

Setting, Social Class and Survival of the Quickest.
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I: Introduction

The question of whether students should be grouped and taught in classes according to their perceived 'ability' during their school careers is one of the most controversial issues in education. This is partly because the issues that surround setting, streaming and mixed ability teaching are relative, both to ideology and personal values. Decisions about student grouping are also of immense importance to the education of students and this importance extends beyond the development of subject understanding. In the UK moves from streaming to setting to mixed ability teaching and back again to setting can be related directly to developments in research, educational theory and the political agenda of the time. In this paper I will present a brief overview of the theoretical and historical developments which surround student grouping, I will then aim to extend theoretical positions further by examining the way in which setting and mixed ability teaching influenced the motivations, perceptions and eventual attainment of students in two schools.

Historical and Political Developments

In the nineteen-fifties almost all of the schools in the UK were streamed and students were differentiated within, as well as between, schools. Jackson (1964) conducted a survey of junior schools and found that 96% were streamed and 74% of the schools had placed children into ability groups by the time they were seven years old. Jackson's study also identified some of the negative effects of streaming, including the tendency of teachers to under-estimate the potential of working class children, and the likelihood that low-stream groups would be given less experienced and less qualified teachers. This report contributed towards an increasing public awareness of the inadequacies of streamed systems. In 1967 the Plowden report recommended the abolition of all forms of ability grouping in primary schools (Bourne & Moon, 1994).

The nineteen-seventies and early eighties witnessed a growing support for mixed ability teaching in the UK. The extent to which this support was influenced by the results of educational research conducted at that time is salutary to reflect upon in the nineteen-nineties. Studies by Hargreaves (1967) and Lacey (1970) both explored and highlighted the ways in which setting and streaming created and maintained inequalities, particularly for working class students. Ball (1981) also conducted a highly influential study of a school moving from setting to mixed ability teaching that served to establish the link between setting and working-class under achievement. Schools appeared to be receptive to the results of these research studies, which fitted with the more pervasive concern for educational equality at that time. However, the nineteen-nineties have witnessed an apparent reversal of this thinking, manifested by large numbers of schools returning to policies of setting. This turn-around does not seem to have occurred because schools have forgotten about the reported consequences of setting, nor because they have ceased to be concerned about educational equality. Rather, schools appear to be responding to a set of policies, emanating directly and indirectly from the Education Reform Act (ERA, 1988) that have forced them to turn their primary attention away from equality and towards academic success, particularly for the most able.

The ERA required schools to adopt a National Curriculum and research has shown that a number of teachers regard this curriculum as incompatible with mixed-ability teaching (Gewirtz, Ball, & Bowe, 1993). This is partly because of its levelled nature and, related to this, the introduction of a tiered examination system. The creation of an educational 'marketplace', which forces schools to compete with each other for students, also means that schools have become concerned to create images that are popular with the parents of 'valued' students (Ball, Bowe & Gewirtz, 1994). Both setting and streaming appear to be regarded as positive school attributes, particularly amongst the middle class parents that schools generally want to attract. The establishment of league tables which position schools in order of their GCSE results, also forces schools to pay more attention to potential high achievers than other students. This has impacted upon setting policies via a widespread belief that setting enhances achievement for high ability students (Dar & Resh 1986). In addition to all of these indirect pressures upon schools, primary schools received a set of

government directives to group their students according to ability. In 1993 all primary schools were sent reports from both the National Curriculum Council (1993) and the Department for Education (16/93) which explicitly encouraged schools to introduce or re-introduce setting. More recently Tony Blair has put on public record his intention to promote setting and actively discourage mixed ability teaching under any New Labour government (Blair, 1996).

The direct and indirect influences of political pressures have had a clear impact upon student grouping policies in schools. Unfortunately the thinking behind such pressures does not seem to have been informed by research but by memories of times-gone-by in which setting played a predominant part in traditionalist school policies. The 'back to basics' policies of the Conservative government and the anti-mixed-ability stance of the New Labour party derive from a widely held opinion that setting advances achievement, particularly for high ability students. But this notion flies in the face of evidence collected from a wide variety of research studies. Indeed there is little, if any, research, anywhere in the world, that supports this notion. Slavin (1990) produced a review of all of the research that contrasted setted or streamed ability grouping with mixed ability grouping and that fulfilled certain methodological criteria. His review included the results of six randomised experiments, nine matched experiments and fourteen correlational studies that compared 'homogeneous' and 'heterogeneous' ability groupings. Across the twenty-nine studies reported, Slavin found the effects of ability grouping on achievement to be essentially zero for students of all levels and all subjects. The median effect size was + .01 for high achievers, -.08 for average achievers and -.02 for low achievers; effects of this size are indistinguishable from zero. Four British studies were included in Slavin's analysis and these found no differences in achievement between streamed and unstreamed classes.

A recent piece of research conducted in Israel consisted of four longitudinal studies that considered mathematical attainment and student grouping (Linchevski, 1995a, 1995b). In one of the studies Linchevski compared the eventual attainment of students in twelve setted schools with their expected attainment, based upon entry scores. This showed that ability grouping had no effect on attainment in ten of the schools and a small *negative* effect in the other two. A second study examined the thinking and performance of similar-ability students who were at the border of

different ability bands and assigned to different groups. This showed that the students of similar ability assigned to different groups varied in attainment, with the students assigned to higher groups attaining more than students of a similar ability assigned to lower groups. Linchevski concluded from this that ‘the achievements of students close to the cut off points are largely dependent on their being arbitrarily assigned to a lower or higher group level.’ (Linchevski 1995a, p11). Ball (1981) also noted the arbitrary nature of success in a setted system for those students who were at or near the border of different ability bands. Another of Linchevski’s studies compared the achievements of two groups of students at the same school assigned either to setted or mixed ability groups. This showed that the average scores of the most able students placed in setted groups were slightly, but not significantly, higher than the able students placed in mixed-ability groups. However the scores of students in the two lower setted groups were *significantly* lower than similar-ability students in the mixed ability classes. Linchevski found that low ability students in the mixed ability classes coped well with tests because they were used to high demands and expectations. Other studies which have found differences in achievement between homogeneous and heterogeneous groupings have tended to replicate Linchevski’s finding with some small, statistically insignificant increases for students in high tracks gained at the expense of large, statistically *significant* losses, for students in low tracks (Hoffer, 1992; Kerchkoff, 1986).

Consideration of the research, policies and practices that have surrounded student grouping decisions over the last twenty-five years reveal two clear trends that are worth remarking upon. First of all, patterns in the sixties, seventies and eighties have indicated that research into ability grouping has a potentially important and formative role to play in shaping policy decisions in UK schools. Second, the number of schools that are returning to policies of setting in attempts to raise achievement reveal the extent and strength of belief in the setting process as a panacea to under achievement. It is clear from this that schools are generally unaware, or unconcerned, that research has failed to demonstrate any links between setting and high achievement. Both of these phenomena, taken alongside the achievement-based priority shift in schools, suggest that there is an urgent need for the results of setting research to reach schools and policy makers. A review of the research that has been conducted in this field also reveals the need for new forms of research that will increase our understanding of the impact of student grouping policies upon student attainment.

Research into the effects of setting and streaming in the UK and ‘tracking’ in the USA has been polarised by virtue of its concerns, its methodology and its geography, and this polarisation has left important gaps in our understanding of the setting process. Research in the UK has concentrated, almost exclusively, upon the inequities of the setting or streaming system for those students who are allocated to low sets or streams. These are predominantly students who are also disadvantaged by the school system because of their race, class or gender (Abraham, 1995; Tomlinson, 1987; Ball, 1981; Lacey, 1970; Hargreaves, 1967). These research studies have used mainly qualitative, case-study accounts of the experiences of students in high and low sets and streams to illustrate the ways in which curricular differentiation results in the polarisation of students into ‘pro’ and ‘anti’-school factions. Such studies, by virtue of their value-based concerns about inequality (Abraham, 1994), have paid relatively little attention to the effects of setting or streaming upon the students’ development of subject understandings. In the US, on the other hand, there have been a wealth of research studies that have compared the average scores of students taught in homogeneous and heterogeneous groups. However, these studies have tended to compare average group scores rather than consider the responses of individual students to setting. The quantitative nature of these studies has also meant that they have not considered the *way* in which setting influences achievement or the processes by which it takes effect. In the following report of a three-year research study I hope to bridge these gaps, both by combining qualitative and quantitative methods to consider the responses of students to setted and mixed ability teaching, as well as by considering the differential ways in which setted and mixed ability teaching impact upon the achievement of individual students.

II: The Research Study

(i) Research Methods

The issues reported in this paper emerged as part of wider, ethnographic (Eisenhart, 1988) case studies of two schools. The aim of the studies was to monitor the learning of students who

experienced 'traditional' and 'progressive' approaches to the teaching of mathematics. Particular attention was paid to the influence of the students' teaching approach upon the degree to which students could use mathematics in new, unusual or out-of-school situations (see Boaler, 1996a, 1996b & *in press*). The research involved a longitudinal study of a year group of students in each of two schools as they moved from year 9 to year 11. In one of the schools there were approximately 200 students in the year group, in the other school there were approximately 110. A variety of qualitative and quantitative methods were employed in the study. In order to learn about the students' day-to-day experiences of mathematics I observed approximately one-hundred lessons in each school, interviewed approximately forty students in each school, and gave questionnaires to all of the case study students each year. I also performed a number of secondary analyses such as recording time-on-task and eliciting constructs (Fransella, 1978) from teachers. To learn about the students' developing understanding of mathematics I performed a wide range of assessments of the students and analysed their school-based assessments and their GCSE performance. All of the qualitative and quantitative methods were used to inform each other in a continual process of comparison and re-analysis. Interviews and fieldnotes were analysed using open coding (Strauss, 1987) and observation data were collected and analysed using a grounded theory approach (Glaser & Strauss, 1967). Extensive use of triangulated data was made in the formation of emergent theories. As the study developed I used progressive focusing to form and shape new research ideas, in response to events occurring in the field. Setting was not an initial focus of the research study but it quickly emerged as a major and significant factor for the students; one that influenced their ideas, their responses to mathematics and their eventual achievement.

In year 11 twenty-four students from each school were interviewed about mathematics lessons and the qualitative analysis that forms the first part of this paper draws heavily upon the students' perceptions about setting which were reported in these interviews. The students were not specifically interviewed about setting and the twenty-four students were chosen because they held a range of positive and negative views about mathematics lessons.

(ii) The Two Schools

Amber Hill

Amber Hill is a mixed, 11-18 comprehensive school located in an area of social disadvantage. The students who attend the school are mainly white and working class. In my case study year group there were approximately 200 students; 68% of these were classified as working class, using the OPCS classification of fathers' occupations; 20% were from single parent families; 47% were girls and 17% were from ethnic minorities. When the students entered the school they took NFER (National Foundation Educational research) tests, the results of these tests showed that 75% of the students were below the national average for the examination. Amber Hill is located on the edge of a large city and recently became grant maintained, largely due to the wishes and campaigns of the head teacher. The school is run by an 'authoritarian' (Ball, 1987) headteacher whose commitment to traditionalism is evident throughout the school. In the classrooms students can generally be seen sitting quietly in rows watching the blackboard, whilst the corridors display icons of traditionalism.

Amber Hill uses setting as a grouping policy to greater or lesser extents within different subject departments. The mathematics department used to operate a fairly loose system of setting whereby they would divide students into three or four bands at the beginning of year 9. One year prior to the beginning of my research they were forced to change this policy at the direction of the head; they now place students into one of eight or nine sets at the beginning of year 9. The teachers decide upon the set students go into based upon their NFER test scores and their work in years 7 and 8. There are eight mathematics teachers at Amber Hill and they are all in favour of some form of setting. Most of the teachers in the department had never experienced mixed ability mathematics teaching beyond years 7 and 8. This is fairly typical for a department of mathematics, a recent OFSTED survey showed that 94% of schools use setting in the upper secondary years for mathematics (*The Guardian* 8/6/96).

The Amber Hill mathematics department was an interesting place to consider the impact of setting because the students experienced both mixed ability and setted approaches within the same school for mathematics, at different times. This gave the students important insights into the advantages and disadvantages of the two approaches. At Amber Hill mathematics was taught using the SMP

scheme. As part of this scheme the students worked through individualised booklets, at their own pace, in years 7 and 8, in mixed ability groups. In year 9 they change to a setted textbook system. There was no departmental policy that dictated the way that teachers should operate in years 9 to 11, but all of the teachers used the same approach. They stood at the front of the class and explained methods and procedures from the blackboard for ten to twenty minutes, they then set the students questions to work through in their textbooks. At periodic intervals they would stop the students and check answers, then move them on to the next exercise. This process ensured that the students all moved at a similar pace through their textbooks. Despite reports in the press, there is evidence that this traditional, textbook model of teaching is still predominant in secondary mathematics departments in the UK (HMI, 1985, 1992).

In the qualitative analysis that forms the first part of this paper, twenty out of the twenty four students interviewed were taken from the top four out of eight sets (because of the wider aims of the case studies). Their views about setting may not therefore be considered as representative of students from across the setting spectrum. The other four students were taken from set seven.

Phoenix Park

Phoenix Park school was chosen as a contrast to Amber Hill because the students who attended the two schools were very similar but the schools offered contrasting and, in many respects, opposing approaches. Phoenix Park is also located in an area of social disadvantage and most of the students who attend the school are white and working class. Comparisons of the case study students attending the two schools showed there to be no significant differences between the cohorts in terms of social class, ability (measured on NFER tests), ethnicity or gender. At Phoenix Park 79% of the students were classified as working class, 23% were from single parent families, 42% were girls and 11% were from ethnic minorities. In NFER tests which the students took on entry to their school 76% of the students were below the national average for the examination. Phoenix Park is a 13-18 upper school. Prior to joining Phoenix Park all of the students had attended middle schools that used the SMP scheme. This meant that, like the Amber Hill students, they had all learned mathematics through SMP booklets for the two years prior to the beginning of my three-year

research period. At this point the Amber Hill students changed to settled groups and textbook teaching, the Phoenix Park students changed to mixed ability groups and a project based teaching approach. There were approximately 110 students in the case study year group at Phoenix Park.

In stark contrast to Amber Hill, Phoenix Park is an extremely 'progressive' school. The staff believe in giving the students freedom, independence and choice. The mathematics teachers allow the students to work unsupervised in separate rooms if they want to, because students are meant to be responsible for their own learning. In mathematics lessons the students work in mixed ability groups from the beginning of year 9, when they start the school, to half-way through year 11. At this point the students are moved into one of three 'examination' groups according to the level of examination they have been entered for. In mathematics lessons at Phoenix Park the students work on open-ended projects at all times, the department do not use any textbooks or published materials. They generally give the students open starting points, such as "what is the maximum sized fence that can be built out of 36 gates?", the students are then encouraged to go away and work on this information, develop questions of their own, extend the problem and use mathematics to answer their questions, for approximately three weeks. At the end of this time they complete a description of the activities they have worked on and their results. Discipline is very low key in Phoenix Park and the teachers show little overt concern to keep the students 'on task'. Lessons are extremely relaxed and it is fairly typical for at least one-third of the students to be off task at any one point in time during lessons.

In the analysis that follows I will mainly concentrate upon the students at Amber Hill and their responses to setting. At times I will refer to the differences between the students at the two schools in relation to their grouping arrangements, but there is not enough space to analyse Phoenix Park in the same depth as Amber Hill in this paper.

III Research Results

(i) The Students Responses to setting

At an early stage of my case study at Amber Hill I became aware that certain features of the students' mathematical experiences were causing some students to become disaffected about mathematics and, subsequently, underachieve. A number of these features were intrinsically linked to the setted nature of their learning environments. I will now discuss each of these features in turn, starting with the one that seemed to have the most impact upon the largest number of students.

Working at a fixed pace

Probably the main reason that teachers place students into sets in mathematics is so that they can reduce the spread of 'ability' within the class, enabling them to teach mathematical methods and procedures to the entire group, as a unit.

It's good (setting) because you're putting similar abilities together. I mean it's easier to pitch your lesson, to pitch the work at them, to teach them all together, you know, from the front, as a class. (Edward Losely, mathematics teacher, Amber Hill)

There is evidence that the way in which teachers proceed in setted lessons is by teaching towards a reference group of students (Dahllöf, 1971). Teachers generally pitch their lessons at the middle of the group, on the basis that faster or slower students will be able to adjust to the speed at which lessons are delivered. At Amber Hill many of the students were unable to make this adjustment and when they changed in year 9 from working at their own pace, to working at a fixed pace many students became disaffected and started to underachieve. In interviews conducted in years 9, 10 and 11, working at the pace of the class was a major complaint for almost all of the students and one that they variously related to disaffection, boredom, anxiety and underachievement. Many of the students were unhappy because they felt that the pace of lessons was too fast, this often caused them to become anxious about work and to fall behind; which then caused them to become more anxious. This response was particularly prevalent amongst the top set girls and I have written elsewhere about the marked underachievement of many of these students in response to setting arrangements (Boaler, 1996b). However the anxiety caused by fixed pace lessons did not only prevail amongst

the top set students, In the following extracts the students all relate the fixed pace of lessons to a loss of understanding:

A: I preferred the booklets.

S: Yeah cos you just get on with it don't you?

A: Yeah, work at your own pace. You don't have to keep up with the others.

JB: Do you feel that now?

A: In a way because if you don't do all the work, then you get left behind and you don't understand it.

(Suzy & Anna, Amber Hill, year 11, set 2)

L: Well in the first two years you worked at your own pace, this last year or two you got to do it all, with everyone else at the same time, at the same speed, and if we're too slow or something, you've got to be able to do it, quickly, even if you've got it wrong, just to catch up with everyone else, which is bad, 'cos you don't learn it, you're just rushing and trying to make sure you get it done just so you don't get in trouble and you can catch up with everyone else. (Lindsey, Amber Hill, year 11, set 3)

The majority of students interviewed related their reservations about setting (and particularly class teaching) to what they perceived as a resultant loss of understanding. However, whilst some students, who were generally girls, complained about the fast pace of lessons, other students in the same groups linked their lack of understanding to the fact that lessons were too slow. These were usually boys:

C: Yeah, if the work's easier, like the pace, it's normally quite fast and the teacher will set us questions we have to get up to...we'll do that and if it's hard it will take longer, but if we find it easy we'll get it done quicker but there will still be people that are struggling behind, which means you have to go back ... and go over it again. It's a waste of time. (Colin, Amber Hill, year 11, set 1)

M: It's silly now, it's just, most of the people slow the class down, gets it more boring

C: You don't learn as much

M: Like people laze around, when they've completed the work...say we've completed the work and we can go further up the book, we have to do that piece of work and then stop, and wait for the others to catch up and then people laze around. (Chris and Marco, Amber Hill, year 11, set 4)

The fact that some students complained about the pace of lessons being too fast, whilst other students in the same classes, complained about lessons being too slow seems to reveal an important limitation of a class taught approach. For the teacher it shows how difficult it is teaching a group at the same pace, even when they are supposed to be of 'homogeneous' ability. Amber Hill divided the students into eight sets which should produce relatively little variation amongst students in the same set. The complaints of the different students at Amber Hill may also reflect the fact that the ability of a student does not necessarily indicate the pace they feel comfortable working at, although this is an assumption that class teaching to setted groups is predicated upon. Despite the variation amongst girls and boys in their preferences for the pace of lessons, they were clearly united in their view that a fixed pace of lessons decreased their opportunities for learning. None of the girls or boys interviewed expressed a preference for mixed ability lessons because they allowed them to do less work, the students were clear that they preferred mixed ability groups because working at their own pace gave them a greater access to understanding:

JB: What did you think about the booklets you used in the first two years here?

S: I thought they were good

L: I dunno if the booklets were good - or if it was working at your own pace

JB: Do you like going at your own pace?

S: Yes definitely

L: Yes, but it's not like we go slow if we go at our own pace, it's not that we go slow, we don't think oh going at our own pace, lets do one sum a lesson type of thing

S: It's good, because you know if you understand something you can move on

L: And if you don't you can spend more time on it- You spend more time on it - but she wants to move on, so you just leave that bit and go onto the next bit even though you don't know the bit before and you don't understand the chapter. (Sara and Lola, Amber Hill, year 11, set 3)

The view that working at a pace which was determined by the teacher, diminished understanding was prevalent both amongst students who found lessons too fast and students who found lessons too slow. But these were not always the same students, almost all of the students seemed to find some lessons, or some parts of lessons, either too fast or too slow:

C: I felt like I was learning - you feel you was learning more, 'cause the teacher would help you - if you went up to him and showed him the book he would help you and I felt I learned more in the first and second year, but in the fourth and fifth year it's more slow and like if you finish first you have to wait for the others, or if you're behind you have to work fast because everyone else is finished.

M: And that's why I don't like maths any more 'cause I can't go at my own pace.

(Chris & Marco, Amber Hill, year 11, set 4)

The pace that students felt comfortable working at seemed to be determined by a wide range of factors. These included the difficulty of individual topics, the students' own prior experience, individual preferences and, of course, their feelings on that day.

The fact that Amber Hill used setting did not mean that the teachers had to teach students as a group at a fixed pace, but for many teachers the only reason for establishing setted groups is to enable teaching from the front to whole classes. There would be very little point in setting students, given the known disadvantages this confers upon low set students, if the students then worked at their own pace, which they could do in mixed ability groups. At Amber Hill the main purpose of setted groups was also the main source of disaffection for the students as well as the factor that almost all students linked with diminished learning opportunities and under achievement.

The students' second major complaint about setting was also related to class teaching, but it extended beyond this. A major concern of significant numbers of students interviewed was the pressure that they felt was created by the existence and form of their setted environments.

Pressure and Anxiety

Various research studies have shown that the presence or absence of mathematical anxiety is an important determining factor in a students' response to mathematics (See, for example, Buxton, 1981). Women and girls, in particular, have been shown to be prone to mathematical anxiety (Fennema & Leder, 1990; Dweck, 1986), and this has been shown to have serious negative consequences for their achievement (Hart, 1989; Fennema & Sherman, 1977, 1978). At Amber Hill mathematical anxiety was commonplace, particularly amongst girls. In a questionnaire given to the students in year 9, significantly more boys than girls thought that they were good at mathematics ($\chi^2 = 18.04, 2 \text{ d.f. } p < 0.001$), whereas at Phoenix Park there were no significant differences between the attitudes of girls and boys. These patterns continued throughout years 9, 10 and 11 at the two schools. In interviews the girls at Amber Hill linked their anxiety, not to the intrinsic nature of mathematics, but to the pressure created by setted classes. Some of this pressure derived from the need to work at a pace set by the teacher:

H: I don't mind maths but when he goes ahead and you're left behind, that's when I start dreading going to maths lessons. (Helen, Amber Hill, year 11, set 1)

K: I mean she's rushing through and she's going "we've got to finish this chapter by today" but I'm still on C4 and I don't know what the hell she's chatting about and I haven't done any of it, 'cause I don't know it, she hasn't explained it properly she just says "take this off, take that off" and she puts the answers up and like - what?, I don't know what she's doing. (Karen, Amber Hill, year 11, set 3)

Another aspect of the students' anxiety related to a more reflective pressure. This concerned the competitive standard that students believed they had to live up to within their setted groups.

H: You're expected to know more

M: They expect too much, yeah ... you should know this..

H: You should know that...

M: You're the top set. (Helen and Maria, year 11, set 1)

The creation of groups intended to be homogenous in ability caused many students to feel that they were constantly being judged alongside their peers.

L: I preferred it when we were in our tutor groups

JB: Why?

L: 'Cause you don't worry so much and feel under so much pressure then, 'cause now you've got people of the same standard as you and they can do the same stuff and sometimes they can do it and you can't and you think oh I should do that and then you can't.. but if you're in your tutor group you're all a different status...it's different. (Lindsey, Amber Hill, year 11, set 3)

One of the reasons commonly given for the formation of setted groups is that the competition created by setted classes helps to raise achievement. For some students this was probably true:

You have to keep up and it actually, in a way it motivates you, you think if I don't do this then I'll get behind in the class and get dropped down a set. (Gary, Amber Hill, year 11, set 3)

However, of the twenty-four students interviewed in year eleven, only one student, Gary, gave any indication that the competition and pressure created by their setted environments enhanced motivation or learning. At Amber Hill setting was a high profile concept and the students were frequently reminded of the set they were in. This served as a constant standard against which they were judged. The students gave many indications that this continual pressure was not conducive to their learning. Undoubtedly the most intense pressure was experienced by top set students and at Amber Hill placement in the top set appeared to have serious negative consequences for the learning and achievement of students (Boaler, 1996b). What I am attempting to show here is not that the

pressure of setting is bad for all students, but that individual students respond differently to setted situations. This individual variation in response is frequently overlooked within setting debates. Some students, even those placed in high sets, are disadvantaged because of setting and at Amber Hill there was much evidence that the students who were negatively affected were not the least able in the setted groups. In set 1 for example, the students who experienced the most difficulties in response to setting were originally the highest attainers in the group. At the end of year 8, immediately before the students were setted, Carly and Lorna attained the highest and second highest NFER scores in the school. At the end of year 11 these two students attained the lowest GCSE grades in set 1 (grade E).

JB: Can you think of some good and bad things about being in set 1?

L I can think of the bad things.

C: I agree.

JB: OK, what are the bad things?

L: You're expected to know everything, even if you're not sure about things.

C: You're pushed too hard.

L: He expects you to work all the time at a high level.

C: It makes me do less work, they expect too much of me and I can't give it so I just give up.

(Carly and Lorna, Amber Hill, year 11, set 1)

It appeared from a variety of data sources in the two case studies that a students' success in their set had relatively little to do with their ability, but a great deal to do with their personal preferences for learning pace and style. These preferences, in turn, seemed to relate to the sex of students. The vast majority of students who reported in interviews that they were disaffected by a fixed pace of lessons were girls. Other data sources, that I shall discuss later, show that social class also had a significant impact upon the students' responses to setting.

The third major complaint of the students was particularly prevalent amongst students outside of set 1 and this related to the way in which setting limited their potential opportunities and achievements.

Restricted Opportunities

In interviews many of the students at Amber Hill expressed clear feelings of anger and disappointment about what they felt to be unfair restrictions upon their potential mathematical achievement. The students, from a variety of sets and ability ranges, cared about their achievement, they wanted to do well and they were prepared to put effort into their work, but many felt that they had been cheated by the setting system:

L: The thing I don't like about maths is .. I know because we're in set 4 you can only get a D.

S: Yeah you can't get any higher than a D.

L: So you don't do as much.

S: Yes you could work really hard and all you can get is a D and you think, well what's the point of working for a D? (Lindsey and Sacha, Amber Hill, year 11, set 4)

A: I'm in set 3 and the highest grade I can get is a C... it's silly because you can't, maybe I wanted to do A-level, 'cause maths is so useful as an A-level, but I can't because...I can get a C if I really push it, but what's the point? (Alan, Amber Hill, year 11, set 3)

A number of the students explicitly linked the restrictions imposed by the set they were in to their own disaffection and underachievement. They reported that they simply could not see any point in working in mathematics for the grades that were available to them:

JB: How would you change maths lessons? If you could do it any way you wanted what would you do?

C: Well work at your own pace and different books.

JB: How would working at your own pace help?

M: Well it would encourage people more wouldn't it?, they'd know they're going for an A wouldn't they? like what's the point of me and Chris working for a D? Why are we gonna work for a D?

C: I'm not saying it's not good a D, but...

M: It's not good, it's crap, they said to us if we get 100% in our maths we're gonna get a D, well what's the point? (Chris & Marco, Amber Hill, year 11, set 4)

These extracts raise questions about the accuracy of the students' assessments of their own potential but, in many ways, the degree of realism in the students' statements is irrelevant. For what the students clearly highlight is the disaffection they felt because of their setting arrangements. The students may have been unrealistic, but the disaffection they experienced because of their restricted attainment was real.

S: We're more to the bottom set so we're not expected to enjoy it.

JB: Why not?

S: I'm not putting, I'm not saying 'cause we're in the lower set we're not expected to enjoy it ... it's just... you're looking at a grade E and then you put work in towards that ... you're gonna get an E and there's nothing you can do about it and you feel like...what's the point in trying, you know? what's the difference between an E and a U?

JB: How did you feel about maths before you were put into sets?

K & S: Better. (Keith & Simon, AH, year 11, set 7)

These feelings of despondency were reported from students in set 2 downwards and many of the students suggested that the limits placed upon their attainment had caused them to give up on mathematics. The students believed that they had been restricted, unfairly and harmfully, by their placement into sets.

The fourth and final response that prevailed amongst students primarily affected the students in low sets and this related to the way in which the sets were chosen.

Setting decisions

Many of the students interviewed did not feel that the set that they had been put into was a fair reflection of their ability:

S: I was alright in the first year, but like me and my teacher had a few problems, we didn't get on, that's why I think it's really better to work really hard in the first years, 'cause that's when you've got a chance to prove a point, you know, that you're good and then in the second year you'll end up in a good set and from then on you can work. But me in the first year, I got dumped straight into the bottom set. And I was like huh? what's going on?, you know? and they didn't teach me anything there and I was trying hard to get myself up, but I couldn't, 'cause once you're in the bottom it's hard to get up in maths. That's another bad thing about it, and other people now, there's people now in like higher sets man and they just know nothing, they know nothing. (Simon, AH, year 11, set 7)

Some of the students, particularly the boys, felt the set they were in reflected their behaviour more than their ability:

M: Yes but they're knocking us down on our behaviour, like I got knocked down from second set to bottom set and now, because they've knocked me down, they've thrown me out of my exams and I know for a fact that I could've got in the top A, B or C. (Michael, AH, year 11, set 7)

Tomlinson (1987) provides evidence that the behaviour of students can influence the examination groups which they are put into and some of the Amber Hill students were convinced that their behaviour, rather than their ability, had determined their mathematics set, which in turn, had partly determined their examination grade.

The Impact of Setting

The students at Amber Hill were coherent in their views about setting. The twenty-four students interviewed in year eleven were in general agreement about the disadvantages they perceived and all

but one of the students interviewed expressed strong preferences for mixed ability teaching. This was because setting, for many of the students, meant one or more of:

- a lack of understanding, when the pace of lessons was too fast;
- boredom when the pace of lessons was too slow;
- anxiety, created by the competition and pressure of setted environments;
- disaffection related to the restricted opportunities they faced; and
- perceived discrimination in setting decisions.

It was also clear from the students that setting did not have a single influence that affected all students in the same way. Some students were probably advantaged by setted lessons, but others had been negatively affected by processes of setting. In almost all cases the disadvantages students reported concerned their learning of mathematics and their subsequent achievement. Nevertheless, some students also experienced other negative repercussions:

K: You walk around the school and you get people in the top set and you get people in our set and if you walk round the school and you're talking about maths, they put you down because you're not in that set, it's like...

S: They're dissing you and that.

K: They're saying you haven't got the ability they've got. (Keith & Simon, Amber Hill, year 11, set 7)

Despite the labelling associated with setting, the major concern for the majority of students interviewed was the consequences setting might have for their achievement. In the next section I shall present various forms of data that give some indication of the way in which the students' achievement was affected by their placement in sets.

(ii) Setting and Achievement

The students' different responses to setting, given in interviews, indicate that the success or failure of a student in a setted group related to their preferred learning style and their responses to competition, pressure and opportunity (or lack of it). Various quantitative indicators add support to the idea that success was strongly related to factors other than ability. For example, at Amber Hill, there was a large disparity between the attainment of students when they entered setted lessons and their success in GCSE examinations at the end. This may be demonstrated through a consideration of the students' scores on their NFER tests at the end of year 8 and their scores on their GCSE examinations at the end of year 11. This information is provided for both of the schools, giving an insight into the different implications of setted and mixed ability teaching for students' achievement.

At Amber Hill a high correlation would be expected between NFER results at the end of year 8 and eventual achievement, because the students were setted largely on the basis of their NFER results and, once inside their sets, the range of their attainment was severely restricted. At Phoenix Park a smaller correlation would be expected, because prior to their NFER tests the students had attended fairly traditional middle schools. At Phoenix Park they experienced considerable freedom to work if and when they wanted to in lessons which, combined with the openness of the school's teaching approach, may have meant that some students would not perform at the end of year 11 as would be expected from their performance at the end of year 8. However, a comparison of performance, before and after setting and mixed ability teaching at the two schools gives the following scattergraphs:

- Figures 1 & 2 here -

These scattergraphs display an interesting phenomenon. They show that at Amber Hill there was a relatively small relationship between the students' attainment in year 8 and their eventual success, after three years of working in setted lessons, demonstrated by a correlation of 0.48. This meant that some students did well, even though indications in year 8 were that they were not particularly able and some students did badly, despite being high achievers at the end of year 8. At Phoenix Park where students were taught in mixed ability groups and given considerably more freedom, there was a correlation of 0.67 between initial and eventual attainment. These results support the

idea that once inside a setted group a number of factors, that are relatively independent of initial attainment, influence a students' success.

A second interesting phenomenon was revealed at Amber Hill through a consideration of the relationship between social class and the set students were placed into. This relationship could be examined at both schools because the students were put into setted examination groups at Phoenix Park in the middle of year 11. Partial correlations from the two schools enable the impact of 'ability' (measured via NFER tests) and social class upon the sets students were given, to be considered. These showed that at Amber Hill the correlation between the social class of students and the set they were placed into was 0.25, after ability was controlled for, with students of a 'low' social class being more likely to appear in a low set. A similar analysis of partial correlations at Phoenix Park showed that there was a small, negative correlation of -0.15 between social class and examination group, after the effect of ability was taken out. This showed that at the end of their mixed ability teaching experiences there was a small tendency for students of a 'lower' social class to be placed into a higher examination group at Phoenix Park. At Amber Hill there was a significant tendency for students of a 'lower' social class to be placed into a lower set, irrespective of their mathematical attainment.

Another way of looking at this relationship is to consider the two-way correlations between different variables. At Amber Hill there was a small correlation between the results of the students' NFER tests and their social class, of 0.19. However, when the teachers placed the students into sets, the correlation between set and social class increased to 0.3, despite the fact that setting decisions were partly based upon the students' NFER scores. At Phoenix Park the students took NFER tests on entry to the school and at this time there was a large correlation between NFER test results and social class of 0.43. I do not have the data to explain why the students left their middle schools with this apparent class bias, however, when Phoenix Park placed the students into sets at the end of year 11 and the end of their mixed ability teaching, the correlation between set and social class had drastically reduced to 0.15. Thus, it seems that at Amber Hill the students started the school with relatively little class based achievement, but this increased when the students were setted. At Phoenix Park the students started the school showing evidence of class based achievement,

favouring the middle classes, but this had disappeared, almost entirely, by the time they reached the end of year 11. One possible factor influencing the change between middle school and Phoenix Park was that all of the middle schools that the students attended, set the students for mathematics.

Further insight into the possibility of class bias at Amber Hill is demonstrated by locating individuals at the two schools who 'under' or 'over' achieved, in relation to their initial ability scores. At Amber Hill approximately 20% of the students ($n = 22$) could be described as 'outliers' on the scattergraph. The twenty-two most extreme outliers on the graph were made up of 7 'over' achievers and 15 'under' achievers. Closer examination of these students gives the following sex and class profiles:

- Tables i & ii here -

These tables show that amongst the over achievers there was a ratio of 3:1 of middle class to working class students, who were mainly boys. Amongst the underachievers there was a ratio of 1:4 of middle class to working class students, made up of roughly even numbers of girls and boys. These outliers represent only a small proportion of the students at Amber Hill but they show quite clearly that those students who did better than would be expected from their initial ability scores tended to be middle class boys, whereas those who did worse tended to be working class students (of either sex). This is interesting to contrast with the most extreme 20% of Phoenix Park students ($n = 18$). These students did not 'under' or 'over' achieve to the same extent as the Amber Hill students, as can be seen from the scattergraphs (figures 1 and 2). However, the students who were nearest to the edges of the graph did not reveal any class polarisation in achievement at Phoenix Park:

- Tables iii & iv here -

These tables show that amongst the over achievers at Phoenix Park there was a ratio of 2:5 of middle class to working class students. Amongst the underachievers there was a ratio of 5:6 of middle class to working class students. The over achievers at Phoenix Park were generally working

class boys, whereas the under achievers were roughly equal numbers of middle class and working class girls and boys.

What these results indicate is that at Amber Hill the disparity between initial mathematical capability and eventual achievement shown in figure 1 is partly created by a small number of mainly middle class students who achieved more than would be expected and a relatively large number of mainly working class students who achieved less than would be expected. Similar evidence of class polarisation is not apparent at Phoenix Park. This quantitative analysis enables social class to be added to the list of factors that appeared to influence achievement in setted lessons, it also re-establishes the notion that success in a setted environment had little to do with 'ability'. The influence of class bias over setting decisions is well documented (Ball, 1981; Tomlinson, 1987) and some of the students gave some indications, in interviews, about the way that this process may have taken effect. In the following extract Simon, a working class student, talked about the way in which he opted out of the 'game' of impressing the mathematics teacher:

S: Yes and in a way right, when I came to the school, I was scared to ask questions man, so I just thought, no forget it man. (Simon, Amber Hill, year 11, set 7)

This withdrawal because of Simon's fear probably served to disadvantage him when setting decisions were made. The disproportionate allocation of working class students to low sets shown by the correlations at Amber Hill would certainly have restricted the achievement of working class students. However, it seems likely that the social class of students may also have affected the way in which individuals responded to the experiences of setted lessons. In the next section I will attempt to draw together the various results that have been reported so far, in order to illuminate the different factors that influence a students' achievement in setted and mixed ability groups. Before doing so I would like to consider the overall achievement of the students at the two schools.

In any debate about setted and mixed ability teaching it is important to consider the achievement of students. The approaches of Amber Hill and Phoenix Park schools differed in many important ways but the GCSE results of the two schools showed that the setted classes did not achieve better results

than the students in the mixed ability classes, despite the increased time spent ‘working’ by the Amber Hill students (see Boaler, *in press*). The students who learned mathematics in an open approach in mixed ability classes, achieved significantly more A-G grades ($\chi^2 = 12.5, 1 \text{ d.f. } p < 0.001$), despite the comparability of the two cohorts of students on entry to their schools.

- Table v here -

Part of the reason that significantly more Amber Hill students failed the GCSE examination could be related directly back to the fact that the students were placed in low sets and this had caused them to give up on their mathematics education.

IV Discussion and Conclusion

At Phoenix Park school the students experienced a great deal of freedom to work when they wanted to work and talk or wander about when they did not. The students were grouped in mixed ability classes, the high ability students were not placed in high sets that would “push” them, the low ability students were not placed in sets in which teachers could “concentrate upon their individual needs”. At the end of three years of this relaxed and open approach the students who did well were those of a high ability. Students who did exceptionally well, compared to their entry scores were mainly working class students, those who did exceptionally badly were both working class and middle class students.

In all of these respects Amber Hill differed from Phoenix Park and although setting and mixed ability teaching was not the main focus of my research study, there were a number of clear indications from various forms of data, that at Amber Hill:

- social class appeared to have influenced setting decisions resulting in disproportionate numbers of working class students to be allocated to low sets

- significant numbers of students experienced difficulties working at the pace of the class resulting in disaffection and reported under achievement
- students became disillusioned and de motivated by the limits placed upon their achievement within their sets
- some students responded badly to the pressure and competition of setted lessons, particularly girls and students in top sets (Boaler, 1996b).

For a student, being able and hard working at Amber Hill was not a guarantee of success within their setted classrooms. Indeed the students indicated that success depended more upon working quickly, adapting to the norms for the class and thriving upon competition than anything else. A number of different results from this study cast doubt upon some wide-spread beliefs about setted teaching. For example, there was no qualitative or quantitative evidence that setting raised achievement, but there was evidence that setting diminished achievement for some students. A comparison of the most able students at the two schools showed that the students achieved more in the mixed ability classes of Phoenix Park than the high sets of Amber Hill. This may be related to a number of features of the two schools' approaches, but there were many indications from the top set students at Amber Hill that features of their top set learning had diminished their achievement (reported in Boaler, 1996b). The various forms of data also seem to expose an important fallacy upon which many setting decisions are based. Students of a similar 'ability', assessed via some test of performance, will not necessarily work at the same pace, respond in the same way to pressure or have similar preferences for ways of working. Grouping students according to ability and then teaching towards an imaginary model student who works in a certain way at a certain pace, will almost certainly disadvantage students who deviate from the ideal model. The stress and anxiety reported by the students in interviews at Amber Hill is probably an indication of this phenomenon. There was much evidence that the students who were disadvantaged by this system were predominantly working class, female or very able. The class polarisation that existed within the setted system of Amber Hill and that was completely absent at Phoenix Park is consistent with the results of other research studies that have considered the links between setting and class bias

(Abraham, 1995; Tomlinson, 1987; Ball, 1981; Lacey, 1970; Hargreaves, 1967). A common feature that links all of the findings of this study concerns the individual nature of students' responses to setting. Students at Amber Hill responded to setting in a variety of different ways indicating that it is too simplistic to regard the effects of setting as universally good or bad for all students, even students in the same set. The various quantitative studies that have compared the group scores of setted and mixed ability classes overlook this fact and, in doing so, overlook the complexity of the learning process for different individuals.

To conclude, 'survival of the quickest' is probably not the most accurate way to describe the experiences of setted students, for this research has indicated that it was the students who were most able to adapt to the demands of their set who were most advantaged, or least disadvantaged by setting. In predicting who those students may be, it seems fair to assume that if a student is middle class, confident, thrives on competition and pressure and is motivated, regardless of limits on achievement, they will do well in a setted system. For the rest of the students success will probably depend upon their ability to adapt to a model of learning and a pace of working which is not the most appropriate for their development of understanding.

The consequences of setting and streaming decisions are great. Indeed, the set or stream that students are placed into, at a very young age, will almost certainly dictate the opportunities they receive for the rest of their lives. It is now widely acknowledged in educational and psychological research that students do not have a fixed 'ability' that it is determinable at an early age. However the placing of students in academic groups often results in the fixing of their potential achievement. Slavin (1990) makes an important point in his analysis of research in this area. He notes that as mixed ability teaching is known to reduce the chances of discrimination, the burden of proof that ability grouping is preferable must lie with those who claim that it raises achievement. Despite the wide range of research studies in this area, this proof has not been forthcoming.

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