

"they're (teachers) like "Oh this guy knows it, come up to the board"

"They get fed up with you if you don't (understand). I mean, they'll try and explain it to you don't get me wrong and help you. But sometimes it doesn't click does it? And then they get fed up and they're like urgh. They blame it on you saying you're not trying hard enough"

- **Sub-theme 12: Using different mathematical methods**

Students commented that having different teachers meant the introduction of new and different methods to solve problems. They felt that this made things more confusing and therefore they were less likely to achieve a 4.

"I think in high school it was like positive because we would learn our own ways and the teacher would be fine with it and we could learn it how we wanted to and by the end of it we did get it right. But now, if we learn it our own way we have to do it the way that the teacher says now we're in college and it confuses us because we can do it a much simpler way and get the answer right. But then they end up doing it a much longer way and it confuses us."

"It's going to make it harder (re-sitting again) because you've already learnt some stuff and then you've got to learn new stuff next year, and it's probably going to confuse you."

You'll struggle a bit to get the grade as you get a different method each time and you don't actually know where you're at"

The third research question I hope to understand is:

To what extent do students engage with and see the relevance of contextualised maths lessons?

➤ **Theme 16: How maths relates students' main programme of study**

Students struggled to tell me how maths related to their main course and when they might see it in future:

"I guess IT has a lot of maths anyway but it's all like spreadsheets and everything."

"You taught us how to calculate profit and I never did that once on my business course! In the whole year!"

➤ **Theme 17: Perceived practical applications of maths**

Students were asked where they thought they might use maths when they leave college: Students on Business and IT courses were more likely to believe they would use maths in future, whereas those on Health and Social care courses were less likely to see the relevance.

"percentages and that are useful. I wish we did more on that. Why can't we do stuff like learn about tax and mortgages? That would be really useful."

"I think maths is important for your money and everything. I think if you want to go into business you need maths don't you!"

"Well they say that everyone needs maths don't they?"

Some students did not think they would use maths after college:

"I don't think it's necessary"

"Like working in a nursery you need maths GCSE (sarcastically) They can only count to like 10"

"I think a lot of things are done by computer these days anyway, because there is like human error and stuff. You wouldn't need it anyway because the computer would do it for you. "

➤ **Theme 18: Opinions of supplementary contextualised “transition” maths lessons**

○ **Sub-theme 13: The “point” of “transition” maths lessons**

Students were asked how the transition maths lessons supported their mathematical development. Unfortunately, the response was almost unanimously negative. Some students commented that they found them “pointless”. This was often because there was no qualification at the end.

"Bit pointless really"

"you didn't get anything for it in the end so no one turned up. It was first thing in the morning then we had a long gap, so people just didn't go"

*"Those are pointless. They don't go towards anything so everyone just ****es about. We have to do all these formulas on excel and stuff which I am sure is useful but no one cares."*

"yeah I don't go to those lessons they are a waste of time"

- **Sub-theme 14: How transition lessons support GCSE maths skills**

Others commented that it wasn't useful to improving their maths skills because it didn't relate closely enough to their GCSE. Those on Business and IT courses claimed that the maths they were using was on computers so wasn't translatable to their GCSE course.

"Nothing we learn in those lessons would be on our GCSE"

"Yeah, I think it's more relevant to what we're going to be doing in the future, but I don't think these extra maths lessons contribute to our maths GCSE at all. I think it is going to be relevant to our future jobs"

"Although I do find it weird that we have learnt about percentages in GCSE maths but they haven't done it in business"

"We mainly work on the computer using formulas and everything. It's OK but it won't help me get my GCSE. "

- **Sub-theme 15: Transition classes and life skills**

Some students commented that they felt what they were learning in these lessons was more important to life skills. They explained the topics that they had been covering:

"It's real-life stuff. Like it's probably more important actually"

"Umm, we did like cake recipes and all sorts of stuff and like working out how much it would be for like certain amount of people."

"But I would say it's more just like normal maths rather than just trying to relate it to health and social care."

"Some of the lessons do like we do case studies and all that, but most of it's just like. Actual maths, maths."

"It's more to do with Health and Social Care"

And one student wasn't aware they were participating in extra maths lessons:

"Do we do extra maths lessons?"

➤ **Theme 19: The perception of academic versus vocational education**

Students were asked about their perception of A Levels compared to T Levels. This needed a lot of explanation as some students appear to pick courses based on it being the only course available to them with their academic profile, so had not attempted to understand other qualifications.

"that's for clever people and vocational is for less clever people. People who do A Levels go to uni and people who to BTECs get a job."

"if you do hairdressing you're not going to be rich are you?"

"My parents aren't like that (academic) and they are fine"

"(vocational courses) are just easier"

➤ **Theme 20: Challenges of the GCSE maths curriculum**

Students commented on the things they found challenging about the GCSE maths curriculum. It was common for students to state topics that they did not feel

would be useful in life after college.

"Mostly just like taking in all the information and remembering it"

"I think it's necessary but some things like circles and radius we don't really need that"

"some of it is relevant and like, I can see myself using. But some of it is so pointless"

"All we really need is like money."

➤ **Theme 21: thoughts about the use of contextualisation in GCSE maths**

Students were asked about the contexts used in GCSE maths questions. Some of the answers were quite funny, but all seemed to find them confusing and not relevant to the maths they were going to see in everyday life.

"why are they always sharing sweets?"

"yeah it's so confusing! Sometimes it's like "Ben has 3 apples and 2 oranges so how far is he from x" it like makes no sense"

"they just bring in random characters too. Who's Colin and why do I care about his field?"

"No, they're too wordy. There's so many words and few numbers. You try and do it one way and it turns out you should have done it another way because of the way they've worded it. They make it a lot more difficult and sometimes it is hard to understand what is going on"

➤ **Theme 22: The usefulness of GCSE maths to life**

Students were asked if they thought having a GCSE and the content of the GCSE maths course would be useful to them in life. There weren't any students who felt the curriculum wholly benefitted them.

"there's always people joking about maths saying stuff like...I dunno "Times I have used Pythagoras in life, zero times". You see those memes don't you?"

"Like, I understand we use money and that but we don't actually learn anything important in lessons"

"I don't know if I will use the maths I have learnt, a lot of it doesn't seem relevant"

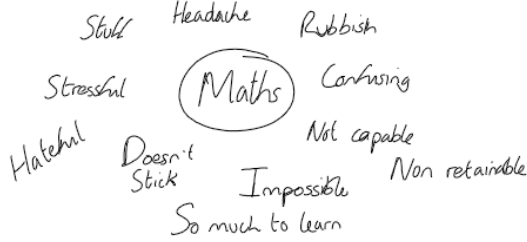
"When it comes to algebra and "finding x" I'm sorry I am not going to be finding x if I'm in childcare. I don't think finding x is going to relevant to whatever I am doing"

"I like learning about money. If it relates to money, I can understand it. I am good at questions that need money as feel like I am obsessed with making money. I like learning about things that are to do with earning. I think we should do more stuff on loans and tax and that sort of thing coz we're all going to need that aren't we?"

Themes from field notes

I gathered field notes and wrote from my own perspective. They were reflections on events happening within the classroom and staffroom that could relate to this research. Table 5 shows three of my reflections that seem relevant to the themes discovered through interviews. This is not an exhaustive list and the complete field journal will be added to the appendix

Date	Incident	Comment
September 2021	Today I met with DG who is delivering the transition maths lessons to Health and Social care students. He said that	These thoughts are common to what I hear in the classroom. These comments

	<p>he had asked students to share their feelings towards maths. He shared these with me</p>  <p>The handwritten notes are arranged around the word 'Maths' which is circled in the center. The words are: 'Stuck', 'Headache', 'Rubbish', 'Stressful', 'Confusing', 'Hateful', 'Doesn't Stick', 'Impossible', 'Non retainable', and 'So much to learn'.</p>	<p>show the lack of confidence students feel, but also that the don't find the amount of content achievable. DG was surprised by the lack of basic maths skills and how negative they were towards the subject. What can we do to help? Why are they feeling this way?</p>
November 2021	<p>Student came to lesson and told me they don't need to do maths anymore. They had heard from their dad that the policy regarding T Levels had changed and that they wouldn't need it if they wanted to do a T Level next year.</p>	<p>I had not heard of the policy change at this point. I quickly looked it up and found out about the U-Turn. I emailed around to find out what impact this will have to transition maths courses and recruitment to T Levels. The institution has not decided yet.</p>
January 2022	<p>Management at this institution have decided that it will be mandatory for students to have a 4 in maths and English to do a T Level despite government U-Turn. This is due to the level of challenge of a T Level and therefore they do not believe it possible for a student to be successful studying a T Level and studying GCSEs alongside.</p>	<p>This will be difficult news for some students who were hoping this would mean they could progress without their GCSE in maths.</p>
June 2022	<p>Following a "deep-dive" into the GCSE maths curriculum it has been decided that streaming will no longer take place for GCSE maths. Data suggested that those at a grade 3 make excellent progress, but those at lower levels get left behind.</p>	<p>This has caused a lot of concern amongst the team who are used to teaching streamed groups. This will involve a curriculum overhaul.</p>
February 2023	<p>Team meeting following Rishi Sunak's announcement that students should continue to study maths until 18. Discussion about where maths is positioned in FE especially with the low recruitment to T Levels. Management are apparently worried about the lack of maths skills and low recruitment in some areas. More intervention may be</p>	<p>There was a lot of debate about whether maths should be continued until 18 amongst staff. Many felt it unnecessary, many felt basic skills should be continued but generally all staff felt the policy was laughable. This institution struggles to recruit</p>

	needed in future and there is an indication that maths teachers should be delivering the contextual maths classes	maths teachers for the current provision, and in fact most teachers who teach re-sit maths are not maths specialist teachers.
--	---	---

Summary of what has been found:

There are twenty-two themes addressed in this section of the thesis. I have summarised these themes into 7 categories, in order to support a conclusion and subsequent recommendations. These categories have been created with reflection on how the themes answer the research question and are in line with the initial codes that were generated in the first step of analysing the data collected. These categories are:

1. How learners see GCSE maths benefitting them in the future
2. Where learners see maths sitting in their career and educational goals
3. The suitability of the GCSE to FAVE students
4. The impact of policy on learners' experience of studying maths at college (streaming, teacher shortages etc.)
5. The impact of using contexts on learning in mathematics
6. The success of implementing supplementary contextual maths lessons.
7. The impact of using results as an accountability measure for FAVE institutions

Conclusion

This chapter has reviewed the methods of data collection and begun to analyse the responses from students. There are some themes that are expected, but many raise more questions about the curriculum and how it is impacting learners.

Chapter Five will look further into this data and aims to understand how these themes link with literature and research that already exists. In the next chapter I will delve further into answering the research questions before making conclusions and recommendations.

Chapter 5: Data Analysis

So far in this research I have considered wider literature and from that I have defined a methodology which informed my data collection strategy. In this chapter I am going to analyse this data with reference to the key texts identified in the literature review, and themes that emerged in Chapter Four.

My research questions are as follows:

1. How do students view maths in relation to their educational progression?
2. How has curriculum and policy change affected the experience of studying maths?
3. To what extent do students engage with and see the relevance of contextualised maths lessons?

I will look at each of these research questions in detail and discuss how the data collected and student responses resolve these issues.

Research question 1: How do students view maths in relation to their educational progression?

The baseline questionnaire showed that student's come to college with different plans and aspirations. The intention of the curriculum changes and introduction of supplementary "transition" maths lessons is to support students in achieving their goals, especially those who are interested in a technical rather than an academic career path.

These students started college without a GCSE grade 4 or above in maths and were identified as needing support to reach that benchmark. The new route to industry is the T Level, so it is assumed that any student looking to pursue a vocation would ultimately aspire to complete a T Level.

As part of the study, students were asked about their educational and career goals. The initial questionnaire given to students as they started their academic year found that only 50% of students enrolled onto “transition” courses who were participating in the research wanted to continue to the T Level. By the time I interviewed students, most had changed their mind about continuing onto a T Level. The reasons for this were varied, but one thing that stood out is every student seemed to be limiting their aspirations due to their lack of belief that they could get their GCSE at the required grade by the end of the year. In fact, 100% of students interviewed stated that they felt maths was the biggest barrier to their progression. Students were altering their plans based on their perceived ability, one student deciding that an occupation as a nurse was out of their reach and one student fed up with repeating maths at college, decided it was time to leave education and become a bartender, her dream of working in childcare put to one side.

“I can’t be a nurse without my maths. If I don’t get my maths, I am wasting my time now.

What’s the point of doing something in the long run if you’re not going to get it?”

Level 2 Health and Social Care student.

The Social Mobility Commission (2021) report “the road not taken: drivers for course selection” found that students starting courses in Further Education with low prior attainment had little to no choice with their course selection. Students who did not achieve a 4 in maths and/or English were often enrolled onto mandatory corrective courses. All students in this study were enrolled onto a Level 2 programme in either Business and IT (BIT) or Health and Social Care (HSC). The assumption of the institution was that these learners would want to progress to the higher-level version of this course. However, this was not reflected in the responses given by learners. It was apparent that the “transition” course was not the first choice for most, and they told me of the courses that they wish they could have done had they achieved their maths at school. Some commented that they no longer saw a higher-level qualification as an option for them due to their struggle with achieving their grade 4, many expressing their frustration with the system.

The students who were interviewed from the group studying HSC were less likely to want to progress onto a T Level. There are a few factors that could have influenced this. This first is the quality of the transition maths lessons they were given. The students within the HSC faculty were given classes that were clearly defined as “extra” maths lessons and different from their main curriculum, whereas in the BIT faculty they were embedded into their programme, and it was less obvious to students that they were part of this curriculum pilot (the pros and cons of these approaches will be discussed later in this chapter). The second is that a few of the students interviewed from the HSC group were hoping to study Childcare rather than Health and Social Care, but this course did

not run due to low recruitment. Therefore, they were probably less likely to want to continue with this career path if they didn't opt for this route in the first instance. Thirdly, the social demographic of each group could be a factor. All the students I spoke to within the HSC group were young women. The Social Mobility Commission (2021) found that female students are more likely to start low paid technical qualifications and not opt for qualifications that lead to higher pay.

A lack of a maths (and for many English) qualification meant that for these students there was little choice when it came to their initial course selection. If they do not achieve their maths a second time around, their options are limited again, and they begin the cycle of failure. Sainsbury (2016) found that course choice has an impact on occupational segregation. Students from disadvantaged backgrounds are more likely to be affected by this as they are more likely to achieve lower grades and therefore go onto low paid/less skilled jobs. Bellamy (2017) found that often students gave up before even trying, already demoralised by previous "maths scars". Amazingly though the Sainsbury review (2016) suggested that the level of maths for an "acceptable pass" was too low and that we are falling behind other countries and the skills required for the job market.

The Social Mobility Commission (2021) found that not having maths (and English) resulted in students feeling less confident about their abilities overall and therefore hold lower aspirations. This became apparent when students talked to me about their views

on university. They commented that it wasn't for people like them, it was a waste of money or just for academic people.

"uni isn't for me. It's a waste of money I think. I just want to work and get paid"

Level 2 Health and Social Care student.

"You're supposed to be clever though aren't you if you want to go to uni? I've never thought about going because I am not like academic or whatever."

Level 2 Business student.

This made me wonder what narrative they were telling themselves, and where this could have come from. Was it the lack of prior attainment that led them to believe higher study was not possible, or did they believe this before they sat examinations? Was there a cultural influence that led them to believe university was only for certain types of people? This research did not delve into questions surrounding their perception of higher education, but their comments on university gave an insight into their confidence and self-perception.

This research did however ask how students perceived academic versus vocational qualifications. This was a tricky one to gain answers to as students had poor understanding of the structures of qualifications and the routes to different careers, which perhaps highlighted the inadequate career guidance students have had up until this point. In January 2023 the Department for Education issued an update to its "Careers Guidance and Access for Education and Training Providers" which puts more

of a responsibility on schools to ensure children understand their options. Although they did not necessarily understand the structure of qualifications at college, they did perceive an “us and them” mentality between vocational and academic students. The belief amongst some was that vocational qualifications were “easier” or for “less clever people” leading to a job rather than further study. Dalby (2015) noted that the resitting of GCSE maths reinforces the inequality between academic and vocational qualifications. There are those who need to re-sit maths (vocational = not clever), and those who don’t (academic = clever). There are some A Level or “academic learners” who are also part of the cohort who are also re-sit their GCSE maths, but the participants in this research did not seem aware of them, believing an A Level meant you were clever. It was evident that re-sitting GCSE maths at college was seen as lowering their status to “not clever” and an indicator that they were unlikely to participate in further study.

"that's for clever people and vocational is for less clever people. People who do A Levels go to uni and people who to BTECs get a job."

Level 2 IT student

This narrative that learners tell themselves creates an additional barrier which affects their ability to engage with and access their maths lessons. Any re-sit teacher will quote confidence and motivation as some of the biggest challenges in the classroom. As a dedicated practitioner of GCSE maths in FAVE who absolutely believes in every student’s ability to achieve, it was difficult to hear the fears and concerns from learners who did not believe they could “pass”. Some believed that it could impact them for the

rest of their lives. One learner I spoke to (who achieved the grade they needed that academic year) had such low confidence of their ability to “pass” they started applying to courses at other colleges that they weren’t necessarily interested in but didn’t require a maths qualification. From my perspective this learner was bright, engaged and had a very good chance of success, so hearing their lack of faith in their ability was sad.

Jo Boaler’s “The Elephant in the Classroom: Helping Children Learn and Love Maths” (2015) observed that students often see themselves as those who “can do” and those who “can’t do” maths. If they believe they “can’t do” maths they see little point in continuing to study the subject.

“I just know I am not going to pass maths”

Level 2 Health and Social Care student

I expected to hear students with low confidence and self-worth as it is what I experience in the classroom. I was surprised therefore that there were a group of BIT students who had a different perspective. They spoke to me about “manifesting” the outcome that they wanted and how a belief in a particular outcome would make this more likely. They seemed to have adopted a “growth mindset” and were encouraging each other to have the same view. This contrasts with the literature read for chapter 2 (Bellamy, A, 2017) that claim many students have negative thoughts on re-sitting their maths. From my data, this is true, but a surprising number of students were pleased to be re-sitting and given the choice would have chosen to re-do their GCSE maths anyway. This was a

really positive thing that came from the research, as it appears over time a message has got through that this is an essential skill that needs continuous development.

“It gives me more opportunity to improve”

“yes I think (I would re-sit given the choice). I was really disappointed that I didn’t get it last year”

Level 2 Business students

The positive attitude towards re-sitting was in some ways made possible by the disruption caused by the covid-19 virus. In summer 2020 and 2021 exams were cancelled and students were awarded grades by their teachers. Some therefore believed that an inaccurate grade awarded to them by their previous maths teacher gave them more chance in the summer exam where the grade would be awarded off their own merit. They commented that they felt this disruption had affected their progression since they struggled to learn online. As teachers, we struggled to teach low ability students online without the usual classroom support. Students with special educational needs and disabilities were disproportionately affected by home learning. In December 2020 Ofsted shared a press release which stated that isolation due to covid-19 was having a detrimental impact to children’s education and welfare. Colleges reported more “gaps” in learning than previous years and that they made more mental health and safeguarding referrals to local agencies than in 2019.

Upon returning to college institutions were given money or a “catch up” fund to support these learners, however within the institution that this research takes place this money

was utilised for GCSE maths students who were most likely to achieve a 4 by the end of the year. Students who were borderline grade 3/4 were offered 1:1 sessions to help get them over the line. Students who were really struggling but unlikely to achieve a 4 by the end of the year were not offered these extra sessions. A lot of emphasis and pressure is put upon institutions to get results as a measure of success. This can lead to strategies that do not necessarily benefit learners such as this one. This will be discussed further in this chapter.

Overall students saw maths as a barrier to their educational progression. They saw it as a hurdle to overcome just to be permitted to pursue their dreams. Many decided that the hurdle was too high and adjusted their ambitions to suit what they believed they could achieve. All students in this study were given very little to no choice in which course they could do; none were studying their first-choice course. They were aware of how GCSE maths could affect their futures, a challenge some had the energy to overcome but many had already given up. This cohort were unlucky with the covid-19 restrictions giving them extra obstacles, but generally I feel their sentiments reflect conversations I have had with students in the past. It is disheartening to hear their lack of belief in themselves, but it is what makes teaching these learners rewarding. It also speaks to the best way to get results from them, to ensure their confidence is built up first before tackling mathematical problems. Maslow's Hierarchy of Needs (1958) suggests that to achieve higher needs (the need to achieve GCSE maths for example) a person must ensure basic needs are met (mental health, love, belonging and esteem). Quite often these students' basic needs are not being met. To get the best out of a GCSE maths

student they must feel accepted and ready to learn. This will be discussed more in the recommendations part of this thesis.

Research question 2: How has curriculum and policy change affected the experience of studying maths?

This research came about following policy change to vocational education which triggered an important curriculum redesign. The introduction of T Levels and their requirement to obtain GCSE maths and English at grade 4 or above for full certification left questions about how to fully recruit for these new qualifications, given that current students on Level 3 qualifications often start study without maths or English. Only a few months into the research, there was an update to this policy and the requirement for maths and English was no longer needed (although students were still subject to the condition of funding). The Department for Education (2021) felt that this policy was limiting access to T Levels (as institutions had feared and expressed). However, since T Levels are more demanding than current level 3 qualifications the institution where this research takes place decided to make GCSE maths and English at a grade 4 a condition of enrolling onto a T Level. The curriculum changes including “transition” courses continued rather than attempting to teach GCSE maths and/or English alongside T Levels. Since then, there has been further policy announcements. It was announced that student loans will no longer be awarded to university students who do not possess a GCSE grade 4 or equivalent in maths or English and Rishi Sunak (January, 2023) has declared that all students in FAVE must continue to study maths until they are 18. Norris and Adam (2017) found that since the 1980s and 2017 there

had been 28 major pieces of legislation affecting education and 48 different secretaries of state. There have been 9 policy changes affecting just post-16 maths and English between 2014 and now. The three policy changes which happened whilst this research took place were expected due to this history of constant reform in education. However, the turnover of Prime Ministers has been unexpected and has left a question mark over which of these most recent initiatives will remain following the next general election.

The learners that I interviewed had much to say about the policy changes, not least the question as to why students are never included in consultation with educational reforms. Bernstein (2000, summarised in McLean et al 2013) introduced the concept of “pedagogic rights”. These include the personal realm, inclusion in the social realm and participation in the political realm. Talking to students about their rights is enabling their right to participation. They have the right to influence how they are educated and should be consulted about major changes. All students interviewed articulated their thoughts on policy exceptionally well and were remarkably candid about the mistakes they made in the past which they believed got them to the place they were. No student I spoke to attempted to lay blame for “failing” maths elsewhere. Many were frustrated with aspects such as covid and teacher shortages, but they were open about their own errors. When discussing the changes to T Level certification requirements with students, they thought that the policy change was a good one but that it was “unfair” that the institution didn’t pass on this change, although one student agreed that it was hard enough attempting a Level 2 course with GCSE alongside never mind Level 3. Ofsted (2014) stated that a culture driven by policies, strategies and documentation is a significant

barrier to FAVE institutions being able to provide “Outstanding” teaching and learning. Mid-year policy changes have certainly disrupted focus amongst some learners. One student this year found out about the T Level changes before I did and came to class to tell me they would no longer be attending as they didn’t need maths anymore. A couple of weeks later when the college had firmed its position on T Levels, she returned to lessons but was angry about being “forced” back. The mandatory nature of the qualification seemed to be her only motivation for participating.

Mid-year policy changes have happened before. One year I was teaching a group of Childcare apprentices GCSE maths, many of whom had very low grades on entry. They were required to achieve a C (now 4) to gain their qualification. Every other apprenticeship was allowed to have Functional Skills Level 2 instead. About 3 months before their exam, the policy changed, and they were now allowed Functional Skills as an equivalent to the GCSE. I lost them in that moment and was not able to reengage them. I was frustrated at the time as many were on track to succeed, but they immediately stopped coming to lessons. These changes lead me to wonder if students will only study if the course is mandated.

The students interviewed had strong views about the government and policy changes, even when they didn’t affect them. During the first year of this research a prominent member of parliament visited the institution. This MP had some polarising views, and I had to convince a group of students that egging this person was probably not their best idea. These students had firm views about the policy change regarding access to

student loans without maths and English at a grade 4 or above. They believed this was unjust. A few quoted subjects for which they thought maths wouldn't be relevant, such as dance. One student was quite outraged that someone could still go to university without the GCSEs if they had the money to do so. Some felt that it was fair because if you can't achieve maths, you would be too much of an "idiot" to go to university anyway. This idea that ability to do maths correlates to high intelligence is what Jo Boaler (2015) called the "Elephant in the Classroom". She suggests that the way maths is taught in schools leads pupils to believe it is an elitist subject with those who "can do" and those who "can't". Policies such as these certainly help to reinforce this narrative.

"I'm not sure. It's a hard one because GCSE maths is not like hard is it? I failed because I was an idiot and didn't try. I was too cocky I guess. It's our own fault if we don't really do well at it. If you can't even pass your maths, should you really go to university?"

Level 2 Business student

Historic policy changes have affected the experience of studying maths in FAVE. In 2019 Functional Skills was reformed following a recommendation in the Post-16 skills review by Lord Sainsbury (2016). Similarly in 2015 the GCSE was reformed which included new scaling from 9 to 1 instead of grades A* to U. There is also more content, including some more demanding subjects (Pearson 2015). More is now expected from a student to get a grade 4 (previously C). The number of topics that come up on the GCSE maths exam was cited by students as a challenge for them in achieving the grade they are hoping for. Learners struggling to retain information is something I have

observed in the classroom. Although it is a qualification most students have attempted before and therefore have some prior knowledge; when they are at college, they often have more responsibility and different priorities. Bellamy (2017) found that just under half of learners she interviewed also worked over 10 hours per week. However, it is the philosophy of this institution (and the basis of a previous research project that I have conducted) that not all topics should be taught to re-sit students, but rather fewer topics with more depth or a mastery approach. This has also been suggested by as Nixon, L and Cooper J (2020) who recommend a “less but better” approach. I will discuss this further in the recommendations section of this thesis.

A story I have often heard from students is how poor their maths teachers were at school, and this is often given as a reason for their lack of success. These views were given anecdotally and recorded in the research journal. This was something that came up a lot in the interviews too. Although this could be a typical teenage response to failure, to blame something that wasn't in their control, there could also be some truth to it. Many of the interviewees commented that they had multiple maths teachers whilst at school and college. One learner told me in a lesson that they were put into “bottom” set at school, and she found her teacher to be excellent. However, when the “top” set teacher went on maternity leave their teacher was reallocated to the “top” set and the “bottom” set were given the sports teacher. On recent visit to a local secondary school this issue was reinforced again where management admitted that pupils who were borderline for a pass were given more intervention than those with lower grades because these were the students that would affect their statistics.

*“I don’t really know why (there were so many teachers). I was at ***** school. I think the teachers didn’t like it there or something”*

Level 2 Health and Social Care student

In 2004 Adrian Smith ran an inquiry into post-14 maths and found there was a national shortage of maths teachers, especially those with a maths related degree. Haward, G and Homer, M (2016) found that 43% of maths teaching staff in FAVE did not have an A Level in maths compared to 4% in secondary school. This is reflected in this institution where of those who teach GCSE maths 22% do not have an A Level in maths, only 50% with a maths related degree and only 42% had a maths element within their teaching qualification. Although this is deemed as not important by this institution as having empathy and the skills to build confidence, it does beg the question where the maths teachers will come from if The Prime Minister Rishi Sunak’s maths policy is successful. In Smith’s 2017 review of post-16 maths, he recommended that it be compulsory for all students up to the age of 19 to continue to study maths to help the labour market (Smith 2017). He claimed that England is one of the few countries where maths is not studied by all post-16. However, Smith also declared in 2004 a recruitment crisis for maths teachers with a shortage of around 3,400 specialists.

During the research there were issues with recruiting maths teachers at this institution, leaving some classes without a teacher. Those who did have a teacher had disruption while classes temporarily doubled in size whilst the recruitment for a new teacher took

place. One student interviewed claimed to have been moved into 5 different groups before they settled into my class. The introduction of T Levels also caused issues with timetables. Some vocational courses transferred to T levels and some remained BTECs. These two qualifications have different expectations and guided learning hours so need to be timetabled differently. The pilot of T Levels came with teething issues for timetabling, again resulting in students moving groups and switching teachers. From experience, getting the first few weeks right sets a student up for success in the year. Lots of initial disruption can send the message that maths is not as important as their main programme. Students can also be very wary of joining a group that has already been established.

One of the challenges faced when moving between maths groups is that each maths teacher uses different methods to teach a particular topic. It seemed that the consistency of school was preferential to some as they got used to a teacher over many years, whereas in college they could have their transition maths teacher giving them one method and their GCSE maths teacher teaching something completely different. One learner commented that this was their biggest fear if they had to re-sit again, that they would get yet more methods which would confuse them. Recently there has been a shift in how maths is taught at school, with an emphasis on mastery. The National Centre for Excellence in the Teaching of Mathematics (NCETM, 2018) describes mastery as “acquiring a deep, long-term, secure and adaptable understanding of the subject.” Along with skills gaps due to covid lockdowns, this cohort are also from the years where there have been changes to maths curriculum. Therefore, they can be

taught all sorts of methods and come in with very different maths experiences. Future students re-sitting their GCSE maths with a background in mastery should in theory be able to adapt more easily to differing methods.

Many students also had a lot to say about the perceived quality of maths teachers they have had in the past. There seemed to be a perception amongst the group that maths teachers were inflexible and wanted things done a certain way. The opinion was that if a student could not adopt a particular method or struggled to understand the teacher believed them to be “stupid”. This was very disheartening to hear, as every effort was made on my part to make sure everyone in my lessons felt included and supported, I assumed that the culture of embarrassing someone for not knowing something had passed. It made me reflect on my own mathematical journey. I remember being asked to come up to the board to write up my answers knowing full well I had got them all wrong and freezing in fear.

“they’re (teachers) like “Oh this guy knows it, come up to the board”

Level 2 Health and Social Care student

The Education Policy Institute 2020 stated that teachers of high priority subjects such as maths are frequently asked to teach longer hours due to staff shortages. Could these maths teachers be perceived as lacking compassion due to burnout? Perhaps they have not managed to convey a culture of exploring problems and discussion rather than getting everything right due to lack of time and energy for teaching. These comments

show how essential it is for colleges to prioritise confidence building if these are the “scars” students leave school with.

The belief that lack of ability in maths makes them “stupid” seems to be exacerbated by which set they were put into at school. In Anna Bellamy’s (2017) research into the attitudes of learners participating in “forced resits” she found that all students commented on which set they had been put into when asked about their prior maths education. Similarly in this research, many chose to tell me what set they were in without being prompted. According to Boaler, J (2015) 88% of students put into low sets stay there until they leave school, although one student commented moving between sets created more opportunity for teacher change. Being streamed into a lower set seemed to go along with the belief that they could not do maths. Almost all comments about bottom set were linked to a negative term like “stupid”, “baby” or much worse! The Education Endowment Foundation (EEF) 2011 believes that setting and streaming has no impact on student progress, but conversely it can impact confidence and engagement. They also state that streaming can cause issues for disadvantaged learners as teacher expectations can lead to them being placed in lower sets, and once they are there it is difficult to move up or down.

“Too many maths teachers think that their role is to find the chosen few who are really good at maths, assigning the rest to low level sets and giving them low level work for the rest of their school lives”

Jo Boaler, 2015

Student feedback suggests that most GCSE maths learners were streamed at school, and until recently this institution also streamed its learners. However, based on evidence to show its negative impact, in the academic year of 2022/23 groups were mixed ability.

Disadvantaged students have struggled in other ways whilst at college. A high proportion of those sitting GCSE maths have special educational needs, disabilities or come from low economic backgrounds. Within this institution it is common for around 50% of learners sitting their GCSE maths to need extra provision during the exam. An unexpected theme from the research was how little support they had access to, some paying for private tuition or learning difficulty assessment. The institution made the decision that they could only offer exam provisions if they had been given them whilst at school. This was because they were overwhelmed by the number of requests put forward by teachers. It is not unusual for a student to come to college and settle into a smaller GCSE group only for the teacher to find they have undiagnosed learning needs that have been missed for many years. This is not helped by the GCSE content being inaccessible for the weakest learners. Students told me about being lost in large class sizes whilst at school. Some students started going down the path of diagnosis whilst at school, but it was put on hold because of covid lockdowns. When they started college, this was not resumed due to pressure to access support.

Another difference at college compared to school is the number of hours dedicated to studying maths. It is recommended that GCSE maths is studied over 120-140 guided learning hours. At this institution it is studied for 3 hours a week over 33 weeks. It is also only studied for one year, which is half what is studied at school. Many interviewees commented on the amount of time spent on GCSE maths at college. A surprising number stated that they felt they should be receiving more maths lessons, despite their dislike for the subject. One student commented that if they missed a maths lesson at college, they missed a whole topic since things needed to move so quickly. Higton et al (2017) found that teachers often felt the time pressure of completing the GCSE in a year and they didn't find enough time to work on fundamental concepts. To combat this Higton et al suggest using contextualisation to allow maths to be studied outside of formal GCSE maths lessons. This was the justification for the "transition" maths lessons, which I will analyse more closely in the next section.

Research question 3: To what extent do students engage with and see the relevance of contextualised maths lessons?

So that students could see maths as relevant, "transition" maths lessons were designed to link directly to their programme of study. The rationale for adding these maths lessons was to support their progress in GCSE maths with the hope that if they succeed in this area, they could move onto a T Level. The T Levels also include a maths element, with skills that will be needed in industry. This research interviewed and observed students studying Level 2 Business and IT (BIT) and Health and Social Care (HSC). The BIT students were given extra maths, but it was timetabled as if it was part

of their course and not an “extra”, whereas the HSC group were given discreet classes that were clearly labelled “transition maths”. This meant that the HSC students were able to give their opinions on these lessons more easily, whereas some of the BIT students were not even aware they were part of a curriculum pilot.

The students commented that they were given case studies and “real life stuff” to work out in their “transition” maths lessons rather than maths that would appear on their GCSE examination. The students felt that the content of these lessons would be beneficial to them in life but distracted them from the skills they were learning in their GCSE maths lessons. The BIT students did a lot of work on computers and spoke to me about the difficulty they would have translating this to a paper exam. They explained that they were often inputting numbers into formulae without much understanding of what the formulae were. One business student commented that calculating percentage profit was not something they had done in their business lessons, but that they had learnt it in their GCSE maths class. They all unanimously said that they felt their “transition” maths lessons did not support their progress in GCSE maths, and often found any linking between the two confusing especially when different methods were used.

"Nothing we learn in those (transition) lessons would be on our GCSE"

Level 2 Business and IT student

One reason why “transition” maths lessons cannot link seamlessly to the GCSE maths content is because most GCSE maths topics do not easily link to these two industries. The contexts used in GCSE maths are what MEI (2018, pp2) describe as “pseudo-contexts” where a context is forced into a maths question. This can reinforce the view that maths is not useful to real life. The students’ comments on contexts in GCSE maths exams were quite entertaining, my favourite being “Who’s Colin, and why do I care about his field?”. This comment highlights the challenge of using contexts to motivate. Boaler, J (2015) explains that we quite often ask students to leave all common sense at the door. The GCSE maths exam never uses realistic or current numbers in the questions. For example, a question regarding the best price of a loaf of bread would not use current or realistic costs, but rather costs that would test a certain skill such as division of decimals without a calculator. Boaler believes that this encourages students to ignore the contexts and just look at the numbers, therefore making both the maths and the context meaningless.

“it’s so confusing! Sometimes it’s like “Ben has 3 apples and 2 oranges so how far is he from x” it like makes no sense”

Level 2 Business and IT student

In fact, there have been many times over the years where students have come to me with questions about their own finances and then asked why we don’t learn “useful” maths in the classroom. Every year when I teach compound interest and explain a little about interest rates, there is always one student who is shocked that a bank would loan

you money and expect more than what was initially borrowed to be returned. I have had students comment that they don't need maths because they can budget by just buying everything that has a red discount sticker on. During the Covid-19 hospitality closures one of my students commented that they didn't understand why they were only getting paid 80% of their salary. I explained it was because he had been furloughed, and he asked why we didn't talk about pay cheques in class.

In general students found that the content of the GCSE maths curriculum was not useful or needed for everyday life. Students quoted memes they had seen which describe useless maths topics learnt at school. There was a consensus that anything to do with money would be beneficial but that not enough of this content comes up on the exam papers. It seems the main motivation for doing GCSE maths was the perception that it is an essential qualification that opens doors to different careers and further study. Bellamy (2017) found that students believed they would need a C (now 4) in maths more than they would need the skills of maths. Noyes et al (2020) found that motivation is lower in vocational areas where the main progression route is directly into employment and a mathematics qualification is not required. This was reflected anecdotally by the teacher of the HSC group, who commented that those who wanted to go into care and did not need a maths qualification were less motivated than those going into childcare who did.

"I don't know if I will use the maths I have learnt, a lot of it doesn't seem relevant"

Level 2 Health and Social Care student

"I think you need maths to get the job you want but you don't need the maths to actually do the job.

Level 2 Health and Social Care student

Students were even less motivated if their parents had apparent success without a GCSE in maths. Higton et al (2017) found that in further education the parents of learners had often had great financial success without maths qualifications, so sometimes did not value it. Conversely students were worried about having to re-sit as an adult, one student commented that her mother had to re-sit her to get a job she wanted, which she found embarrassing. It's clear that parents have great influence over the usefulness of the GCSE.

*"My mum never got her GCSE and she has her own business. There are loads of people without GCSE maths who earn ****loads"*

Level 2 Business and IT student

The usefulness of the maths GCSE to learners in FAVE is questionable since the maths they learn does not link to their course and in fact studying GCSE maths alongside the maths they will use in industry confuses them. This is especially apparent for the BIT students who do all their maths on a computer. Adrian Smith (2004) claimed he does not believe that the GCSE is a suitable qualification to prepare students for the skills needed in the workplace. MEI (2020) have also proposed that a new curriculum be developed specifically for students who are re-sitting their GCSE maths post-16. They

recommend that it include a steppingstone qualification and exclude any foundation tier topic that is not relevant to everyday applications. They also suggest creating higher grade boundaries.

In November 2022 students needed 56% to get a 4 (good pass exempting them from the condition of funding) and 72% for a grade 5 (Pearson, 2022). Given that 5 is the maximum a student can achieve in the exam, it does make me wonder what the point is in the rest of the paper. It can be very demoralising for a student hoping to “pass” but only being able to access around half of the paper. This can lead them to believe they have not done well and not return for the next examinations. These are grade boundaries for the most popular exam board, but for OCR it was 39% for a 4 and 56% for a 5 (OCR, 2023). Covid has influenced this, but the reforms to GCSE maths have also impacted the accessibility. There is now very little a grade 1 student can access, in fact you only needed 6% to get a grade 1 on the OCR paper in November 2023.

Functional skills is an alternative qualification some learners are able to study at college, although currently if they have a grade 3 on entry, they have to do GCSE.

Functional Skills is a more practical maths qualification that only includes real life maths. However, colleges often don't offer this as there is pressure for students to “make progress”. A student coming to college with a GCSE grade 1 and leaving with a grade 2 would be looked upon positively as they have made progress, whereas a student sitting Level 2 Functional skills and improving their skills but not passing the qualification would count as negative progress. Noyes et al (2020) criticises colleges for taking a “blanket” approach to GCSE, often ignoring students' individual needs, and not offering a choice

of qualification. This institution chooses to enrol every learner to GCSE regardless of their prior attainment.

The importance of results for accountability builds pressure for institutions to take measures to ensure as many students “pass” or get high grades as possible. Quite often these are strategies that are not necessarily student centred or in their best interests, and do not prioritise developing maths skills which is what these policies were brought in for in the first instance. These strategies are summarised in an article by the Intelligent Innovation Consultancy called “Teachers Behaving Badly” (2023). These can include:

- Streaming or selectively grouping by abilities
- Changing exam boards in the hunt for an “easier” option
- Opting for “easier” qualifications (such as GCSE over Functional Skills)
- Paying for early entry to November exams for the few who may “pass”
- Offering intervention or support to students who will benefit the institutions statistics rather than those who really need it.

Further to this, teachers know that examination performance is not always an indicator of actual level of attainment.

We can see how the value put on results has influenced the students involved in this study. Many students admit that their “transition” maths lessons are beneficial to industry and life, but almost all describe them as “pointless”, some admitting they do not attend as they believe them to be a waste of time. Bellamy (2017) identifies that

students see maths as an add on subject and not part of their course, whereas Higton et al (2017) found that students were more motivated in their GCSE maths lessons if they could get their maths “out of the way”. They found that institutions who offered early examinations as a reward for good work resulted in more engaged students. As a maths teacher who is passionate about helping young people who struggle with basic numeracy, this has been the most disheartening result of this research. It seems that students are unable to learn for the sake of learning, but instead believe that an exam at the end makes something useful. The students claim that the content of the GCSE will not help them in life and yet believe this is what will stop them from progressing and achieving their dreams. Despite this they will not engage in “transition” maths lessons which will give them the skills to perhaps be financially independent as it is not a mandatory course offering certification. These findings appear to signal the impact of what rigorous examinations can have on young people and how mandating qualifications can influence their importance.

This brings into question the usefulness of contextualising lessons. Students cannot seem to engage unless there is a certificate at the end, but the GCSE does not offer contexts that are practical or relevant. Contextualising is often time consuming for the teacher and from these student responses seem to offer little reward. Whilst we are in the context that we are in of mandatory GCSE maths resits for most, perhaps the time would be better spent on other strategies such as working on growth mindset, mastery skills and classroom culture.

Conclusion

This research was designed to understand the effectiveness of a drastic curriculum change and its impact on learners. However, the overarching message I have received from learners is that our educational systems make learning extremely difficult. Whilst being very able to articulate themselves, students struggled to explain why they were studying maths. They knew maths as a topic was important but didn't see these skills in the GCSE curriculum. They knew the GCSE qualification was important, but only saw it as a necessary step to move onto further study or better employment. They know that maths is important, but all they hear is "nothing else is important". What I found was a group of demoralised and disheartened students who felt they were up against something unachievable.

This is reflected in the curriculum change, which attempts to give learners "useful" skills and motivate. But instead, it seems to do the opposite, frustrating them that the maths being demonstrated as practical for life does not match the qualification the government insist is essential for career and educational progression. The message is confusing to both students and teachers. We are in a landscape where maths teachers are short and there are outside pressures to get good results. Contextualisation seems to require a lot of effort for little reward if the goal is for it to produce more grade 4's. And, if a student feels that downtrodden, contextualising learning are not going to have the motivational effect that we hope, their confidence needs to be addressed first. We should not be pretending the maths they need for the GCSE is something different.

The students interviewed amazed me in the way they expressed themselves. I underestimated their understanding of some of the complexities of the education system. They were more positive about learning maths than I had expected, many saying they would study it even if they hadn't been forced. I heard lots of positive comments about the progression they had made whilst at college. They were all annoyed at the system they found themselves in but were facing it with maturity even when it was affecting their self-esteem.

We are in the system that we are in, and it is therefore necessary to do the best we can to educate within the parameters we have been given. For me I have always prioritised the teaching of maths and not getting lots of grade 4's. My hope is that students will leave my class with better skills that will help them in life. In chapter six I will make recommendations based on this research which I hope will help other practitioners teaching GCSE maths in a FAVE.

Chapter 6: conclusions and recommendations

Conclusions

This research has generated these conclusions, which this chapter will explore in further detail:

1. The GCSE as it currently is, is not a qualification fit for purpose for those re-sitting at college on vocational qualifications.
2. Contextualisation of the GCSE maths curriculum to learner's programmes of study can only work if it is an honest representation of what is happening in real life.
3. Adapting curriculum to fit policy reform often overlooks the actual needs and best interests of learners.

"I think you need maths to get the job you want but you don't need the maths to actually do the job"

Level 2 Health and Social Care "Transition" student

This quote from a GCSE maths re-sit student who is also studying on a Health and Social Care "transition" course is reflective of the sentiment I received from most students that I interviewed. The qualification that they could potentially receive is useful, but the maths they learn on that qualification is not. This conflict between learning because it is mandated and/or will prevent progress compared to learning because the skills will be beneficial or for the sake of curiosity became central to this investigation. It

reflects how we view education as a society, and the value we place on the certificate rather than the journey.

This project was practitioner research, I was lucky enough to be in a context where I was able to observe learner experiences first hand. The research came about through a real challenge at the institution following the implementation of T Levels, and a concern that recruitment onto these courses would be low given the continuously low “pass” rates for GCSEs in FAVE. The institution introduced extra supplementary contextual maths lessons in the hope that the learners enrolled into these “transition” maths lessons would make better progress, leading to more passes and more opportunities for these learners. This research project gave learners participating in this pilot the opportunity to comment on the new curriculum development as it was happening. The first research question I hoped the learners could help me to answer was:

How do students view maths in relation to their educational progression?

The learners who participated in this research were studying two types of maths courses, one that would gain them a qualification (GCSE maths) and one which would not (“transition” maths). The GCSE was deemed the most important to them, even though they felt that the maths was not particularly relevant:

"I don't know if I will use the maths I have learnt, a lot of it doesn't seem relevant"

"we need a GCSE to actually do that course (as opposed to needing it for life)"

When commenting on the maths that they learnt in their supplementary contextual “transition” maths classes, students commented that this maths was more useful to that on the GCSE:

"It's real-life stuff. Like it's probably more important actually"

"I think it is going to be relevant to our future jobs"

However, participants in this research seemed unwilling to learn the maths that they deemed to be most useful, as it did not lead to a qualification and distracted them from the GCSE which was the real barrier to their progression.

"you didn't get anything for it in the end so no one turned up"

*"Those are pointless. They don't go towards anything so everyone just ****es about"*

Through these discussions with students and other data collected, the first and most important conclusion for this research is:

The GCSE as it currently is, is not a qualification fit for purpose for those re-sitting at college on vocational qualifications.

This research has shown that students are unable to identify how the GCSE in maths will prepare them for the real world. Students already had a preconception that maths was not a subject that would help them and was a bit of a waste of time.

"there's always people joking about maths saying stuff like...I dunno "Times I have used Pythagoras in life, zero times". You see those memes don't you?"

Unfortunately, the introduction of extra contextual maths lessons has reinforced this opinion, as the students have been shown maths that is applicable to their life after college and see that this content is not in their GCSE maths course. Students feel conflicted with the maths they are learning in their GCSE and identify that this is the most important maths because the qualification will stop them getting to the next stage of education or employment. Every learner interviewed stated that obtaining their maths GCSE was the biggest barrier to their educational progression. Students have identified that the maths they learn on their course is more applicable to their careers but will not engage with it as it interferes with what they learn in their GCSE.

The interviewees do not value the skills they learn within the GCSE qualification. They made suggestions about the type of maths they wished they could learn, most suggested was financial maths. The fact that Vocational teachers created a maths curriculum based on their lived experience of using maths in industry to deliver to these learners, and apparently none of this content is on the GCSE shows that very little of the GCSE curriculum is going to support them after they leave college.

Students see achieving the GCSE as a necessary step to getting a job or progressing to the next step. They see the skills that they are learning as useless. This is a very demotivational message.

"It affects your confidence though because obviously I have done it for lots of years. And each time my confidence just goes like down."

"Like, I understand we use money and that but we don't actually learn anything important in lessons"

In chapter two there was an exploration of the benefits of contextualising maths to make it more engaging to learners who are re-sitting. A 2014 OFSTED document recommended to FAVE institutions that realistic working environments should be used to motivate and inspire learners and use relevant commercial contexts as the basis for learning (OFSTED, 2014). MEI (2018, pp1) claim that contextualisation can help to make maths “less threatening” and “more meaningful”. However, staff have anecdotally told me that their struggle to link the maths needed for the GCSE into relevant contexts as they feel like they are retrofitting the maths into their scheme of work.

In academic year 2023/24, there was a change of direction for the “transition” maths lessons and the scheme of work was written by GCSE maths teachers. The reason for this was that it was felt that students needed the support with GCSE rather than the maths skills that were linking to their main course. The maths teachers who designed this curriculum were tasked with creating a scheme of work that gave students some practice using their GCSE maths skills in a relevant context for their course. The maths teachers who have design this scheme have stated that they struggle to find relevant links between the two.

There are many justifications that I can see for a different GCSE for students who are re-sitting their GCSE post-16 other than the fact that students have found the content demotivational and irrelevant. The first is that the qualification was not designed for them. It is a school level qualification that is taught over two years (Pearson, 2019),

repeated at college in one. It is therefore impossible to cover the content in the time allocated to teachers. It feels like a race to cover as much as possible in a year, and students commented that they needed more lessons at college or for the pace of the lessons to be slower to help their understanding. From a personal perspective teaching these students first-hand, it is frustrating to leave topics behind that I know will benefit them greatly in life because of the pressure to move onto topics that will help them gain marks in the examination. I have been asked to help students with their pay cheques and have had questions about how their tax is calculated. I would love to do a series of lessons on these useful skills but feel unable to commit the time to it. It is especially frustrating when a learner is struggling on a seemingly “irrelevant” topic (algebra came up a lot here) when you know time would be better spent for them on things that support their financial understanding. Boaler, J (2015) explains that one of the challenges with current maths qualifications is that students are often expected to leave common sense at the door for example students are given money problems which are not realistic to the actual cost of things.

The GCSE exam has three exams, two calculator and one non-calculator. It is a huge undertaking for colleges to coordinate 3 exams each summer. In June 2024 this institution is expected to have over 1000 GCSE maths students aged 16-19 sitting their exam (a further 130 adults will also sit). In previous years the institution has had to close entire buildings to house all the learners. The exam could be designed in a way that does not cause these issues for FAVE institutions, perhaps more flexibility for when students attempt the exam or consideration into how many exams are taken.

The content of the exam could include more relevant skills, but the grade boundaries do not currently support students aiming to progress in maths. In June 2023 a student who achieved a grade 1 in the OCR paper only needed 7% (20 marks out of 300). These marks can be found with careful training. It is common for maths teachers to suggest guessing multiple choice questions or multiplying numbers if in doubt as most calculations involve multiplication. There is not a lot of content a lower ability student can access. Too much of the exam is focused on higher level skills. The highest grade you could get on the Foundation tier paper is a 5, which was a 59% pass rate. What is the other 41% of the paper useful for?

From a personal perspective, I believe that if the exam removed some of the content that was designed for those who are hoping to go onto higher level maths and increased the content that would be useful to general life skills, a higher level of maths could be taught. This would satisfy the Lord Sainsbury (2016) recommendation that a grade 4 is not a high enough grade for the maths skills needed in society. A different GCSE that is focused on life skills could also be taught to the whole cohort rather than just those who “failed”. This could eliminate streaming and support the initiative to introduce maths to 19 (gov.uk, 2023). If the maths were more applicable to their main course, there would be justification for using non maths specialists to teach the course. There is a currently recruitment crisis for maths teachers (Smith, 2017), and feedback from learners was that their maths education had been disrupted by changes in teachers and/or unqualified teachers preparing them for their exam.

“our teachers were constantly changing, and they all had different ways of teaching”

The second research question I hoped to answer was:

To what extent do students engage with and see the relevance of contextualised maths lessons?

In 2020 MEI suggested that the GCSE which is studied in school is not fit for purpose. It proposes that a new GCSE is created for these students, which contains more maths seen in the workplace and less of the content contained on the current GCSE which is designed to prepare learners for further study in maths. This research supports this notion, and certainly the students who participated in the study would prefer a qualification that offers them support with the maths they will use upon leaving college.

This leads to a second conclusion that teachers and institutions need to be very careful about contextualisation.

Contextualisation can only work if it is an honest representation of what is happening in real life.

A recurring theme from students who participated in this research was that they struggle to relate to the contexts presented in the GCSE maths exam. This disconnect makes the maths more confusing, less engaging and students struggle to see the relevance of what they are studying to their everyday life. One student described the exam contexts as “laughable” and observed that they were far removed from practical application. This issue is further compounded by the fact that many students already view maths negatively.

In chapter 2 I introduced research that promoted the use of contexts for engagement and understanding, however this research shows that quite often it can do more harm than good. Students were aware when contexts are artificially integrated into maths, MEI (2018,pp2) call these “pseudo-contexts” When the contexts are forced like this or feel irrelevant to the students, they fail to support understanding and instead add to their confusion, reducing the effectiveness of the learning process. Unfortunately, almost all of the contexts used in the GCSE exam are examples of “pseudo-contexts”, so therefore emphasis on supporting real life maths can be seen as a distraction for students. The current GCSE curriculum does not offer many opportunities to explore the maths that is relevant to students’ real-life experiences and future needs.

“Who’s Colin and why do I care about his field?”

This comment from a student highlights the challenge of making maths contexts meaningful and relatable. It shows the students’ ability to see through forced and artificial contexts in exam questions, and their frustration that they do not relate to their lived experience. However, Chapter 3 also highlighted that a benefit for contexts could be in supporting memory retention. Students did recognise that contexts using mnemonic devices, such as a “factorpillar” for remembering factors, were genuinely useful. However, there is no pretence here that it is a real-life scenario.

Extensive planning and resourcing are also required for effective contextualisation, which was apparent in the preparation for “transition” courses. The disconnect between the “transition maths” lessons and the GCSE content led to disengagement, as the skills

taught were perceived by students as irrelevant to their progression and a distraction to their GCSE preparation, even if they felt it was more useful to their lives. It also assumes that every learner is enrolled onto a programme they are interested in, which from experience is often far from the truth.

This leads to the third research question and conclusion:

How has curriculum and policy change affected the experience of studying maths?

Adapting curriculum to fit policy reform often overlooks the actual needs and best interests of learners.

This research started in 2020 and concluded in 2024. Over the 4 years, there were 4 policy changes announced that affected the delivery of re-sit maths in FAVE institution. Although this was challenging to overcome as a practitioner, as a researcher it meant I was in a privileged position to see an institution respond to these changes first-hand. These responses fed into my research and formed part of my field journal. The main thing I observed was how the institution struggled to meet the targets set by a policy, whilst also meeting the needs of students. These included:

1. **An inflexible qualification approach:** The necessity for all students to take GCSE maths exams regardless of their individual needs or careers paths highlights a rigid system that prioritises policy over student-centred learning. This inflexibility fails to understand the diverse learning style FAVE institutions

cater for and the plethora of aspirations held by young people. Noyes, A and Dalby, D (2020) call this the “blanket GCSE” approach where all students are expected to complete a GCSE in maths and are not given a choice in their maths course.

2. **Teaching beneficial maths:** teaching maths that benefits students’ understanding and confidence, regardless of its direct contribution to GCSE grade attainment can lead to better overall outcomes. Focusing on practical and applicable maths skills, rather than sticking strictly to the curriculum for examination purposes could enhance learner confidence and interest in maths.

3. **The detrimental focus on mandatory qualifications:** The emphasis on qualifications like the GCSE has shown to hinder students’ motivation for learning. This was evidenced by students wanting to opt out of their GCSE course when they thought the policy had changed to allow it, and the lack of engagement in “transition” maths lessons solely because it did not lead to a qualification at the end. This indicated that student perception of what is beneficial for their personal and professional development is different to educational policies.

4. **Data-driven decisions vs student-centred approaches:** When teaching strategies and interventions are aligned with data trends, especially for students who are on the borderline of a grade 3/4, it often overlooks individual student needs. The mandatory GCSE re-sit has led to some institutions prioritising outcomes over individual learning experiences.

5. Impact of teacher shortages: This research shows how high-priority subjects such as maths are inflicted with teacher shortages. This can lead to higher workload for these teachers and result in poorer maths lessons. For the institution where this research took place, students were faced with changing teachers, merging of GCSE classes and inconsistent teaching methods.

6. Personal confidence in advocating for student-centred strategies: Reflecting on these findings has bolstered my confidence in challenging strategies that are presented to me that are not learner focused. This has again highlighted the importance of giving students a voice in policy reform, as they have clearly expressed concerns about how their education is formed.

Each of these points demonstrates the challenges in aligning educational policy with the true needs of learners, particularly in the context of GCSE maths education in vocational settings.

Opportunities for enhancing this research:

If I were to continue this research, I would want to explore:

1. What an alternative qualification could look like in consultation with learners

2. More research into how to create links between vocational courses and the GCSEs. How can the content be made relevant, and students be further supported in achieving the qualifications they need to progress?

Limitations of the research:

1. This is a small number of students giving anecdotal opinions on their experience in one institution. It is not reflective of every learner experience.
2. Consultations were made over two academic years, the experiences between the two years had changes due to necessary responses to new policy.
3. My own learners were more enthusiastic to talk to me, as they knew me.

This could cause some bias.

4. Students were selected on a voluntary basis, but due to SEND/safeguarding restrictions not every student was offered the opportunity.

Therefore, it can't be said that the experiences of these learners are inclusive of those who have greater needs. They were mostly, for ethical reasons as explained in chapter 4, excluded from this research.

Recommendations:

There is a disparity between the skills taught in GCSE maths and those required in real-world applications. This lack of relevance to learners disengages them and fails to prepare them adequately for practical aspects of their future careers. Financial maths, which students are often engaged by and is more relevant to their everyday life, is absent from most of the GCSE curriculum. A redesign the GCSE maths curriculum for

FAVE students which includes more real-world applications and financial maths could offer a qualification that is both engaging and supports academic progression. This aligns with the views students expresses in Chapter 4's data analysis, which highlighted the need for more relevant and applicable content that does not conflict with the maths they are introduced to through their main course.

Therefore, the main recommendation for this research is that the structure and content of the GCSE maths curriculum is reconsidered for vocational learners. A curriculum that focuses more on practical maths and less on abstract concepts could bridge the gap between academic qualifications and real-world applications.

This research also leads me to the following recommendations:

1. Allow for more flexibility in the examination process, allowing institutions to pick the right qualification for the student. This in turn could reduce the logistical strain on institutions and provide a more accommodating environment for students. The burden of conducting GCSE exams to institutions is significant.
2. Focus on strategies that build confidence and a positive mindset towards maths, rather than attempting to contextualise maths to the vocational curriculum. This strategy takes a lot of planning for little reward, as evidenced by students remarks about contextualisation in Chapter 4. Practitioners should take more time to prioritise understanding learner's unique needs, interests and learning styles.

3. Practitioners should continuously incorporate student feedback into the learning process. This allows for teachers to adapt their teaching methods to suit the needs of the learners. Student feedback should be valued and acted upon, and they should have a say in how their education looks.
4. Engage with policy makers to advocate for educational reforms that are in the best interest of learners. Lecturers play a vital role in sharing insights from the frontline of education, this should be shared to shape policies that support meaningful learning experiences rather than those that just comply with policy.

Impact the research has had on me and my practice.

When I began this research, I was following a problem that had been identified within the institution where I worked. What I found was how little learners are consulted in curriculum design and policy reform. They often see education as something that is done to them rather than something they equally participate in. The biggest thing I took away from this research was the importance of the learner feedback process, and to include elements of curriculum design within this.

The learners who volunteered for this research had a lot to say. I was moved by their frustration and feelings of helplessness when it came to progress in maths. But many were much more understanding of why and how policies came into place that I previously gave them credit for. They understood that their maths skills were not where they should be and were willing to improve. They felt frustration that the skills they were

learning were not supporting their main course or even the maths they were beginning to experience in the outside world.

One thing that this research has given me is the confidence to challenge decisions that are made that are not learner focused. Through looking at the context of maths in FAVE I have gained a good understanding of how we have got where we are. I have also understood through the research how certain pedagogical recommendations have come to us, and some of it has come from shaky groundwork. I am therefore more confident to question decisions and ask why before they impact the learners. The candidness of the learners' responses will remain in my mind when the curriculum is steered to suit the most recent agenda or policy.

The project has also benefitted my career progression and has led me to support a CPD project across the region for re-sit maths and English teachers. Had I not had a solid understanding of the strategies used to support the re-sit policy previously, as studied as part of this research, I would not have felt able to put myself forward for this change in career.

Closing remarks

Throughout this research I have been amazed by the profound understanding and clarity expressed by the students. Their voices have highlighted the key issues with the current educational framework, particularly within the context of GCSE maths for vocational learners. It has been both insightful and disheartening to hear the challenges

they face, their sense of resignation and the feeling of being failed by a system that does not properly prepare them with the skills they will need once they leave college. Hearing them articulate their experiences of being unsupported and undervalued shows how important change is needed in our approach to education in this country.

Their comments and feedback have been fundamental in creating the conclusions and recommendations in this chapter. The difference between what they are taught and what they perceive to be useful reflects a deeper issue with the educational system which fails to recognise the diverse talents and aspirations of students.

This research has reignited my commitment to championing change and advocating for educational strategies that genuinely support our learners. The next steps are not about whether contextualisation is an appropriate strategy, but about reimagining the educational system so that it values and caters to the unique needs and potential of every learner. We need to move away from a one-size-fits-all model and embrace a learner-focused approach that does better at preparing them for life after college.

As an experienced FAVE re-sit teacher, I am motivated to contribute to this change and work towards a system that empowers rather than demotivates students. We owe it to our students to create an environment where they feel valued, understood, and equipped for the challenges and opportunities that lie ahead.

References

Bellamy, A 2017. *Forced GCSE mathematics resits: Students' voices*. London: British Society for Research into Learning Mathematics

Biesta, G (2020). *Risking ourselves in Education: Qualification, Socialization and Subjectification Revisited*. *Education Theory*. 70 (1). Pp89-104

Boaler, J. (2015) *The Elephant in the Classroom: Helping children learn and love maths*. London: Souvenir Press

Coe, R, Waring, M, Hedges, L.V, Arthur, J, L.D Ashley (Eds) (3rd Edition). (2021) *Research Methods and Methodologies in Education*. London. Sage.

Coffield, F. 2008. *Just suppose teaching and learning became the first priority*. London: Learning and Skills Network

Dalby, D, Noyes, A (2016) *Locating mathematics within post-16 vocational education in England*. *Journal of Vocational Education and Training*. 68 (1). pp. 70-86

Dalby, D , Noyes, A, (2015) *Connecting Mathematics Teaching with Vocational Learning*. *Learning Mathematics: An International Journal* 10(1). pp. 40-19

Dalby, D.M. (2014) *The connections and contradictions in student responses to contextualised tasks*. *Research in Mathematics Education*, 16 (1). pp. 75-76. ISSN 1754-0178

Department for Business, Innovation and Skills, 2016. *Post-16 Skills Plan* [pdf]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/536043/Post-16_Skills_Plan.pdf [Accessed 12 April 2021]

Department for Education, 2023. *Careers guidance and access for education and training providers* [pdf]. Available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/

[le/1127489/Careers_guidance_and_access_for_education_and_training_providers_.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/1127489/Careers_guidance_and_access_for_education_and_training_providers_.pdf)

[Accessed 6 August 2023]

Department for Education, 2021. Introduction of T Levels [online]. Available at:

<https://www.gov.uk/government/publications/introduction-of-t-levels/introduction-of-t-levels>

[Accessed 11 January 2022]

Department for Education, 2017. Report of Professor Sir Adrian Smith's review of post-16 mathematics [pdf]

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/630488/AS_review_report.pdf [Accessed 12 January 2022]

Department for Education, 2021. Skills and Post-16 Education Bill [online]. Available at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1035459/Skills_and_Post-16_Education_Bill_November_2021_policy_notes.pdf [Accessed

11 January 2022]

Education Endowment Foundation, 2019. Embedding contextualisation in English and mathematics GCSE teaching [online]. Available at:

https://educationendowmentfoundation.org.uk/projects-and-evaluation/projects/embedding-contextualisation-in-english-and-mathematics-gcse-teaching?utm_source=/projects-and-evaluation/projects/embedding-contextualisation-in-english-and-mathematics-gcse-teaching&utm_medium=search&utm_campaign=site_search&search_term=context [Accessed 9 January 2022]

Education Endowment Foundation, 2011. Teaching and Learning Toolkit [online]. Available at:

<https://educationendowmentfoundation.org.uk/education-evidence/teaching-learning-toolkit>.

[Accessed 10 January 2022]

Education and Policy Institute, 2020. *Teacher Shortages in England* [online]. Available at:

https://epi.org.uk/wp-content/uploads/2020/02/Teacher-shortages-and-pay_2020_EPI.pdf

[Accessed 23 December 2021]

Education and Skills Funding Agency, 2014. *English and maths requirements in apprenticeship standards at level 2 and above*. [online] Available at:

<https://www.gov.uk/government/publications/english-and-maths-requirements-in-apprenticeship-standards-at-level-2-and-above> [Accessed 20 December 21]

Education and Skills Funding Agency, 2014. *16 to 19 funding: maths and English condition of funding*. Available at:

<https://www.gov.uk/guidance/16-to-19-funding-maths-and-english-condition-of-funding#contents> [Accessed 26 March 21]

Education and Skills Funding Agency, 2024. 16 to 19 funding: maths and English condition of funding. Available at: <https://www.gov.uk/guidance/16-to-19-funding-maths-and-english-condition-of-funding#changes-for-2024-to-2025> [Accesses 24 February 2024]

FE Week, 2023. *GCSE resits 2023: Maths and English pass rates down again*. [pdf] Available at: <https://feweek.co.uk/gcse-resits-2023-maths-and-english-pass-rates-down-again/> [Accessed 21 October 23]

Hayward, G. & Homer, M. (2016). *Profile of the mathematics teaching workforce in the college sector in England*. London: Gatsby.

Higton, J et al, 2017. *Effective practice in the delivery and teaching of English and Mathematics to 16-18 year olds [pdf]*. available at:

[C:\Users\harrietgriffey\AppData\Local\Microsoft\Windows\INetCache\Content.Outlook\TDSZFBF\WHigton et al. \(2017\) English and Mathematics to 16-18 year olds.pdf](C:\Users\harrietgriffey\AppData\Local\Microsoft\Windows\INetCache\Content.Outlook\TDSZFBF\WHigton et al. (2017) English and Mathematics to 16-18 year olds.pdf) [Accessed 24 May 2021]

Intelligent Innovation Consultancy, 2017. *Teachers behaving badly*. Available at:

<https://www.silverbulletmachine.com/single-post/2017/09/02teachers-behaving-badly> [Accessed 21 October 2023]

Ireland, J, 2019. *Studying English and Maths at Level 2 post-16: Issues and Challenges*. Cambridge: Research Matters. Issue 28

Joint Council for Qualifications, 2019. *GCSE (Full Course) Outcomes for key grade for UK, England, Northern Ireland & Wales, including UK breakdowns*. Available at:

<https://www.icq.org.uk/wp-content/uploads/2019/09/GCSE-Full-Course-Results-Summer-2019.pdf> [Accessed 26 March 21]

Maslow, A. H. (1958). *Understanding human motivation* (pp. 26–47). Howard Allen Publishers.

Maths Education Innovation, 2020. A new maths GCSE curriculum for post-16 resit students. [pdf] available at: <https://mei.org.uk/about-me/what-we-do/current-projects-and-programmes/a-new-maths-gcse-curriculum-for-post-16-resit-students/> [Accessed 21 October 2023]

Maths Education Innovation, 2018. *Contextualising post-16 GCSE Mathematics: a toolkit [pdf]*. Available at: https://mei.org.uk/files/pdf/P-16GMCT_About_the_toolkit.pdf [Accessed 28 May 2021]

Monica McLean, Andrea Abbas & Paul Ashwin (2013) *A Bernsteinian View of Learning and Teaching Undergraduate Sociology-based Social Science*. Enhancing Learning in the Social Sciences

National Centre for Excellence in the Teaching of Mathematics, Information for school leaders. Available at <https://www.ncetm.org.uk/professional-development/school-leaders/> [Accessed 12 August 2023]

Nixon, L, Cooper, J (2020) *Less but Better? Teaching Maths in Further Education and Collateral Growth*. Education Sciences, 10

Norris, E, Adam, R (2017). *All change: Why Britain is so prone to policy reinvention, and what can be done about it*. London: Institute for Government

Nowell, S., Norris, J., White, D., and Moules, N., (2017) *International Journal of Qualitative Methods* Thematic Analysis: Striving to Meet the Trustworthiness Criteria.' Volume16 (pp 1- 13)

Noyes, A, Dalby, D. (2020). *Mathematics in Further Education Colleges*. London: Nuffield Foundation

Nuffield Foundation, 2019. *How do shortages of maths teachers affect the within-school allocation of maths teachers to pupils?* [pdf] Available at: https://www.nuffieldfoundation.org/wp-content/uploads/2018/06/Within-school-allocations-of-maths-teachers-to-pupils_v_FINAL.pdf

[Accessed 21 October 2023]

OCR, 2023. GCSE grade boundaries 2023 [pdf]. Available at <https://ocr.org.uk/Images/690906-gcse-grade-boundaries-june-2023.pdf> [Accessed 21 October 23]

Ofsted, 2020. Covid-19 series: briefing on further education and skills, November 2020 [pdf].

Available at

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/943486/COVID-19_series_briefing_on_FES_November_2020.pdf [Accessed 6 August 2023]

Pearson, 2015. GCSE changes [online]. Available at:

<https://qualifications.pearson.com/en/qualifications/edexcel-gcses/gcse-changes.html> [Accessed 12 January 2021]

Pearson, 2019. The reform of Functional Skills Mathematics. [pdf]. Available at

<https://qualifications.pearson.com/content/dam/pdf/Functional-skills/FunctionalSkillsMathsWebinar210319.pdf> [Accessed 12 January 2021]

Scott, D and Usher, R (1996) *Understanding Educational Research*, New York. Routledge.

Silver Bullet Machine, 2023. Teachers behaving badly!

<https://www.silverbulletmachine.com/single-post/2017/09/02/teachers-behaving-badly>

[Accessed 12 August 2023]

Smith, A. (2004). *Making Mathematics Count: Professor Adrian Smith's Inquiry into Post-14 Mathematics Education*. Department for Education and Skills

Social Mobility Commission, 2008. *The road not taken: the drivers of course selection* [pdf].

Available at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/973596/The_road_not_taken_-_drivers_of_course_selection.pdf [Accessed 28 May 2021]

Times Education Supplement, 2021. GCSEs 2021: Results at a glance [online] Available at: <https://www.tes.com/magazine/news/secondary/gcses-2021-results-glance> [Accessed 29 August 21]

Times Education Supplement, 2019. Dylan William: Teaching now a research-based profession. [online] Available at: <https://www.tes.com/magazine/archive/dylan-wiliam-teaching-not-research-based-profession#:~:text=As%20soon%20as%20humans%20are,tell%20teachers%20what%20to%20do.> [Accessed 10th May 2022]

William, D, Bartholomew, H. (2003). *It's not which school but which set you're in that matters: the influence of ability grouping practices on student progress*. British Educational Research Journal, 30 (2). pp 279-293

Winch, C (2008). *Knowledge, skills, competence: European divergences in vocational education and training (VET) – the English, German and Dutch cases*. Oxford Review of Education. 35 (5), pp 547-567

Winch, C (2021). *Learning outcomes: The long goodbye: Vocational qualifications in the 21st century*. European educational research journal EERJ, 22 (1). Pp20-38

Wolf, A 2011. *Review of Vocation Education – The Wolf Report*. Department for Education

Appendix

Baseline questionnaire: summary of responses

Q1: *What's is your current GCSE maths grade?*

Grade 3: 80%

Grade 2: 80%

Q2: *What is the main course you are studying this year and the level?*



Q3: *How many hours per week do you study maths this academic year?*

1 hour: 2.5%

2 hours: 2.5%

3 hours: 67.5%

4 hours: 25%

I don't know: 2.5%

Q4: *What do you hope to do after you complete your current course?*

(50% of respondents answered "T Level")

Q7: How do you think maths is used in the industry you hope to go into?



Q8: When you think about your maths education so far, what comes to mind?



Q9: How many hours of maths did you have per week when you were at school?

4 hours: 30%

5 hours: 60%

6 hours: 10%

Q10: Are you retaking GCSE English this academic year?

No: 62.5%

Yes: 37.5%

Full interview responses and their corresponding codes

<u>Theme description</u>	<u>Student response</u>
Current course	"It's like a transition. In Health and Social Care"
Feelings towards not achieving a grade 4	OK, I was disappointed because I thought I worked hard but it was a lot in a year you know
Impact of Covid	"exams were cancelled because of Covid so I just like got given a 3. I don't think I learnt much that year as learning at home was hard" "but exams were cancelled again" "But school was in covid and I didn't learn online, I just sat on the computer and pretended to listen." "I asked to be assessed for dyslexia but they never did it because of covid." "I know, because we all missed out on so much " "My teacher made me believe I could get a 4 so I didn't do any revision for the exam. I know covid and everything means teachers couldn't always give the grades they wanted, but I was really disappointed."
Feelings towards exam/course repetition	"I really hope I get it this time as I have done all this extra work you know" "(students in my class" Kind of annoyed. Because they thought they would actually pass it this year" "Annoyed and like kind of feel like frustrated because I thought I would actually pass it because I did really good." "I don't want to do it again.....again!" "Now I think it's a good thing that I had to do it again. At college I've realised how much I didn't know. I can see how much I have improved in one year. " "A bit (worried about having to repeat the exam). Not really. I felt confident in the exam because I feel like I have learnt a lot this year. But then I felt confident last time. I would be really upset if I failed again. It would be hard to try this hard again. " "What worries me is that I might not ever get on the course. I wouldn't mind doing a T Level and resitting maths alongside the T Level. What worries me is that I don't get that maths and I can't do the T Level. I don't mind doing maths again and again and again. " "It worries me because I am an adult and I would have to go on an adult course. I think you have to pay because I have done my 3 years free. I don't know if I can afford it, I don't know how much it is. With the times of doing maths if I have a job as well, can that fit together. If I want to do bartending that's usually in the evenings. " "In high school I got level 1, first year of college I got level 2 and last year I got level 3 maths. " "We use maths every day so it might be beneficial to pass. " ". I think it's a good thing because if you did pass you would get more job

	opportunities. But they should make it easier for you to pass. If you failed so many times you're not realistically going to get it are you? "
Confidence level	<p>"I am feeling confident."</p> <p>"I have always thought I would get maths by the end"</p> <p>"but we have to be confident this time guys! Manifest what we want"</p> <p>"I was confident last time and look where that got me! I am going to be less confident this time"</p> <p>"you have to believe you can do it or you'll just fail again"</p> <p>"so much pressure!"</p> <p>"I have been looking at other options. I've just tried twice now to get my maths and am worried I won't get it. I have been looking at (another college) at an equine course because I love horse riding and you don't need maths."</p> <p>"I wish I could have sat the exam in November but I think I would have failed again."</p> <p>"</p> <p>"I feel confident going into the next exam as we have practiced the questions loads."</p> <p>"</p> <p>"But I just know that I am not going to pass maths."</p> <p>"It affects your confidence though because obviously I have done it for lots of years. And each time my confidence just goes like down. And with the question about mixed classes I was with someone who was going for a 6 or 7 grade and that's when I was aiming for a 2. It was so different and it was kind of lost my confidence. And I had a TA with me. It didn't help my confidence and I hated the class"</p>
Career/ Educational goals	<p>"I want to do an apprenticeship at ***** next year and I need a 4 in maths."</p> <p>"I'm was going to do a Level 3 or an apprenticeship, but I might just go straight into a job."</p> <p>"Health care assistant. But I need my biology as well as my maths."</p> <p>"I don't really know, but I wanted to do a Level 3 because then I would be able to do anything in like the hospital."</p> <p>"we all want to do a T level in business"</p> <p>"I want to do a T Level next year and we have been told we have to pass maths. I want to do business. I am not sure what I want to do when I leave college though"</p> <p>"I want to be a nurse. "</p> <p>"I want to get a job. I want to be a bartender so I just need to know money really. "</p> <p>"I would like to do the T Level but they won't accept you unless you have a 4 in maths"</p> <p>"I want to be a doctor but realistically that's not going to happen because I am not going to get my maths. "</p> <p>"I want to do level 3 Health and Social care, not the T Level."</p>
Motivation	"Sometimes I don't want to do it and get lazy and that but I want a good job you know"
Maths appearing in students' course	<p>"I guess IT has a lot of maths anyway but it's all like spreadsheets and everything."</p> <p>"You taught us how to calculate profit and I never did that once on my business course! In the whole year!"</p>

Usefulness of GCSE maths	<p>"there's always people joking about maths saying stuff like...I dunno "Times I have used Pythagoras in life, zero times". You see those memes don't you? "</p> <p>"I don't understand why we have to do it. "</p> <p>"Like, I understand we use money and that but we don't actually learn anything important in lessons"</p> <p>"Like we did profit one time and interest rates"</p> <p>"My mum never got her GCSE and she has her own business. There are loads of people without GCSE maths who earn ****loads. "</p> <p>"I just think it is better to have it than not"</p> <p>"we need a GCSE to actually do that course (even though the content is not relevant to life)"</p> <p>"I don't know if I will use the maths I have learnt, a lot of it doesn't seem relevant."</p> <p>"if we were to drive a boat or a plane, you would get onto that course and they would teach you that maths anyway. I have never been taught in college how to drive a boat or a plane."</p> <p>"When it comes to algebra and "finding x" I'm sorry I am not going to be finding x if I'm in childcare. I don't think finding x is going to be relevant to whatever I am doing. "</p> <p>"I like learning about money. If it relates to money, I can understand it. I am good at questions that need money as feel like I am obsessed with making money. I like learning about things that are to do with earning. I think we should do more stuff on loans and tax and that sort of thing coz we're all going to need that aren't we?"</p> <p>"You need it for so many jobs and courses and everything. I would want to do it again anyway. I think we should be forced to do it again because its meant to open more doors isn't it?"</p> <p>"I think you need maths to get the job you want but I don't you need the maths to actually do the job. "</p> <p>"It's not useful unless you want to go into maths and that. "</p>
Practical application of maths to life	<p>"percentages and that are useful. I wish we did more on that. Why can't we do stuff like learn about tax and mortgages? That would be really useful."</p> <p>"I think maths is important for your money and everything. I think if you want to go into business you need maths don't you!"</p> <p>"Well they say that everyone needs maths don't they? "</p> <p>"I don't think it's necessary. "</p> <p>"Like working in a nursery you need maths GCSE. They can only count to like 10"</p> <p>"I think a lot of things are done by computer these days anyway, because there is like human error and stuff. You wouldn't need it anyway because the computer would do it for you. "</p>

<p>Opinions of "Transition" maths lessons</p>	<p>"Bit pointless really"</p> <p>"you didn't get anything for it in the end so no one turned up. It was first thing in the morning then we had a long gap so people just didn't go"</p> <p>"it was all on computers"</p> <p>"It was kinda related I guess to other lessons so more like that if you know what I mean. "</p> <p>"contextualized maths is like alongside like this based on the course as well."</p> <p>"But I would say it's more just like normal maths rather than just trying to relate it to health and social care."</p> <p>"Some of the lessons do like we do case studies and all that, but most of it's just like. Actual maths, maths."</p> <p>"Umm, we did like cake recipes and all sorts of stuff and like working out how much it would be for like certain amount of people."</p> <p>"Yeah, it helps (towards GCSE). But like, I don't think I'll actually remember anything from them."</p> <p>"it just doesn't really make sense, the actual lessons."</p> <p>"They kind of feel like it's like kind of useless because like, it's not like it's not really related to like what we're actually wanting to do when we finished college."</p> <p>"I don't mind them."</p> <p>"Do we do extra maths lessons?"</p> <p>"it's not actual maths is it?"</p> <p>"It's more to do with Health and Social Care"</p> <p>"Those are pointless. They don't go towards anything so everyone just ****es about. We have to do all these formulas on excel and stuff which I am sure is useful but no one cares."</p> <p>"yeah I don't go to those lessons they are a waste of time"</p> <p>"Nothing we learn in those lessons would be on our GCSE"</p> <p>"Yeah I think it's more relevant to what we're going to be doing in the future, but I don't think these extra maths lessons contribute to our maths GCSE at all. I think it is going to be relevant to our future jobs."</p> <p>"it's all spreadsheets and on the computers"</p> <p>"Although I do find it weird that we have learnt about percentages in GCSE maths but they haven't done it in business. "</p> <p>"We mainly work on the computer using formulas and everything. It's OK but it won't help me get my GCSE. "</p> <p>"we learn about calories and stuff"</p> <p>"It's real life stuff. Like it's probably more important actually"</p> <p>"medication and how to measure medication"</p> <p>"all the different methods confuse me"</p>
---	---

Consequences of not achieving a 4	<p>"I won't be able to do this apprenticeship. It's one of those degree type apprenticeships so I really want to do it. I want to work too so it's perfect for me"</p> <p>"Get a different IT job I suppose"</p> <p>"I don't think you can go to university for IT without a 4 in maths can you?"</p> <p>"I'll have to do a Level 3. And then I'll have to redo maths again."</p> <p>Need a grade 4 in maths, English and biology to be a healthcare assistant."</p> <p>"I really want the GCSE because my mum said that she had to do hers to get a job when she was older. She had to come back to college when she was like 40, so embarrassing! I would rather get it out of the way. And if we go to college next year don't we have to do it again anyway?"</p> <p>"And I need a 4 in maths to do that (T Level in business)"</p> <p>"I can't get certain jobs and stuff unless I get a 4."</p> <p>"that's so annoying. I won't be able to do a T Level then! (without GCSE maths)"</p> <p>"I wasn't sure what I wanted to do this year without my maths. I wanted to do a T Level but obviously couldn't. "</p> <p>". I was thinking of changing my course next year because I didn't think I was going to get my maths. Because if I don't ever get my maths I can't be a nurse without my maths. If I don't get my maths I am wasting my time now. What's the point of doing something in the long run if you're not going to get it?"</p> <p>"I was going to do Level 3 childcare but I couldn't because I have to have maths for it. So that obviously stopped me and now I am doing Health and Social. But I wanted to do childcare. They got rid of Level 2 childcare this year. "</p>
Opinions on University	<p>"uni isn't for me. It's a waste of money I think. I just want to work and get paid"</p> <p>"Yeah, I wanted to be a paediatric nurse, but then that means I have to go to uni. (its) just expensive. it would just take a long time to pay it off (loans)"</p> <p>"I have never thought about going to uni because I am not like, academic, so I haven't thought about it."</p>
Thoughts on T Level U-turn	<p>"the T level changes have worked for me because it means I can do it without maths. I wouldn't get the qualification otherwise"</p> <p>"We don't even need It (maths) for a T Level now so I don't get it (why they have to re-sit"</p> <p>"you don't (need a 4) anymore. The government changed it"</p> <p>"Well it's made no difference has it because college still want us to have maths. I don't think I would be able to do a harder course and GCSE maths at the same time. I have done quite a lot of hours extra. I have done extra maths lessons with you for the last month and come to every lesson. I have done a lot because I really want it. I don't think I could do it again and definitely not if my course was more hard. "</p> <p>"I think that it's not fair. Are you saying other colleges are accepting people?"</p> <p>"T Levels are meant to be harder"</p> <p>"It gives students more of a challenge and hope if they can keep doing maths"</p> <p>"I think it's good that it's not mandatory. It gives everyone the same opportunity. Whereas otherwise you're making people feel like they can't do what they want to do. Whereas others can. "</p>

Thoughts on needing maths for university	<p>"I don't really know. I hadn't heard about it, but it doesn't apply to me so I dunno."</p> <p>"I am not sure really. You're supposed to be clever though aren't you if you want to go to uni? I've never thought about going because I am not like academic or whatever."</p> <p>"I didn't know about that. I mean if you're doing business I think you need to have maths"</p> <p>"what if you want to do, I dunno, dance, do you need a GCSE in maths"</p> <p>"that's unfair!"</p> <p>"I'm not sure. It's a hard one because GCSE maths is not like hard is it? I failed because I was an idiot and didn't try. I was too cocky I guess. It's our own fault if we don't really do well at it. If you can't even pass your maths, should you really go to university? "</p> <p>"I think it's a joke. Not giving a loan to someone for not having their maths and English. Imagine if I wanted to do like, dance or music or something artsy like that and I can't go to university to do something completely irrelevant to maths and English because they won't pay for it because I don't have my maths and English. Or you have the money. "</p> <p>"It's giving less opportunity to other people."</p> <p>"Yeah you might feel a bit less confident because they can't do something that they want because they can't get the grade that they want."</p>
Concerns about getting a job	<p>"I sometimes worry about not being able to get a job. Like I work hard and then I am just not clever enough or too dumb to get a good grade and then not get a job."</p>
Concerns about getting a 4 in maths	<p>"I am more likely to fail maths again (than main course)"</p> <p>Probably mostly maths. and biology (are the biggest barriers to progression)"</p> <p>"I would like to do the T Level but they won't accept you unless you have a 4 in maths"</p> <p>"I want to do an apprenticeship. I don't really know how maths fits in with it. "</p>
Opinions on academic versus vocational education	<p>"that's for clever people and vocational is for less clever people. People who do A Levels go to uni and people who to BTECs get a job."</p> <p>"if you do hairdressing you're not going to be rich are you?"</p> <p>"you could go to uni and fail the course and have lots of loans and no job."</p> <p>"My parents aren't like that (academic) and they are fine. "</p> <p>"(vocational courses) are just easier"</p>
Thoughts on current maths lessons	<p>"It's been good. I you. Do you remember *teacher's name here* that covered some of your lessons. Yeah, it's been really good. She's very nice. And I've also got *teachers name here* as well."</p> <p>"Ah, it's a bit more quiet since there's not as many students in the class. So I get like more help."</p> <p>"We don't get as much lessons in college as we did in school. "</p> <p>"we got a lot of lessons in maths in High School"</p> <p>"I used to have a lesson like, every day."</p> <p>"I think we would be more likely to like pass if it was set out the way it was at school. If you think about it. Because at school I never really thought....I didn't really care enough about it. Then obviously now I have come to college it has kicked me up the bum a little bit because obviously I can't get certain jobs and stuff unless I get a 4. And like, having two lessons a week in maths, you're not going to realistically</p>

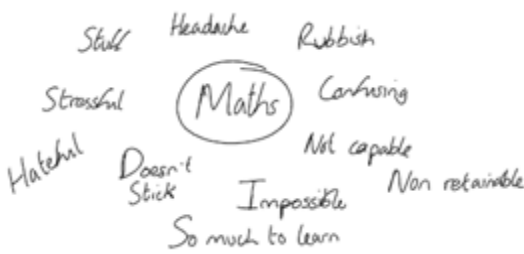
	going to pass in maths with two lessons a week are you? And the start of the week by Friday you've forgotten."
Challenges of GCSE curriculum	"Well, I do struggle with some of the topics that we're doing." "Mostly just like taking in all the information and remembering it." "I think it's necessary but some things like circles and radius don't really need that" "Algebra is not necessary." "Percentages are quite useful." "All we really need is like money."
School compared to college	"It's completely different. You didn't really get as much help. because like. Because you're younger when you're in high school, so you get more like 1 to 1 help." "I find the times annoying. I travel so far to get here and my business teacher lets me arrive when I want. If I miss maths I miss a whole topic if you know what I mean. We do so much in a lesson." "- I hated my teacher last year. He was so horrible and didn't like me. Also there were some kids in the group who made it difficult for me to understand. I can do maths but like, I need it taught to me in a certain way." "I get a lot more help at college and there aren't many people in the class. " "we didn't constantly have other students like in college flooding in our classroom. Like it's too loud and it's too much. Because in high school it was more like our class." "I preferred it in high school than I do in college." "I think I learnt more in school, considering I got a 3 in school and a 2 here in college."
General feelings towards studying maths	"I'll say more positive"
Class sizes	"We just had a few new students joining, so I would say about like 15 to almost 20. I think" "I think college is good, like I have a smaller class and more help and that. It's good that no one wants to go to maths because then we get more help when we do come to the lesson." "yeah I like the small classes here"
Confidence prior to school exam	"I was too confident I could pass really because I found maths easy. I was well shocked when I failed man, (laughs) gutted!" "I was confident I could pass when I was at school. I was absolutely sure I had passed. Of all the subjects maths was the one that I felt confident about. So I was really surprised when I got a three. "
Access to support	"My dad paid for me to be assessed privately because college wouldn't do it." "They said I was dyslexic but like, could write at a normal speed and everything but was really slow to read. That's why I did well at my English because I am not think I am just really slow to read. They said I need to have rest breaks and have my work on yellow paper. I will have this in the GCSE maths exam now which is good. I hope it will make a difference." "Because I didn't learn anything and I didn't get the help I needed." "They should give you more support to get that grade not just say you've got to keep re-sitting until you're 19 and not help you. Obviously their way of helping you

	is giving you two lessons a week, but if you didn't pass in school with 4 lessons a week you're not going to pass with two lessons. "
Number of teachers	"urm... although we now have a small group at the beginning it was a bit crazy. I had like 5 different teachers until I was put in your group. I also didn't get put in for the November exam which p***ed me off." "I was in three different groups too" "In my high school I actually learnt something. We did have quite a lot of different maths teachers but it was a nice small environment" "I don't really know why. I was at ***** school. I think the teachers didn't like it there or something. " "I don't know, like it's the same our teachers were constantly changing and they all had different ways of teaching. " "Mine changed because lots of times I went like, up a maths class. So we had like sets, bottom set, top set, and if you got like a certain grade in one of the like tests you would go up. So it would be a different teacher for that set. "
Thoughts on college insisting on a 4 for a T Level in spite of go U-turn	"but that's unfair! You don't need it for a T level"
How to improve transition lessons	"I would rather have more GCSE lessons to be honest and then we would be more likely to pass and then do a T Level" "It's just like, want them to be more based on like what we want to do."
Thoughts about contextualisation in GCSE maths	"some of it is relevant and like, I can see myself using. But some of it is so pointless." "why are they always sharing sweets " "yeah it's so confusing! Sometimes it's like "Ben has 3 apples and 2 oranges so how far is he from x" it like makes no sense." "they just bring in random characters too. Who's Colin and why do I care about his field?" "No, they're too wordy. There's so many words and few numbers. You try and do it one way and it turns out you should have done it another way because of the way they've worded it. They make it a lot more difficult and sometimes it is hard to understand what is going on" "I think it makes sense. Most of them are like "this guy travels at 56 miles per hour, can you work out the acceleration" it makes sense. If you are driving a boat or a plane you need to know the consequences of that. Would it be OK or I dunno. "
How to improve GCSE lessons	"go slower, do less stuff and stuff that I will actually use. Like mortgages and that." "I would make it more useful" "I just think it needs to be easier! I don't think we need to do all the algebra and trig and everything to pass" "I think we need more lessons at college. I would also get rid of shapes. I hate shapes! " "Make it easier for you to pass!"

<p>Would you study GCSE maths this year if it wasn't compulsory?</p>	<p>"No!" " yes I think so. I was really disappointed that I didn't get it last year" "yes I would" "Yes, it gives me more opportunity to improve. " "It shows you what you can do " "It's going to get you the job if you do pass it. If you don't resit it you don't get your job do ya?"</p>
<p>Attendance</p>	<p>"People don't come to the lesson which I don't get, because surely they don't want to do maths again? But it's good for me because I get more help. "</p>
<p>Thoughts on GCSE maths teaching</p>	<p>"I think they get fed up with you quite quickly if you don't get it." "But at high school if you don't understand they...they don't care. They then pay attention to the people who do understand, because it looks good and..I don't know. " "they're like "Oh this guy knows it, come up to the board" "They get fed up with you if you don't. I mean, they'll try and explain it to you don't get me wrong and help you. But sometimes it doesn't click does it? And then they get fed up and they're like urgh, they blame it on you saying you're not trying hard enough" "I think in high school it was like positive because we would learn our own ways and the teacher would be fine with it and we could learn it how we wanted to and by the end of it we did get it right. But now, if we learn it our own way we have to do it the way that the teacher says now we're in college and it confuses us because we can do it a much simpler way and get the answer right. But then they end up doing it a much longer way and it confuses us." "I used to sit at the back of the class and spend the whole hour asking for help. I thought the teacher was just useless to be honest. "It's going to make it harder because you've already learnt some stuff and then you've got to learn new stuff next year, and it's probably going to confuse you. You'll struggle a bit to get the grade as you get a different method each time and you don't actually know where you're at. "# "</p>
<p>Thoughts on streaming</p>	<p>"I think it's worse. " "Well I remember, I went to two secondary schools. And the first one I was put in a bottom set and....it's going to sound really rude now but the people in there were (offensive term used here) they were like...I don't know how to explain it...they were like..Not bright at all" "they didn't care. They would mess around, chuck stuff around. Whereas there would be people in there who were obviously working at the same ability and like level, but they cared. But, because you're put in that group with a bunch of people who didn't care it makes you feel as if you're like them. I mean, I was in a group with a bunch of people who didn't care, and you not what I mean? I dunno, it rubs off on you. " "the teacher treats you like you're stupid. Because like, you're in that bottom set and they're trying to explain to the people who don't care, like. It's like you're a child or a baby." "when I went to the other high school they put me in a middle set and it was completely different. Even though I may not have understood as well the teacher would talk to me as if...I'm stupid" "Well if you're put in a class with like lower ability, the teacher is just going to</p>

	<p>assume that you're just going to be as bad as the people who don't really give a crap. They're going to treat you the same as everyone else, they're not going to give you more attention than....because obviously you care and know how to do it but they're too busy marking things on the computer or telling other kids to stop doing something because they assume you're just as bad. You don't really care. So it's like...what's the point?"</p> <p>"I think it is helpful and if it works it works. "</p> <p>": I don't think it makes a difference, we've all failed haven't we? Being put in a different group depending on how much you failed by doesn't really, I don't think it really matters. "</p>
--	--

Field journal

<u>Date</u>	<u>Incident</u>	<u>Comment</u>
September 2021	<p>Today I met with DG who is delivering the transition maths lessons to Health and Social care students. He said that he had asked students to share their feelings towards maths. He shared these with me</p> 	<p>These thoughts are common to what I hear in the classroom. These comments show the lack of confidence students feel, but also that the don't find the amount of content achievable. DG was surprised by the lack of basic maths skills and how negative they were towards the subject.</p> <p>What can we do to help? Why are they feeling this way?</p>
September 2021	Challenging topics list created for transition maths lecturer	
October 2021	HCP cover – students commenting that 2 lessons a week is not enough and complaining about mixed classes	
	Teaching algebra again – lots of “when will I need this?”	
November 2021	Student came to lesson and told me they don't need to do maths anymore. They had heard from their dad that the policy regarding T Levels had changed and that they wouldn't need it if they wanted to do a T Level next year.	I had not heard of the policy change at this point. I quickly looked it up and found out about the U-Turn. I emailed around to find out what impact this will have to transition maths courses and recruitment to T Levels. The institution has not decided yet.
November 2021	Parent called to question whether their child will need maths for their progression and whether their attendance is mandatory. Parent felt that attendance to maths was damaging to their	This is a common conversation I have had. Trying to explain the condition of funding and various policies mandating maths to teenagers is

	child's mental health and would rather they could opt out.	difficult. This parent understood and wanted to support their child, but sometimes parents can be angry and frustrated, and I often get told "my child wants to be X and won't need maths" or "I do X and have never needed a maths GCSE"
November 2021	Announcement that students will not be able to get a loan to university without 4's in maths and English	Many members of the team commented that this could discriminate against students with EHCPs
November 2021	Announcement that there may not be loans for courses that do not result in high employment.	
November 2021	Feedback from GCSE team deep dive mostly positive but comments about linking the course to real-life and/or curriculum	
December 2021	Discussion with AS about SEN and assessments	Student has chosen to be privately assessed for dyslexia as they cannot be assessed through college. They ended up with a report of profound difficulty
	Teaching shape in Functional Skills. Students have been given an exam question about bunting. They don't know what bunting is and have complained about the context.	Contexts are often quite middle-class
	Student unable to get exam access arrangements because they were not formally put in place during the lockdowns	Only exam access arrangements from school can be carried forward to college. Some students have been missed out due to Covid and informal arrangements put in place. This was a difficult conversation and will impact this learners' ability to succeed.
January 2022	Management at this institution have decided that it will be mandatory for students to have a 4 in maths and English to do a T Level despite government U-Turn. This is due to the level of challenge of a T Level and therefore they do not believe it possible for a student to be successful studying a T Level and studying GCSEs alongside.	This will be difficult news for some students who were hoping this would mean they could progress without their GCSE in maths.
January 2022	Following success in the November exam, some classes were merged as many had become quite small.	Students are not that pleased to have new teachers. Is this negatively affecting their experience?
	Teaching inequalities, students questioning the relevance.	
March 2022	Wonderful conversation with BIT students about motivation and "manifesting" their future. One	Students often have more tools than we give them credit for.

	student expressed a lack of confidence going forward and another told them they must have belief to manifest their outcome.	
	Conversation with learners about the amount of topics in the GCSE. Explained it is a “one-size fits all” type of qualification so therefore some aspects may not be relevant to them.	
	Class shifts again after a member of staff leaves the team. Introducing some learners back into my group that they left in October. They are frustrated.	
	Teaching loci, students are really struggling and again struggling to see its relevance.	
	Students getting confused about by characters introduced in a problem-solving question.	Some students have such poor literacy skills that they cannot recognise less common names as names rather than mathematical terminology
May 2022	Discussion with BIT group about confidence before the exam and having a positive mental attitude	
	Student told me about their experience at school last year. The teacher of the “top set” went on maternity leave, so their excellent and loved teacher was reallocated to the top set. They were then given the sports teacher	This is a really common experience for many lower ability learners.
	Directed to look at functional skills to see if any other exam boards offer a qualification that is “easier”	This tactic of moving exam boards is a classic way of finding a way around a policy that has been introduced without the support to roll it out effectively.
June 2022	Following a “deep-dive” into the GCSE maths curriculum it has been decided that streaming will no longer take place for GCSE maths. Data suggested that those at a grade 3 make excellent progress, but those at lower levels get left behind.	This has caused a lot of concern amongst the team who are used to teaching streamed groups. This will involve a curriculum overhaul.
June 2022	Emails of thanks from students and comments about maths at college	
August 2022	Emails from students with thanks and comments on experience at college.	
February 2023	Team meeting following Rishi Sunak’s announcement that students should continue to study maths until 18. Discussion about where maths is positioned in FE especially with the low recruitment to T Levels. Management are apparently worried about the lack of maths skills	There was a lot of debate about whether maths should be continued until 18 amongst staff. Many felt it unnecessary, many felt basic skills should be continued but generally all staff felt the policy was laughable.

	and low recruitment in some areas. More intervention may be needed in future and there is an indication that maths teachers should be delivering the contextual maths	This institution struggles to recruit maths teachers for the current provision, and in fact most teachers who teach re-sit maths are not maths specialist teachers.
February 2023	Review of “unstreamed groups”	Many members of staff deeply unhappy with the decision to no longer stream GCSE maths groups. They feel it will be a lot more work in the classroom.