

## LEARNING MATHEMATICS: A GENDERED PRACTICE

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*In this paper I employ classroom transcripts to develop Bourdieu's writings with respect to the construction of gendered life in the mathematics classroom and the disempowering consequences of many practices for a significant number of girls within mathematics education. Using Bourdieu's concepts of habitus, practice and dispositions, the construction of a gendered mathematical habitus will be proposed. Bourdieu (1977) describes habitus as being a "matrix of perceptions, appreciations and actions." Bourdieu does not employ gender as a primary category of capital where capital is central to the construction of social space. Feminist writers, such as McCall (1992) have been able to reapply Bourdieu's notions of cultural capital to incorporate a gendered habitus. Through a gendered habitus, students learn to take on certain dispositions which will be influential in their success in schooling and their later positions within the social structure. For females, a gendered habitus is paramount to the construction of their marginality in mathematics.*

By the time students enter school, they have been socialised into the world as a result of many experiences. These experiences provide a habitus which will influence how perceptions and behaviours will be interpreted and enacted. Bourdieu (1992, p.) extends this so that the habitus gives "disproportionate weight to early experiences." The primary socialisation of students will impact upon how they their worlds at school will be constructed, so that social differences, such as gender, class and ethnicity, since a different habitus has been internalised. The dispositions which they bring with them into the school situation will be different for different individuals and social groups. In this way, the habitus becomes a mediating device between the social structures and practices and individual action and perception. Through the insertion into certain gendered practices, a gendered habitus is constructed, and through this habitus, children come to see and act in the world in certain gendered ways. The ways in which gender is organised and internalised can be related to two crucial aspects of Bourdieu's writings - habitus and capital.

Bourdieu's notion of *embodied* cultural capital is particularly important in developing an understanding of the distribution of gendered power since he argues that cultural capital can exist in three forms, embodied as long-lasting dispositions of the body and mind; objectified as cultural goods (such as books, instruments, machines) and in an institutionalised state in such things as educational qualifications (Bourdieu, 1983, p. 243). In this way, Bourdieu is arguing that certain dispositions are forms of cultural capital. McCall (1992) develops Bourdieu's writings to question whether women can possess gendered capital in a form that will be recognised and rewarded. She argues, "The dichotomous action of gender acts to constrain and subordinate the meaning of women's activity, whatever the so-called capital" (McCall, 1992, p. 846).

### MATHEMATICS HABITUS

The insertion of young students into the mathematics classrooms exposes them to practices which will construct a habitus for their school mathematics learning. This habitus, when linked to other habitus, provides a lens for viewing and acting in mathematics classrooms. The mathematics habitus will be constrained by a number of influences and practices which will include:

The conditions of the field (objectivism, utilitarianism, psychologism, normativity)  
 Certain linguistic codes  
 Teacher and student goals  
 Culturally valued knowledge, skills, abilities, morals, ethics and values  
 Specific language, examinations, streaming, pedagogies, etc.

Through the construction of practices and participating in the practices, they will come to construct a mathematical habitus which will impact upon the way they perceive and act in the mathematics classroom. As part of the production of a mathematical habitus, students will be exposed to gendered practices which influence the construction of a gendered mathematical habitus. A gendered mathematics habitus is possible because of other gendered practices outside mathematics practices.

### **ORGANISING PRINCIPLES OF THE FIELD**

It is through the practices associated with the field of school mathematics that participants accept the non-random failure of a significant number of students from marginalised social groups. The conditions of objectivism, utilitarianism, psychologism and normativity mask the political agenda of school mathematics. The macro practices associated with mathematics education perpetuate the belief that failure in the subject is essentially a function of the individual. Apart from the dominance of the belief in the objective nature of mathematics, there is the dominance of psychology in the field as well. The monolithic presence of psychology in the field helps to reify the complex nature of the beast while masking its socially constructed roots. Psychological research has aided in defining mathematics as a complex subject which needs to be organised in ways to reflect the increasing complexity of the nature as is apparent in the van Hiele levels of Geometric thought, and taxonomies such as SOLO. Psychological research has also introduced ideas about learning styles which help to reify the ideas that people from different socio-cultural backgrounds and contexts think in ways which may be incongruous with the rational and logical thinking associated with success in mathematics. It would appear that the supposed inability of many social groups to be successful in their study of mathematics is a reflection of some internal characteristics. In this way, habitus is constituted by practices which relate to social regulation of the population.

### **THE SITE**

The site of the study was a grade one classroom where the children were learning about shapes. The school has a small population of 130 and is located in a middle-class suburb of a major provincial city. There is a disproportionate number of boys to girls (16:8) so that it would be reasonable to expect more male talk than female talk. The lesson is being taken by a (male) "specialist teacher" who is responsible for the applied maths curriculum for the grade. The children are very familiar with the teacher who also takes them for physical education and art. Extracts from the hour lesson will be used to illustrate certain practices which may be influential in students learning gendered dispositions, and hence, habitus. Similar broad themes are found in other sites, so that this particular lesson should not be seen as a reflection of the individual teacher. Such practices are shared practices found across many sites and form part of teaching practice.

### **The Lesson**

The teacher is introducing formal names to a variety of shapes. He introduces the topic formally on the chalk board and then sets the children to work with concrete materials. This is done through a variety of formats. He

sets the classroom up with a series of work stations which contain different activities for the students. The students rotate around the stations after a given amount of time.

### "BEING MACHO AND FEMININE"

The practices within the classroom contain certain messages that the children are likely to perceive as natural and hence incorporate them into their habitus. In the following phase of the lesson the teacher is introducing formal names of shapes. He attempts to use the shapes in ways that he perceived to be drawing on the children's experiences, which are gendered. In the following extract, the teacher is acting a way whereby the boys are likely to see the dispositions of being "macho", sporting (because Leigh is good at football, isn't he) and mateship (Luke, my best mate) as part of the natural way of being a boy.

When the teacher attempts to include the girls in the discussion of shape, he adopts a practice which focuses on the aesthetics of possessions (as in diamonds) and appealing to the idea of desiring things as being part of being a girl (girls really love having this shape). Girls are the receivers in relationship and the bearers of manners and tact, i.e. social etiquette. (If you gave a girl a triangle, she would probably say thank you ...).

B Um they're not a circle but they're a bit like ...got a side

T Show us

.boy goes to board and points to the sides on the oval)

T Well, who can tell us what that shape is? and I'll give you a clue that you play football on it.

laughter

B I know

chatter with lots of "football ovals" being called out<sup>1</sup>

T Well I did say I'd give a clue

Leigh An oval

T That's very good, that's the one. Well apart from that, because of course Leigh is good at football isn't he? Are there any other ones?

B There's a piece of orange that looks like the shape of a semi-circle

T That's very good. Can you go and point to that one? ...A semi-circle

b Up there

T Oh very good, very good, like on one of those oranges that are cut up there. Um OK that's a semi-circle. What shape is a semi-circle?

Rachel A half a circle

T Good girl, good girl. And one more.

G See that banana thing up there, it's spinning around, it's like a circle shape on it but I don't know what's it called

Bs We've already had that

G I don't know what's its shape is.

B It's like a semi-circle

<sup>1</sup> The protocol has been adopted in these transcripts whereby children who can be identified have been done so through the use of names unknown children have been identified according to the gender B: Boy, G:Girl, and where the gender is not known C:Child has been used. All names used are pseudonyms to protect the identity of the students, teacher and the school.

T It's like a semicircle isn't it? In fact we'll have to name out our own shape for that one. Right now, you're all rotten kids because you didn't pick the one that I wanted you to pick

Cs I know

T Turn around this way. My wife told me about this one...girls really love having this shape

C I know

Cs Oh no

Cs I know I know

chattering and giggling

T What's a girl's best friend? Luke do you know what shape a girl likes?

Luke Yes

T What is it?

Luke A triangle

T No! If you gave a girl a triangle, she'd probably say thank you, but she wouldn't say Luke! That's what I always wanted!

giggles

G A heart

T excellent, but not that one

Cs Ohhh

giggles

T Bad luck but not that one. You couldn't work out what one it was.

C I know which colour it is

T The one that I wanted was a diamond. every time I go to the jeweller's shop, she goes "I want a diamond."

While there is a strong emphasis on naming shapes in this segment, the introduction of a slightly irregular shape becomes a slight problem. The girl does not know the name of the shape (somewhere between a semicircle and a crescent) and is open about her lack of knowledge. She recognises that it is not a semicircle, even though a group of boys seem quite content that a "semicircle" is an adequate signifier for the shape, and to a certain degree, the teacher reinforces their assertions with "It's like a semicircle, isn't it?" Part of the habitus of schooling is being able to guess what the teacher has in mind (as is apparent when the teacher says that they "didn't pick the one that I wanted you to pick"). Whereas there has been a strong emphasis on correct signification, the naming of this shape suddenly becomes quite arbitrary, and clearly not part of the game that the teacher has in mind. The teacher dismisses the girl's shape since it is not part of the game he has in mind, and moves on to the next segment of the lesson. As a result, the message that the girl is likely to receive is that naming shapes can be quite arbitrary, whereas for the boy who was not sure of the shape earlier in the segment, it was pointed out that there was a name for that shape (semicircle), suggesting that naming shapes is a precise action. In this way, there were quite different messages being given to the students about the processes involved in naming shapes. Unless the focus was on a gendered analysis, it would be difficult to observe the construction of gender in mathematics. With a non-gendered focus, the teacher could be seen to be using a dominant pedagogical strategy which seeks to draw on the prior experience of the students in order to engage them in the discussion, thus rendering the construction of a gendered habitus as invisible. However, when the focus is on the construction of gender, different practices can be seen to be operating for girls who likely to receive quite different messages about the patterns of signification in mathematics, along with the importance of their contributions to the class discussions.

**BOYS HAVE ABILITY, GIRLS JUST TRY**

In the following extract where the children have been called to draw diamonds on the chalk board, the teacher appears to be constructing a situation where the messages are ones that the boys are good at maths and have the right skills (reflecting) through overt and covert practices. (David is *extremely* clever, Sean's done a good thing, he did it quickly and then he thought to himself ....). In contrast, Sally was given messages that indicate an inferior position when she was told that her effort "was a lovely try." While her drawing was the same as David's, she was not clever like David, since she had done the wrong thing by drawing the same shape. Sally had not been able to guess the teacher's game since her diamond was pointing in the same direction as David's, which the teacher did not want, although he only mentioned that he wanted the diamond in a different colour. Through this type of practice, girls learn that their work, although the same as boys', does not rate them as clever but rather as "good triers." In this way there is a gendered difference in the construction of ability versus effort in the classroom.

T Who can come up to the chalk board and draw me a diamond?

(David comes up the board and draws a diamond)

T Now as you can see David is extremely clever and had done a great job. Alright, who can draw me a different coloured diamond

B I can

T You've already had one.

(Sally comes up to the board and draws a diamond similar to David's) ..

T Right very good, thanks Sally, that's a lovely try. Now they're all pointing in the same direction, but I wonder where it points. I suppose that one would point up and that one would point down. Who can make it pointing in a different direction?

??

T This little tail,,I don't know what's its called? Sean. Marcus, if you want to have a shot next, don't be rude.

Sean I don't know which way to giggles

T Now Sean's done a good thing, he did it quickly and then he thought to himself "It doesn't look the best and he better do something about it"

Sean It's hard

T It is pretty difficult to do these aren't they? ..Same as you did it then...right very good.

B Very good

Contradictory messages were being given to the students. When Sean has difficulties drawing on the board, the teacher encourages him by indicating that the task is a difficult one, and guides him through the drawing process. Sean is also encouraged for being "reflective." Yet Sally's drawing was as good as Daniel's, yet received little recognition for it. The interaction with the two boys is more extensive and positive than his interaction with Sally. At one level, the quality of interaction is quite different, but the length of interaction is also considerable. As a result, the feedback that girls would expect would be quite different to that which boys could expect. This practice creates quite different possibilities for the construction of gendered mathematics habitus.

## GIRLS AND PASSIVITY

Through the practices of school mathematics, students are positioned in ways which will facilitate the construction of certain dispositions. In the following transcripts, the girls are positioned in ways which would be conducive to the construction of passive dispositions. Girls learn through their interactions with the teacher and their peers that they are not as valued in the classroom as their male peers, and to take a less active and compliant role in the mathematics classroom.

### GIRLS ARE IGNORED, BOYS ARE VALUED

In the following extract, the teacher is interacting with a group of children working on a task where they had to make patterns with shapes and then illustrate them. He interacts with the boys, giving them attention, asking them how their work is proceeding etc. etc. During all of this the voice of Gail keeps asking for affirmation of her work, but is continually ignored. When she finally gains his attention, she is not praised in any way, but told to do more of the same. To this she responds that her page is full, he replies that she should help another child, almost as a punishment for finishing too early. In contrast, during the interaction he praises Sean and uses Glen's work as an exemplar to the other children, even though Gail has clearly finished her work. He also praises a group of boys for "lovely" work. Such praise is not forthcoming with the girl's work.

Practices such as these aid in the construction of a disposition suggesting that girls should expect to be ignored, their work has little value and that there is not much praise to be expected when they complete their work. In contrast, boys can expect a significant amount of the teacher's attention, most of which is supportive and encouraging.

T So can you do just at least one pattern that I can see..or we can work out what might come next. You're doing a good job Glen, just keep on going. Can you maybe give Sean a hand, he's looking pretty sad there. Alright

B He doesn't know what to do.

T Alright, what you have to do is to make a pattern like you know on a jumper, right? So what I want you to do is to work out a pattern like a diamond then a square and then you might have say another diamond. Can you see a pattern happening already? What's the next one we do?

Sean A square

T A square. So just do that, that's it. Do another one, Do another pattern. Alright? OK, well if you were doing a pattern, there's these two and what would be going to go down next?..What goes after that? ...good boy, so that's what you draw. You draw that...

Gail Mr Mason, this is what my pattern looks like

T and then one more and then you've finished. That's one, two three..two more

//

Gail Mr Mason

T Like these guys over here. Like his too. That looks lovely, leave it there. That looks lovely, just keep going on it

Gail Mr Mason, that's my pattern

T OK let's have a look (works with another boy)..Right I'll show you. It goes, square, diamond, rectangle, square, diamond, rectangle, same, alright? So just draw that. Just do number one. Just draw it here. ...I'll do it for you. Then you go that one then that one and then that one and then that one and then that one, just like that. Alright? Now do another one.

Gail I've finished mine Mr Mason,

- T Then do two more  
 Gail I can't fit any more  
 T Then help Rachel

In defence of the teacher, it can be argued that he was trying to ignore Gail for calling out, so that he was attempting to extinguish a behaviour (through negative reinforcement) which he considered to be undesirable in the classroom, yet as the following extract indicates, interrupting is also a gendered practice.

### **GIRLS DON'T INTERRUPT**

While the boys could interject with comments, particularly if they are relevant, the practices in the classroom suggest that girls are expected to be more docile, put their hands up and wait to be asked to reply. While it was argued in the previous section that girls can expect to be ignored, when they do try to participate with boys insofar as trying to have some voice in the classroom, they can expect to be admonished. In the following extract the teacher was asking children to sort equilateral triangles from non-equilateral. When a girl interrupts, she is reprimanded and her response is ignored. Yet when a boy calls out, his answer is accepted and even expanded.

- T Now some triangles are...look like triangles, which ones look like triangles and which ones don't  
 Gail These ones  
 T Get one that looks like a triangle...  
 B These ones look like a triangle  
 Gail This one looks like a triangle  
 T Now most people will pick these ones like these 2 boys did because they've all got equal sides haven't they? But these ones are really triangles too. These ones are called "equilateral triangles". Guess what's equal? Because they're called equilateral triangles  
 Rachel Because it's got equal sides  
 T Don't call out Rachel. What's equal about it?  
 B The sides  
 T The sides are the same size. The sides are all equal. You have to sort out the equilateral triangles from the other triangles. You want two bunches, one of beautiful equilateral triangles and the other triangles that look like flags. Ok off you go.

It would seem that the girls are likely to be exposed to different practices in the classroom which will construct different habitus for them than their male peers.

From these practices, it would appear that there are many messages that children receive that construct certain gendered dispositions within the individual. These have focussed on the unequal power relationships associated with the student and the teacher, but it is also apparent that when students are working together, there are similar displays of gendered dispositions.

### **WORKING WITH PEERS**

In the working on a task to make patterns with shapes, the boys had commandeered all the rectangular shapes and the girls required some. While the girls use all the "correct" language for asking for co-operation, the boys are resisting joining the game. This interaction indicates that the boys have taken on some of the dispositions of being dominant in the classroom and assuming the role of the more powerful participants in the practice. On the other hand the girls have acquired dispositions of a more subservient and compliant participant, avoiding

confrontation with the boys in the classroom, even though the boys have more rectangles but are not willing to share them with the girls.

Gail Hey can I please have some rectangles

Bob No

Gail yes we can.

Bob What? .... well we've used them all

Bill Yeah we used them all

Gail Can we please have some rectangles?

Gina They haven't got any

Cate They don't have any

Gail I need one more rectangle

G ?

Gail Just one more rectangle

Bob Then what about if you fly up there

It would appear that transcripts such as these are illuminating in that they are able to shed some light on the practices, albeit discursive, that occur in the classroom which may be influential in the construction of gendered dispositions and habitus in mathematics. The gendered positions that are available to the girls are not as empowering as those available to the boys, and, as such, may be seen to be influential in the distribution of power in the wider society.

### **RANGE OF DISPOSITIONS AND POSITIONS**

From these transcripts, it appears that girls are positioned in mathematical practices in ways that are different to their male peers. Such practices could be influential in the construction of gendered dispositions which will impact upon the later positioning within the social order. For these girls, it is possible that their experiences will construct dispositions which position them as compliant, passive and "subservient" within the classroom whereas the boys are exposed to more empowering practices. For boys, such practices will impact more positively on the dispositions which are likely to develop. This may improve their chances of success, and hence, social positioning within mathematics education and the wider society.

These transcripts are examples of practices in the mathematics classroom but it is noted that they are never fixed and that there are a range of positions and dispositions that are available to students at any time. The positions and dispositions that are available to the female members in mathematics do not have the same capital associated with them as do those offered to their male peers.

### **HABITUS AND CAPITAL**

A view of mathematics education as being apolitical and culture free is a fairly dominant view amongst mathematicians, mathematics educators and the wider society that masks the hidden function of mathematics as a social filter. Such practices belie the social sorting based on the grounds of gender, class and ethnicity that mathematics fulfils in the wider social arena. Through covert means, mathematics is employed to play a major role in the process of cultural and social reproduction. Atweh and Cooper (1991) have argued persuasively in support of the hegemonic nature of the mathematics curriculum. Those students who are excluded from the study of mathematics based on their perceived inability to cope with the content accept their marginalisation as an internal lacking, or dispositional attribute. Conversely, those students who enjoy the success and the



increased career options associated with success in maths, come to perceive their status as natural and deserved.

Bourdieu is concerned with understanding the ways in which beliefs and practices are constructed in cultural contexts and the ways in which certain relationships are more powerful than others, along with an understanding of how such relationships come to be seen as natural. Through these "natural" and "taken-for-granted" beliefs the unequal distribution of power, status and economic rewards remain unchallenged. Through the practices at the macro level of society, and the micro level of the classroom, certain "habitus" are internalised to provide the lens with which to view the world. It is at a level that could be referred to as unconscious so that it, for the main, remains unquestioned. Through the practices of schooling, children are induced into socially patterned habitus which is closely aligned to the social patterns of the wider society.

Through analysing classroom interactions, an examination of those practices which construct girls in a gendered way so that they learn to take certain gendered dispositions will be undertaken. These dispositions will influence not only to their learning of mathematics content *per se* but also their social positioning.

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