DELIVERING DIFFERENTIATION IN THE FULLY INCLUSIVE, MIDDLE YEARS' CLASSROOM

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Despite the universal acceptance that no classroom is a homogenous group of students, the actual task of providing a lesson which accommodates the needs of all students is such a challenge that it is not surprising that many teachers opt to "teach to the middle" in the hope that the majority of students have their learning needs met. This paper will describe one model of practice which demonstrates how to effectively plan and deliver a fully differentiated and inclusive maths lesson in the middle years' classroom. The philosophy for this model is to empower all learners to choose a task which is "just right"' for them.

In the first part of the twentieth century, psychologists and scholars believed that an individual's capacity to learn was a predisposed facet to their intellectual make up which could be neither influenced nor changed. (Binet, 1909; Kohler, 1929). This meant that the learning process was entirely dependent upon the developmental stage of the individual.

By the middle of the century, Piaget's (1952) research into the cognitive development of children and specifically how they assimilate number concepts (1942) agreed with the earlier researchers that what a child is able to learn is determined by the maturity of the child.

In 1978, an alternate view of how cognitive development occurs was proposed by a contemporary of Piaget; Lev Vygotsky. Vygotsky's previous work on the relationship between language and development (1962) and his belief that social interactions were the key to learning, led him to identify the Zone of Proximal Development. Vygotsky described this zone as the difference between the child's actual developmental stage and what the child could achieve with the assistance of a teacher or peer.

As previously stated, the existence of a homogenous classroom would indeed be a rarity, but as educators there remains the obligation to establish an environment which provides learning opportunities for all students.

The typical 21st century, middle years' mathematics classroom utilises a number of methods to deal with the varying levels of cognitive development within each classroom, this includes streaming, ability grouping, or an alternative form offered by the authors the '*just right'* differentiation.

Streaming

Despite the dearth of evidence to support this practice, many secondary school students find themselves in either the "Top Maths Class", the "Numeracy Class" or somewhere in between. It is interesting that this practice is still widely used when so much empirical evidence describes the detrimental effects of streaming on the students of lower ability (Zevenbergen, 2003).

In many cases, the unfortunate answer is that the job of delivering an opportunity for every individual in the classroom to learn is just too enormous to be practical. Advocates of streaming believe it minimises this task, however it fails to produce the desired homogeneous classroom or justifies all students working to an identical curriculum. Research gives little support to streaming yet it is a wide spread practice. Ruthven (1987) believes teachers stream in mathematics because, by its very nature, mathematical curricula is hierarchical and therefore placing students at different levels throughout the hierarchy is logical and exposes students to content that matches their level of understanding.

The practice of streaming has been noted to lead to many negative side effects, including;

- Teacher-centred pedagogical practices; where the erroneous belief that the class consists of an homogenous group of learners allows the teacher to teach a concept which the students then imitate. In 1978 Vygotsky stated that, children are able to imitate things outside their zone of proximal development but they are unable to internalize or fully understand it.
- Reduces exposure to core curricula. Teachers often underestimate the ability of the students in 'low' groups handpicking topics to teach and those to leave out (Braathe, 2010)

- Under- or over-utilization of teachers; when the majority of a class are self-motivated learners they require little while students at the opposite end of the spectrum require the reverse.
- Reduced or no modelling of good mathematical practices in classes where few if any of the students believe they can do the mathematics.
- Lower expectations of less able students (Tate & Rousseau, 2002).
- Little or no movement between streams therefore students become stuck at the low end (Zevenbergen, 2001).
- Girls under performing in the competitive nature of a higher streamed class.
- Students underperforming due to social reasons or to be in the same class as their friends.

In 2008, Sunshine College established a Numeracy Program across all junior sites for students in Years 7-9, prior to this students were streamed. The practice of streaming continued for many years despite many students experiencing the aforementioned negative effects.

Ability Grouping

An alternative to streaming is to organise students into ability level groups within a single mathematics classroom as a tool to deliver differentiation (Harrison & Watters, 2004). Students are generally grouped according to their ability. Students are placed into 3 groups; one group is for students who are considered to be operating at an age appropriate development level, another is for students who are operating above an age appropriate level and a third group for students who are operating below an age appropriate level.

Each class in general is conducted in the same physical space, unlike streaming, however, three different tasks run concurrently with each other. This model allows the teacher to focus on one of the three groups during each lesson (either formally or informally) whilst the others two groups work independently, usually on ICT related skills or presentation skills. This model makes it difficult for students to move fluidly from one group to another as each group is working on a different task during any given lesson. It is also reduces the time available for the classroom teacher to monitor student learning and progress if they are not part of the focus group for that lesson.

This type of ability grouping is thought to be most detrimental to students operating at the lowest level (Slavin, 2004). Physically separating children into smaller groups draws attention to students who are underachieving. This attention may negatively affect the psychology of students who want to be seen by their peers as successful. It is not unusual for students in the lowest group to prefer to be seen in this group as a result of poor behaviour or poor work ethic as opposed to their poor ability.

Due to the quasi-streaming nature of this model, students suffer not only the negative effects of streaming but also many of the additional problems described above.

Task versus Child

In some classrooms where differentiation is being offered, the class is organised into ability groups and each group is then labelled to reflect the ability level of the group. The authors would argue that this has the potentially damaging effect of linking "*the evaluation of a child's behaviour with evaluation of the child.*" (Wierzbicka, 2004, p. 251*)* reinforcing the negative perception that 'I am in the low ability group therefore I am of low ability'.

The model proposed by the authors, labels the *task* not *the child* and therefore facilitates the development of the self-belief that the student is indeed a good mathematician.

"*Just Right*" Tasks and Differentiation

The curriculum for many schools is governed by various state bodies and will soon be influenced by the introduction of the Australian Curriculum. Curriculum planning is made even more difficult by the diverse nature of schools; it is not uncommon, in a Government setting, to have students who have had less than one year's formal schooling. Combine these difficulties with the fact that students in year 8 are still expected to work on developing an understanding of directed number while students in year 9 have progressed to developing an understanding of Pythagoras' Theorem and Trigonometry. Yet it is rare to find a non-augmented classroom whereby all students are capable of learning the same concepts at the same time and in the same manner.

The authors of this paper are middle years' mathematics teachers, who teach at Sunshine College, a Victorian Government Secondary school located within the Western Metropolitan Region. Both had laboured with the predicament of providing learning opportunities for all students yet rarely saw any improvement in learning outcomes for students either side of the middle band. This, coupled with a general dissatisfaction of teaching to the middle of the class, was the impetus for developing the following model of differentiation and the "*just right*" task.

This paper provides an alternative model of differentiation in the middle years' mathematics classroom. The described lesson format provides learning opportunities for all students to work at their Zone of Proximal Development (Vygotsky 1978). The lesson format encourages students to personalise their learning through goal setting by selecting tasks which will have the biggest effect on their learning; a "*just right*" task.

Context – Sunshine College

At Sunshine College all students in years 7 to 10 receive four, fifty-minute lessons of mathematics instruction per week. Each two-week cycle is divided into one of four components, as illustrated in Figure 1, one Scaffolding Numeracy Lesson per week (Siemon, Virgona, & Corneille, 2002), one Reciprocal Teaching Lesson per fortnight (Reilly, Parsons, & Bortolot, 2009), one ICT lesson per fortnight and two differentiated content lessons per week (Reilly, Parsons, & Bortolot, 2010).

	Lesson 1	**Lesson 2**	**Lesson 3**	**Lesson 4**
Week 1	Scaffolding Numeracy	Differentiated Lesson	Differentiated Lesson	Reciprocal Teaching
Week 2	Scaffolding Numeracy	Differentiated Lesson	Differentiated Lesson	ICT

Figure 1. Sunshine College Numeracy Program

"Just Right" Tasks

A "*just right"* task refers to an activity which allows students to work in small groups on a mathematics problem at their Zone of Proximal Development. All students within the one classroom work on the same learning outcome, e.g. area of composite shapes, but at a level which maximises their opportunity to learn. It is this access to achievable tasks coupled with the perception that less able mathematician work alongside the better mathematicians on the *same* learning outcomes which we have observed to have the most effect on student learning.

"*Just right*" tasks are designed at three different entry levels (below, at and beyond). Students work in concert with the classroom teacher (in the beginning) to select a task which is most appropriate to their learning. When students work on tasks that are too easy they are quickly bored, disengaged and more importantly not learning. Similarly when students work on tasks which are too difficult they become restless, lose confidence in their mathematical ability and are unable to learn. Just right tasks are scaffolded.

At the beginning of each unit students evaluate their understanding of a specific topic. From these pre-assessments students set Personalised Learning Goals (PLGs) and in consultation with the classroom teacher students are supported to select the appropriate just right tasks to realise these goals. The setting of PLGs has been shown to improve student learning. At the conclusion of each unit students re-evaluate their understanding of a given topic. Their improvement motivates them to continue to apply themselves in mathematics.

Each lesson students are informed of the learning intention. And after a brief introduction they select a just right task. Each lesson is designed so that the classroom teacher spends minimal time at the front of the room '*teaching*'. Teaching occurs at the point of need through questioning, supporting and challenging students. Each just right task is designed as a student resource card. It is the author's experience that it is best to colour code each student resource card. The colour coding need not remain the same colour throughout the unit. Colour coding makes it easier for a student to select an appropriate task and for the classroom teacher to monitor task selection.

Students are encouraged to select activities which are appropriate for their learning. However, should a student pick an activity that a teacher believes is too difficult the student is either encouraged rethink their selection or have a go but is monitored closely. If the challenge is too great then it is suggested that the student be scaffolded through the tasks.

"*Just right*" tasks by their very nature ensure there is variety within the curriculum. Lessons are either delivered as a whole class investigation, as open ended tasks or solved in small group settings. Students are regularly encouraged to justify their answers, by explaining procedures to peers and with opportunities for assessment by through conferencing.

"*Just right*" tasks provide for the strategic use of concrete and visual supports and the inclusion of reflection activities which support the consolidation of learning. Just right task which can be solved using concrete manipulatives help students to visualise the mathematics. The use of manipulatives is particularly useful for students who are part of the 35% of the population who will never become abstract thinkers, supporting also those children whom Bruner (1966) identified as being taken too quickly from concrete to symbolic level of mathematics. This engenders a culture where all students feel like mathematicians and empowers them to select and complete the tasks which are “just right” for them.

The Benefits of “Just Right” Tasks

- Groups are fluid (daily)
- Students are supported to take ownership of their learning
- Positive self esteem
- Tasks should support them in improving their learning. Students can see this thus the understand the benefits and the rewards of their hard work
- Provides a forum for personalised learning and individual goal setting

Considerations for developing “*Just Right*” Tasks

At times the lesson structure is complicated and so too is student tracking however, we have found this can be overcome by being well organised and making full using of planning time. The hard work is definitely worth the rewards.

In the initial stages of introducing just right tasks we have found it to be beneficial for students to be guided by their classroom teacher. Initially we were concerned students would select a task which is too easy however, from our experience this is rarely the case; they are more likely to select a task which is beyond them in order to keep up with the ‘smarter kids’ in the classroom. Over time students and their classroom teachers become more experienced in selecting the most appropriate task.

We do not teach at the front of the class as we do not have a class of students who are developmentally similar and ready to learn the same thing at the same time. We believe explicitly teaching from the front of the room disengages those who already have an understanding of what we are ‘teaching’ and bewilders those who are not yet at that level. Instead we teach at the point of need. In class students are encouraged to work with someone who has chosen the same task therefore like-level student’s work together. This helps us to target teach more efficiently.

Just right tasks focus on conceptual understanding of mathematics as opposed to procedural practice. Each just right task teaches more than one mathematical concept at a time. This reinforces the complex nature of mathematics.

The ethos of our lessons is probably the complete inverse to a typical secondary mathematics classroom. We identify the learning objective, provide a generalised introduction and discuss prior learning however, our teaching takes place at the student’s desk not at the whiteboard. More able students are not utilised as additional teaching tools; these children are expected to be learning too.

Conclusion

Since we began the Numeracy Program at our campus, our NAPLAN and On Demand results have illustrated a better rate of improvement when compared to the rate of improvement for Victorian students of the same age. We believe this improvement is as a result of students working consistently at their zone of proximal development, the development of PLGs and students taking ownership of learning. Students understand the value of tackling the task in hand at a level which is most suitable for them.

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