The impact of social class and ethnicity on students' Higher Education aspirations and its relation to mathematics

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Abstract

This paper is part of an ongoing ESRC-TLRP project which aims to understand the reasons implicated in young people's decisions to go into Higher Education (HE) and particularly into mathematically demanding courses.
As part of the project, we are doing a series of longitudinal interviews with students about their family and educational backgrounds, their experiences and views about mathematics and their dispositions and aspirations towards future study and particularly, if these are related to mathematics or not. In this paper we report on interviews made at the time when the majority of these students were beginning their first year at College, and were taking at least one course in mathematics. We were interested in analysing the impact that social class and ethnicity have in these students' aspirations and how this relates to their mathematical disposition.
The research literature shows that students who come from lower social class backgrounds are especially vulnerable to marginalisation by the education system (Ball et al, 2002a), particularly in relation to mathematics (Cooper & Dunne, 2000), and also how social class position affects students' access to, and participation in HE (Lynch & O'Riordan, 1998). The literature also shows how ethnic minorities' choices of HE are limited by the education system, highlighting class and racial differences and inequalities (Reay et al, 2001). Therefore, in this paper we will address the following question: How are students' aspirations and dispositions towards entering HE (especially mathematically demanding subjects) influenced by social class and ethnicity?

Introduction and theoretical framework

As with the other papers in this symposium, this paper focuses on the concept of identity as a way to understand the self and its relation to the world. Our perspective on this concept is informed by Cultural-Historical Activity Theory (CHAT) and centres on object orientated activity as a mediator of identity. This view captures the ontological aspect of learning inherent in Vygostky's theory – we use 'tools' not simply to acquire knowledge but to become what we do – to become contributing members of the communities with which we engage through activity.

Furthermore, because we belong to a multitude of communities and engage in different activities throughout our lives, we construct different identities by which we function in different circumstances. For example, we can have a mathematical identity as well as an identity as a teenager, or a father/mother identity as well as a grandfather/grandmother identity. These identities might align or not in different circumstances and times.

This paper, like the others, also draws on the concept of cultural models which Gee (1996) describes as everyday theories of action which are situated in social and cultural experiences. Cultural models are associated with particular cultures, society, institution and groups - each has specific ways of acting and interacting associated with it which are directly related to underlying values and belief systems (ideology). Students who belong to a particular group (be it classed, gendered, ethnic or otherwise) internalise cultural models as unspoken "rules" or "norms" as a result of

their involvement in socio-cultural practice and draw upon them during further interactions, to guide their own behaviour and make sense of other peoples'. Thus cultural models make up the Discourses people draw on in storying their identity and ensure that they are "rooted in the practices of socio-culturally defined groups of people" (Gee, J., 2005: p.60).

In this paper we are interested in looking at how Discourses (through the lens of cultural models) surrounding our students' aspirations interrelate with a particular type of identity which we call 'leading identity'. As with the other papers in this symposium, we use this concept to refer to the student's imagined future identity that is 'leading' their biographical account of 'where they are headed', their narrative goals of the moment. In this sense, a student can have a leading identity of becoming an engineer, which is guiding him/her at that stage of his/her college life. We are interested in how students Discourses around their choice making and aspirations (in relation to maths or otherwise) are intricately connected and directed (or not) by this leading identity.

Previous Research on Aspirations to enter HE

The vast majority of the students in our sample stated that they intended to go to university after leaving college and recent literature indicates this is no longer unusual for students who come from 'non-traditional' backgrounds. Ball et all 2002a note the increased participation in HE by the lower social class and ethnic minorities groups, especially since the New Labour Era (Ball, *et al*, 2002a). However, despite such change the evidence suggests that patterns of stratification remain within the HE system. For instance, Raey *et al* (2001) argue that we now have a "new hierarchy of institutions in which prestigious research universities have emerged as a top layer of elite institutions and these remain overwhelmingly white and middle-class in composition" (p. 856). They note the tendency for those from working class and minority ethnic backgrounds to end up in lower status HE institutions.

In understanding such patterns of stratification or disadvantage, there is a clear need to recognise how the cultural fabric of society may mediate students' choices and decision making in respect of education. This has been done via a wide body of literature which seeks to explore how issues of class, ethnicity and gender intersect in students' constructions of themselves as learners and potential participants in HE (Archer, Halsall, Hollingworth and Mendick 2005, Brooks 2003, Francis et al 2003, Raey et al 2001). For example, Archer (2003) notes how students from middle class families have access to cultural capital which they can use to resource their aspirations in respect of HE. They suggest this cultural capital comprises of the knowledge, language and culture required to guide decisions and actions (e.g. knowledge regarding the education system and available post 16 routes). Lucey, Melody and Walkerdine (2003) highlight how white working class women tend to adopt a discourse where HE is seen as a route to not becoming like their parents. They contrast this with the discourse of the middle class where becoming like one's parents means participating in HE as a rite of passage. These authors conclude that for many working class women, the destiny or will to go to university is not afforded by the social structure but must come from within – an inner strength and commitment. In relation to ethnicity, we find complex intersections with discourses which are also classed. For instance, Ball *et al* (2002b) note the preference for working class, minority ethnic students to attend HE institutions which they know to have a certain ethnic mix. This provides support to Knowles (1999) claim that in negotiating the

cultural transition involved in going to university, students from non-traditional backgrounds must deal with the dynamic of 'belonging' and 'escape'.

Since the present study focuses on students who are undertaking AS mathematics, in this paper, we seek to consider how students' discourses surrounding their aspirations in respect of HE are afforded or hindered by their mathematical identities. In doing so, we are interested in exploring the cultural models students use in storying their identities regarding subject choice and how these connect to classed, gendered and ethnically defined discourses about HE.

Methods

The students that are taking part in our sample were selected from 5 different 6th form and FE colleges, ranging from colleges located in urban deprived areas to some located in affluent urban areas. These students were selected to include 'at risk' students in terms of prior attainment in mathematics (GCSE grade C or below) or from lower SES neighbourhoods who's families typically have a low participation in HE. 50 students are being interviewed at three data points – at the beginning of the AS year, towards the end and in the A2 year and when UCAS applications are being completed. The analysis reported in this paper is based only on data point 1 and involves 40 students who answered questions about their ethnic backgrounds and post code address in the survey part of our study (see 2nd symposium).

Our methodology to determine social class was based on a geodemographic classification provided by ACORN (see http://acorn.caci.co.uk). This classification is based on postcode information, and "combines geography with demographics and lifestyle information, places where people live with their underlying characteristics and behaviour, to create a tool for understanding the different types of people in different areas throughout the country". (CACI, 2006:2)

Table 1 describes the different geodemographic areas of our students and shows that the approximately half came from the financially 'hard pressed' category 5.

Geodemographic Areas and what they mean	Number of students
Category 1 – Wealthy Achievers	**3**
Category 2 – Urban Prosperity	**7**
Category 3 – Comfortably Off	**6**
Category 4 – Moderate Means	**4**
Category 5 – Hard Pressed	**20**
(Categories 5N, 5O, 5P – Predominantly white areas)	(10)
(Category 5Q – Predominantly multi-ethnic areas)	(10)
Total	**40**

Table 1. Number of students in the sample by geodemographic area (ACORN)

The analysis of the students interviews was conducted using the software Atlas.ti, coding for different categories of identity statements and also statements regarding the students aspirations, influences on such aspirations in addition to their use of cultural models about mathematics. This analysis has enabled us to identify four distinct Discourses used by the students in describing their future intentions and aspirations (to be described below). At this stage, we would like to make a clear distinction between the student as 'subject' or 'participant' and the Discourse they draw on. Whilst some students may stick closely to one particular Discourse throughout the study, others may draw on several of these Discourses at different points in time.

Therefore, these Discourses are not fixed to the person but are used as a tool for a certain kind of 'identity work' – identity work which may align with but is not reducible to a certain social group.

The distribution of students who subscribed to each Discourse at data point 1 in the study is presented in Table 2a below. Table 2b reveals the ethnic background of each of the students who used each Discourse and Table 2c provides an analysis by gender also.

Discourse type	**Geodemographic Area**					**Totals**
	1	**2**	**3**	**4**	**5**	
1	0	2	2	2	4	10
2	2	2	2	0	0	6
3	0	0	1	1	8	10
4	0	2	0	0	6	8
unclassified	1	1	1	1	2	6
Totals	3	7	6	4	20	40

Table 2a. Discourse types by geodemographic area

Discourse type	**Ethnic Background**					**Totals**
	White British	**Black**	**Asian**	**Chinese**	**Other White**	
1	1	4	3	1	1	10
2	6	0	0	0	0	6
3	10	0	0	0	0	10
4	2	3	1	1	1	8
unclassified	2	3	1	0	0	6
Totals	21	10	5	2	2	40

Table 2b. Discourse types by ethnic background

Discourse type	**Gender**		**Totals**
	Male	**Female**	
1	7	3	10
2	5	1	6
3	3	7	10
4	8	0	8
unclassified	3	3	6
Totals	26	14	40

Table 2c. Discourse types by gender

Discourses, leading and mathematical identities

Discourse 1 – HE as a way to gain a respectable place in society

The first discourse that we identified was one in which students talked about going to university as a way to achieve social respectability and/or monetary rewards in the

future. This is clearly exemplified by one of the students, Jose, whose family came to the UK from South America. He wants to go to university in order to be "someone":

I: Has someone advised you to go to University?
J: It is just because I want to. Always my mum tells me to go to University and all that. Even if she says don't go, I will go because I want to go. I want to become someone.
I: So do you see education as important in that?
J: Definitely, if you don't do nothing, you won't become no-one.

Within this type of discourse, parental influence in the students' decisions about going into HE was strongly present and it stressed the value of education as a way of "bettering oneself". Furthermore, in this discourse, career choices were narrowed by what is culturally regarded as a reputable profession which can lead in the future to a high status in society ("traditional" careers might include Medicine, Accountancy, Business, Law, and others).

For example, Takeshi, a Chinese student whose family moved to the UK from Hong Kong, wants to do a Business Studies degree. She talks about her parents' expectations about her:

I: Can you tell me a little bit more about your family? Did they encourage you to go to university?
T: My mum and dad really have high expectations and they expect me to go to university because in my family only my uncle went to university so they really want me to go… cause I have a brother, older brother but I guess he didn't really learn that much English… he is like 20 and I don't know how to help him cause like sometimes I feel responsible for helping him so… I don't know… but I do want to go so…

Her imagined future is one of prosperity and high ambitions, which can be achieved by a university education:

I: If ask you in 10 years time where would you like to be?
T: I would like to be in my own office in charge of a company, driving a really nice car and… I don't know where I'll be like living but I know I'd be travelling, doing business around the world and stuff.

And Hamal, a student from an Asian background whose family moved to the UK in order for him to have a better education, wants to become an Accountant. He tells about his and his family's expectations:

I: Is there a special reason why you moved to England?
H: For my studies they moved here. To get a better education.
I: Your parents wanted you to have a better education so they want you to go to University as well?
H: Yes, they are saying we are staying here for your education and then you can complete it and they can go back.
I: Do you feel like you have to go to University?
H: I wanted to go to it. I wanted more education and get a better job.

It is clear for him in his imagined future that a university career will help him obtain a better job. In his own words, he expresses why he wants to be an Accountant:

I: Why Accountancy?
H: It has got a lot of money in it and I just like to do number work.

Mustafa, a student from an Asian background who also wants to be an Accountant, describes why he wants to go to university, and what this would mean for him and his parents:

I: If you can pinpoint a person or an event in your past life that you would say was the turning point for your future plans, which one would you say?
M: My parents.
I: Your parents, why is that?
M: Because they were very keen for me to go to University and give me a lot of support and I basically want my parents to be proud of me so, for them it would be an honour for me to go to University.

In describing his prospective career, Mustafa talks about his ambitious plans of achieving higher stages of education that would ensure him a great job:

M: Ok, well, because I am in first year, I would stay on for second year, and from second year I will go to University and then from University, so when you go to University you are on an undergraduate course and I would do it in Accountancy and then I would go back to University and do a post-graduate course so I would have a stage higher and then from then I would want to, I would like to another degree, but it will be higher, I want to go and do it on a Masters from Accountancy to slowly board myself up so I have a higher degree, so then from the degree you can apply to any job and depending on the job you get it can be great, so I want to be an Accountant.

In this discourse, mathematics does not play a fundamental role for itself; instead, it is seen as instrumental in achieving future goals, it serves a purpose as a high status discipline that can move one along a determined career path. Hence, cultural models used by these students might include views of mathematics as 'hard', 'not relevant to everyday life', a 'pre-requisite' for their future plans, or a subject that potentially could be somehow helpful in the future. For example, Hamal believes that it will be better for his career if he can have an A-level in mathematics, even though the university he is applying for does not requires mathematics. He says:

I: Did you decide about the University?
H: Right now, Middleland University.
I: Did you do any applications?
H: I have asked them and they said I would need two "A"s and one "B" I think. In any subject.
I: They didn't ask for Mathematics.
H: In any subject. But if I do Maths then it will be easier it will be better. That is why I picked Maths. Everyone who I talked to, like my family said you really need Maths to do Accountancy.

And Albert, a student from a Black background who is thinking about doing an Engineering degree, considers mathematics as only a pre-requisite for his planned career, but he does not give it a great value:

I: do you find it relevant to real life?
A: not very
I: not very compared to…
A: no, but because I am doing engineering maths is useful in engineering so…

In fact, his aspirations to go to university are very much influenced by his father:

I: and this is a definite plan? I mean you don't, you definitely want to go to university?
A: yeah my dad wants me to go to university
I: do you want to go?
A: yeah
I: because your dad wants you to go
A: yeah mostly

Janet, a student from a Black background, does not want to pursue a highly mathematical demanding career, but she gives an opinion about mathematics that is aligned with this type of discourse:

J: Anyone that does maths is always like an A student in all subjects, is never like a normal person (laughs) but like my dad was telling me that if you do maths at university you get like money… I heard about that but…

As discussed above, in this discourse the students' narratives regarding their aspirations are mostly about their parents' expectations of "becoming better" by going to university and moving into what is culturally considered to be a respectable career that can potentially lead to a good social and economic status. Although mathematics is considered as having a high status, for them it is only an instrument to achieve a goal. Their mathematical identity is such that they would consider taking subjects with mathematical content, as long as they serve their 'leading' interests. We could say that their leading identity is an educational one, seeing university as the way to achieve social respectability, and in this identity mathematics plays a tangential role.

As is evident in Table 2b, this discourse appeared to be commonly used by students from minority ethnic backgrounds and thus, in some way we feel discourse 1 may in some way be mediated by their ethnicity. We suggest discourse 1 was used to mediate a certain kind of identity within the ethnic communities that many of the students belonged to. An identity which relates to positioning in accordance with high status occupations and prestigious educational qualifications which are given exchange value. Their cultural models regarding choice making surrounding mathematics served this identity work.

Discourse 2 – HE as a way of achieving personal satisfaction

A second discourse identified in the students' narratives was one in which choices were not narrowed but remain open and focused on personal interest and enjoyment. Parental influence is still present in this discourse but in a different way: parents want their children "to be happy", so the students' choices are more open to what they really like, even to the possibility of pursuing alternative educational paths to

university. However, it seems that on the whole, for these students the possibility of going to university is there for them to take if they so decide. This type of discourse is clearly demonstrated by Preston, a student who is thinking of going into the Army instead of following a university degree. He says about his plans for the future:

I: Your parents want you to go to university?
P: They are kind the same as me. If I want to go I can go but at the end of the day I don't think it and they don't think it would ultimately… achieve what I want to do with my life. I've had a lot of experience with people who've been in the army and…

David is another example of a student who is seriously thinking on following a singing career as opposed to pursuing a university profession. He says:

I: So what do you want to be?
D: I like music, I am very into music, I write songs as well.
I: Did you have any experience? Did you used to sing when you were younger?
D: It is not serious. I have written joke songs but, kind of more writing serious music now.
I: You don't want to sing on your own. Just write songs?
D: I write and sing. I want to be in a band. I haven't learnt any instruments yet. I might start learning guitar soon.

And Maurice, a student who is planning to be an Architect, talks about the influence of his parents in the same tone as Preston:

M: I'm set that I am going to University and stuff. My parents have told me that they want me to go, but they have said that they are not bothered if I don't. They are not pressurising me.

Another student, Andrew, wants to go to university to pursue a career related to Biology. He speaks about his parents' support of his plans and how they are not "pushing" him but want him to do "his best":

I: So did your parents or your family influence this decision or?
A: They support it but they don't influence it in anyway.
I: They don't want you to be something else?
A: There is nothing that is pushed. It's like "if you want to do this you go and do it and you do your best at it", and they are quite supportive this way.

In this discourse, the students talk about understanding and enjoying mathematics, and some of them talk about being good at it. Their choice in studying mathematics is guided by a sense of satisfaction with the subject, even if they are not planning on continuing with a mathematically demanding career. For those who are planning to take mathematics courses in their future education, mathematics is a valuable subject which is connected and relevant to their futures. For example, Preston regards mathematics as his favourite subject and very enjoyable:

I: Do you like the course here?

P: Yes, I'm really enjoying maths. Maths has to be my favourite subject now. I am finding it really easy and a lot of stuff I learned and it's just build in on top of that so it's kind of… it's just increasing my knowledge of maths.

And Andrew talks about how he is satisfied with his mathematics course, how he understands it and enjoys it. Even though mathematics will not be essential for his plan to study Biology, he realises how mathematics relates to "real life" situations and therefore it is useful for him. He says:

I: So generally you enjoy the experience in this course? You are satisfied?
A: Yeah. I am satisfied with what I am doing and it is moving at quite a fast rate, because with secondary school it is a lot slower than this, but you take it in better you understand it a lot more. It's quite enjoyable.
I: Do you find it related to other subjects or real life?
A: Oh yeah, yeah you do a lot more.
I: More than before?
A: A lot more than before. Before, for instance we were just asked to do basic working out things, and today we are going to learn algebra, whereas there they are going to say we are going to learn algebra to solve this and it will be a real life thing. I think its better to take in because you can relate it to something then can't you? You've got something to relate it to.

And although Maurice is planning to drop mathematics in his second year at college, at this point he finds mathematics easy to understand and considers his college mathematical experience as "quite good":

I: How have you found learning Maths? Here at college how have you found it?
M: Quite good. I think it's a lot better than when I was doing my G.C.S.E.'s and its easier to understand and stuff and then I know what I am doing and understand it more.
I: Do you think you will do A2 Maths then?
M: At the moment I am not completely sure, I am thinking about it. I really only did an AS but I was just thinking how much harder it gets over the year and stuff and if I find it too difficult then I don't think I will take it next year.

It seems that in this discourse, the students' leading identity is one of personal development through enjoying what they choose to do, and sometimes this involves an alternative pathway to university. Mathematics comes along as an enjoyable, understandable and a useful subject (useful in the sense of everyday use rather than instrumental use). This discourse sometimes even takes the form of being passionate about mathematics, like Jack, who wants to be an Engineer and talks about his mathematics courses:

I: Something else you would put in there, to make it "wow"?
J: Maybe a bit of interest. There are loads of different interesting things like you have the science formula for string theory which links everything in the universe to one thing. But it is all a mathematical formula. Little interesting things like that kind of like that will make you go "oh yeah", it makes Maths seem more interesting rather than just being numbers.
I: So something from let's say, from the real world that ties everything.

J: The string theory is a really obscure theory, they haven't got the answer but it's like the equation for everything.

The leading identity in these students could be described as "liberal" in the sense that choices are more open and students have more agency in what they want to do in order to become the person they have imagined to be in the future. There is a positive mathematical identity adopted by these students, because mathematics is a personal choice which they enjoy, are good at and/or is a valuable asset to have as a discipline which is connected and useful.

We found that this discourse tended to be used by students from White British backgrounds and in Table 2a we see that all 6 of them came from the more middle class geodemographic areas of 1, 2 and 3. The fact that this discourse is used by students in the higher socio-economic sectors indicates that this discourse may afford a certain kind of positioning or identity within this social group. This discourse enabled these students to enjoy greater agency and freedom in their choices which may originate in their social status in wider society.

Discourse 3 – HE as a way to achieve a fantasy

In this discourse, students' imagined futures related to pursuing a future which is either different from the reality they live in (escapism) or is the realisation of a dream - a fantasy which has been with them for a while but the goal or the way to get there may be blurred or unclear. For example, Gemma is planning to go to university to be a Marine Biologist in order to work with Orcas, which has been her dream ever since watching the film "Free Willy". Her aspirations are fuelled by this dream and at the same time she talks about escaping the possibility of ending up in a cleaning job, like her mum.

At this stage, most of the students using this discourse were still undecided or did not know how they were going to achieve their future fantasy. Going to university was seen as a possibility, which might bring about a change in cultural experience for the student, but other options were still also very much a possibility. For example, Caroline says how she is seriously considering going to university, but going into an apprenticeship would also be a good possibility for her:

I: You want to go on to University?
C: I do at the moment but I don't know whether I will end up going or not. I think I might get an apprenticeship when I come out of college.
I: You would be interested in doing an apprenticeship. What will make you decide for one or the other?
C: My A level grades and what I get in them. I will apply for University as it is.

Parental influence in this discourse was sometimes present in the sense that parents supported their children's choices, but they were not seen as steering them in any particular direction, generally because they themselves did not have the necessary information to provide such guidance. This is reflected in some of the students' comments when they tell us about what they want to do without being fully aware of the implications of their choices. For example, Sonia talks about her aspirations of studying ICT, but when questioned more about it, she really does not know what exactly she wants to do or what is implicated in studying that field:

I: What are your plans for the future after this?
S: I plan to go to University and I think I'm going to do something with IT because I thought I wanted to be an Accountant, that's why I chose maths but I'm not sure what I want to do now. I might want to do something with IT or might just, don't know but I think I'm going to go to University.
I: but you are not very sure of?
S: no, what to do yet.
I: so if it is IT have you thought more or less working in what, because IT is a big field?
S: I know, I'm not sure yet, I don't really know.
(…)
I: what sort of software do you like on the computer?
S: eer, probably games and stuff like that, I play a lot of games on the computer.
I: do you know how to programme?
S: No.

The students who used this discourse were generally the first generation in their families to be going to university, so they did not have a role model to follow in this respect. Some of them knew people in their extended families or friends who had been to university, but mainly they were following a fantasy, which for some was fuelled by the media. For example, Adele wants to study forensic science and criminology, and her aspirations come from watching the CSI television series, as she narrates:

I: So what do you plan to do after?
A: I hope to go to university to study forensic science and criminology because I won't mind becoming a criminologist.
I: How did you decide this?
A: Probably whilst watching CSI, the program… it is really interesting.

Or Annette, who wants to be a nurse since school year 9, and describes herself as someone who is "always helping out at charity events and taking part in them and things. I like to help people". She talks about how this dream came to happen:

A: To begin with it was all the glamour on TV and I would love a job like that, but now looking into it, it is a lot more hard work and I still think it's a good job to have, because everywhere needs nurses, they always say that are short on nurses and staff so, I don't think it will be that hard finding a job and things.

Unlike most of these students, Annette is lucky enough to have an aunt that went to university to study nursing, so she has someone to talk to and ask about her aspirations. She says:

I: Has anyone in your family been to University or are you the first?
A: In my immediate family no-one has been to University, but my aunty is a Nurse and she has gone to University and things.
I: Is that where you found out about nursing from?
A: Yeah. I have researched it on the internet but she is always saying "it's not just all that you see on Casualty and Holby City, there is a lot of hard work to put into it". She has given me some information and stuff.

Some of these students did not want to break ties with their current social networks, and like Caroline, would prefer to stay near their families, even if this would narrow their possibilities in the future. Others, like Will, who wants to study Mathematics at univeristy, would like to stay near to their local communities but felt pushed to leave their home towns because their local universities did not offer the degrees they wanted to pursue. He says:

I: Are you still thinking of going to university locally?
W: I can't go because there's no maths department, is there?
I: Oh right, yeah. So the nearest is Middleland, isn't it?
W: I don't know, I thought it was Yule.

Likewise, Gemma, who is "going to university since she was 8", is planning to move to Liverpool because it is the only university that works with whales.

The leading identity of these students seems to be one of achieving a fantasy of dream and in some cases the road or pathway to this dream is still unclear. For some, achieving this dream will allow them to escape a reality which they do not want to associate with. Yet other back up options remain open – so whilst university is seen as the appropriate next step to achieving one's fantasy or dream, the reality of failure is to 'make it' remains a concern.

Mathematics within this discourse generally does not play a central role, quite the opposite it comes into play mainly "by chance". Mathematics can be a mere instrument to achieve a goal, or because it seemed "a good idea" to take a mathematics course at a specific moment in time (e.g. because they liked it at school), even if they will not need it for their future plans. For example, Annette, who has decided to study a non mathematically demanding degree (nursing) states why she took a mathematics course at College:

I: So why did you choose to do those subjects and Maths particularly?
A: I chose to do Health and Social Care as obviously it will help me in my career, and Applied Science because originally I wanted to do Biology, but when I spoke to some people here, they said it is hard just doing one Science by itself, they said Applied Science is more hands on and it helps with Health and Social Care, they both fit together. I just chose Maths because I thought it would look good on my CV and I found it easy in Year 11 and I thought why not. That's why I chose it.

And Adele referred to undertaking her mathematics course as a backup plan:

I: Which was your favourite subject?
A: Art was my favourite and then science.
I: Maths was not on the top list?
A: No it was not (laughs).
(…)
I: You are in your first year in college, what other courses are you doing?
A: Chemistry, sociology and psychology.
I: So they are all relevant to your future plan. So you are definite about that. I mean you don't have any other options for…?
A: No. I took maths as like a backup plan because my dad… like he was partly a year ahead of everyone… so easily determined for me to do maths so I just decided to do it cause it is like a backup plan cause most jobs…

Rachel is another good example of this discourse. Her mum works in a supermarket and her dad is an electrician, so she will be the first in her family to go to university. She is planning to achieve her dream of being an architect and emigrating to the United States by going to university. She was also influenced by the media in her aspirations, and her mathematical identity is not strong; mathematics is useful for her plans as instrumental, but does not play an essential role. She says:

R: I would like to move to California when I am older.
I: California? Like in States?
R: Yes.
I: Where does this come from?
R: Just a dream I have for a long time.
I: And you are planning to go to university to do architecture. So, how this came into your plans?
R: I've like watched programs and things and I like interior design as well and I thought designing houses I like that as well.
(…)
R: I need maths and the other subjects I am doing but I think when I go to university to be an architect it will all be in one.

We found this discourse to be classed and all students who used it came from a White British background (see table 2a: From the 10 students using this discourse, 9 come from geodemographic areas 4 and 5, and only one from area 3). The fantasy aspect of this discourse and its use within this group of students, suggests that it may be used to mediate a certain positioning away from the 'reality' of their present lives. Nevertheless, it provided little in the way of resources to achieve this positioning or disalignment. Additionally, for some there was a sense of conflict between their desire to escape and their desire to maintain the social connections and security of their current world (by wanting to stay near home). Thus, in some sense this discourse may be highly fragile with many potential obstacles challenging the imagined fantasy of the future. We will explore this possibility in analysing our follow up interviews with these students.

Discourse 4 – A strong mathematical identity discourse

The final discourse focuses on the representation of a clear vocational pathway where mathematics was integrally connected. The majority of students who used this discourse were on BTEC courses in engineering and therefore we hypothesise that their leading identity was one in which becoming an Engineer was the driving force. Most of the students using this discourse talked about mathematics as being highly useful and related to what they want to do in the future, and describing themselves as able in this subject. In this sense, we consider that these students' mathematical identity is very much aligned with their leading identity as future Engineers. We have already cited above the cases of Preston and Jack in relation to discourse 2 since there decision making regarding the future was still fairly open. We noted how both had mathematical identities whereby mathematics for them was highly enjoyable and interesting. Nevertheless, both students also drew on discourse 4 since they narrated themselves as being on a clear vocational pathway and their cultural models about doing mathematics was very much connected to this (i.e. applied to the engineering context):

P: Not really but I am sure it will come up in a stage when… trying to design something you need maths, I think maths relates quite a lot to mechanical principles cause I did a lot of equations there and you have to know how to do equations before… evolving to mechanical principles.

J: I'm not brilliant, I am just good. Well hopefully, as Maths is quite important I will hopefully get better by the end of the year and understand more, it is going to be a big part because it is almost in everything, electronics as well.

Other examples from students using this discourse show that they also viewed mathematics in this way. For example, Malik says:

I: What about Maths then, how does that fit into things?
M: Maths is the main part of electronics. Because to work out what is wrong, you have to work out the formula. You need Maths to calculate stuff, to calculate voltage to current. You need lots of Maths to do that as well. So my Maths course right now is helping me to do my electronics course as well. That's why if I don't do Maths I can't do electronics.
I: Did you enjoy it?
M: I enjoyed it very well but it was kind of hard, but now it is starting to be a bit easier for me now.
I: Why do you think that is?
M: Because now half the week I am in Maths and I have got more hours for Maths. Seven hours a week just for Maths now. So now it's been easier for me now.

And Punab talks about the utility of mathematics in electronics:

I: How helpful do you find (mathematics), or do you find it does connect to the other BTEC courses? Is there anything in particular in the courses that it connects with?
P: It depends on what we are doing actually. I said before like Simon Hays equations we are doing that in electronics side of the course. All three give a different way of doing it. But Maths gives the mathematical way of doing it, the right mechanical way of doing it. They give another way of doing it. But I guess this way it helps with their way of doing it and if you apply it both ways to make it your own way. So yeah, it does help.
(…)
I: What sort of subject is Maths?
P: I don't know really. I wouldn't say it's fun. I would say it's challenging, I would say it's logical I guess.
I: So you think it's a challenging subject?
P: Yes it's a challenging subject.
(…)
P: It's more challenging. There is stuff in there like you are not going to see in AS Use. But, yeah, it' much more challenging and there is more stuff to do with Maths in there and I would have liked to have done that properly, and focussed properly on that.

We believe that for these students their leading identity as future Engineers is very much aligned with their strong mathematical identity. Mathematics is useful not only

for their future plans, but also for the everyday activity of doing engineering, and most important, it is also very enjoyable and challenging.

The fact that the majority of the students (apart from Preston and Jack) who drew on this discourse were in the lowest geodemographic category cannot be ignored. Nevertheless, it is difficult to tell the extent to which the discourse is classed or ethnically mediated since all these students were on a specific vocational course and therefore, it may have also been mediated by their participation in the pedagogic culture of that course. However, the fact that students who opted for this course came mainly from this geodemographic group is perhaps significant and worthy of future study.

Conclusions

In this paper, we have delineated the four main discourses adopted by the students we interviewed about their aspirations for HE. We called these: Discourse 1 – HE as a way to gain a respectable place in society, Discourse 2 – HE as a way of achieving personal satisfaction, Discourse 3 – HE as a way to achieve a fantasy, and Discourse 4 - A strong mathematical identity discourse.

We found the use of these various discourses related to the background of the students in significant ways, involving intersections of gender, social class, locale, ethnicity and even College programme. For instance, a fragile discourse of fantasy (D3) seemed most strongly associated with a white working class group of students who had few role models and were predominantly 1st generation to HE, and a discourse with a strong parental and cultural influence regarding the kind of choices students make (D1) seemed related to students coming from ethnic minority groups. A discourse where a liberal viewpoint of personal satisfaction seems to lead the students' choice-making (D2) appears to be associated with students coming from white middle class groups, and a discourse where a mathematical disposition is very strong (D4) seems to be much related to the kind of vocational programme these students are following.

The significance of this for the students eventual decisions and trajectory into HE is not yet clear, and will be followed up in the next stages of our research project.

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