Chapter 2
Of Archaeology and Genealogy: Choosing Sites and Tools

Archaeology

Research that aims to understand humans as subjects calls for methods that do not seek to discover the truth, but to apprehend a process. Within theories that see people not as socialised into a self-evidently real world but as engaged in continuous discursive processes of subjectivity, investigative techniques are required that will allow us to catch subjects in discursive acts of subjectification. Foucault established an approach he termed *archaeology*, which he developed to better understand the slippery stuff of subjects in process, located and made visible in discourses. His method is a way of examining and understanding complex social phenomena through careful attention to their production. In his work *The Archaeology of Knowledge*, Foucault (1972) outlined four principles of archaeological method which I have abbreviated here. To steer researchers away from traditional methods that seek causes and effects, "hard facts" and universal truths, Foucault based his principles on what was to be avoided, offering an alternative framework for conceiving the focus and purpose of social research.

> 1: Archaeology tries to define not the thoughts, representations, images, themes, preoccupations that are concealed or revealed in discourses; but those discourses themselves, those discourses as practices obeying certain rules …
>
> 2: Archaeology does not seek to rediscover the continuous, insensible transition that relates discourse, on a gentle slope, to what precedes them, surrounds them or follows them … on the contrary its problem is to define discourses in their specificity; to show what set of rules that they put into operation is irreducible to any other …
>
> 3: Archaeology … does not wish to rediscover the enigmatic point the individual and the social are inverted into one another. It is neither a psychology, nor a sociology, nor more generally an anthropology of creation … it defines types of rules for discursive practices …
>
> 4: … archaeology does not try to restore what has been thought, wished, aimed at, experienced, desired by men in the very moment at which they expressed it in discourse … it is the systematic description of a discourse-object. (pp. 155–156)

His archaeological approach stresses that the site of investigation is discourse itself, particularly its productive and regulatory powers which Walshaw (2007) described:

F. Walls, *Mathematical Subjects*: *Children Talk About Their Mathematical Lives*,
DOI 10.1007/978-1-4419-0597-0_2,

> Archaeology takes discourses as its object of study, investigating the way discourses are ordered … offers a means of analyzing 'truth games' by looking at history and uncovering the rules of construction of social facts and discourses …' (p. 9)

In an archaeological approach to understanding mathematical subjects it is the discourse that produces those subjects-which must be of prime interest; subjects are not seen as psychological, sociological or anthropological, but as discursive. Wherever discourse emerges and subjects with it, a site of archaeological investigation can be found. Cotton (2004), for example, uses this kind of archaeological approach in his examination of assessment in mathematics education.

In recognising discourse not only as the words that we say or write that bring the objects of which we speak into being for us, but also the systematic practices and rules that govern them and that generate and permit our ways of speaking and doing (Foucault 1972), an archaeological investigation of mathematical subjects must include schools, classrooms, popular culture and homes as *discursive sites of emergence*, exercise books, textbooks, school reports and other artefacts of schooling as *discursive objects*, and the acts and utterances of *discursive subjects* such as children, principals, teachers and parents as *acts of discursive production*. Foucault's notion of *archive* in such an archaeological investigation is nicely explained by Bate (2007):

> The archive in Foucault's work … involves the whole system of apparatus that enables artifacts to exist … In this model the "archive" is already a construct, a *corpus* that is the product of a discourse. One must dig to make sense of the systems behind what one sees. (p. 3)

The archaeologist must look beyond the surface of things – a mathematics worksheet for example – to the discursive systems and their rules that have brought such an artefact into being and the subjects, subjectivities and subjectification that are produced in its use.

In my archaeological approach I have taken education, schooling and the discipline of mathematics itself to be the primary intersecting discursive formations in which children as mathematical subjects are constituted. Rather than attempt within the limited scope of this book, a comprehensive investigation of the archive, I have taken samples of archival material from a range of sources as evidence of the systems of management and techniques of power that typify discursive modes of production of mathematical subjects, their subjectivity and subjectification. These include statements of vision and intent from education policy documents, mathematics curricula, school brochures, textbooks and guides for teachers of mathematics.

Genealogy

Archaeology and genealogy are closely linked as supporting methodologies in Foucault's approach to understanding our lives. Through genealogy Foucault was able to connect discourse with its everyday enactments, which was particularly useful in examining how subjects are made as both discursive and "real" at the same time; genealogy explains how subjectivities become realised as subjects play out the discourses that delimit and circumscribe what is possible – who they might "become." Foucault (1994c) described genealogy:

> Genealogy is gray, meticulous and patiently documentary … it must record the singularity of events outside any monotonous finality; it must seek them in the most unpromising places, in what we tend to feel is without history – in sentiments, love, conscience, instincts; it must be sensitive to their recurrence, not in order to trace the gradual curve of their evolution but to isolate the different scenes … genealogy requires patience and a knowledge of details, and it depends on a vast accumulation of source material. (pp. 369–370)

Genealogy focuses on the "doings of everyday doings" [Foucault (1983) cited in Winecki (2007)] providing links between the archaeology of a discursive formation and its practice. Kendall and Wickham (1999) listed the following characteristics of Foucault's genealogical approach:

> Genealogy … describes statements but with an emphasis on power; introduces power through a 'history of the present', concerned with 'disreputable origins and unpalatable functions' … describes statements as an ongoing process, rather than as a snapshot of the web of discourse; concentrates on the strategic use of archaeology to answer problems about the present. (p. 34)

Walshaw (2007) viewed genealogical method in educational research as important for its power to reveal obscured discursive meanings and ulterior purposes of taken-for-granted practices of the classroom as they are experienced by the subjects they create:

> Genealogical analyses that explore the interaction of power and knowledge within the practices and social structures of education are able to highlight the profound influence of discourse on shaping everyday life in education. (p. 14)

An investigation of mathematical subjects engaging both archaeology and genealogy methodology must therefore include an examination of the rules of production of the discourse of mathematics education itself and its manifestation in everyday situations as technologies of power. The use of mathematics exercise books as a practice designed to consolidate learning for example sits within a wider discourse that enables and validates its existence and in which power is inevitably at play.

Foucault (1994b) was careful to observe that power is not necessarily negative. He recognised the many uses of power in schooling, but distinguished certain kinds of authority in education he called *domination*, as something to be rigorously challenged:

> Let us take … something that has often been rightly criticised – the pedagogical institution. I see nothing wrong in the practice of the person who, knowing more than others in a specific game of truth, tells those others what to do, teaches them, and transmits knowledge and techniques to them. The problem in such practices where power – which is not in itself a bad thing – must inevitably come into play is knowing how to avoid the kind of domination effects where a kid is subjected to the arbitrary and unnecessary authority of a teacher … philosophy is that which calls into question domination at every level and in every form in which it exists … (pp. 298–299)

Foucault regarded the purpose of philosophy to be its political acts of questioning, particularly of power in the form of domination emanating from what he termed "arbitrary and unnecessary authority." Archaeology and genealogy are techniques of enquiry that invite the researcher to take a forensic approach to examining power in all its forms and manifestations at both micro and macro levels. This approach is particularly suited to investigations over time that span a multiplicity of classroom, family, community, institutional, governmental and international educational settings.

Children Talk About Their Mathematics Lives: Framing the Research

Mathematics is universally regarded as a core subject of the school curriculum and accepted without question as something that children must learn and teachers must teach. So great is the belief in the benefits of teaching children mathematics from a very young age that governments devote a significant proportion of public funding to building teachers' capacities to deliver improved outcomes in mathematics. Over recent decades, approaches to mathematics education in New Zealand have echoed those of other English-speaking countries. The outcomes-based Years 1–13 mathematics syllabus introduced in 1992 for example represented a shift in teaching and learning mathematics reflecting international trends in its emphasis on processes of working mathematically, such as problem solving, logic and reasoning and communicating mathematical ideas. Appealing to the discourses of inquiry learning and learner-centred pedagogy, the syllabus aimed to improve the quality of children's engagement in mathematical learning and increase their understanding of the underlying principles of mathematics.

When the results of the New Zealand TIMSS[1] research were released in 1997, one of the reported findings was particularly striking:

> While a majority of students have positive attitudes to learning mathematics … beginning from a fairly young age, there is an increasing proportion of students having lost interest in the subject, with a concomitant decline in their achievement. This effect is considerably greater for girls than for boys. (p. 252)

The gendered correlation between enjoyment, confidence and achievement in mathematics suggested fertile lines of investigation since changes in curriculum had failed to reduce traditionally recognised disparities. The first part of this book – Phase 1 of the study – is based on a project that began in 1998 and finished in 2000. It was focused particularly on issues of disaffection, alienation and marginalisation in primary school children's learning of mathematics highlighted by the TIMSS results. This formed Phase 1.

[1]Third International Mathematics and Science Study.

After this phase of the study had been completed, links between confidence, enjoyment and achievement, and disparities by sex continued to be reported. The results of New Zealand children's performances in TIMSS[2] 2002/2003 for example stated:

> Proportionally more boys than girls in New Zealand expressed a high level of self-confidence in both mathematics and science. The relationship between confidence and achievement observed for all students was also evident within each gender group. (Caygill et al. 2007, p. 77)

Australia's report on the 2002/2003 TIMSS results (Thompson and Fleming 2004), contained similar findings.

> Students' self-confidence in mathematics had a clear positive relationship with mathematics achievement. Males had higher self-confidence in learning mathematics than females … At both year Levels [4 and 8] males enjoy learning mathematics more than females. (p. 9)

The same report also showed a significant overall decline from Year 4 to Year 8 in children's enjoyment and confidence with mathematics, a trend echoed elsewhere. The PISA[3] results that tested the mathematical literacy of 15-year olds revealed a similar gendered trend in disaffection. While there were no significant differences on the mean scores for *mathematical literacy* in the PISA 2003 results (Thompson et al. 2004) gender differences were revealed.

> Although Australia's results in PISA on average were very encouraging, when results for specific sections of the population are examined, areas of concern are revealed … While there are no significant gender differences overall in mathematical literacy, boys tended to be over-represented in the upper levels of achievement while girls appeared to be less engaged, more anxious and less confident in mathematics than boys. (p. xvi)

The gaps had reportedly widened in the 2006 study.

> Males significantly outscored females in mathematical literacy in Australia in 2006. Almost twice as many Australian males as females achieved the highest PISA proficiency level … Australian males significantly outscored females in mathematical literacy in PISA 2006, by 14 score points. More males achieved the highest proficiency levels in mathematical literacy, with 20% achieving at least Level 5 compared to 13% of females. (Thompson and De Bartoli 2008, p. 11)

Gendered differences in achievement were also reported in the New Zealand PISA 2006 results.

> On average, boys had higher mathematical literacy than girls, with a difference between their means of 11 scale score points. This pattern of a gender difference in favour of boys was also found in 2003 and was observable for many OECD countries. Across OECD countries the average gender difference in favour of boys was 11 score points. (Caygill et al. 2008, p. 16)

These studies also found that indigenous children, children from lower income families and children of parents with limited education and qualifications were consistently less likely to perform well in assessments of mathematical achievement.

---

[2]Trends in Mathematics and Science Study.

[3]OECD's Programme for International Student Assessment.

Persistent global disparities by sex, ethnicity and socio-economic background in mathematical achievement, in the choice of mathematics as an upper secondary school subject, in the choice of mathematics in tertiary study or of occupations requiring advanced mathematics, were inadequately understood, it seemed, since interventions had done little to reduce the equity gaps (see Mendick 2006). Explanations for children's achievement in mathematics were unable to unravel the social, cultural, historical and political embeddedness of attitude/achievement connections revealed in the quantitative data of studies such as TIMSS and PISA.

Cotton and Hardy (2004) argued for research that could provide more than the flat accounts of the classroom free of power and affection that had failed to account for the enduring failure of groups of learners (p. 85) and suggested problematising the discourses in which such failure is produced. Longitudinal studies capturing the discursive processes of inclusion/exclusion for particular children in learning mathematics from an early age were scarce. Inspired by these issues and challenges I decided to extend my earlier research to include the children's learning of mathematics as they moved through secondary school.

Archaeology, Genealogy and Biography: Researching the Storied Subject

> *Every self is a storied self. And every story is mingled with the stories of other selves, so that each one of us is entangled in the stories we tell about ourselves and that are told about us. The understanding of subjectivity cannot be separated from the way selves are narrated, so that we can conceptualise the* '*who*' *as narrated identity.*
>
> Venn (2002, p. 52)

> *Biography is the proper source of unity in human existence.*
>
> Weigert (1981, p. 62)

This research sought to document children's unfolding mathematics lives as narrated by the children themselves and by others around them. Venn and Weigert (aforementioned) recognised self-storying as a critical dimension in the production of the *self* and *other* suggesting that it is through sharing stories about ourselves we produce ourselves as beings we call "human." As humans we are engaged in a continuous quest to explain ourselves, and story-telling as a method of both defining and explaining human experiences and existence can be found in all human cultures. Personal stories are captivating for the ways in which they situate us within social and historical contexts, connect us, speak *about* us, and speak *to* us in ways that other forms of research such as large-scale quantitative studies cannot. As we learn about the lives of others we reflect on their experiences with reference to our own, expanding our awareness of self in community. Through such contemplation we recognise common challenges and contingencies at play in our lives. In (auto)biography – telling stories of our lives – as we bring ourselves into being for our selves *and* for others we exist more compellingly for each other as intersubjective subjects-in-making.

In combination, biography, archaeology and genealogy present the researcher with a formidable collection of tools with which the "power and affection" mentioned by Cotton and Hardy (2004) can be explored. Biography provides human plot lines by which the archaeology/genealogy of the discursive formation we recognise as mathematics education can be investigated for its personal, local and historical manifestations, its distinguishing artefacts, actions and utterances, and its power to delimit or allow particular subjects to exist. Centred on biographical case stories, this became the methodological approach I adopted for its power to provide insights into learner subjectivity, recognising children as active beings in learning mathematics, and the discursive domains in which they emerge as subjects, including the discourses of policy and pedagogy that surround the doing of everyday doings in classrooms.

Case-based ethnographical method in gathering such stories is supported by researchers such as Verma and Mallick (1999) who claimed that, "the greatest advantage of this method is that it endeavours to understand the individual in relation to his or her environment" (p. 82). They added that:

> … one of the strengths of the case study is that it allows the researcher to focus on a specific instance or situation and to explore the various interactive processes at work within that situation … its prime value lies in the richness of the data that are accumulated and that can only be acquired as a result of long and painstaking observation and recording followed by subsequent analysis. (p. 114)

An example of such research is Loughran and Northfield's (1996) ethnographic case study of life for students in one Year 7 classroom. They instanced two students who spontaneously introduced themselves as mathematical subjects.

> Kathy: I'm Kathy and I'm no good at maths.
>
> Rhonda: My name is Rhonda and I can't do maths … I'm not much better at other subjects. (p. 64)

This illustrates how mathematics as a subject is implicated in subjectivity, apparent even in studies where learning of mathematics was not the subject of investigation.

Case-based studies focused specifically on learner perspectives in mathematics (e.g. Walshaw 2001; Boaler 2002; Mendick 2006) have made valuable contributions to our understanding of pupil experience in mathematics education particularly in describing gendered learners and the effects on learners of contrasting pedagogical approaches. These studies were located in a time-specific period in students' lives and investigated a particular aspect of learning of mathematics such as issues of gender or pedagogical effects. Walkerdine's (1998) research focussed on children's mathematical learning in early childhood settings, with a small group tracked into their fourth year of secondary schooling. Her ethnographic study included interviews with parents and investigated the processes by which girls and boys became gendered subjects in mathematical discourse.

This research was designed to generate greater richness of biographical and archaeological/genealogical data than previous studies had been able to provide.

Through a method of biographical ethnography, I aimed to produce multi-dimensional accounts of the complex processes of mathematical subjectification for specific children over the greater part of their schooling and into their post-secondary years. In closely documenting a small sample of children as mathematical subjects in unfolding narrative, located in their sites of production such as classroom and home and positioned and contextualised in everyday discursive settings, I expected to better understand how failing/succeeding children are made in the learning of mathematics. Rather than a truth I was trying to reach, it was a lived *process* I was seeking to discern through an investigation of both the material and discursive worlds that produce the mathematical subject. This view of realities as situated and as constructed in the doing suggested the kind of research focus Walshaw advocated (2007).

> Once you accept that reality is constantly mobile, then our interest in research moves from establishing truth onto an understanding of how meaning is produced and created and in how these productions factor into larger decisions concerning power and privilege. (p. 151)

Biographical ethnography requires that the researcher enter the worlds of the participants in a relationship that allows for the data (the storied self) to emerge in situated acts of narration since it is in the telling that the storied subject can be "seen." To this end I set about generating a sample of primary school children who were prepared to talk about their experiences of learning mathematics over several years and whose families and teachers were also willing to contribute to these emerging stories. Through random selection of schools from a list of all schools within a large urban area in New Zealand, I established a group of 10 schools whose principals and one Year 3 teacher were willing to participate. From there I randomly selected one Year 3 child from each of these 10 schools. The selection was made from lists supplied by the Year 3 teachers who were to become participants in the study, of all the Year 3 children in their classes who had recently reached 7 years of age. The parents of the selected children were then approached through the schools and without exception, the parents and their children agreed to take part. The sample group formed by this method included 4 girls and 6 boys (see Table 2.1).

Substitute names were adopted for the children and have been used throughout the study. Pseudonyms for schools and teachers were also used, based around a theme of geographical landforms which bore no relation to the schools' actual locations.

The children's schools were located in a range of geographical areas and social communities within the region. As Table 2.1 shows, they varied markedly by type, size and decile (socioeconomic status) rating.

The children were all speakers of English as their first language. Their families included New Zealand Māori (indigenous) parentage (1 child), first generation Asian immigrant parentage (1 child), and first generation Northern European immigrant parentage (two children). Family relationships and circumstances altered over the period of the study, with parental separations (2 families), changes of primary school (5 children), changes of secondary school (5 children), shifts from living with one parent to another (1 child), and relocations from one house to another (all of the children).

Table 2.1 The children's schools by name, type, composition (mixed- or single-sex), size and decile rating

	Year 3	Year 4	Year 5	Secondary Years 9–13
Fleur	*Hill* – State primary, mixed, medium, 6	*Hill*	*Pukeiti* State primary, mixed, medium, 8	*Upland* (Yrs 9–12) – Private secondary, single-sex, large, 8 *Kull* (Yr 13) - State secondary, mixed
Georgina	*Island* – Catholic primary, mixed, medium, 6	*Motu* – State primary, mixed, small, 10	*Motu*	*St Skerry* (Yrs 9–12) – Catholic secondary, single-sex, medium, 10
Jessica	*Lake* – State primary, mixed, small, 8	*Roto* – Private primary and secondary, single-sex, large, 10	*Roto*	*Roto* (Yrs 9–13)
Rochelle	*Bridge* – State primary, mixed, large, 8	*Bridge*	*Bridge*	*Crossover*(Yr 9) – Catholic secondary, single-sex, medium to large, 7 *Arches* (Yrs 10–11) Private secondary, single-sex, small, 9 *Arawhata* (Yr 12) State secondary, mixed, large, 4
Dominic	*River* – State primary mixed, medium, 7	*River*	*River*	*Braeburn* (Yr 9) International, mixed, medium (Yrs 10–13); *Beckham*, mixed, large
Jared	*Spring* – State primary, mixed, medium, 5	*Spring*	*Spring*	*Holy Fount* (Yrs 9–12) Catholic secondary, single-sex, large, 9
Liam	*Mountain* – Catholic primary, medium, 5	*Mountain*	*Mountain*	*Summit* (Yrs 9–10) Catholic secondary, single-sex, medium, 5 *Taranui* (Yrs 11–13) State secondary, mixed, large, 4
Mitchell	*Cliff* – State primary, mixed, small, 1	*Pari* – State primary, mixed, medium, 4	*Pari*	*Edgecombe* (Yrs 9–13) State secondary, mixed, large, 8

(continued)

Table 2.1 (continued)

	Year 3	Year 4	Year 5	Secondary Years 9–13
Peter	*Beach* – State primary, mixed, large, 10	*Beach*	*Beach*	*Dockside* (Yrs 9–13) State secondary, single-sex, large, 10
Toby	*Bay* – State primary, mixed, medium, 8	*Bay*	*Harbour* International primary, mixed, large	*Harbour* (Yr 9) International secondary, mixed, large *Portsea* (Yrs 10–13) State secondary, single-sex, large, 10

Size: School size as determined by number of students: large (> 500), medium (250–500), small (<250)

Decile rating: In New Zealand, schools are rated according to socioeconomic status of a sample of students. A school's decile rating indicates the extent to which the school draws its students from low socio-economic communities. Decile 1 schools are the 10% of schools with the highest proportion of students from low socio-economic communities, whereas decile 10 schools are the 10% of schools with the lowest proportion of these students (http://www.minedu.govt.nz/index.cfm?layout = document&documentid = 7697&data = l)

Learning mathematics is most commonly associated with schools and classrooms, but it is also experienced at home and in other settings including after-school tutoring programmes. All of these locations were viewed as sites Foucault termed *surfaces of emergence* (Foucault 2002), that is, places where subjects are made in discourse. These sites were included in the study where possible. A schedule was devised to firstly meet and get to know the children and their families, and then to maintain regular but low-intrusive contact over the initial three years of the study.

Structured interviews with teachers took place at the beginning of each year of the study, yielding important information about the specific research children, as well as insights into the mathematical pedagogies of their classrooms. On subsequent visits, the teachers reported on the children's engagement with mathematics and their participation in school life in general. These conversations played a critical role in the construction of composite pictures of classrooms as discursive sites of productivity in the children's mathematics lives. Teachers were also able to provide updates on the children's progress, their placement for instruction, and records of the children's assessment in mathematics.

The support of school principals was critical to the study. Principals facilitated access and provided essential information about school-wide mathematics programmes, professional development for teachers, and data about the school composition, climate and overall mathematics achievement of the children. Where the children moved class or school, it was necessary to negotiate participation with principals and teachers who were new to the study. In every case this was accomplished without difficulty.

Detailed interviews with children and parents were held at the beginning of the first year of the study, and informal conversations conducted three times a year for the following three years to track the children's ongoing experiences with mathematics. Most discussions with parents took place in the children's homes. In meeting their families, I was better able to appreciate what it was that the children brought to their mathematical learning at school and how the parents – and occasionally other siblings or grandparents – viewed and supported the child's mathematical learning. These visits often included chatting over a cup of coffee, sharing meals or even staying overnight in one case where I had to travel a great distance to visit the child when the family moved city. As a genealogical approach, this closeness of contact helped me to appreciate the children's lives beyond school, and allowed me to keep abreast of change over time.

Interviews with the children took place within school settings, but in suitable spaces removed from the classrooms. These often turned out to be school staff rooms, libraries, medical rooms, unoccupied storage or small group teaching areas adjacent to the classroom, or even outside in the playground. It was important that the children felt sufficiently comfortable that they were able to talk freely about their lives and the place of mathematics within them, so our conversations were based around a flexible set of questions that acted as a rough guide rather than a fixed structure and often took unexpected turns in the flow of our talk. I tried various supplementary approaches to assist the children in expressing themselves as mathematical subjects. At the beginning of Years 3 and 4 the children were asked to draw themselves doing mathematics and to talk about their drawings. These drawings appear in Chap. 3. A simple survey sheet entitled "*How I Feel about Maths*"[4] (see Appendix) also proved to be a useful discussion tool, particularly the scale for children's self-ratings in response to questions about how they felt about mathematics and how good they thought they were at the subject. These methods provided a broad overview of the children's subjectivities as mathematical learners based on their self-reported confidence, their feelings about doing mathematics, and the connections between the two.

Information about the children's mathematical learning was also gathered through classroom observations. During mathematics teaching and learning sessions I sat among the children taking field notes of my observations of the lessons. I also made short video recordings of some classroom sessions, aiming for one per year from each classroom. These were useful starting points for my conversations with the teachers and children, because I could ask about the classroom practices I had observed. Additional evidence of the way children engaged in mathematical learning was gained from children's mathematics exercise books, worksheets, test papers and work displayed in the classroom, supporting and enhancing the children's accounts of their mathematics lives.

The children's classmates were keen to fill me in on how things worked in their classrooms. Their talk often centred around how much they personally liked or disliked mathematics and why, who else did or did not like it, who was good at mathematics in their class, and how they *knew* all this. Their unsolicited views were compelling indicators of mathematics classrooms as socialised, culturally defined and culturally defining political spaces productive of children as mathematical subjects.

At the time of renewed contact in Phase 2 (See Table 2.2), the children were nearing their 16th birthdays and those who had remained in New Zealand were approaching the end of Year 11, an important juncture in their schooling because they were soon to face their first external standardised national mathematics examinations for the NCEA.[5]

Table 2.2 The scope of the research by children's Year levels at school

Phase 1				Phase 2		
Year 3	Year 4	Year 5	Years 6–10	Year 11	Year 12	Year 13
Conversations with children parents, teachers and principals Classroom observations			No contact. Children and parents provided retrospective descriptions of these years	Conversations with children and parents Viewing of school reports, mathematics exercise and text books and test results, where offered		

[4]From Beesey and Davie (1991). *Level 2b, Children's Recording Book*, p. 3.

[5]NCEA – National Certificate of Educational Achievement. Children are able to accumulate points towards their certificate in a range of subjects. Some points are gained through internal school-based assessment and others through external examinations.

I visited the children and their families early in Year 12 after the examination results had been received, contacted them again late in Year 12, visited all except Fleur who was on a student exchange programme in Europe in mid Year 13, and made final contact late in Year 13 or after those who remained at school had received the results of their final national examinations. By this time all of the children had confirmed their occupational plans for life after school.

As their stories will reveal in the following chapters, it was within the situated discourse of social sites of production such as school, home and peer group interaction that the children were made as mathematical subjects. Within their experiences as both learners of mathematics and members of social networks, and in their recounting of them, the children as mathematical subjects were made visible. Their stories are representative of children's learning of mathematics in classrooms all over the world and remind us as parents, teachers and policy makers that learning mathematics is not a singular pathway of individual cognitive development, but a socially significant, complex, fraught process in which children are subjected and subjectified with profound implications for their life chances and choices. Subjectification of the kind that involves the "arbitrary and unnecessary authority" of which Foucault spoke, supported within regimes of truth and knowledge that justify its "domination effects," emerged as recurring and enduring themes in the children's speaking about their mathematics lives.

The stories are presented as interwoven biographical accounts, organised around unifying themes that emerged in their telling, supported by the self-storying of teachers and parents, and supplemented by my observations from the classroom. The "gray and meticulous detail" of years of data gathering is reflected in copious excerpts from interviews and observations. Interspersed with archival material that helps to peel back the everyday and familiar to reveal the discursive underlay of mathematical "doing of doings" the data speak compellingly of mathematical children in the making, illuminating commonplace practice in children's learning of mathematics, and revealing the processes by which confidence and competence, success and failure are structured in discourse.

Springer

http://www.springer.com/978-1-4419-0596-3

Mathematical Subjects
Children Talk About Their Mathematics Lives
Walls, F.
2009, XVI, 286 p., Hardcover
ISBN: 978-1-4419-0596-3