How Humanism Can Foster Mediocrity in Early Years Mathematics Education: A Poststructuralist Comparison

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In this paper I argue that humanist understandings of learners can underscore mediocrity in mathematics learning in the early years. Although many children come to school ready and eager to learn mathematics, it can happen that their classroom experiences alienate and disenfranchise them. This sometimes occurs when teachers, deferring to humanist understandings of learners as naturally capable and competent and learning as experiential, teach little mathematics but concentrate on fashioning the learning environment to supposedly make it non-threatening, 'enjoyable' and 'relevant'. In contrast I use the poststructuralist notions of positioning and subjectification to suggest that learners can not be positively positioned in the discourse of mathematics education if they are not given the opportunity to construct robust mathematics and generative and idiosyncratic ways of thinking and reasoning in mathematics.

When they come to school young children are quite fascinated by mathematical ideas and have an easy and energetic confidence in working out simple problems (Askew & William, 1995; Hughes, 1986). Many of them count purposefully with few mistakes (Lambert, 2000). Over time, though, an initial fascination fades and these very same students are not backward in asserting that they neither like mathematics, nor the learning of it. As stated in *A National Statement on Mathematics for Australian Schools* (1990, p. 31) "there is considerable evidence that children come to school enthusiastic and eager to learn mathematics" and "leave school with quite negative attitudes". How can it be that an initial desire to use and learn mathematics waxes and wanes and initial interest and confidence turns to aversion and dread?

This is an important question for those teaching and researching in the early years of schooling, where I suspect feelings of alienation and frustration take root. Although policy documents such as those from the Queensland Studies Authority (2005) recommend learners' active engagement in environments of investigation and play, little has changed in classrooms where routinised computation and worksheet or textbook work prevail (Askew & Williams, 1995; Hardy, 2004; Willoughby, 2000). Although teachers, and in this paper I refer to student teachers in a preservice program in regional Queensland, hope to improve learning environments, their own constituted sense of what mathematics is and humanist, psychological notions of learners scuttle their best intentions. This is because proposed changes at the classroom level do not merely involve 'sugar coating' established teaching practice, but qualitatively change teaching-learning relationships to emphasise the active and productive role of students (even very young students) as initiators of learning and creators of knowledge. The new ways of being a learner (and teacher) of mathematics are premised on new power relationships and new conceptions of learners that are not considered in humanist assumptions about learning. At the moment meaningful participation is denied many students and active engagement becomes little more than a ruse, or sham, as the mathematics is cosmetically enhanced, though stripped of its reasoning processes and robustness.

To try to better understand this issue I asked preservice teachers intending to teach in the early years to describe some strategies they could use to enhance learning in mathematics, and to say how each strategy would actually boost their students' learning. I wanted to know first of all which discourses they found seductive and convincing, and then to analyse their comments to contemplate the possible effects on learners in their care. For example, I anticipated that these preservice teachers who had completed a semester long subject engaged in exploring mathematics as a science of pattern and order would stress teaching strategies that ensured engagement in learner-generated reasoning processes, leading to understanding and the construction of robust mathematics. I felt that some at least of the preservice teachers were keen to make a difference; I set out to find out the assumptions that would guide their teaching practices and the possible consequences of these actions for their pupils' learning and identity construction.

Reading Practice Through Different Lenses

A poststructuralist, analysing learning environments, assumes that learners are de-centred and at the mercy of intersecting relationships of power which inhere in instructional (discursive) strategies and are productive of identity. For example, Dahlberg et al., (1999, p. 31) reiterate how Foucault cautioned that discourses speak us into existence, they "shape our understandings of what is possible and desirable". So learners of mathematics take up discursive positionings as their own, and come to know themselves as competent, confident and authoritative (in the sense of having *author*ship of ideas and practices) in performing mathematical tasks and applications or as marginal to the operation of the discourse. A poststructuralist turns to the operation of the discourse (the knowledge produced therein and the relative positionings available to learners) when evaluating outcomes. On the other hand, the researcher (and teachers) wedded to psychological (humanist) readings of learners assume a rational, autonomous individual 'naturally' able to engage in learning tasks. When learning outcomes are not met, attention turns to the individual learner rather than the regulatory and constraining teaching practices. For example, a teacher might ask why Trudy can figure out some mathematics and Tom can not. Has Tom not been listening? Has he neglected to do the homework? Is he just not good at figuring out? Each question is laden with some sort of implied deficit on Tom's part and leaves the teacher nowhere to go; other than to position Tom as 'not good at figuring out' and in need of help. Although we are not likely to be able to dispense with humanist ways of reading the world, a poststructuralist analysis attempts to make visible how the use of language, as in Tom's case, produces what is taken to be real (Weedon, 1987); in this case, that Tom is mathematically deficient in some way.

Mathematics classroom worldwide operate on humanist understandings of learners. Mathematics education is informed by Piaget's child development through stages, Vygotsky's social interaction is a key force in the development of mind, and Lave's (Lave & Wenger, 1991) 'situating' learning in socially supportive contexts; each of these is framed by notions of the rational, autonomous learner of mathematics and the principles of developmentally appropriate practice (DAP). As Yelland and Kilderry (2005) point out, these intersecting notions and teaching principles comprise a meta-narrative informing education in the early years, and it is difficult to understand children and learning outside this discursive frame. However, while the theories above make important epistemological contributions regarding the construction of mathematical ideas, they do not recognise how learners themselves, and what counts as mathematics, are *produced* in teaching-learning interaction (which often privileges adult control and direction and ignores diversity). These theories are silent on the ontological dimension of *how* it is (rather than why) that so many young students are not confident, 'turned off' mathematics and wouldn't do it even if they could (Willoughby, 2000). As suggested by Yelland and Kilderry (2005), if developmental theories such as Piaget's could be removed from positions of *primacy* in the field, new ways of conceptualising and engaging with learning in the early years might emerge.

In the table below humanist and poststructuralist notions of the learner and learning are compared. Humanism takes for granted rational, autonomous learners "competent and capable" as in the Early Years' Curriculum Guidelines (Queensland Studies Authority, 2005). On the other hand, poststructuralism posits a contradictory, multiple, multi-layered self, constituted through engagement in a range of discourses over one's life. In this research I analyse the preservice teachers' discourse to contemplate their seduction by humanist understandings of the learner and the possible later effects on teaching practice.

Table 1

Humanist and Poststructuralist Notions of the Individual

	HUMANISM	POSTSTRUCTURALISM
LEARNER	Rational, coherent, autonomous being. Ability and attitude are personal attributes.	One's identity (subjectivity) is constituted in discourses such as mathematics education through one's own and others' acts of speaking and writing. The learner seeks to be recognisable (by oneself and others) as a legitimate participant in the discourse and discursive practices.
LEARNING	Learning mathematics is about constructing knowledge. Learning choices are based on rational thought. Learners have a choice, and those who do not make the 'correct' choices are somehow at fault.	Intellectual and self knowledge are constituted in the learning process. Learning is rhizomatic, rather than linear, a process of establishing oneself as competent and confident in a particular discursive field. Co-requisites include: Space to make personal sense of discursive 'truths' (mathematical knowledge) and practices; Having access to a subject position in which one has a right to speak and be heard, including the right to initiate new discursive threads (ideas or actions).
AGENCY	All persons have agency; they are autonomous.	Agency is not a personal attribute; it is constituted in discourse (discursive practices). Agency is a discursive position available to some persons some of the time. Agency includes (the dot points above, plus): Having a constituted sense of oneself as able to go beyond the given to forge new/innovative ways of being or acting in a discursive field.

A poststructuralist analysis focuses on discourse and discursive and regulatory practices (Davies & Gannon, 2005). Any setting where discourses are mobilised can be used for research; in this case I have analysed second year preservice teachers' comments about what they consider to be responsible pedagogical practice. The data that I present are examined not as if they described the 'real world' of preservice teacher education, but as indications of the constitutive work that has formed these particular prospective teachers and their taken for granted assumptions. The preservice teachers were responding to the request to:

> Describe briefly some strategies you could use to enhance learning in mathematics in the early years; say how each strategy would be beneficial to your students' learning.

Analysing the Preservice Teachers' Discourse

A first analysis of the preservice teachers' comments found that most of them focused on 'making maths fun/enjoyable' and 'making it relevant/something they (their students) are interested in'. For example, the discourse the novice teachers used demonstrated their strong desire to make the learning of mathematics an enjoyable experience for those they would teach. It was almost as if they intended to teach in an environment where 'having fun' would be unproblematic and easily translate into competent, numerate persons. Some of their statements about the strategies they would use to enhance learning included the notion that 'Best learning comes from children having fun' (a statement of one of the preservice teachers):

> To enhance children's learning in mathematics I would try and make it appealing to them by using a hands on approach, not just writing sums in a book. Students will be more involved and interested in maths.
>
> Use games because this shows that maths doesn't have to be boring! Games can be a very helpful teaching tool because they get the children excited and interested in learning.
>
> Make maths fun and interesting, using fun resources, hands on things.

> Use small groups to give variety and fun; work stations were also mentioned for their ability to make learning enjoyable
>
> Use hands on as the children remember more through participation in experience.
>
> Use concrete resources
>
> Make students feel comfortable when asking questions and encourage questions
>
> Only one student (out of the 37) concentrated on the mathematics and suggested the use of ICTs to encourage and enhance the learning; that teachers encourage and emphasise mathematical relationships, have students explore their own daily activities to see where maths and numeracy are relevant, and when, how and why it is used.

From a poststructuralist perspective what was missing from the preservice teachers' talk was any mention of strategies that would ensure their students' engagement in mathematics, in mathematical reasoning processes, such as those of representation, justification and generalisation, necessary for the construction of robust knowledge, the foundation of meaningful participation in the discourse of mathematics.

A second concern of many of the preservice teachers was that the mathematics should be 'relevant' or 'authentic'. One student stressed that mathematics should be related to real life and used a 'relevance=interest' equation. Again, in their discourse the preservice teachers make it clear that they would do what is necessary to make learning mathematics palatable, positioning their students' interests (rather than the students themselves, and their participation as agentic, generative) as of utmost importance. Some of the ways they wrote about 'relevance' included:

> Rather than using the traditional methods for counting for example, some children may benefit from counting familiar /favourite objects. Eg: If Ben loves trucks, allow him to bring in some trucks to practise counting with. Helps to develop a love for mathematics.
>
> I could incorporate maths into other subjects and activities, in the curriculum. This way the children can see how maths links with everyday concepts and becomes part of everyday life. They may also find it more interesting than just copying from the blackboard.
>
> Use authentic activities as these keep interest.
>
> Students enjoy and relate to outside use (by showing maths in everyday situations the better the students understand)
>
> Relate it to everyday life (relevance=interest)
>
> Real life examples make maths a lot easier to understand especially for younger children.
>
> Make it relevant and something they are interested in (caters to needs of different learning levels)

In these discursive events there is an underlying notion, held by the preservice teachers, that they are sharing their power with the students, using contexts that are 'relevant' and 'authentic' for their students means that they are harnessing the students' (assumed) interest, and interest is assumed to invoke an inherent and unquestioned competence. The assumption is that if the students are interested they will learn; however, the question could be asked just what are they learning and are they really interested in the mathematics, or something else? Some miscellaneous comments, which satisfy a full representation of the kinds of comments the preservice teachers made included:

> Reinforce learning by repetition
>
> Teach math early in day

Even If I Hate Maths, Don't Let the Students Know

The quote I have used to introduce this section of the paper signifies again a preservice teacher's desire to make mathematics something the students regard favourably, and the humanist assumption that s/he can manipulate the learning environment to make it so. The last thing prospective teachers would want to engender is a hatred of mathematics, yet in the expression of constituted desire (to have 'fun' and 'relevance' as key components of learning) this may just be the outcome. One (double sided) reason for this might be that the external cosmetic tampering with 'the environment' for learning mathematics does little for the 'learning' and even less for the mathematics. The teacher operating under humanist assumptions assumes that negative effects of power can be extracted from the learning process, rendering the students free to act according to reason and choice. The 'humanist' teacher can assume much more of her teaching than it delivers, and epithets such as those below from the preservice teachers more likely than not go unfulfilled and unchallenged:

> Make maths fun and interesting
>
> Make students feel comfortable
>
> Make maths a lot easier to understand
>
> Make it relevant and something they are interested in

One consequence, to do with the learning process, is that it is as manipulated and regulated by the teacher as it ever was. The teacher sets out to make everything OK and in so doing chooses tasks that will be enjoyable for and relevant to, all students . However, a postmodern world is characterised by difference, heterogrneity and contradiction and any chosen task can not appeal to all learners. Since this appeal is taken for granted though, the teacher does nothing to focus on students' idiosyncratic ways of making sense of mathematical ideas that would render them participants in the learning community. A second problem is that the students learn to be suspicious of mathematics since it needs so much dressing up to make it palatable; students are 'turned off' even before they are granted entry to mathematics' order and pattern. Teacher dominated regulatory practices are maintained and the learner of mathematics is alienated and frustrated by not being able to make sense and participate in personally meaningful ways.

Another consequence of humanism, to do with autonomy, is that because it is assumed to be a commodity available to all, nothing is done to lessen the effects of power relations that delimit students' active engagement. Mathematics today is not viewed as 'a set of correct answers but a method of reasoning, a way of figuring out a certain kind of system and structure in the world' (Department of Education, QLD; 2001, p. 898). Consider the learning process appropriate and fruitful for young learners; it is one where grappling with rich mathematical ideas is paramount, where learners have a real 'presence' and license to ask questions and initiate lines of inquiry, one where they are encouraged to explore new ways of thinking and reasoning as they struggle to establish themselves as numerate subjects. The ontological in learning can not be denied, and new power relationships are needed that recognise the contingencies of productive learning, that recognise the productive quality of all pedagogic encounters. After all, mathematics education is a discursive field in which the discourses of mathematics and education come together in teaching strategies that structure the learning experience; the way in which mathematics education is played out in any context affects the extent to which learners can establish themselves as competent and confident, numerate subjects.

A related issue to a cycle of mediocrity circulating through mathematics education is that any sort of change is likely to be slow in coming. One reason for this is that a discourse privileging 'enjoyment' and 'relevance' is very convincing and could surely not be problematic. But more is left out of this discourse than is said, and it is likely that this sort of talk is likely to reign in early years education for some time. The teacher and parent deferring to humanist perceptions of the child will favour 'enjoyment' and 'relevance' in education, while the poststructuralist might insist that the opportunity to learn some robust mathematics and actively participate in the discourse might be more 'relevant'. Where humanists see 'relevance' in the external environment, poststructuralists consider it to be visceral, internal to the student who senses a certain capability, a desire to learn more about some aspect of mathematics. A second reason that change is unlikely is that teachers' identities stand strong in the humanist tradition. Any problems can be sheeted home to the students, and the teachers only gain in prestige and power from their attempts to make learning so appealing for their students. They often lack mathematical knowledge themselves, and in concentrating their energies on the external environment, on physical resources and students' active participation in games and play, they manage to keep their teacher identities in tact.

Conclusion

In this paper I have argued, from a poststructuralist perspective that recognises the constitutive power of discourse, that in spite of teachers' best intentions contemporary learning environments can be quite banal, with dour consequences for learners, especially in the early and primary years of schooling. I am concerned that preservice teachers' allegiance to 'enjoyment' and 'relevance', as currently constructed and played out in schools does not necessarily enhance the learning of mathematics; indeed I have argued that the opposite may indeed be the case. The humanist inspired assumption that learning is experiential encourages teachers to employ teaching strategies that focus on active engagement and play; where students are supposedly 'free' to take the learning in directions they choose, according to individual effort and drive. Power relations are seen to be negative and denied, their continued invisibility ensuring the maintenance of mediocrity in learning experiences that do little to inspire and mathematically engage young learners.

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