MINISTERIAL MUDDLING OVER MIXED-ABILITY

Mike Ollerton

The secondary school where I taught was, as I see it, almost 40 years ahead of its time; as the technical school in the tripartite (tripartheid) system of grammar, technical and secondary modern schools, my school was the closest thing to a comprehensive school. It also met the desired aim of a statement in the government White Paper, Excellence in Schools (July 1997) of ‘setting pupils according to ability’ as one way of ‘modernising the comprehensive principle’ [1]. As someone who was classified as of low ability and placed in the bottom set in mathematics for the first three years of my secondary education, I should be grateful that my teachers were so progressive, although, as that is not a word that trips easily off the lips of our educational leaders, I should perhaps say: ‘modern’.

Whenever I find myself in discussions with fellow professionals about the ‘best’ way to group children, the phrase low-ability children is frequently used, and it seems to be accepted without question that there is a common understanding of what a low-ability child is. Furthermore, within the pages of the consultative report, Numeracy matters [2], and the final report, The implementation of the National Numeracy Strategy [3], the debate over the way teachers ought to teach and group children has gathered pace.

In this article I suggest that it is this preoccupation with separating children into different attainment groups in order to teach them, which is one of the fundamental reasons for children’s under-achievement. I therefore invite readers to consider the following questions: How is a low ability child defined? How is a low ability child recognised?

Is a low-ability child someone who:
• doesn’t usually get to the end of an exercise?
• doesn’t hand in homework very often?
• disrupts the smooth progress of others?
• is given a lot of detentions?
• doesn’t often put their hand up to answer questions?
• is at least 5 cm below the average height of the year group?
• doesn’t usually have a pen, ruler or protractor?
• usually comes near the bottom in tests?
• twitches at the very sound of words like fractions and decimals?
• is more likely to be born between May and August than at another time of the year?

Some of the above may appear glib. However, on the final point regarding children’s date of birth, I offer the following information which I find both interesting and disturbing. In 1994 I carried out a small-scale survey across nine Shropshire secondary schools, gathering information on sex and the date of birth of pupils in the highest and lowest sets in years 10 and 11.

Information about 643 pupils (311 female, 332 male) was gathered; of these 455 were taught in the highest sets (234 female, 221 male) and 188 in the lowest sets (77 female, 111 male). The table below is a summary of the results.

<table>
<thead>
<tr>
<th></th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Highest set</td>
<td>Lowest set</td>
</tr>
<tr>
<td>Jan-Apr</td>
<td>33%</td>
<td>36%</td>
</tr>
<tr>
<td>May-Aug</td>
<td>32%</td>
<td>40%</td>
</tr>
<tr>
<td>Sep-Dec</td>
<td>35%</td>
<td>23%</td>
</tr>
</tbody>
</table>

This survey indicates a higher proportion of children born between May and August were placed in the lowest sets, and raises a question for me about whether date of birth was a criterion which was unwittingly applied when decisions about setting were made. As this was only a small sample, it would be imprudent to over-generalise. However, these results are in agreement with concerns raised thirty years ago by Plowden [4]:

The lower the stream, the younger the average age, and the higher the proportion of children who will only have had six terms in the infant school. Conversely, the higher the stream, the older the average age and the higher the proportion of children who will have spent nine terms in infant classes. (para. 814).

More recently this issue has been researched by the NFER, studying the impact of season of birth on attainment [5]; the report is unequivocal about the influence that age has upon children’s achievements:

This research has provided strong evidence that results are
influenced by age differences: all responding authorities that had investigated this at KSI or GCSE level found evidence of age-related effects. These findings raise two key questions. What is causing the underachievement of children born in the summer months, and what might be done to reduce the inequalities between children born at different times of the year?

If date of birth is an unwittingly applied criterion, then could it be possible that other criterion are also being applied? I wonder, for instance, how the average height of children in ‘lowest’ sets compares with the average height of children in ‘highest’ sets.

Turning to Numeracy matters [2], the section sub-headed Group work, (para 45) reads:

One purpose of group work is to allow a manageable degree of differentiation around a common theme. Groups can be organised by attainment, and while the main body of the class works on the set task, a more challenging task can be set to challenge the most able, with a simplified task for those who would benefit from this.

At the time of publication it appeared there existed an over-simplified model, of the teacher being able to conveniently divide a class into three groups: the most able, the main body of the class, and those who would benefit..., signifying a quality of thinking which assumes it is necessary, desirable and feasible to split a class into three distinct groups. However, turning to the final report I notice a remarkable and most encouraging change in thinking; indeed, rather than suggesting teachers should group children by ability it appears the task force are challenging the notion that there are as many different ability ‘groups’ as there are children in a class.

Defining future achievement and acting upon this to create attainment groups is, I contend, the root cause of under-achievement; it is aligned to Donaldson’s description of ‘definers’ [6, page 114]:

If the child is defined as a failure he will almost certainly fail, at any rate in the things which the definers (people who define others) value; and perhaps later he will hit out very hard against those who so defined him. So we know at least something to avoid. But we must contrive to avoid it not merely at the surface of our behaviour. If we do not genuinely respect and value the children, I am afraid they will come to know.

or in the words of David Bowie:

“...they’re quite aware of what they’re going through”. [7]

As an alternative to defining children’s future attainment through the process of setting, I offer a model which does not require any of this. My model is based initially upon whole-class teaching, where a common starting point is offered. Devising an appropriate starting point requires careful thought: a variety of strategies and resources might be used, including practical work, discussion and mind-imagery. The purpose of this approach is to offer students a problem they will be able to work on. Outcomes may be to define terminology, extract specific language and begin to determine foci for further explorations. The problem must, by nature, be rich enough to support a range of extension tasks; such decisions will be rich enough to support a range of extension tasks; thus allowing a school to set pupils for mathematics, especially if this is not happening in other subjects. (para 120)

In reality there is a whole spectrum of levels of cognition and there exists as many different levels of understanding as there are children in a class; the depth to which a child understands something will depend upon a whole host of factors such as: interest; motivation; alterness; their relationship with mathematics; their relationship with the teacher; and how much they have eaten for breakfast. Seeking to separate children into attainment groups in order to enhance their learning is a falsehood and reminiscent of the slogan from the Bero flour advert: “Graded grains make finer flour”.

The act of pre-determining achievement, particularly in order to compare one child’s achievement with another’s, is both problematic and wholly unnecessary. It is the desirability of attempting to predict learning outcomes, the messages received from information gathered, and the validity of the methods used to create ability groups for which I see no rationale.

My main concern is to ask who benefits from grouping by ability. Are decisions taken to fit an over-simplified model of teaching and learning based upon providing specifically different tasks to different groups of children, and is this done in children’s best interests? If, alternatively, children’s learning is seen as an ever-changing continuum which rarely progresses in an ordered or linear fashion, then the model of creating three (or however many) categories of different learning groups cannot be sustained. I again return to the notion that there are as many different ability ‘groups’ as there are children in a class.
opment, consolidation or support tasks, and I do not, therefore, need to allocate children into distinct attainment groups. Planning a range of extension tasks for future use is an important element for teaching per se.

The effectiveness of this style of teaching has advantages both for students' learning of mathematics and my teaching of mathematics. It requires me to construct a number of common starting tasks, and that for each of these tasks I have a range of extension ideas. This approach forces me to apply myself to short-term lesson plans and long-term curriculum development.

References

Mike Ollerston teaches at University College of St Martin, Lancaster.

MATHEMATICAL BINGO

Last week I played a game of mathematical bingo with my year 9 pupils.

In this game two ordinary six-sided dice are thrown, the sum of the two numbers shouted out and the players cross out that number from their card. Players are allowed to design their own 3 x 3 bingo card. Numbers can be repeated but only one number is crossed out at a time. The winner is the first person to cross out all nine numbers. The bingo cards shown below were used by four of the pupils:

A B C D

<table>
<thead>
<tr>
<th>7</th>
<th>7</th>
<th>7</th>
<th>6</th>
<th>3</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>7</td>
<td>7</td>
<td>10</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>7</td>
<td>9</td>
<td>4</td>
<td>8</td>
</tr>
</tbody>
</table>

We played the game and player C won.

There was a lot of classroom discussion as to why the cards of players A and D were not good cards. All agreed that players C and B had good cards. After further discussion we agreed that card C was the best because it bore some resemblance to the sample space of possibilities when two dice are thrown.

With just a few minutes of the lesson left I asked the pupils to design their cards but this time the first player to have a line vertically, horizontally or diagonally would be the winner.

The numbers I shouted out were 9 8 7 and then someone shouted bingo. This winner had the card on the right.

However, when I checked his card it was clear that he had crossed out the 9 in the bottom left hand corner first and later rubbed this out, changing it to the other 9.

In this way he then had the right-hand line of the card crossed out. After heated discussion we agreed that this was not cheating as I had not specified that this could not be done.

An interesting question then arose. If one is allowed to retrospectively cross out numbers on one's card, does it make any difference to the way in which one should design it?

Readers are invited to design their 'best' bingo card.

Mike Fletcher Canterbury Christchurch College
The attached document has been downloaded or otherwise acquired from the website of the Association of Teachers of Mathematics (ATM) at www.atm.org.uk. Legitimate uses of this document include printing of one copy for personal use, reasonable duplication for academic and educational purposes. It may not be used for any other purpose in any way that may be deleterious to the work, aims, principles or ends of ATM.

Neither the original electronic or digital version nor this paper version, no matter by whom or in what form it is reproduced, may be re-published, transmitted electronically or digitally, projected or otherwise used outside the above standard copyright permissions. The electronic or digital version may not be uploaded to a website or other server. In addition to the evident watermark the files are digitally watermarked such that they can be found on the Internet wherever they may be posted.

Any copies of this document MUST be accompanied by a copy of this page in its entirety. If you want to reproduce this document beyond the restricted permissions here, then application MUST be made for EXPRESS permission to copyright@atm.org.uk.

The work that went into the research, production and preparation of this document has to be supported somehow. ATM receives its financing from only two principle sources: membership subscriptions and sales of books, software and other resources.

Membership of the ATM will help you through:

- Six issues per year of a professional journal, which focus on the learning and teaching of maths. Ideas for the classroom, personal experiences and shared thoughts about developing learners’ understanding.
- Professional development courses tailored to your needs. Agree the content with us and we do the rest.
- Easter conference, which brings together teachers interested in learning and teaching mathematics, with excellent speakers and workshops and seminars led by experienced facilitators.
- Regular e-newsletters keeping you up to date with developments in the learning and teaching of mathematics.
- Generous discounts on a wide range of publications and software.
- A network of mathematics educators around the United Kingdom to share good practice or ask advice.
- Active campaigning. The ATM campaigns at all levels towards: encouraging increased understanding and enjoyment of mathematics; encouraging increased understanding of how people learn mathematics; encouraging the sharing and evaluation of teaching and learning strategies and practices; promoting the exploration of new ideas and possibilities and initiating and contributing to discussion of and developments in mathematics education at all levels.
- Representation on national bodies helping to formulate policy in mathematics education.
- Software demonstrations by arrangement.

Personal members get the following additional benefits:

- Access to a members only part of the popular ATM website giving you access to sample materials and up to date information.
- Advice on resources, curriculum development and current research relating to mathematics education.
- Optional membership of a working group being inspired by working with other colleagues on a specific project.
- Special rates at the annual conference
- Information about current legislation relating to your job.
- Tax deductible personal subscription, making it even better value

Additional benefits

The ATM is constantly looking to improve the benefits for members. Please visit www.atm.org.uk regularly for new details.

LINK: www.atm.org.uk/join/index.html