Widening Participation Research Fund Final Report

Project Title: Overcoming the Mathematical Barriers to Participation in Higher Education

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A brief description of the research project as presented in the original proposal, including the objectives and the research methodology:

The aims of the Overcoming the Mathematical Barriers to Participation in HE Project were : 1) to work in partnership with mathematics teachers to raise attainment in GCSE mathematics and 2) to understand the role that GCSE mathematics plays in terms of access to Higher Education.

The research was based in Bristol, a city with some of the most affluent and poorest neighbourhoods in the country. Rates of participation to HE vary considerably across the city: in 2010/11, 16% of students in Bristol South progressed to HE, compared with 48% in Bristol West.

The research involved working collaboratively with mathematics teachers to develop their students' ability to obtain the pre-requisite GCSE grade in mathematics for their chosen area of study. Teacher partners worked in schools classified by the University of Bristol as "Widening Participation" schools[1]. The aim was that this work would develop their students' aspirations and awareness of University, together with their ability to obtain the pre-requisite GCSE grade in mathematics for their chosen area of study. Two groups of mathematics teachers participated in the project, the first in 2013/2014 and the second in 2014/2015.

The work with teachers was framed around the idea of collaborative action research, with early meetings focused on supporting teachers to find and clarify their own research questions. This derives from an enactivist world-view (Brown & Coles, 2011), and the characteristics of such an approach include: (a) meetings spread out over an extended period of time, (b) teachers being volunteers rather than conscripts, (c) time being given for teachers to discuss their emerging research questions, (d) the leader of the group providing individual research readings in between meetings. Each group of teachers met ten times for two-hour twilight meetings on a fortnightly basis. All group meetings were audio-recorded and writing produced by the participating teachers was collected. The analysis was undertaken following enactivist methodological principles (Coles, 2015) and in particular the notion of 'equifinality' that leads us to look first at the final items of data (in this case the assignments of the teachers) and look for patterns in that data, to be used to shed light on earlier data.

The research also examined student performance in GCSE mathematics in state maintained schools in Bristol and the relationship between GCSE Mathematics and local and national university entrance requirements. Data was collected on the mathematical performance of schools and the entrance requirements of a range of undergraduate degrees at pre and post-92 universities across the UK.

An outline of any departures from the original objectives and methodology, with reasons:
Within the original proposal the plan was for mathematics teachers to attend workshops led by the School of Mathematics. These took pace in June 2013 and October 2013. The second of these was

[1] Defined as schools where any of the following measures are in the lowest quintile nationally: participation in Higher Education (HE); attainment at age 16 in the General Certificate of Secondary Education (GCSE); attainment at A-level, proportion of students on free school meals.

poorly attended and a decision was taken to tap into the existing network of the professional associations of mathematics teachers. The Association of Teachers of Mathematics (ATM) holds three meetings a year and these were advertised to WP schools and used as a recruitment vehicle for the project in 2014/15.

Summary of the findings:

Review of literature

That students from more disadvantaged backgrounds in the UK perform less well at school and are under-represented in Higher Education, and particularly in the more selective universities, is well documented (Boliver 2013). This is a trend that persists in spite of the overall increasing participation (Moore et al. 2013). A relatively recent study has shown that, of those pupils eligible for free school meals (FSM), a mere 14% participated in higher education compared with 33% of their FSM-ineligible peers (Chowdry et al. 2013). Furthermore, students from independent (i.e. fee-charging) schools in the UK are more likely to enter elite universities than their state-educated peers with equivalent A Level grades (The Sutton Trust 2010).

Whereas much attention is paid to the role of universities in widening participation, research suggests that ‘poor achievement in secondary schools is more important in explaining lower HE participation rates among students from low socio-economic backgrounds than barriers arising at the point of entry to HE’ (Chowdry et al. 2013, p.431). This is not to say that university outreach does not have a role to play (Moore et al. 2013), but the striking effects of disadvantage on pupils’ performance at school can be seen to exacerbate issues around low levels of progression to higher education. Although GCSE scores have risen over time, and in spite of attempts to remove stratification in the school system, the ongoing, systematic effect of inequality on GCSE scores has been described as ‘dismal’ (Gayle et al. 2016). This is also the case in Mathematics GCSE, where pass rates (i.e. A* to C) generally trail the pass rates for other subjects by approximately 5% (Joint Council for Qualifications 2015). So in a subject with already relatively weaker pass rates, disadvantaged students may lag even further behind. Noyes’ (2009) found that from over 100,000 pupils, the top SES quintile had an almost 70% chance of achieving a C grade, while for the bottom quintile the chance fell to 32%. In relation to this study, then, there appears to be a relationship between social disadvantage and GCSE mathematics.

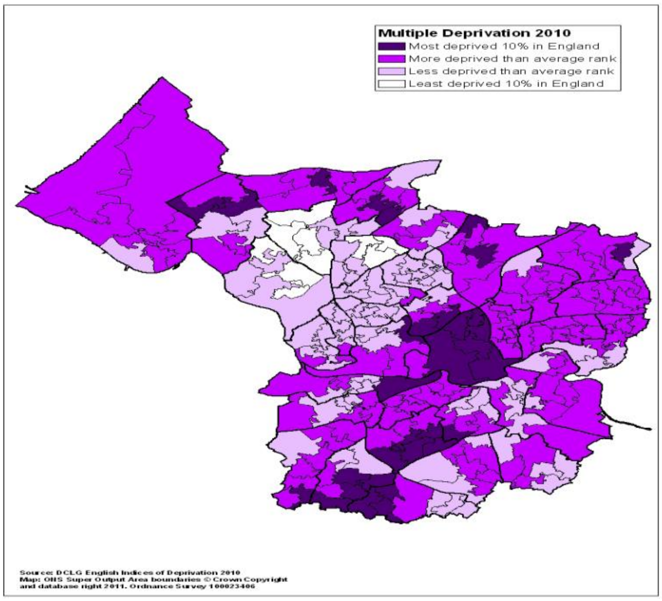
Within this research we have drawn on the work of Amartya Sen and his Capabilities Approach in order to illuminate the manifestly severe injustices that exist with respect to access to Higher Education in the UK. The CA is a conceptual tool which has emerged from Sen’s work in economics and development (Sen 1997; Sen 2005). In brief, it holds that rather than measuring the (resource) input into the provision of education, health services and so forth, it is better to look at what individuals accessing those services are potentially able to achieve. The idea centres around the question of what capabilities – i.e. opportunities – may or may not be available in practice (Sen 2009). We each have a ‘capability set’, a variety of options that we can choose from, and each option has a different set of potential ‘functionings’, or outcomes. People can have what appears to be the same opportunity, but their actual ability to access – and benefit – from that opportunity can vary. The idea of capabilities centres around a comparative methodology, focusing on comparative assessments as opposed to identifying a transcendental solution, although solutions may emerge during a process of analysis.

Walker (2008) has applied CA in a widening participation context as a means of interrogating how opportunities are distributed between different groups in relation to accessing and benefitting from higher education. It is the access framing that we are interested in here, specifically by examining how GCSE Mathematics can play a role in the opening or closing off of opportunities at university. We are not promoting a university degree as more inherently valuable than apprenticeships or direct entry to the labour market, rather that it is up to the individual to decide what they want to do or become. However, should someone want to study at university, this opportunity should not be arbitrarily removed from their capability set through a lack of prerequisite subjects and grades.

The Bristol picture

As can be seen from figure 1 – where the degree of deprivation increases as the shade darkens – Bristol contains some of the most affluent and poorest neighbourhoods in the country[2]. Very high levels of deprivation exist in the South of the City, in parts of the inner city area and along the Northern boundary. By contrast, some of the inner suburbs located to the North of the city centre consist of communities that are amongst the wealthiest in England.

Figure 1: Degrees of Deprivation in the City of Bristol (Source: Atlas of Deprivation 2010 for England)



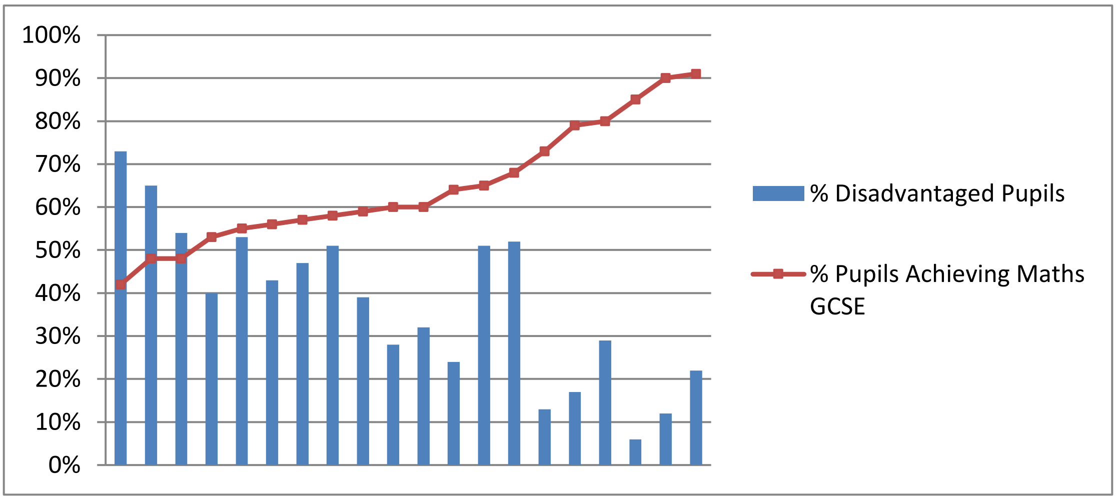
There are currently 22 state-maintained mainstream secondary schools in the City and eleven independent fee-charging schools, with the latter largely being located in the most well off areas of the city. State-maintained post-16 provision consists of two Further Education Colleges (one of which is located slightly outside of the Local Authority boundary), a sixth form college and school-based sixth forms, where 14 out of the 22 secondary schools have their own sixth form centres. The opportunities for post-16 study within the City are not evenly distributed. For example, in the South of the city – where some of the highest levels of deprivation are concentrated - only two of the six state-maintained secondary schools offer their students A level courses. A similar situation occurs in communities along the Northern boundary of the authority, where only two in five of the local secondary schools currently offers A Level courses.

Our analysis of DfE School Performance Tables shows that state-maintained schools in Bristol performed below the English national average in terms of the percentage of pupils achieving 5 GCSE A*-C (including English and Maths) from 2006-13. On average, Bristol state-maintained schools also performed less well in relation to the percentage of pupils achieving A* – C in the mathematics component of the English Baccalaureate in the period 2010-2013. A closer examination of Bristol's data found substantial differences in performance at GCSE Mathematics between the state-

2 This is according to the Department for Communities and Local Government (DCLG) Multiple Indices of Deprivation which take into account of a wide range of factors including income, education, skills and training, health, employment, crime within neighbourhood, access to housing and services and living environment

maintained schools (Fig. 2). As Figure 2 shows, those schools with a low proportion of students from disadvantaged backgrounds[3] in Year 11 generally had a higher proportion of students achieving A* – C in GCSE mathematics. The proportion of students achieving GCSE Mathematics in each school in Figure 2 increases from left to right, and thus we can see that as the grade distribution increases, the proportion of disadvantage in the school's cohort decreases. 85% of pupils at the school with the lowest proportion of disadvantaged pupils achieved a C or higher in GCSE mathematics, while at the other end of the scale, less than half achieved a C grade. This is in line with the national picture as described in the literature (Frederickson & Petrides 2008; Noyes 2009; Chowdry et al. 2013), in that there is a negative relationship between deprivation and GCSE attainment. Perhaps unsurprisingly, those schools with very low numbers of students from disadvantaged backgrounds tend to be located within the most affluent communities in the city and those schools that have more than 40% of their intake classified as disadvantaged are located within the most deprived areas of the City. From a Capabiliies perspective, young people who live in these more deprived areas of Bristol are less likely to have GCSE mathematics, and as such may have a more restricted capability set than those who live in the more affluent areas of the City[4].

Figure 2: Bristol Schools GCSE Mathematics Results in 2013 plotted against the proportion of 'disadvantaged pupils' in that cohort



GCSE mathematics and access to Higher Education

We examined the admissions criteria for a range of degrees at universities in the UK[5], comparing a 'pair' of pre- and post-92[6] universities in a selection of UK cities. We are mindful that this this divide between so-called elite research-intensive (pre-92) and egalitarian teaching-intensive (post-92) is not clear-cut (Jary & Shah 2009). However, almost all pre-92s 'outrank' post-92s and as such it offers a useful comparison within the city pairings. As can be seen from Table 1, the requirements of pre-92 universities are uneven. In summary four of the seven pre-92 universities examined (Edinburgh, Birmingham, Brunel, Southampton) stipulate that a C grade in mathematics or higher is a prerequisite for entry to all degrees, whereas none of the post-92 universities apply the same blanket policy. Students without a GCSE grade C in Mathematics would largely be unable to study

[3] Pupils who were eligible for Free School Meals at any time in the previous six years or who had been in public care for 6 months or longer.

[4] For the majority of the state-maintained schools in Bristol the admissions system is organised around geographical distance from the school.

[5] Every UK University undergraduate degree course sets its own entrance qualifications and this usually involves the specification of a set of GCSE qualifications and a set of A-level or equivalent qualifications. A Levels are the traditional academic route, although there are also Baccalaureate and vocational/occupations options at this level which can also provide access to undergraduate courses.

[6] Post-92 universities are former polytechnics or other colleges which gained university status in 1992 or later. Pre-92 universities were already universities before this point.

STEM subjects because they require at least a C in GCSE mathematics. For Humanities and Social Science subjects, the requirement of a C or higher GCSE grade in mathematics varies.

Table 1. GCSE Mathematics requirements at selected Pre- and Post-92 Universities

	Edinburgh	*Edinburgh Napier*	*Manchester*	*Manchester Metropolitan*	*Birmingham*	*Birmingham City*	*Cardiff*	*South Wales*	*Brunel*	*Kingston*	*Bristol*	*West of England*	*Southampton*	*Southampton Solent*
Chemistry	AL	n/a	C	C	C	n/a	C	C	C	C	AL	n/a	C	n/a
Medicine	B	n/a	B	C	C	n/a	B	B #	C	n/a	A	n/a	C	n/a
Molecular biology	B	C	C	C	C	n/a	-	C	C	C	B	C	C	n/a
Physiology	B	n/a	C	C	C	n/a	AL	n/a	C	n/a	B	n/a	C	n/a
Classics	C *	n/a	—	n/a	C	n/a	n/a	n/a	C	n/a	-	n/a	C	n/a
English language	C *	-	—	-	C	-	-	C	C	-	-	-	C	-
History	C *	n/a	C	-	C	-	-	C	C	CŦ	-	-	C	-
French	C *	n/a	—	-	C	n/a	-	n/a	C	-	-	n/a	C	n/a
Music	C *	-	—	-	C	-	-	C	C	C	-	n/a	C	-
Philosophy	C *	n/a	B	-	C	n/a	-	n/a	C	n/a	B	C	C	n/a
Geography	B	n/a	C	C	C	n/a	-	C	C	C	B	C	C	-
Law	C *	C	B	-	C	-	-	C	C	C	-	-	C	C
Psychology	A	B	B	C	C	C	B	C	C	C	B	C	C	C
Sociology	C *	B	CŦ	-	C	-	-	C	C	C	C	C	C	n/a

Key: AL - A Level, C* - a C or higher in Mathematics or an applied science, CŦ – C in Mathematics as preferable.

We examined more closely the admissions criteria for the University of Bristol, because as shown in Table 1 it appears that there are a range of courses for which a C grade in GCSE mathematics is not a requirement. On paper 78 of the undergraduate degrees starting in 2014 at the University of Bristol did not require a C in mathematics, 74 of these being based in the Faculty of Arts. However, a review of the three admissions cycles 2012-14 revealed that only 35 out of a total of 12,000 (0.003%) English, Welsh and Northern Irish (Scottish pupils do not take GCSEs) undergraduates admitted during that period did not have this qualification. One explanation for the discrepancy between the number of undergraduate degree courses that do not require at least a Grade C in GCSE mathematics and the extremely low proportion of students entering without this qualification is that the vast majority (82%) of the undergraduates at the University of Bristol have attended fee-charging schools or state-funded schools not categorised as WP schools. In general these schools have a relatively low proportion of students who have not obtained at least a grade C in GCSE mathematics. Whereas students from the local schools within disadvantaged areas might think that they could obtain an undergraduate place without that C in GCSE mathematics, in practice it appears that they are very unlikely to be accepted. This relates to a potential difference between what is written down as being the "rules of the game" and the actual practice (Whitty et al. 2015).

In summary the vast majority of undergraduate degree courses at Universities in the UK require at least a GCSE grade C in mathematics, with the exceptions tending to be Arts and Humanities courses at Post-92 universities.

Working in partnership with mathematics teachers to raise attainment in GCSE mathematics

Schools in England are judged on the basis of getting as many students as possible over a particular grade (at age 16 this is currently GCSE grade 'C'). For this reason most schools divide students into three categories: comfortably passing, need work to pass, and no chance of passing. There is often pressure on schools to focus disproportionately on the middle group, as the most important measure of school performance is the proportion of students gaining a C grade or over (Gillborn & Youdell, 2000; Marks, 2012). For those students who perform badly in mathematics at the beginning of their school career, there is a chance that they may be permanently disadvantaged by being placed in groups where little is expected of them. Furthemore there is evidence that teaching in low-attaining groups can be carried out in a more top-down manner, with less interaction and space for children to answer questions and think things through, than in higher attaining groups (Harris & Williams, 2012). Such an approach to the subject, Watson (2008) argues, can be tantamount to 'cognitive bullying' (p.22), whereby students who struggle with material taught a particular way are subjected to it repeatedly over consecutive years, and this undermines their confidence.

It was within the context sketched above that we sought to engage local teachers in action research into their own practice with the aim of raising their students' aspirations and attainment within mathematics. We wanted to explore what local solutions would be adopted by groups of teachers interested in the widening participation agenda and what we could learn from looking across these solutions. Teachers clearly have a key role in their students' attainment at GCSE and our approach to researching mathematical barriers to widening participation focused on the actions of mathematics teachers. As mentioned above we worked with two cohorts of teachers, one throughout the academic year 2013/2014 and the other throughout the year 2014/2015. Teacher partners identified a range of barriers to mathematical achievement for students at risk of not passing GCSE mathematics. A commonality in the barriers identified was a sense of the difficulty of working with classes of students who had not bought into the project of a gaining GCSE 'C' grade. There were a range of reasons identified, including; students being placed in sets with no expectation that they would pass GCSE; lack of self-belief: lack of engagement; students not working independently.

All of the mathematics teachers from both cohorts identified their own area of inquiry and developed an action research project that fitted with the needs and context of their particular school. We present here in some detail an example of one of the teachers in Cohort 1, in order to illustrate both the action research process and the outcomes of this teacher's action. In her initial writing about why she wanted to undertake an action research project, she commented that:

> *The school scheme of work does not allow for true independent inquiry – teachers end up re-teaching year after year (January 2014)*

Elaborating on this in her final assignment, the teacher wrote:

> *I came to the conclusion that over time I had subconsciously developed an almost resignation to pupils engaging during a lesson, yet not being able to retain and recall the learning and knowledge for the subsequent testing. I had almost separated the two parts of the process (learning and recalling) and grown to accept that as the way it normally would be. If I can engage a group of pupils during a lesson and they can achieve success and confidence then it is a great lesson! However, the topics that we teach are repetitive and pupil ability to retain what we teach them is not strong (statement based on thoughts from … journal entry).*

Reflecting on a lesson she taught to a year 7 (age 11-12) class about converting between units of metric measurement, the teacher analysed the following features, related to retention and recall of learning:

1) *The lesson was a topic that had been covered before yet had not been previously mastered.*
2) *The teacher perceives that the pupils need a different 'hook' to develop their learning.*

3) *The pupils face a topic where they may have previously been successful but could not remember all of it. (And this leads on to the possibility that they are struggling to engage because of disappointment/frustration at not being able to remember).*
4) *The teacher is trying to find yet another way of teaching a topic that should have been covered before yet needs to be done in a different way so that pupils can remain focused and hopefully have something that will remain in their understanding.*

This teacher was therefore wanting to explore what she could do in her teaching to both motivate students to engage in lessons and to increase what students could recall. A few weeks into the action research process, she coined the phrase of a 'circular curriculum' as a description of what many students experience (rather than the hoped for 'spiral curriculum' of developing mastery). The 'circular curriculum' captures the realisation that for students who are struggling in mathematics, they effectively get re-taught the same content year after year between ages 11 and 16, a recognition echoing Watson (2008).

This teacher chose, for her action research project, to focus on her examination class of year 11 (age 15-16) students. In the UK the examination for 16 year olds was split between Higher Tier (grades A* to E could be awarded) and Foundation Tier (grades C to G could be awarded). In September 2013, the teacher's year 11 class had finished the syllabus for the Foundation Tier (they would take that examination in May 2014) and, instead of simply revising this content as a way of preparing them:

> *With the support of my Head of Department, from October to December the pupils received a grade B Higher Tier diet including Trigonometry, Cumulative Frequency and the Quadratic Formula. I decided that the topics would … reinforce the concepts needed for parts of the GCSE Foundation course. Trigonometry, for example, would hopefully cause the pupils to recall facts of triangles and consolidated their work with fractions and calculations. The pace was slow compared to how I would teach these to a higher ability group. It took double the usual time as usual to teach but there was the flexibility within the structure this year for this to happen. The pupils were encouraged considerably that this would be something to try out to see if it helps their grades (positive re-enforcement), they were not going to be pressured into doing this in an exam and they were being told regularly that they were doing aspiring grade A/B work.*

She was able to compare student achievement on a mock Foundation Tier paper in October and again in December, after the time spent working on Higher Tier content. 9 out of the 12 students improved their performance by more than one grade on average. In more qualitative evidence, she recorded an incident in her research diary:

> *The Special Education Needs Co-ordintor (SENCO) from the school came up to me and relayed a story of one of my students offering to help another in the Special Education Needs department. His comment was "that's alright; I'll help him because I'm doing grade A work at the moment!" For this pupil to make that comment (and for the SENCO finding me to tell me) spoke volumes of the impact this learning was having on the pupils and how much progress was being made.*

She concluded her reflections by looking back over what she had learnt:

> *The first observation that I have seen in my teaching with year 11 is that I have raised the level of subject knowledge taught to similar year 11 groups in the past and it has been successful. The second observation that I have made of my year 11 class is that they are believing they can get a grade C in Maths. The whole idea of never being able to reach a C was very real for them in year 10 as their grades were similar to those at the October mock exam. Yet for them to have been able to complete higher tier has produced a change in attitude in them and they are more positive about the maths and realising that they can succeed. And* finally the effect of this

research on my own practice has been highly significant. I have *been teaching pupils topics which, in relation to their levels, I have not done before. It has challenged me to think again as to how I deliver these topics so that the entry point for each learner is accessible and they can see the progress being made.*

We are not suggesting that this teacher's approach is the only way to tackle underachievement in mathematics but three other teachers also chose a similar approach of working on Higher Tier content with low-attaining groups. As she mentions in the case above, the orthodoxy in secondary schools in the UK at the time of this research (2014) was to teach the whole curriculum each year with the vision of spiralling back to topics year after year hopefully pushing students to new learning. For some students this meant they were re-taught the same content year after year whilst making little progress. In this respect there was striking similarity in the results reported by teachers working in different schools around the Bristol area. What we have evidence for is that if students, who have been grouped together on the basis of low prior attainment, are offered activities and mathematical topics usually reserved for their higher attaining peers then several things can happen. Students can recognise that their teachers now believe they are capable of 'A' grade work. Students can report an increased belief that they can attain the key benchmark grade (in terms of access to Higher Education) of a 'C' at GCSE mathematics. Students' attainment can rise (as measured either by their success on that higher level content or on the content at which they had previously failed).

There were other approaches developed by different teachers including: a focus on student reasoning; supporting student dialogue in group-work; making effective use of specific materials for number work; developing collaborative group working on mathematics. In general, the teachers reported on how, through their action research, they had shifted their expectations of their students in terms of mathematical attainment or capabilities in terms of independent working. We are struck by the fact that it appears as though the teachers' identification of lack of student engagement as a key barrier to further participation was an accurate one. In those projects where a shift in teaching promoted greater student engagement, there was evidence of higher attainment and therefore the possibility of widening participation in Higher Education.

An important conclusion to draw from this project is evidence of the power of action research as a mechanism to support teachers' continuing professional development and the importance of the regular meetings of a collaborative group to support, challenge and enrich each others' work. Although the project set the overall framework of widening participation, we see it as significant that teachers chose to work on issues of personal relevance to themselves and their classrooms. These action research projects can be viewed as 'paradigmatic cases' (Freudentahl, 1981, p.135) of just how quickly it is possible for students' perceptions of their own abilities to shift, even students who have presumably experienced repeated failure within mathematics for up to ten years. We are pointing, here, to the significance of relationships: teacher-student relationships and students' relationships with the subject of mathematics.

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Suggestions for extension of the project or further research avenues:

Below are suggestions for two projects:

1. We believe it would be valuable to articulate, in the form of free resources for schools, how Higher Tier GCSE topics can be offered to students at all levels of prior-attainment. Such an idea is potentially in-keeping with the current emphasis on Mastery teaching in the UK and the notion of access to the whole curriculum for all students. In order to achieve this, we would need to work together with a small group of schools over the course of a year.

2. We currently know very little about the progression from GCSE level to A-levels and Higher Education, for students from the schools in Bristol that do not offer Post-16 academic A level provision (5 schools in South Bristol, 2 schools in the North and 1 school in the East of the City). Whereas we know, for example, that some students from South Bristol progress to St Brendan’s College, St Mary Redcliffe and Temple School and Bristol Cathedral School, we have anecdotal evidence that suggests that such students are sometimes not able to study their A-level choices because of relatively poor GCSE results and that they have a tendency to drop out of their Post-16 courses. For this reason a 3 year longitudinal study is needed to follow a cohort of high-potential learners from such schools as they progress (or not) through Post-16 study to Higher Education, apprenticeships or the workplace.

Impact of the research findings for the higher education sector and policy makers in the UK:

Policy makers and practitioners need to acknowledge and understand the class divide in terms of the relationship between mathematical attainment and access to Higher Education.

The evidence from our project is that through a focus on engaging students in mathematics and raising their self-belief, attainment will also rise. This is an important point for policy makers, school leaders and teachers.

Action research involving partnership between teachers and researchers is a mechanism for tackling under-achievement in mathematics in order to impact on HE participation rate.

Other impacts of the research (e.g. for schools, local authorities, other bodies or sectors):

School and University teachers in Bristol need to find a way to work collaboratively to tackle the divide in mathematical attainment across the city. Rather than focus on "one off events", we suggest that mathematics teachers should be supported to identify barriers to mathematical attainment and then be given the time and space to implement changes related to those barriers, in the context of collaborative action research.

In the current policy context of a shift towards 'Mastery teaching' in mathematics there is a real danger of more students than ever being offered a 'circular curriculum' – where they are not allowed to 'move on' until they have 'mastered' a particular set of techniques. What our teachers have shown is that students can become engaged in studying more complex mathematical ideas than might be expected and that a shift in the level of complexity of mathematics being studied is actually a powerful mechanism for mastering easier aspects of content (for example, one teacher reported a low-attaining student who had, for the first time, understood 'square roots' after having studied Pythagoras' Theorem).

Financial summary:

Budget Headings	**Budget**	**Actual**
Staffing	£	£
R Budd	41262.00	33267.97
Other staffing	30044.00	14168.61
Non staff		
Funding for teachers	12810.00	16255.00
Travel	854.00	1559.46
Conferences & Dissemination	1601.00	720.00
Consumables		20.00
Capital	1067.00	0.00
Transcription	1708.00	0.00
Total	**90542.00**	**66841.03**