How are schools catering for mixed abilities within a primary mathematics classroom?
Setting the Scene

Within the primary classroom there are a range of abilities in every subject. Mathematics is a subject with varying degrees of difficulty for students depending on their previous experiences, their cultural background and their learning needs. It can be difficult for teachers to cater for each individual’s needs, so how are schools catering for this variety? What is the opinion of teachers, students and parents of the way the needs of the children are being catered for? And which method of teaching is the most effective at meeting the needs of all children?

What is happening in schools?

Within schools there are a range of methods for grouping children for the teaching of mathematics. This includes mixed-ability classrooms, where all the children stay together; streamed classes, where students are grouped based on their ability; and a combination approach, where students stay in their class and are then placed into smaller groups based on their ability. The system differs from school to school. So which is having the most positive effect on the children?

Who are we catering for?

The students in the primary classroom differ greatly. There are students from non-English speaking backgrounds, varying socio-economical backgrounds, varying educational experiences and students who have varying special needs ranging from intellectual disabilities through being gifted and/or talented. It is important that each child’s needs are catered for in the primary school classroom and this can be a great challenge for teachers. As teachers we need to be aware of the needs of each of our students. This can be gauged through a variety of assessment strategies. Students can complete tests, keep learning journals and demonstrate their understanding verbally. It is important that students are assessed in a number of ways to ensure a full understanding of each child’s needs is reached.
The mixed-ability classroom

There is a great emphasis in schools on achievement. This is evident in the United Kingdom with the introduction of publically publishing school performance grades by the Thatcher Government and the continuation of this practice by the Governments that followed (Thomson, 2005) and more recently in Australia through the introduction of the My School website (ACARA, 2011). The inclusion of mathematics in these test results has put pressure on schools by parents, the wider community and policy makers, to increase their performance in this area. Teachers are looking for ways to facilitate quality learning in mathematics for their students and it comes down to how the students are grouped and what this means for both teachers and students. Is it more effective to group students based on their ability and what impact does this have on students, not just their performance but their self esteem?

Much of the discussion of this topic is centred on gifted and talented students who have a high ability in mathematics. Kettler and Curliss (2003) state that students who have high abilities in mathematics are more likely to retain their knowledge when taught a concept two or three times in contrast to other students who need greater repetition of the content. They suggest that if a skill is repeated more than two or three times then gifted students are more likely to forget or mislearn the concept. This means that these students need to be recognised within the mixed-ability classroom and given the opportunity to extend their skills while the remainder of the class continue their learning. One suggestion is, rather than include these students in a mixed-ability class, to remove them and place them in a streamed class.

“Extensive research demonstrates that one of the most effective means of providing for the needs of students with high abilities is through differentiating curriculum in supportive environments and this is more likely if students are grouped for instruction on the basis of competence” (Benbow, 1996 as cited in Kronburg, Plunkett, Kelly and Urquhart, 2008; p24).
Using a streamed class system for mathematics allows teachers to program more easily and gives students the opportunity to associate with peers at the same academic level as themselves. While this is beneficial for high ability students, the impact on average and lower ability students also needs to be examined. Collins (2007; p38) states that “children with special needs require interactions with peers, opportunities to develop higher-level thinking, recognition or their contributions and equal access to quality instruction”. Students in lower ability groups may suffer from diminished mathematical self concept which affects their performance and their willingness to apply themselves to the learning opportunities being provided. There are studies which suggest that “heterogeneous grouping of lower-achieving students results in positive effects on the academic achievement, self esteem and interpersonal relationships of students” (Collins, 2007; p38).

A student’s impression of themselves as a learner has a great impact on how they apply themselves to their studies. Parents who commented on this issue had mixed remarks. One parent, whose child is currently in primary school, had positive impressions on the mixed-ability mathematics classrooms at her daughter’s school. She felt it was important for students to be able to discuss ideas with higher and lower ability peers as this would enable them to better grasp the concept. She felt that “it [is] one thing to understand a concept yourself and [something else to] have to teach it to another student” (Appendix 1). Another parent, whose children have completed high school, felt that the ability grouping her children experienced through their schooling benefited their learning experiences as the students who struggled were given more time to understand a concept and so higher ability students did not get bored. This contrasted to her children’s view of their mathematics experiences where one boy questioned the inferred low opinions of the teacher directed at lower ability classes and the way this influenced their learning. This is similar to the view of a student currently in year eight as she describes her mathematics lessons as “a bit of a bludge... Most kids just call out to their friends the whole time and we don’t learn much” (Appendix 1). Kilgour (2006; p30) examines a study conducted by Wiliam and Bartholomew (2004) where “teachers in lower-stream mathematics classes were usually the least qualified in teaching mathematics [and] they expected
little of their students.” Teacher expectations are extremely important for students. Teachers who expect very little of their students will get very little from them, while teachers who expect more, will get more. This is a danger in streamed classes, if the teachers expect to get a low standard from their lower-ability class, then students may participate less in their learning and begin to have a reduced mathematical self concept. This may also occur in a mixed-ability classroom if a majority of students are achieving significantly higher than a small group of students.

Teaching style in the classroom will also contribute to student’s mathematical learning. “It seemed that teachers of streamed classes saw their students as being of common ability whereas the same teachers, when working with mixed-ability classes tended to teach differently” (Kilgour, 2006; p30). Teachers identify their student’s needs and cater for them in a variety of ways throughout their learning experiences. In a mixed-ability classroom teachers are catering for multiple needs and therefore the learning may be more varied and interesting for students. This encourages students to engage in their learning. If teachers are treating their students as though they have common ability, some students will not be having their needs met in this learning environment. It is important to ensure that teachers in streamed classrooms are aware of the diverse needs within the classroom and to create learning experiences to maintain student engagement.

There is a great deal of discussion and research into the areas of mixed-ability and streamed mathematics classrooms. The research suggests that high-ability students are more positively affected through streaming and lower-ability students are more positively affected when learning in a mixed-ability classroom. The emphasis on performance in mathematics by our schools will influence the way this key learning area is approached by teachers and the way parents, the wider community and policy-makers feel it should be taught. The most important thing to take into consideration is the needs of the children. These will differ from school to school, and from classroom to classroom. If teaching in a mixed-ability classroom, there is a greater need for flexibility within the learning experiences. This can be achieved through ability groups within the classroom,
where students are learning the concept as a whole class and practicing it according to their ability. This also allows for mixed-ability grouping within the classroom which can challenge all learners in different ways. In schools where mathematics classes are streamed, teacher expectations are very important and are reflected in student’s mathematical self concept. For both learning environments the use of appropriate resources and learning experiences to challenge and motivate students will keep them engaged in their learning and lead to a greater understanding of mathematical concepts and language.
Appendix 1

Contributions by students

Year 8 student; MacKillop Catholic College, ACT

Graduated Student; Chevalier College, NSW

Contributions by parents

Parent of graduated student; Chevalier College, NSW

Femke
For the parents and the teachers: How do you feel about maths being taught as streamed (ability grouped) or mixed ability? Why? (I'm doing an assessment for uni and you won't be named. Message me if you don't want to post publicly)
Friday at 12:51 · Like · Comment

Rugare
Interesting topic. I'm a product of both schools of thought. I'll play devil's advocate when people comment.
Friday at 15:09 · Like

Nel
At Hayley's school they do a mixture of both. When a new concept is taught they learn it as a class group which is then broken into capability groups so the more advanced students can take the concept further while those who are struggling work in smaller groups with more help from the teacher.

Capability groups helps to keeps all students occupied and interested while allowing them to work at their own pace. Although it does cause some strain in classes as the kids quicker work out who the smarter kids are

On the other hand mixed groups encourage kids to help each other. It's one thing to understand a concept yourself and then have to teach it to another student.
Friday at 19:15 · Like

Write a comment...
Contributions by teachers

**Kelly**
**Maths**

Hey Femke,

I can see both sides of the argument and have taught in both situations.

For math groups (ability based) the kids are closer together and it can be easier to move them forward or support them. Using support teachers to make the lower groups smaller is vital if it's going to work. Although even with ability groups you cannot assume that everyone is at the same point for all sub strands.

With mixed ability groups you have higher ability students that can model for and assist the lower ability students. But does this help the higher students?

Reading back through what I wrote, I think I'm sitting on the fence. But I do like maths groups, although I've never taught the kids that really struggle.

Not sure if this helps. I hope it does.
Reference List


Further Reading


