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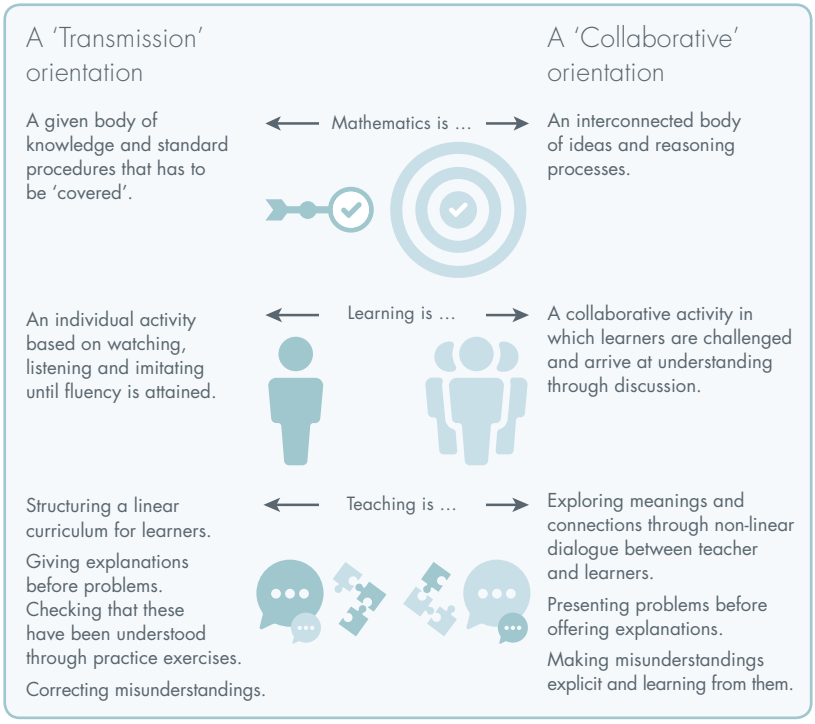
TALKING POINT:

IS THERE ANY VALUE IN APPLYING 'TRADITIONAL' AND 'PROGRESSIVE' MODELS TO MATHEMATICS TEACHING?



adapted from Swan, 2006

1

There are various of models and characterisations applied to teaching mathematics. The key element that defines them appears to be the 'teacher-centric-ness' of the pedagogical approach (Swan, 2006). These include 'traditional vs reform' (more often used in the US) or 'lecture vs participation' (Alsup & Sprigler, 2003) and, more specific to mathematics 'instrumental vs relational understanding' (Skemp, 1976). Another description is 'routine exercises' vs 'students' intuitive and sense-making capabilities' (Pesek & Kirschner, 2000). These models tend to present the two descriptors as opposites, often on the ends of a continuum (eg Roelofs, Visser & Terwel, 2003). A more recent model using the three descriptors 'transmission, connectionist and discovery' (Swann, 2006) has been developed in line with Askew et al, 1997.

IMPLICATIONS: mathematics teaching has been characterised in many similar ways across the globe, which may help to draw out important common pedagogical themes but may also oversimplify classroom practice.

2

Historically, terms such as 'traditional' and 'progressive' have often been used to describe teacher beliefs or ideals rather than classroom practice as the two may not align (Watson & DeGeest, 2005; Swan & Swain, 2010; Pampaka & Williams 2016). There is a conflict for the maths teacher between the type of mathematics teaching called for by organisations (meaningful learning, connecting, reasoning) and that often called for by parents, political agents and other stakeholders (skills, drill, practice) and teachers often adopt a combination of teaching methods in order to absorb the conflict (Pesek & Kirschner, 2000; Swan, 2006). Maths teachers often report that they teach in a way that is not consistent with their beliefs about teaching due to external pressures (Swain & Swan, 2009).

IMPLICATIONS: teachers' professed beliefs about the theory of maths teaching may not always agree with their classroom practice; mathematics teachers are also managing conflicting demands from educational stakeholders.

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3

Some elements of 'traditional' mathematics pedagogy (here described using 'instructional') may disrupt later attempts to construct relational understanding (Pesek & Kirschner, 2000). Traditional methods of teaching appear to be most effective at improving procedural competency, whilst progressive ones are better at increasing conceptual outcomes (understanding) (Boaler, 2002). Transmissionist teaching practices in mathematics 'in which explanations, examples and exercises dominate' can undermine confidence (Swan, 2006) but maths teachers often use teacher-centric approaches because they themselves were taught this way (Swain & Swan, 2009)

IMPLICATIONS: Teaching mathematics using transmissionist methods may improve procedural competency but this could inhibit later conceptual understanding, and it may also undermine confidence. Maths teachers may use these methods because they themselves were taught this way.

4

Defining which type of teaching method Is the most effective is dependent on which measures of effectiveness are used. This is because traditional or progressive paradigms favour different educational outcomes and measure effectiveness differently, including abstaining from measurement of some aspects (Watson & DeGeest, 2005). It is also suggested that certain methods of teaching maths are likely to increase or decrease maths anxiety (Belilock & Willngham, 2014) A better way of dealing with this issue may be to 'acknowledge that quality teaching is multidimensional…there is no recipe or formula' and that it is still not clear what *isolated* elements are necessary for effective teaching (Coe et al, 2014).

IMPLICATIONS: Choosing an effective method of teaching mathematics is dependent on how this is measured. Good quality teaching is not easy to define in terms of these characteristics.

'Some of the objections to reform-oriented approaches have come from mathematicians and others who gained considerable understandings through more traditional routes'
– Prof Jo Boaler, Stanford University

'Most math classrooms are predicated on the transmission model: students are simply given facts and procedures by the teacher and the textbook'
– Alfie Kohn

IN SUMMARY

- There are many ways of characterising mathematics teaching into 'traditional' or 'progressive' models
- Teachers' beliefs and classroom practice may not always align
- Mathematics teachers are often asked to teach in specific ways by different stakeholders, which may cause conflict
- Teaching rote skills in early maths can prevent conceptual understanding later
- Rating the effectiveness of teaching methods depends on how effectiveness is measured

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