

Chapter 15

Language, culture and learning mathematics: A Bourdieuan analysis of Indigenous learning

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Indigenous students in Australia perform poorly on testing measures (MCEETYA, 2009). This is of national concern and a priority for government, as evidenced in the 'Closing the Gap' initiative (FaHCSIA, 2009). Geographical location and poverty compound issues of indigeneity, so that Indigenous students in remote locations are most at risk of performing poorly on measures of literacy and numeracy. In this chapter, I seek to challenge the orthodoxy that poor performances among remote/Indigenous students are a consequence of constructs of ability or learning difficulties *per se*. Rather, I seek to illustrate how the mathematics curriculum delivered to Indigenous students represents a particular cultural form. This is particularly poignant as Australia moves to a national curriculum (National Curriculum Board, 2008). The difficulties in learning mathematics experienced by many Indigenous students can be thought of as a confrontation of language differences (and, by implication, culture). From this perspective, coming to learn mathematics is about 'cracking the code' through which mathematical concepts and processes are embedded and relayed, so that learning difficulties are viewed as structural difficulties rather than individual difficulties. By reconceptualising the 'learning difficulties' experienced by Indigenous learners in mathematics/numeracy, a more inclusive approach to educational reform can be envisaged and enacted.

For this chapter, the notion of 'learning difficulties' is understood to be a subversive process through which the failure of Indigenous students becomes reified through various practices such as curriculum, pedagogy and assessment. In so doing, this reification engenders a view of failure in mathematics as a characteristic of the learner rather than a process of structural exclusion. Using the theoretical constructs offered through the writings of Bourdieu, I explore the notion of practice, which in this case relates to the field of mathematics education, and how it is implicated in the exclusion of Indigenous learners, particularly those living in remote areas. The specific focus is on how the language practices of school mathematics become a barrier for Indigenous students.

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Drawing on a number of projects in which I worked with Australian Indigenous communities,² where the focus has been on improving numeracy learning, the intersection of literacy and numeracy becomes important. It is this intersection that is the focus of this chapter. Depending on their geographical location, Indigenous students may come to school with a home language spoken in their community; a Kriol that allows them to interact with speakers of other Indigenous languages with whom they come in contact; and as they enter the school context, they encounter English as the medium of instruction. Many students are multilingual, with minimal support being offered for the English as Second Language (ESL) status. For many remote Indigenous students, English is spoken only in the school and in contexts such as regional shopping centres or in interactions with agencies. In this way, coming to learn English and the cultural practices of formal schooling represent challenges for many Indigenous learners. Thus, the ‘learning difficulties’ faced by these students are not biological or inherently individual features but rather represent one of cultural and linguistic conflict. In this chapter, I use the notion of ‘learning difficulties’ to mean the problematic clash of language and culture as Indigenous students encounter Western mathematics education.

‘Learning difficulties’ as symbolic violence

Rather than viewing ‘learning difficulties’ as characteristic of the individual, I draw on Bourdieu’s work to argue that the ‘learning difficulties’ experienced by Indigenous learners are acts of symbolic violence. I propose that the practices within which mathematics are taught/learned by students are structured in subtle and coercive ways that limit the success of particular groups of students. Taking such a perspective makes it possible to understand more fully the systematic exclusion of some groups of students from participating in the field of mathematics. A Bourdieuan approach enables a richer theorisation of the reproduction of power through school mathematics. Such an approach enables an understanding of why it takes considerably more effort for teachers and learners to enable students from those backgrounds who are typically at risk of failing school mathematics to be successful in their study of this discipline. Drawing on the work of Bourdieu, I elucidate how the practice of school mathematics can be seen as one in which the ways of thinking, acting, talking and working mathematically have become reified through documents to define what is seen as legitimate knowledge. Those students who have this knowledge and can display it appropriately are more likely to be considered successful learners.

Bourdieu argues that the habitus is the embodiment of the social, which enables the person to be at one (or not) with the field in which they are located.

² The data and examples used in this chapter pre-date my employment at Yulara and in no way should be inferred to be representing the Anangu people.

Habitus being the social embodied, it is 'at home' in the field it inhabits, it perceives it [knowledge] immediately as endowed with meaning and interest. (Bourdieu & Wacquant, 1989, p. 128)

The primary habitus is shaped by the family and is brought into the early years of schooling. This habitus in turn shapes, enables, enhances or excludes students from participating in much of the discourse of mathematics.

This comfort, or 'feel' for the game of mathematics, is referred to as 'doxa'. Bourdieu further argues that the feeling for the game, in this case mathematics, is often at the level of the unconscious and, as such, it enables the reproduction of the field (and power).

The earlier a player enters the game and the less he is aware of the associated learning, the greater his ignorance of all that is tacitly granted through his investment in the field and his interest in it's very existence and perpetuation and in everything that is played for it, and his unawareness of the unthought presuppositions the game produces and endlessly reproduces, thereby reproducing the conditions of its own existence. (Bourdieu, 1990, p. 67)

For example, consider the young child who comes to school knowing how to count, classify and articulate the names of geometric shapes and other mathematical objects. The pre-school familial practices have enabled the child to acquire particular forms of knowledge that are valued within the practices of school mathematics. That is, the child has embodied features of the culture (namely number) so that these are now part of the habitus that is now brought into the school context. The child is able to display this knowledge (or habitus) in ways prescribed by the field. When the child displays, for example, particular counting skills, then the teacher ascribes the child to the category of being an 'effective counter'.

This habitus now acts as a medium through which the child displays and acquires new forms of knowledge. This habitus is now a form of capital within the field that is converted to symbolic power, such as status of the learner. Conversely, in many remote Indigenous communities, there is little exposure to number—the houses are not numbered, few homes (if any) have a telephone, the local store may not display prices, some people do not have their birthdates recorded—so the experience of number is considerably different from that of urban/city learners, who are immersed in number. For remote Indigenous learners, the potential for developing a habitus rich in number is very limited, restricting the transition into the early years curriculum. Thus, the 'learning difficulties' prescribed to many Indigenous students are not some inherent deficits but a difference in the habitus valued within the field. The unawareness of how number is a taken-for-granted form of knowledge in Western epistemology enables the exclusion of cultures that bring to school different ways of knowing; that is, a different habitus, that is not valued. Knowing how to count becomes an 'at oneness' with the field and hence is not questioned and, as such, supports the knowledge structures of some fields while excluding others.

For Indigenous learners, the home environment offers different potential for meaning making and language development. As has been shown by Watson and

Chambers (1989), Yolgnu³ people have a rich repertoire of spatial knowledge that is configured in ways that are very different from that represented in school mathematics. History, people and events figure strongly in the ways of mapping the land. The learners bring to school mathematics a rich language and conceptualisation of spatial representation, but this is not recognised or given attention in the curriculum, pedagogy or assessment practices. As such, the spatial habitus of Yolgnu learners does not convert to scholastic capital with the formal school system. Rather, the lack of particular Western constructs works against their potential for success in school, since the curriculum and/or assessment does not recognise their cultural and linguistic knowledge. In the field of Indigenous communities, the spatial knowledge they develop, and the habitus in which this is embedded, is valued and hence scholastic merit is applied to the learner in this field, but it is a field different from that of school mathematics. It is here that the tautological relationships of Bourdieu's constructs become apparent. It is not possible to consider field, habitus and capital independent of each other.

Structured failing: The field of school mathematics

By seeing mathematics as a discipline that represents objective facts, the discourses of teaching and knowledge remain unchallenged. As such, the unconscious actions of educators often support the teaching of mainstream mathematics when working with Indigenous students whose cultures and languages are not integrated within the practice of instruction/teaching. When assuming that mathematics is acultural, educators are at risk of not recognising the strong ways in which mathematics represents a particular culture or, more specifically, cultural practices, that may be different from those practices that the students bring to school.

The teaching of mathematics is culturally laden. Consider the example of the teaching of number facts. In this process, number facts are typically seen as the precursor to addition; if students do not recognise the number 4, then it is assumed that addition of two 4s will not be possible. However, when teaching is considered a cultural act whereby particular elements of that culture are embedded within the act of teaching, such assumptions are challenged. These may be evident in the language being used, the ways of interacting, the knowledge being represented, but always remaining invisible to the participants—both teachers and students. It is more so the case in mathematics than any other curriculum area. For example, when teaching number, the approach often requires students to count objects using one-to-one correspondence. Indeed, curriculum documents suggest that one-to-one correspondence supports early counting. Challenging the hegemony of Western counting sequences, Willis (2000) found that some Indigenous students subitised very effectively before they entered formal schooling; that is, recognised groups of

³ Yolgnu country is the north-eastern corner of the Northern Territory, Australia.

animals not by counting but by recognising the group. Forcing students to count using one-to-one correspondence is counter to the skills that these learners brought to the learning situation and, indeed, subitising is a more advanced skill than is aspired to in school mathematics. As such, one could argue that the ways of organising curriculum is a particular view of the world and when the students' world view (in the case of Indigenous students their ability to subitise) their cultural knowledge is not recognised as legitimate—even though later on in the curriculum organisation subitising is seen to be a key skill in group recognition. For many Indigenous students, the early years number curriculum forces them to unlearn their numeracy knowledge (in this case subitising) through the structured counting process. Through this unlearning, they come to learn that for the first three years of schooling they do not know very much. This can be internalised so as to constitute a mathematical habitus that is often one of 'I cannot do maths'. For Bourdieu, this pattern of practice is critical to understanding the ways in which the field operates to exclude (or include) particular cultural knowledges.

Language, mathematics and linguistic capital

Part of being successful in school mathematics is being able to speak its language. The words spoken in school mathematics never exist in isolation, but are an integral part of the overall discourse that operates within that context. This discourse is part of the field, but in a dialectic relationship with the habitus of those who participate in that discourse. Bourdieu (1991) defines it thus:

The form and content of a discourse depend on the relation between the habitus (itself a product of the sanctions of a market of a given tension) and the market (field) defined by a level of tension which is more or less heightened, hence by the severity of the sanctions it inflicts on those who pay insufficient attention to 'correctness' and to the 'imposition of form' which formal usage presupposes. (p. 79)

The language of mathematics represents a particular social language—that of the White, middle class. Consider, for example, the processes of comparisons through the use of binary opposites when comparing groups; the terms 'more' and 'less' are used frequently. In her intensive study of mother-child interactions, Walke-rdine and Lucey (1989) reported that middle-class mothers were most likely to use the signifiers 'more' and 'less' in their interactions with their children. In comparison, she also noted that working-class mothers were more likely to use the term 'more' only. Similar differences have been noted in Indigenous languages (Zevenbergen, Mousley & Sullivan, 2004). In the early years of mathematics there are considerable learnings through comparisons—which number is more, which is less, what number is 3 more than 6, what number is 2 less than 9. Similarly, comparisons in the measurement strand are just as common, but more likely to use terms such as wide/narrow, tall/short. Therefore, middle-class, English-speaking students are more likely to use both terms with almost equal fluency, but the term

'less' is not used with students from other social and cultural groups such as working-class and Indigenous students. As such, when the teacher embarks on activities and questions such as 'Which group has more?' 'Which group has less?' 'Which number is two more than five?' 'Which number is two less than five?' some students gain greater or lesser access to the mathematics, depending on their home language. The language becomes a tool for relaying concepts to students. Where they have the language that aligns with the classroom language, they have greater access to mathematical ideas and knowledge, whereas the converse is also true.

Recognising that language is the key medium through which learning is facilitated, it becomes important to identify the ways in which language and culture become barriers to learning mathematics for students whose language is not aligned with school mathematics. There are now many resources available to support teachers in recognising how the languages and cultures that Indigenous students bring to school are substantially different from those that are typically part of the teaching repertoire. The depth of knowledge that has been brought to bear on the range of teaching support materials is critical to good teaching when working with Indigenous students, if success is to be had by all students. It is not the case that teaching mainstream knowledge will suffice. There is now a long-standing body of evidence to show that the imposition of Western knowledge and practices is failing Indigenous students. As such, a radical change in teaching practice needs to be adopted that will enable students (Indigenous and other students who have been traditionally excluded from schooling) to become active learners. To do this successfully, legitimating the language and cultures in and through practice becomes essential.

The role of language in mathematics learning

Often, the learning of mathematics is seen to be a process of learning mathematical ideas, concepts and processes. Increasing the ways in which mathematical ideas are taught to students is seen as problematic. The teacher may have an idea in their head as to what is to be taught, but the way in which the students interpret the discussion can be quite idiosyncratic. When students respond to teacher questions, there is considerable scope for interpretation (and misinterpretation) by both teachers and students. Once the teaching of mathematics was not seen to have a strong relationship with language, but this is now changing so that the role of language in the teaching of mathematics increasingly is recognised. Consider the example in which a teacher poses the problem of 2×5 and represents this on a whiteboard. The teacher's explanation goes something like 'So, if I have five groups of two ... five times two ... How much is that?' The teacher's goal is to convey the concept of multiplication. Students sitting at their desks can make multiple interpretations, such as identifying the key of 'much' and seeing it as a problem about money; identifying the key word of 'time' and seeing it as a problem

about 'o'clock'. Thus, the language being used to convey a concept can create other difficulties for learning.

Typically, the teacher has an idea that they need to convey to the students, but students interpret the teacher's talk in particular ways, such as shown above. When teaching is problematised and the impact of language is recognised, the focus is increasingly on the pedagogy, rather than the student. Recognising the potential communication problems inherent in the pedagogic interaction can create another level of complexity. A greater recognition of language enables a richer interpretation of success (and failure) in school mathematics.

It is here that Bourdieu's approach has practical application. It can be seen how the teachers' doxa with the game of mathematics creates a blindness to the problematic nature of the field in terms of its potential to exclude students. The misrecognition of language and concepts works to exclude Indigenous students from the game.

In adopting a language approach to teaching mathematics, it becomes important to recognise the specific language of mathematics. Much like any other language, mathematics has its unique features. When the language of instruction is Standard Australian English (SAE), it is recognised that the greater the difference between the home language and the school language, the greater the difficulty in coming to learn school mathematics. This phenomenon has been well documented across social class backgrounds (Bernstein, 1996; Cooper & Dunne, 1999; Zevenbergen, 2000) and non-English speakers (Leder, Rowley, & Brew, 1995). Similar issues arise for Indigenous speakers whose languages range along a continuum depending on their backgrounds. English may be their first language, but the register is different from that of school. Others, may speak Koori English or Murri English⁴ so that there are differences in language structure, whereas Pidgins and Creoles are further distanced from SAE. Finally, there are those students whose first (and other languages) are those of their traditional language. In many groups, the need to travel into other people's country means there may be a need to speak multiple languages. It is not uncommon for Indigenous children to enter school speaking up to four different languages and having to learn SAE as they come in contact with the school system.

Language and world views

Language frames how we see and interpret the world, but language is also a representation of the world as it is interpreted. Wittgenstein (1953, 1967) argued that through language games, the world becomes interpreted and constructed. For

⁴ 'Koori' and 'Murri' are terms used by Aboriginal peoples of the eastern regions of Australia in reference to themselves. 'Koori' refers to Aboriginal people from Victoria northwards to approximately halfway through New South Wales (NSW). 'Murri' refers to Aboriginal people from midway through NSW to southern Queensland.

Wittgenstein (1967) and others (Kanes, 1991; Watson, 1989) who have drawn on his work in mathematics, it is proposed that the mathematical ‘facts’ that are seen to be part of the discourse of school mathematics—such as ‘the sum of the internal angles of a triangle add up to 180°’—are not so much facts, but conventions that have been accepted as norms within particular social groups. For example, consider mapping conventions. There are particular ways of representing the land in school mathematics, and often these employ particular conventions (scale, icons, etc.). In contrast, in the [Garma project in Northern Territory discussed briefly earlier in this chapter](#) (Watson & Chambers, 1989), the Yolgnu people were involved in a ‘both ways’ education program (Watson, 1988). Through this approach, students were exposed to traditional mapping conventions whereby events (such as burials or meetings) were represented according to culturally significant events. Thus, the two different approaches to mapping can be seen as socially negotiated artifacts that become a legitimate part of the game of school mathematics.

Comment [RO1]: Where is the Garma project discussed earlier in the chapter?

Wittgenstein (1967) argued that what are seen as mathematical facts or knowledge are events that have become an accepted part of the culture that has grown out of language games. The dominant culture fails to recognise that the language games played construct particular forms of knowledge, seeing such knowledge as ‘natural’ or ‘normal’. Many Indigenous students come to school with other language games and forms of life. In their out-of-school experiences, different games are played according to the needs of their cultures. For example, depending on their living circumstances, language games are developed to reflect the needs of the community. In her work with people in Northern Territory, [Harris \(1990\)](#) noted that mothers holding their babies and young children talked about directions (north, south etc.) so that the young members gained a strong sense of direction. This has often been interpreted by Westerners as ‘an inbuilt compass’. For the city child whose ‘natural’ language has a strong component of shape language, the experience of coming to school is qualitatively different from the Indigenous student whose ‘natural’ language has developed a keen sense of direction. In the early years of schooling, the experiences of the city student are more strongly aligned with the curriculum than those of the Indigenous student. Directional knowledge is part of the curriculum, but in the upper years. Before an Indigenous student gets to experience this success, some 5–6 years of school practices have positioned them as knowing very little.

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In thinking about the links between objects and language, different cultures develop language to reflect their views of the world. Depending on their lived experiences, different conditions create different needs that are, in turn, expressed through language. It can be argued that the rich language of shape in Western language has developed through the need for a language to describe the built environment. In contrast, in cultures where there is not a built environment, there is little need for a complex language of shape. Consider the words that are used to describe four-sided shapes—square, rectangle, oblong, trapezium, parallelogram, convex, concave and so on—and that assume that the four-sidedness is seen as a defining characteristic. The complexity of the language is shaped by the demands of activities situated within a particular cultural context.

Language, habitus and capital

In the preceding sections, I have drawn on a range of perspectives that seek to highlight the problematic nature of language in the learning of mathematics. To unite these literatures, Bourdieu's theoretical project offers a coherent framing. The field, in this case school mathematics, has particular practices that valorise particular ways of knowing and doing. Being immersed in the game of mathematics often means that those who are involved are unaware of how the game is being played and the unspoken rules of the game.

The game of mathematics education is lived through various *objective* structuring practices. These include curriculum documents, assessment practices or pedagogical practices (including group work, streaming, text books). Also at play are *subjective* structuring practices, whereby participants internalise the effects of objective structuring practices so that they come to see themselves as particular types of learners of mathematics. Within the field, particular knowledges and dispositions are seen as more valuable so that those learners who are able to display such characteristics are more likely to be seen as successful learners. But, such dispositions are not neutral and are often brought to the school situation from the out-of-school experiences of learners. For students whose home habitus aligns with the practices of schools, there is greater chance for them to be framed in particular (and positive) ways.

The relation between habitus and field operates in two ways. On the one side, it is a relation of conditioning: the field structures the habitus, which is the product of the embodiment of immanent necessity of the field (or of a hierarchically intersecting set of fields). On the other side, it is a relation of knowledge or cognitive construction: habitus contributes to constituting the field as a meaningful world, a world endowed with sense and with value, in which it is worth investing one's practice. (Bourdieu & Wacquant, 1989, p. 144)

Within a Bourdieuan framing, young children come to develop a primary habitus in the home, which includes a language component, so that when they enter school that habitus is valued to greater or lesser degree depending upon its synergy with the field of school mathematics. For those whose habitus is more strongly aligned with the practices of the field, the habitus offers considerably more capital than for their peers whose habitus is less aligned with the field. The habitus thus becomes of form of capital that can be exchanged within a given field for other forms of rewards. In the case of school mathematics, this might be in the form of grades and other accolades bestowed upon 'successful' learners of the discipline.

Linguistic capital: Implications for learning mathematics

In this section, I draw on one particular aspect of language, prepositions, to highlight the role of language in learning mathematics, and how the linguistic habitus

of learners can enhance or hinder their success in the field. Within mathematics, prepositions are important in the study of space strand since they refer to how objects are located in relation to other objects. This is in stark contrast to other areas of the curriculum, particularly in the teaching of reading, where it has been shown that effective readers often miss the small words as they skim through text to read the more significant terms. In mathematics, the reader needs to pay attention to detail since terms, such as prepositions, play a key role in making meaning. The lexical density of mathematics means that every word serves a purpose, so skimming through word problems can create difficulties. Prepositions are the small words often ignored by readers but which have significant value in mathematics.

Within school mathematics, a range of prepositions is commonly used. Some of these prepositions have greater application and use in mathematics classes than others. Most are commonly used in relation to position, although they are also used in other contexts. For example, the preposition ‘over’ can be used to denote position in an overt way, but can be used to describe position when working with numbers—‘the numerator is over the denominator’. It is difficult to think of teaching mathematics without the use of prepositions. Table 15.1 is a list of commonly used prepositions in mathematics classrooms. It is not an extensive list, but it highlights the amount and types of prepositions that are used.

Table 15.1 Prepositions commonly used in classrooms

across	after	against	around	among	along
beneath	between	before	by	beside	below
during	down	in	into	like	near
from	for	on	off	over	of
past	toward	through	under	up	with
underneath	without	within			

The prepositions used in mathematics classrooms can be particularly problematic for Indigenous students and for students who do not use the middle-class English register. The multiple terms that can be used to describe a particular relationship creates a situation whereby the meaning of the terms is less accessible to students. For example, the terms ‘next’, ‘beside’ and ‘near’ can all be used to describe the same situation. Furthermore, for students whose first language is not school English, the difficulty is compounded. Where the first language is not that of English, the use of prepositions may not be as evident, thereby creating difficulties in translation for students. For example, if the use of ‘off’ and ‘of’ are considered, the words sound very similar, yet 25 per cent off \$100 is very different from 25 per cent of \$100. In many of the sign languages used by deaf and hearing-impaired students, the use of prepositions is only a minor aspect of language development, as students are taught to use key words and rely on contexts in which the signs are being used in order to glean meanings (Hyde, Power, & Zevenbergen, 1999; Zevenbergen, Hyde, & Power, 2001). Similarly, the very subtle differences in these

two terms may be indiscernible for some Indigenous learners who are prone to hearing loss due to ear infections.

For learners who have a strong grasp of language; that, is a linguistic habitus that is aligned with the field, there is a greater possibility for success in mathematics. Having a strong grasp of the breadth, meaning and applicataion of prepositions represents a strong linguistic habitus that can, in turn, be exchanged for rewards and accolades within the field, thus making the linguistic habitus a form of capital that bestows rewards within the field of school mathematics.

Prepositions in Kriol languages

In contrast, the linguistic habitus that an Indigenous learner brings to the school is shaped by the language games of the home. The richness of prepositions in the primary habitus facilitate greater or lesser chance of converting the linguistic habitus to scholastic capital. In studying Kriol languages of the Kimberley/Pilbara region⁵, Hudson (1983) identified five prepositions. These are outlined in Table 15.2. As can be seen from this table, the use of prepositions within Kriol languages does not easily translate to school English.

Table 15.2 Prepositions used in Kriol languages

<i>Langa</i> or shortened to <i>la</i>	In, at, on, in, near	Det men ben hittim langa hed The man hit her/him on the head.
<i>Blanga</i> or shortened to <i>bla</i>	For, because of, about and possessive s.	Det wumun bin kukum dempa bla ola kid The woman cooked damper for the children
<i>Fo</i>	Used for talking about the reason for doing something or for indicating possession of something	Wi bin lukum Rufus fo met. We saw Rufus' friend
<i>From</i>	Similar to English from	Dei bin lukunat as from kemp. They watched us from the camp.
<i>Garra</i> (longer version is <i>garram</i>)	Used to indicate association with a person or thing. Equivaent to with or using	Det boi bin nakam garra stone The boy hit her with a stone.

Source: Adapted from Berry & Hudson, 1997, p. 118.

Examples such as this highlight a two-fold difficulty. First, there is little direct translation from one language to another, thus making it difficult for the learner to transpose ideas from the home language into the school language. Second, the number of prepositions is considerably less than those that students encounter in

⁵ The Kimberley/Pilbara region is in far north Western Australia.

school mathematics. This makes the explanation of the prepositions used in school mathematics more complex due to the poor synergies between the two languages. The examples here suggest that the linguistic habitus that these Indigenous learners bring to school do not transfer easily to school mathematics, thus making for considerable difficulties in coming to learn the acute differences in English prepositions and their applications in school mathematics. This requires considerable reconstitution of the linguistic habitus of the learners.

Conclusion

In the preceding sections, I have sought to illustrate some of the challenges that language poses for Indigenous learners in coming to learn mathematics. Where students come to school with the middle-class register of the language of instruction, in this case English, they are more likely to be positioned well as learners. For them, there is a strong synergy between their home habitus and the practices of school mathematics. The learning difficulties of many Indigenous learners can be better understood as systematic failure due to the misrecognition of the habitus of the learner and the unquestioned practices of the field. While the issues are complex, the role of language and culture cannot be ignored. Through this chapter, I have sought to illustrate some of the ways in which language is implicated in the teaching and learning of mathematics and how it poses particular learning difficulties for students whose language, and hence familial habitus, is not aligned with school instruction. Many remote Indigenous students enter school with at least two languages, neither of which is SAE. Coming to learn mathematics is about learning the language of instruction, which is embedded in a particular nuanced relay system heavily laden with cultural values that may not be known to the learners. Ignoring the subtle and coercive ways in which mathematical language is implicated in the failure of students coming to learn school mathematics amounts to symbolic violence. Appreciating and redressing these forms of symbolic violence may be a small step in changing the current educational disadvantage faced by significant numbers of Indigenous learners.

Essential next questions

In writing this chapter, my intention has been to challenge the orthodoxy around 'learning difficulties' associated with Indigenous learners. I have used this cultural group for two reasons. First, that they are most at risk of performing poorly on most standardised testing schemes, which engenders some deficit thinking around explaining such performance. My goal in this chapter was to highlight the ways in which the structuring practices of the field of mathematics are highly exclusive in terms of excluding particular groups of people. My second intention was to draw

on the most excluded group of people to illustrate the reifying processes adopted within the field of mathematics that exclude learners so that a strong case can be presented. These examples highlight the structuring practices within the field that can be applied to other social and cultural groups. The concepts used in this chapter allow for a rich discussion on how the field of mathematics education creates a mythology of 'learning difficulties' that enables the blame for failure to be placed on the learner rather than the field. By using Bourdieu's concepts, a discussion is possible as to a way forward that enables greater access to the most hegemonic of curriculum areas.

What practices can be developed to enable greater access to school mathematics?

Through the writings of Bourdieu, it becomes possible to challenge the practices of school mathematics in order to open them up for critique. In a small chapter it is difficult to do justice to the corpus of work generated by Bourdieu. Many concepts have not been addressed here and those that have, are only marginally included. A wider reading of Bourdieu's work enables a much richer conceptualization of how practice is implicated in scholastic mortality for marginalised groups. From a theoretical perspective, a richer understanding of marginalisation can be developed. From a practical perspective, his tools enable a shift away from deficit thinking towards developing a much richer practice that enables greater access and participation.

How can we challenge and change the status quo around language barriers in school mathematics?

Breaking down the barriers created by the doxa in the field of mathematics is probably the greatest challenge I see in school mathematics. Members of the field have considerable power within the field but also beyond it, given the high status of mathematics in the wider community. I would contend that much of the power of mathematics has been achieved through its exclusion of learners who have come to accept that the field is one for the 'elite' and, by implication, that they are not capable. As such, it becomes important for those who have power within the field to recognise the structuring practices that exclude participation. By opening up and challenging the taken-for-granted orthodoxies of the field, a more equitable field may be created, with greater success for those traditionally excluded by the field.

What are the implications of this work for teachers and teacher education?

The advantage of using a Bourdieuan approach is that it does not engender a victim-blaming approach of either teachers or learners. Rather, the work enables an understanding of the field and how its practices have come to be rendered invisible in terms of access and exclusion. By focusing on practice, greater chance exists for changing practice. My own work has enabled me to work with many educators, and I see the biggest challenges in two areas. For many primary school teachers, their background in mathematics is weak so there is a tendency to defer to the field and a lack of confidence to challenge the dominant orthodoxies. Using Bourdieu's work enables many to see how their exclusion from the field positions them as 'others' and, as such, they are able to see the ways in which their exclusion works. In contrast, secondary school teachers have had considerable buy-in into the field and have rendered the practices of exclusion as invisible, but on the basis of their strong capital within the field—after all, they were successful in their study of mathematics. Often, they see others as less successful due to some innate feature or characteristic. This is evident in the practice of ability grouping, which is rampant in mathematics but not in other curriculum areas. Using Bourdieu's approach enables teachers to see the structured failing of their students as being due to the practices of the field rather than some innate characteristic of the student.

Glossary

Subitise To immediately recognise collections of objects by 'how many' are in the collection but without counting each item

Habitus The embodiment of culture that provides a lens for seeing and creating the world

Capital The accumulation of forms of objectified and/or subjective relations that become forms that can be exchanged for other gains. For example, capital may come in the form of culture—such as language—that can be exchanged for other goods (such as test scores, rewards, accolades) within a field. The field will shape the particular forms of capital that are valued within that field. The language valued in schools is different from the language valued in hip-hop music, but within the two fields the language operates as a form of capital shaped by that field

Doxa A feel for how particular 'games' are played out in particular contexts. In this chapter, having 'doxa' in schools enables learners to understand the practice of teaching situations so as to be able to participate effectively within that practice.

Field The arena in which an object of study can be undertaken. This would include arenas such as education, work, medicine, sport or art.

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