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Background

Introduction

College Goals and Our Learners

The unemployment rate for the Tameside region is slightly above that for the North West region and above the national average (Tameside Government website, 2020), so improving employment prospects are a key part of the college's goal to 'transform lives by offering first class education and training in order to improve employability' (Tameside College, 2021). The focus for the action research must consider how it will add value to developing strategies to ensure that all young people are given opportunity to achieve highly valued qualifications in maths.

The number of students in Tameside schools achieving GCSE grades 9 to 4 in both English and mathematics remains below the national rate (Ofsted, 2018). Local policy recognises that some schools are still struggling to narrow the gap between the attainment of those eligible for free school meals and others. The MiDAS report on Tameside College (2019) shows that nearly 40% of all learners come to college without a pass in GCSE maths and English, a further 00088714 e Mennphe0008871 7(r)-t neaaber of0 0 1ve4( )-4(gM(he)141 0 0 1.67 Tm0 g0 G

iterative process and adjust our question and make this more specific. Fundamental to forming the new question was the determination of how we defined intervention. In the development of the original question, this was not sufficiently defined and so although the AR had various strands, these did not have distinct objectives linking to an overarching theme. In this reiteration, we have carefully designed the objectives to ensure that we can answer the research aim and that it is clear not only what intervention we are carrying out but also who the intervention pertains to.

What was also becoming more apparent was that by also addressing motivation alongside the mastery model, it became clear that mindset was underpinning any intervention model

Literature Review

Learner mindset and the impact on mathematical learning

In regard to learner mindset, a review of the literature can also be triangulated with anecdotal evidence gained from discussion with the FE providers within the network, i.e., that many of the learners within FE have been taught in the lower ability sets at school which is known to have a detrimental effect on these learners (Boaler, 2013a; Higgins et al., 2015; Francis et al., 2017; Francome& Hewitt, 2019). From further discussion within the network, it is also evident that although there are many reasons, aside from ability, why students have come fr

Methods – What methods did we use to gather our information?

Research methodology

The analysis of the literature review, along with evaluation of 19-20 first Action Research

Diagram1: Illustration of Qualitative and Quantitative data collection methods
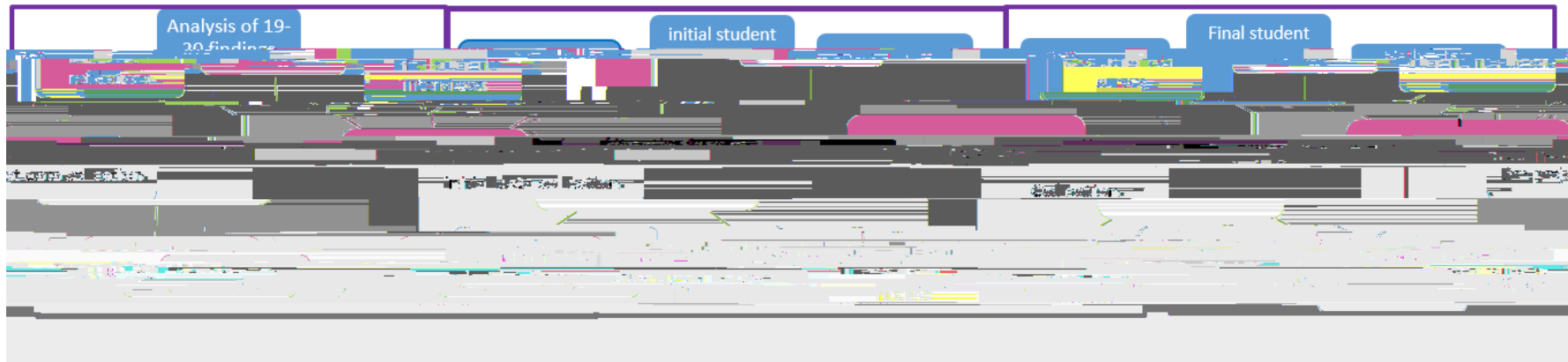
Data Analysis

Coding took place through a methodical two-phase inductive coding approach to allow for both thematic coding (Strauss & Cobin, 1998) and discourse analysis (Coyle, 1995).

Covid Impact

Although Covid meant that learners needed to swiftly move to online learning, we were still able to continue with our original research aim. We did however have to limit the use of physical manipulatives so selected classes who remained learning in college at all times. We also have to change our data collection tool to online questionnaire surveys to enable the reach needed.

Results and Discussion

## Survey & Interview Results

Initial Results

Progress in Maths
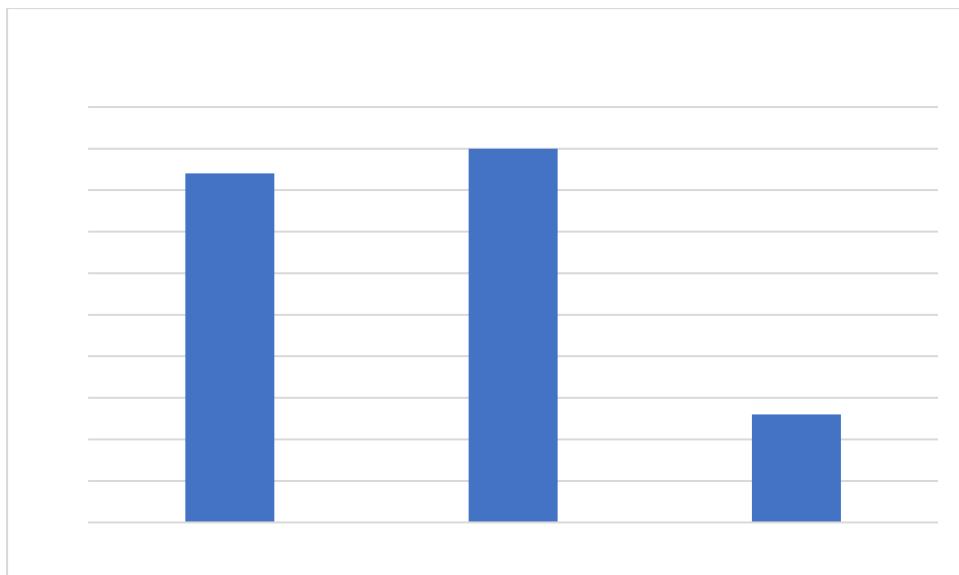
A significant number of students (42%) felt that they could make progress in maths with support and only 13% felt that they would not.

What was their previous classroom experience in maths like?

Students reported that they had lost focus in a previous maths class because it was too hard for them (99) and others reported that they had become bored (77) in previous classes. 67 students reported that they had struggled to concentrate because of others in the class.
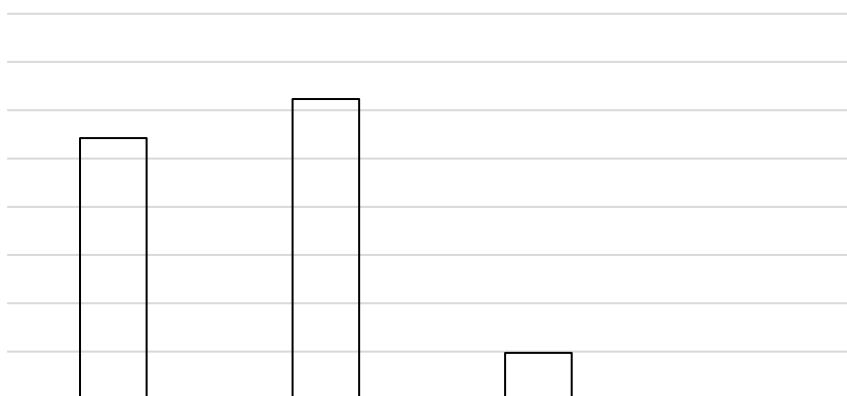
It was not clear at this stage why students had "been bored" in class but this would be followed up in more in depth interviews. What is clear is that degree of difficulty and peer influence has played a significant part in student perceptions of maths previously.

For the first class, we used snap cubes specifically to work on multiplication/division where the students could work on investigating different combinations of cubes so that the students could gain a better understanding of multiplication.

For stud

The target related to "what went well in a question" was more challenging for students and answers had to be found from the student verbally rather than in written form – they could explain what they had done when asked but they needed the question to be broken down so that they could answer it a bit at a time.

Student Comments

These comments were typical of the responses we got from the students whom we asked for their views on target setting.

Number	Something
Student A (Extra Intervention – 3rd year of college)	
Student E (Extra Intervention – 1st year of college)	

given them the opportunity to think about their teaching and their own mindset. By investing in the mindset CPD staff have felt energised and valued.

growth mindset strategies to be shared amongst not only maths teachers, but all teachers within FE.

Final Conclusions

Did we raise attainment in level 2 students by developing an effective mastery model of intervention which fosters a positive mind-set by increasing learner confidence?

- Attainment this year will be difficult to judge accurately because of the impact of both covid and the assessment process

- Provisional trend data indicates a significant increase in grade improvement

- We are now in a position to refine our mastery model of intervention based on our knowledge of what works both in and out of the classroom

- We are now able to recommend the mindset strategies that should go forward to be included in the induction of all maths students as well the college induction

Recommendations

As colleges we need to:

help students make the connection between maths ability, maths confidence and employment by making intervention available to all students by bringing it into the classroom as well as having stand-alone intervention sessions

enable students and staff to realise that a Grade 4 is not an instant "Golden Ticket" but rather an end goal that may take more than 1 year to reach by adopting a whole college approach and making every teacher an intervention teacher thus ensuring continuing sustainability

adapt our teaching and learning framework (and Whole College Approach) to make gaining maths confidence through a positive mind set approach an integral part of college enrolment, induction and tutorials and will become a focal point of observations within the maths department

build on staff intervention by working with our progress tutors, main course teachers

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Appendices

Appendix 1 – Initial Survey Questions - Students

(amalgamation of questions used internally and with our partners)

Questions were answered anonymously

Q1	On a scale of 1 – 5 where 1 is not good and 5 is good, how would you rate your ability in maths?
Q2	On a scale of 1 - 5 where 1 is very anxious and 5 is very confident, how do you feel about maths?

Q3	When you have to do a maths question that you find hard, Do you
	    a) Worry that you cannot do it
	    b) Have a go
	    c) Guess an answer
	    d) Try and break it down
	    e) Leave it

Q4	What do you think of the statement "I can make progress in maths with support"? Do you agree, you are not sure or you disagree
Q5	Why have you lost focus in a maths class? Is it because a) of others in the class b) of boredom c) it was too easy d) it was too difficult
Q6	What has stopped you making progress previously? Is it because a) you did not get on with others b) lack of confidence c) not doing enough revision d) lack of attendance e) combination of above f) no response
Q7	What are your aspirations after leaving college? Write a short response
Q8	How will achieving a GCSE in maths help? Write a short response
Q9	How can college help you to achieve? Write a short response
Q10	On a scale of 1 - 5 where 1 is not at all and 5 is very useful, Do you feel maths will help you in your chosen career?

Q11	How do you feel if you get a question correct?
	    a) Good
	    b) Ok
	    c) Not bothered

Q12	Will maths help you later in life?
	    a) Yes, because it helps me to problem solve
	    b) No, because someone else will do it
	    c) Yes, because I think I will need it
	    d) No, because I have not used it yet

Q13	What do you think of Microsoft Teams? a) good b) neutral

| | b) No |
| | c) Not sure |

Q11 Have you found targets useful for you in previous maths classes? Can you tell me why they were or were not?