# ‘We’ve still got to learn!’ Students’ perspectives on ability grouping and mathematics achievement.

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## Introduction to the Issue

In the UK, there is a long tradition of grouping students by ‘ability’, particularly in mathematics. This practice is founded upon a widespread and deeply held belief that ability grouping raises attainment. However, the research that has been conducted on the relationship between ability grouping and achievement suggests that this is not the case. Studies have tended to fall within three areas, suggesting the following findings.

(1) High attaining students are not significantly advantaged by their placement in high groups, but the attainment of students in low groups is significantly reduced by their placement in such groups (Slavin, 1990).

(2) The placement of students into ability groups is critical to their future level of attainment. Two students whose levels of attainment are judged to be on either side of a borderline for group placement may go on to be placed into different groups – one preparing for an ‘intermediate’ examination paper, the other for a less demanding ‘foundation’ paper. This placement decision will significantly affect the students’ future achievement, with the student in the higher group being given greater opportunity to learn mathematics at a higher level, even though their levels of attainment were virtually the same and differences in their future potential were indeterminable. This aspect of ability grouping reveals both its arbitrary and its inequitable nature.

(3) Ability groups can serve to enhance educational inequalities. When grouping decisions are made, it is common for students from working class homes and ethnic and

cultural minority groups to be over-represented in the lower groups, even after prior attainment is taken into account (Boaler, 1997a) (Some of the reasons for this are discussed in Robyn Zevenbergen's chapter).

Despite the negative research findings, many people still believe that ability grouping is necessary for effective teaching, and that ability grouping raises levels of achievement. In this chapter, we will present an alternative perspective on ability grouping that has emerged from 5 years of research in mathematics classrooms.

## Key questions

In this chapter will address three questions:

1. What are students' experiences of, and beliefs about ability grouping?
2. What effects does setting have upon students' progress and attainment?
3. How does ability grouping serve to disadvantage many students?

One of the main points we would like to make in this chapter is that we have given insufficient attention to the negative outcomes of ability grouping in the UK and that we need to explore alternatives.

## Setting the scene

Ability grouping in mathematics appears to be more prevalent in the UK than in any other country of the world. Indeed, many of the Pacific Rim countries do not organise student grouping along ability criteria, yet student attainment far exceeds that of students in the UK on international tests. This is a challenging fact – but one that is not often raised by those voices who argue that we need to adopt many of the classroom

practices (for example interactive whole-class teaching) of those countries. (More information on this issue can be found in Paul Andrew's chapter.)

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**Task 1**

Before you go any further, spend some time considering your **own** position on ability grouping in mathematics. Is it necessary? Is it helpful? For whom? Why? List three positive aspects of ability grouping, and three negative aspects.

In this chapter, we discuss some students' reactions to ability grouping. In preparation for that, arrange to talk to some small groups of students who have been placed in high, middle and lower sets .As well as this – or alternatively if meeting is difficult - give the students an anonymous questionnaire. Do they believe that they are being well served by setting? Are they involved in making the decisions as to which set they will go into? Are parents involved? What other questions might you want to ask them?

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One of us (Jo Boaler) is currently living and working in the USA, where students are allowed to choose courses in mathematics. When schools do employ '*tracking*' (which is the nearest equivalent to setting in the UK), it is generally to sort students into one of two, or very unusually, three groups – at the age of 14 or higher. Colleagues in the USA are shocked by the British traditions of: placing students into ability groups at a young age; of sorting students into large numbers of groups, as many as 8 or more in some schools; and of using group placement as the basis for determining the mathematics students can learn and the examination grades that will be accessible to them.

Hence, although placing students into ability groups seems both natural and essential to many practitioners in the UK, it is probably more appropriate to see it as a cultural practice, rather than an essential way of organising students for the effective teaching of

a curriculum. There are many countries in the world where setting is *not* an established practice; countries where suggestions that students be placed in ability groups would be considered as ridiculous as the suggestion in the UK that all mathematics teaching should be in mixed ability classes. Hence, although placing pupils into ability groups seems both natural and essential to many practitioners in UK, it is actually more appropriate to see it as a cultural practice, rather than an essential way of organising pupils for the effective teaching of a curriculum. There are many countries in the world where setting is *not* an established practice; countries where suggestions that pupils be placed in ability groups would be considered just as incredulous as the suggestion in the UK that all mathematics teaching should be in mixed ability classes. Consider for example the case of Denmark. Here, there is no streaming or grouping by ability; all students remain in the same group. Nevertheless, the Curricular Guidelines in mathematics for schools (1st to 10th grade) invite not a differentiation *of students*, but a differentiation *in teaching*, which means that teachers have to make an effort to meet all students' needs wherever they are and give them work according to their development, but not with any explicit streaming or ability grouping. One thing that is important to note in the Danish system is the lack of any national tests, marks and exams. This means that even the informal differentiation does not have any public recognition among students because there is no public stratification. (Further examples of such situations are discussed in Paul Andrew's chapter.)

Finding alternatives to ability grouping is not a simple task, and we cannot expect schools and teachers to change grouping methods overnight without curriculum materials and methods of teaching that have been developed to support this task. Governmental support is vital, yet our current (Labour) government has turned its back on the idea of exploring or improving ability grouping practices. Along with other researchers who have been examining ability-grouping practices, we recently met with

Department for Education and Employment (DfEE) officials. All the invited researchers communicated the same message – we do not have evidence that ability grouping works but we have a lot of evidence that it lowers achievement. Despite these meetings, the Labour government has continued to exert pressure on schools to employ ability grouping, even during the primary school years. The implications of such a government policy are profound and need to be examined in detail.

One of us (Jo Boaler) recently undertook a three-year, longitudinal study of approximately 300 students who were learning mathematics in two schools in England (Boaler, 1997a, b, c). Although ability grouping was not an initial focus of that research study, it emerged as a significant factor for the students, one that influenced their ideas, their responses to mathematics, and their eventual achievement. We would like now to give you some sense of the students' views – views that are often marginalised or ignored. You can find a full report of this research in Jo Boaler's book: *Experiencing School Mathematics: Teaching styles, sex and setting* (see the **Further Suggested Readings** at the end of this chapter). The intention is that you consider the situations we describe, and compare them with your own experiences and context.

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**Task 2**

We shall be reporting on research in several schools in this chapter, but what will be important is for you to use the research findings to look into your own context. How are students organised for their mathematics lessons? Are they grouped by ability? How are such decisions made? When are such decisions made? What evidence is used? Who makes the decisions? Are placement decisions flexible? How often do students move between groups?

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## Who benefits and who suffers from setting?

One of the schools studied taught mathematics in mixed-ability groups, the other in setted ability groups. A combination of lesson observations, questionnaires, interviews and assessments – including the GCSE examination – revealed that students in the setted school were significantly disadvantaged by their placement in ability groups. A complete cohort of students in each school (approximately 300 students in all) was monitored over a three-year period from when they entered year 9 until they came to the end of year 11 (ages 13 - 16). The disadvantages of ability grouping affected students from across the ability range and were not restricted to students in low groups. The results relating to ability grouping in that study may be summarised as follows:

> Approximately one-third of the students taught in the highest ability groups were disadvantaged by their placement in these groups because of high expectations, fast-paced lessons and pressure to succeed. This particularly affected the most able girls.
>
> Students from a range of groups were severely disaffected by the limits placed upon their attainment. Students reported that they gave up on mathematics when they discovered their teachers had been preparing them for examinations that gave access to only the lowest grades.
>
> Students' social class had influenced setting decisions, resulting in disproportionate numbers of working-class students being allocated to low sets (even after their prior attainment was taken into account).
>
> Significant numbers of students experienced difficulties working at the pace of the particular set in which they were placed. For some students the pace was too slow, resulting in disaffection, while for others it was too fast, resulting in anxiety. For both higher and lower attaining students, levels of achievement

were lower than would have been expected, given the students' attainment on entry to the school.

A range of evidence in that study linked setting to under-achievement, both for students in low *and high* sets, despite the widely held public, media and government perception that setting increases achievement. It is possible that you will find some of the results given in this chapter unexpected or challenging. This would not be surprising as ability grouping in mathematics is deeply embedded into school practices and British traditions. Very few teachers have considered it important to look for alternatives, and many of those who have, have faced opposition from colleagues, school management or parents. As a result we have only a small number of examples of successful alternatives and we face a critical need for research and dissemination of good practice, as well as support from local and national policy makers.

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**Task 3**

Having read that, why do you think that the practice of setting continues to be the prevailing means of organising students in mathematics in the UK? You might want to offer your own opinion, that of your tutor/mentor or other teachers in the school.

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## Extending the evidence base

We considered the evidence for the negative effects of setting was sufficiently broad ranging and pronounced in that first study to prompt further research in a wider range of schools. We therefore decided, with two colleagues – Margaret Brown and Hannah Bartholomew – to conduct further research in six other schools that varied in their grouping practices. We chose six schools in London that provided a range of learning environments and contexts. All the schools were regarded as providing a satisfactory or

good standard of education and all were partner schools with Higher Education Institutions for initial teacher training. The schools were located in five different local education authorities. Some of the school populations were mainly white, others mainly Asian, while others included students from a wide range of ethnic and cultural backgrounds. The GCSE performance of the schools ranges from the upper quartile to the lower quartile of the national distribution, and the social class of the school populations ranges from some that were mainly working-class, through schools with nationally representative distributions of social class, to schools that were strongly middle-class. One of the schools is an all-girls school and the other five are mixed.

All six schools teach mathematics in mixed-ability groups when students are in year 7 (age 11). One of the schools allocates students to setted ability groups for mathematics at the beginning of year 8 (age 12), three others set the students into ability groups at the beginning of year 9 (age 13), and the other two schools continue teaching in mixed ability groups. At the time of writing this chapter, the cohort of students in our study had completed the end of year 9, which meant a change from mixed ability to setted teaching for three of the school-cohorts. There are approximately 1,000 students in the study. The research methods we used have included approximately 120 hours of lesson observations, during years 8 and 9, questionnaires given to students in the cohort in the six schools (943 for year 8 and 977 for year 9, with matched questionnaires for both years from 843 students) and in-depth interviews with 72 of the year 9 students. This included four students each from a high, middle and low set in the setted schools and students from a comparable range of attainment in the mixed ability schools. We have described the context of the research project in some detail in order to illustrate that the findings that are emerging are not due to particularly unusual settings and are likely to be widespread. There are still a number of very profound questions overhanging the

general practice of ability grouping. We hope in this chapter to raise a number of questions about that practice and to challenge a number of preconceptions.

## The relationship between ability grouping and teaching and learning

When students moved from year 8 to year 9 in our study, it became clear from questionnaires, lesson observations and interview data that many students began to face negative repercussions as a result of the change from mixed-ability to setted grouping. Forty of the forty-eight students interviewed from setted groups wanted either to return to mixed ability teaching or to change sets. The students reported that teaching practices emanating from setting had negatively affected both their learning of mathematics and their attitudes towards mathematics. Three major issues that were raised by students were: (1) the high expectations and high pressure in high sets; (2) the limited opportunities and low expectations in low sets; and (3) the restricted pedagogy and pace in all setted groups. We will consider each of these briefly. As you read the rest of this chapter, consider how the voices of the students might be pertinent to the school(s) with which you are familiar, or in which you are working.

## Issue 1 - High Sets, high expectations, high pressure

In the previous study (Boaler, 1997b), at least one-third of the students taught in the highest set were disadvantaged by their placement in this group, because they could not cope with the fast pace of lessons and the pressure to work at a high level. The students that were most disaffected were able girls, apparently because able girls, more than any others, wanted to understand what they were doing - in depth - but the environment of set 1 classes did not allow them to do this. (Consider what connections there may be here for some of the arguments in Carrie Paechter's chapter.)

We decided to observe lessons and interview students in the highest groups in this study to determine whether the environment of set 1 lessons in other schools was similar to those in the previous study and whether students were disadvantaged in similar ways. Early evidence suggested that this was the case. Each of the girls interviewed from set 1 wanted to move down into set 2 or lower. Six out of eight of the boys in set 1 were also extremely unhappy, but they did not want to move into lower groups, presumably because they were more confident (although no more able) than the girls, and because they knew that being in a top set was important. Observations of set 1 lessons make such reactions easy to understand. In a range of top-set classes the teachers moved through examples on the board very quickly, often interjecting their speech with phrases such as '*Come on we haven't got much time*' and '*Just do this quickly*'. Set 1 lessons were also more procedural than others - with teachers giving quick demonstrations of method without explanation, and without giving the students the opportunity to find out about the meaning of different methods or the situations in which they might be used. Some of the teachers also reprimanded students who said that they didn't understand, adding comments such as '*You should be able to, you're in the top set*'. The following are descriptions of 'top-set' lessons, from students in the four setted schools. As you read these excerpts, do bear in mind that they were made by *real* students. It is important for teachers to consider the challenges in the student's point of view and how they might differ from that we might expect from the teacher.

**School A: Mainly white, middle and working-class school with average attainment.**

*Ayla:* *Sometimes they work too fast for me and I can't keep up with the rest of the class.*

*Josie:* *And all your other friends are in different groups so you can't really ask them for help, because you're the top set and you're supposed to know it all.*

*Simon:* *Most of the difference is with the teachers, the way they treat you. They expect us to be like, just doing it straight away.*

*Mitch:* *Like we're robots.*

**School C: Mainly White, middle-class school with very high attainment:**

*Lena:* *This year I find it really hard and I haven't been doing as well as I wanted to be.*

*Intvwr.:* *Did you enjoy it more last year in mixed-ability groups?*

*Lena:* *Yeah definitely, because it's a whole different process, you're doing different books, you're able to be teached more, you just feel that you're not being rushed all the time.*

*Andrea:* *I used to enjoy maths, but I don't enjoy it any more because I don't understand it. I don't understand what I'm doing. So if I was to move down I probably would enjoy it. I think I am working at a pace that is just too fast for me.*

**School E: Mainly white, working-class school with low attainment**

*Graham:* *If we can't answer the question or something, he'll say 'Oh yeah, you're not going to be in set 1 next year—you are the set 1 class you shouldn't be doing this, you should be doing this. (...) He wants to turn up a number 1 set – but he's going too fast, you know, a bit over the top.*

*Paul:* *He explains it as if we're maths teachers. He explains it like really complex kind of thing, and I don't get most of the stuff.*

*Molly:* *I want to get a good mark, but I don't want to be put in the top set again, it's too hard and I won't learn anything.*

**School F: Mainly Asian, middle and working-class school with average attainment**

*Lena:* *The teacher says 'You'd better do this, by like 5 minutes time' then you start to rush and just write anything*

*Nareen:* *You don't even get time to think in the maths lessons.*

*Aisha:* *I want to go down because they can do the same work but just at a slower pace, so they understand it better, but we just have to get it into our head the first time and that's it.*

These are just a small selection of the many complaints raised by students in top sets, who characterised their mathematical experiences as fast, pressured and procedural. It was interesting and important that the students' perceptions of set 1 lessons were similar in each of the schools. In the earlier study (1997b), it was found that teachers change their normal practices when they are given top-set classes to teach, appearing to believe that 'top-set' students are profoundly different from other students, rather than simply being in the highest-attaining range of students in the school.

Many teachers in our follow-up study also seemed to think that top-set children did not need detailed help, time to think, or the space to make mistakes. Rather they seemed to believe they could be taught quickly and procedurally because they were clever enough

to draw their own meaning from the procedures they were shown. In questionnaires, students in the six schools were asked, '*Do you enjoy maths lessons?*' Set 1 students were the most negative in the entire sample, choosing '*never*' or '*not very often*', more frequently than students in other sets or students in mixed-ability classes. Students were also asked whether it was more important '*to remember work done before or think hard?*' when answering mathematics questions. The set 1 classes had the highest proportion of students who thought remembering was more important than thinking. Thus, our results suggested that the experience of working in high sets caused many students to become disaffected and to view mathematics as a system of rules to be memorized.

Evidence from both of the studies suggests that the fast, procedural and competitive nature of set 1 classes particularly disadvantages girls and that the nature of high set classes contributes to the disparity in attainment of girls and boys at the highest levels. Despite media claims that girls are now overtaking boys in all subjects (Epstein, Maw, Elwood & Hey, 1998), boys still outnumber girls in attaining A or A* grades in mathematics GCSE by five to four. It seems likely that the under-achievement and non-representation of girls at the highest levels is linked to the environments generated within top-set classrooms.

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**Task 4**

It would be useful for you to explore the views of high set students in your school, perhaps through an anonymous questionnaire. How do students feel about the learning environment of the top set? What do they feel about students in lower sets? How do they think about the work and the pace? In addition, talk to some of the teachers about the difficulties they perceive in teaching top sets. What constraints are there, what limitations on their work?

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## Issue 2 - Low sets, low expectations & limited opportunities

The second issue that seemed to concern students was the low expectations placed upon those students who were allocated to lower sets. Students in low sets at the four schools appeared to be experiencing the reverse of the students in high sets, with repercussions that were more severe and damaging. Indeed, the most worrying reports of the implications of the setting process for students in our sample came from students in lower groups. These students reported a wide range of negative experiences, substantiated by observations of lessons. These included a frequent change of teachers (in one school the 'bottom' set had been taught by three different teachers in the first nine months), the allocation of non-mathematics teachers to low sets and a continuous diet of low-level work that the students found too easy. Here is what some students said to us.

*Lynne:* *It's just our group who keeps changing teachers*

*Intvwr.:* *Why?*

*Lynne:* *Cause they don't think they have to bother with us. I know that sounds really mean and unrealistic, but they just think they don't have to bother with us, 'cause we're group 5. They get say a teacher who knows nothing about maths, and they'll give them us, a PE teacher or something. They think they can send anyone down to us, they always do that, they think they can give us anybody.*

*(School E, set 5)*

*Ramesh:* *We come in and sir tells us to be quiet and gives us some work and then he does them on the board and then that's basically it.*

*Jack:* *Even though we're second from bottom group, I think it would be much better if we didn't have the help with it.*

*Ramesh:* *Because he thinks we're really low.*

*Jack:* *Really stupid or something.*

*(School A, set 6)*

Students were particularly concerned about the low level of their work and talked at length about teachers ignoring their pleas for more difficult work. In some lower-set lessons students reported not being given any mathematics questions to answer - only worked solutions to copy off the board.

*Lee:* *We come in, sit down, and there's like work on the board and he just says copy it. I think it's all too easy.*

*Ray:* *It's far too easy*

*Intvwr.:* *What happens if it's too easy? Do they make it any harder?*

*Lee:* *No we just have to carry on. We just have to do it. If you refuse to do it he'll just give you a detention. It's just so easy.*

*Ray:* *Last year it was harder. Much harder.*

*(School E, set 5)*

*Carol:* *He just writes down the answers for us from the board, and we say to him, we say we can do it, but he just writes them down anyway.*

*Intvwr.:* *So what are you meant to do?*

*Carol:* *Just have to copy them down. That's what we say to him, 'cause a lot of people get frustrated from just copying off the board all the time.*

*(School A, set 6)*

*Lynn:* *We do baby work off the board*

*Nelly:* *Yeah it's just like what we already know, you know 1 add 1*

*Lynne:* *Say it's three times something equals nine*

*Nelly:* *It's easy and it's boring.*

*(School E, set 5)*

Students in lower groups were upset and annoyed about the low level of the work they were given; in addition to finding lessons boring, they knew that their opportunities for learning were being minimised, as three girls in set 6 at one of the schools told us:

> *Sir treats us like we're babies, puts us down, makes us copy stuff off the board, puts up all the answers like we don't know anything.*
>
> *And we're not going to learn from that, 'cause we've got to think for ourselves.*
>
> *Once or twice someone has said something and he's shouted at us, he's said, 'Well you're the bottom group, you've got to learn it', but you're not going to learn from copying off the board.*

*(School A, set 6)*

The students sound extremely critical of teachers, but their reflections were, unfortunately, consistent with our observations of low-set lessons, in which students were given answers to exercises a few minutes after starting them or required to copy work off the board for the majority or all of lessons. In response to the questionnaire item '*how long would you be prepared to spend on a maths question before giving up?*' 32 per cent of students in the lower sets chose the lowest option—'*less than 2 minute*s' compared with 7 per cent of students in sets in the top half and 22 per cent of students in mixed-ability groups. The polarisation in the students' perceptions about mathematics questions in the setted schools probably reflects the polarisation in their experiences of mathematics. The students were convinced that teachers simply regarded students in low sets as limited:

*Imran:* *Sir used to normally say, 'You're the bottom group, you're not going to learn anything.'*

*Intvwr.:* *He says that to you?*

*Imran:* *Yeah.*

*Intvwr.:* *Why?*

*Imran:* *I don't know, I don't think he's got - maybe you'd call it faith in us, or whatever, he doesn't believe we can do it.*

*(School A, set 6)*

Teachers in all four schools that used ability-grouping told us that the system was flexible and that students could change groups if they were inappropriately placed, but the students in low groups believed there to be little hope of moving to higher groups. They believed that they were trapped within a vicious circle - to move up they needed good end of year test results, comparable with students in higher groups, but they could

not attain good results because they were not taught the work that was assessed in the tests.

*Ray:* *In our class it was very easy and as soon as we got into the SATS, it was just like we hadn't done it.*

*Lee:* *I want to be brainy, I want to go up, but I won't go up if this work is too easy.*

*(School E, set 5)*

In the same way as the 'top-set' teachers had fixed ideas about the high level and pace of work students should have been able to do, the teachers of the lower sets had fixed ideas about the low level of work appropriate for 'bottom-set' students. The students reported that teachers continued with these ideas, even when students asked them for work that was more difficult.

*Nelly:* *I say 'Oh, I've done this before already.'*

*Lynn:* *And he says 'Well you can do it again'. He's nothing like 'Oh, I'll set you with some harder work or nothing.'*

*(School R, set 5)*

The students clearly felt disadvantaged by the diet of low-level numeracy work that they were given. This problem seemed to derive partly from the students' belief that teachers had a low opinion of the level of work appropriate for low-set students but also from an idea that is intrinsic to setting policies and which will be discussed in the final section - that students in setted groups have the same mathematical capabilities and learning styles as each other and may be taught in exactly the same way.

We have not said much about the teachers' views, and it might be considered that the presentation of the students' view without some response from teachers presents only part of the picture. Nevertheless, it is an important part of the picture, one that has implications for students' progress, and motivation to learn mathematics.

## Issue 3 - Restricted pedagogy and pace

The final issue that appears to be a central concern for students is the restrictions placed upon their pace of work. In interviews students talked at length about the need to work at the same speed as each other. If they worked slower than others, they would often miss out on work as teachers moved the class on before they were finished.

*David:* *People who are slow they don't never get the chance to finish because she starts correcting them on the board already.*

*Scott:* *You don't finish the module.*

*(School A, set 4)*

On the other hand, if they worked too quickly they were disadvantaged as teachers made them wait for the rest of the class.

*David:* *Now we are sort of, people can be really far behind and people can be in front. Because it is sort of set, and we have these questions, say 'C', we have to all start.*

*Intvwr.:* *So you all start at the same, you all start at C?*

*Scott:* *Yeah but then the people who work fast have to wait for the people at the end to catch up*

*David:* *Because I finished, nearly before half the class and I had a lesson to do nothing.*

*(School A, set 4)*

Students also described the ways in which teachers used a small proportion of the class as reference points for the speed of the whole class (Dahllöf, 1971), and the detrimental effect this could have on their learning.

*Aisha:* *Sometimes you can do it fast, and at the end, you don't really know it.*

*Lena:* *But if she knows some people have finished, then she tells the class, 'OK you've got even less time to do the work'. She's like, 'Look at these 5 people, they have finished, hurry up!'*

*(School F, set 1)*

The students linked these restrictions to the norms generated within setted groups.

*Craig:* *Last year it was OK but when we finished our work or anything miss would give us harder work to do. But in this year when you finish it you just got to sit there and do nothing.*

*Liam:* *Yeah because in sets you all have to stay at one stage.*

*(School W, set 3)*

Such problems were not caused by teachers simply imposing an inappropriate pace upon their groups - some students found lessons too fast whilst other students in the same groups found the same lessons too slow. The two boys in school F, quoted above,

described the problem well - in mixed-ability classes students would be given work that was chosen for them, if they finished the work teachers would give them harder work, whereas in setted lessons '*you all have to stay at the same stage*'. Being able to teach the whole class as a single unit is the main reason that teachers put students into 'ability' groups, and it was also one of the main sources of the students' disaffection. The students also described an interesting phenomenon - that some teachers seemed to hold ideas about the pace at which a class should work that were independent of the capabilities of the students who were in that set. For example:

*David:* *If you're slow she's a bit harsh really, I don't think she really can understand the fact that some people aren't as fast as others. Because if you say that I don't understand the work—she'll just say something like 'You're in the middle set, you had to get here somehow, so you've got to do middle set work.'*

*(School A, set 4)*

The teachers of the top sets also exemplified this phenomenon with the frequent remarks they made to students in the vein of:

*Peter:* *He says, 'You are the set 1 class, you shouldn't be finding this difficult.'*

*(School E, set 1)*

It seems that the placing of students into 'ability' groups creates a set of expectations for teachers that over-rides their awareness of individual capabilities. This is a particularly interesting finding given that the main argument that the current Prime Minister, Tony

Blair, and other government ministers have given for supporting setting is that children need work that is at an appropriate pace and level for their particular 'ability'.

However, the process of ability grouping did not only appear to place restrictions on the pace and level of work available to students, it also impacted upon the teacher's choice of pedagogy. Teachers in the four schools in our study that used ability grouping responded to the move to setted teaching by adopting a more prescriptive pedagogy and the same teachers who offered worksheets, investigations and practical activities to students in mixed-ability groups concentrated upon black-board teaching and textbook work when teaching groups with a narrower range of attainment. This is not surprising given that one of the main reasons mathematics teachers support setting is that it allows them to '*class teach*' to their classes, but it has important implications for the learning of students. When students were asked in their questionnaires to *describe their maths lessons*, the forms of pedagogy that appeared to be favoured by teachers in the schools using ability grouping were clearly quite different from those in the schools using mixed-ability teaching. 12 per cent of students from setted groups described their lessons as '*working through books*', compared with 2 per cent of students in mixed-ability groups whilst 8 per cent of setted students volunteered that '*the teacher talks at the board*', compared with 1 per cent of mixed-ability students. 12 per cent of responses from students in setted groups reflected a lack of involvement, compared with 4 per cent of responses from students in mixed-ability groups. Only 15 per cent of students in setted groups described their mathematics lessons as '*OK*', '*fun*', '*good*' or '*enjoyable*' compared with 34 per cent of mixed-ability students. In a separate open question, students were asked how maths lessons could be improved. This also produced differences between the students, with 19 per cent of students taught in sets saying that there should be more open work, more variety, more group work, maths games or opportunity to think, compared to 9 per cent of mixed-ability students.

The influence of ability grouping upon teachers' pedagogy also emerged from the students' comments in interview. The following comments came from students across the spectrum of setted groups:

*Intvwr.:* *What are maths lessons like?*

*Jenat:* *Rubbish - we just do work out of a book.*

*Intvwr.:* *How does that compare with other lessons in years 7 and 8?*

*Molly:* *They were better. We did more fun work.*

*(School E, set 1)*

*Intvwr.:* *What would be your ideal maths lesson?*

*Lynn:* *I would like work that is more different. Also when you can work through a chapter, but more fun.*

*Nelly:* *It would have to be a bit more different.*

*Lynn:* *Could do a chapter for 2 weeks, then the next 2 weeks do something else, an investigation or something - the kind of stuff we used to do.*

*(School E, set 5)*

*Ray:* *Last year it was better, 'cause of the work. It was harder. In year 8 we did wall charts, bar charts etc, but we don't do anything like that. It's just from the board.*

*Lee:* *I really liked it in year 7, because we used to like do it from the books. Like at the end of the year we used to play games. But like this year it's just been like work from the board.*

*(School E, set 5)*

*David:* *In year 8, sir did a lot more investigations, now you just copy off the board so you don't have to be that clever.*

*Scott:* *Before, we did investigations, like* Mystic Rose*, it was different to bookwork, 'cause books is just really short questions but those were ones sir set for himself, or posters and that, that didn't give you the answers.*

*(School A, set 4)*

*Carol* *In year 7 maths was good. We done much more stuff, like cutting out stuff, sticking in, worksheets and all stuff like that. Now, every day is copying off the board and just doing the next page, then the next page and it gets really boring.*

*(School A, set 6)*

The change in teaching approaches that appeared to be initiated by organising students into ability groups could simply reflect the increase in students' age and progression towards GCSE, but similar changes did not take place in the mixed-ability schools. The implications of such changes for students' learning of mathematics are quite significant. The students in the schools that used ability grouping created an image of mathematics lessons that reflected disaffection and polarisation, which was broadly substantiated by our observations of lessons and by questionnaire data. It seems that when students were taught in mixed-ability groups, their mathematics teachers gave them work that was at an appropriate level and pace. When the students were divided into ability groups, students in high sets came to be regarded as 'mini-mathematicians' who could work through high-level work at a sustained fast pace, whereas students in low sets came to

be regarded as failures who could cope only with low-level work - or worse - copying off the board. This suggests that students are *constructed* as successes or failures by the set in which they are placed as well as the extent to which they conform to the expectations the teachers have of their set. This is quite a controversial suggestion – that was nevertheless supported by evidence – but how might it come about?

In mixed-ability classes, teachers have to cater for a range of students whose previous attainment varies considerably. Most teachers respond to this challenge by providing work that is differentiated either by providing different tasks for different students within the same class ('*differentiation by task*'), or by giving all students a task that can be attempted in a variety of ways and at a variety of different levels ('*differentiation by outcome*'). Teachers in the first study used this latter option – giving students a range of open work, which produced excellent examination grades (Boaler, 1997a). Teachers often let students work '*at their own pace*' through differentiated books or worksheets. In setted classes, students are brought together because they are believed to be of similar 'ability'. Yet setted lessons are often conducted as though students are not only similar, but *identical* - in terms of ability, preferred learning style and pace of working. In the setted lessons, students have been given identical work, whether or not they have found it easy or difficult and they have all been required to complete it at the same speed. This aspect of setted lessons has distinguished them from the mixed-ability lessons. The restrictions on pace and level of work that are imposed in setted lessons have also been a considerable source of disaffection, both for students who find the pace of lessons too fast and for those who find it too slow.

In the first study, the teachers only communicated the meaning of being in a low set a few weeks before students were entered for the GCSE examination. At that time they told some students that the highest grade they could get was a D. The students were

devastated by that news, revealing one of the ironies of ability grouping. The students had been placed in a low set and taught easier work – and they had gone through three years of secondary school being extremely successful, or so they thought. They had got most of their questions correct in class, without realizing that they were being given easier work, and they always assumed they were doing well. Even those who knew they were in a low set. The impact of knowing they were being entered for a foundation examination was extremely negative. We are not suggesting that teachers should spell that out for students at the earliest stage, rather that they should try and avoid making such pre-determined decisions. The school initially studied in depth for three years that employed mixed ability grouping and gave students open work that they could do at multiple levels, attained extremely high examination grades from students. When some students entered that school, they had been attaining at a low level, and would have been placed in the lowest set in another school. Nevertheless, they worked hard and attained a GCSE grade B in the examination. It seems salient that the students would have probably attained a D if the school had used ability grouping and even if that is true for a small proportion of students, the impact is so great for those students, it should give pause for thought.

A final challenging but sobering thought – the extent of curriculum polarisation, and diminution of opportunity to learn that we have found, if replicated across the country, could be the single most important cause of the low levels of achievement in mathematics in Great Britain. The traditional British concern with ensuring that *some* of the ablest students reach the highest possible standards appears to have resulted in a situation in which the vast majority of students achieve well below their potential. As one student poignantly remarked:

*Lynn:* *Obviously we're not the cleverest, we're group 5, but still - it's still maths, we're still in year 9, we've still got to learn.*

*(School E, set 5)*

## Invitation to reflect

For any teacher reading this chapter we would offer two sources of reflection:

First, to consider the alternatives to ability grouping. It is extremely important that teachers remain open to the idea that mixed ability teaching may be more productive and equitable and support exploration of ways in which it could work. This is a difficult task as it is not being supported by government, but teachers now have the responsibility to consider ways in which mixed ability teaching may be supported in their schools.

Second, for those who are teaching students in setted groups – we would suggest exploring the students' experiences of mathematics teaching. For example, give students the opportunity to write anonymously about their experiences – are they being given work at an appropriate level? How would they change lessons if they could? Do they believe they should be in a different group? In addition, we would ask students to say what examination grade they are aiming for.

## Further suggested readings

Boaler, J. (1997c) *Experiencing School Mathematics: Teaching styles, sex and setting*, Buckingham: Open University Press.

This book tells the story of two schools that taught mathematics in totally different ways. The book is the first of its kind to provide longitudinal evidence of students'

beliefs and understandings as they developed over 3 years - and the ways that these were affected by the students' experiences in setted and mixed ability teaching groups.

Harlen, W. and Malcolm, H. (1999) *Setting and Streaming. A Research review*, Edinburgh: Scottish Council for Research in Education.

This short (72 pages) readable book reviews of a range of studies on the advantages and disadvantages of setting and mixed-ability grouping at primary and secondary levels that have been undertaken over the past 40 years. It concludes that the research provides no strong clear-cut evidence that achievement is raised by setting or streaming.

## References


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