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**Foregrounding the voices of students**

*extending the Listening Guide in a feminist poetic inquiry into identity work in the context of low attainment in mathematics*

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Foregrounding the voices of students: Extending the  
Listening Guide in a feminist poetic inquiry into identity  
work in the context of low attainment in mathematics

A dissertation submitted to the University of Bristol in accordance with the  
requirements for award of the degree of Doctor of Philosophy in the Faculty of  
Social Science and Law

Rachel Helme  
School of Education  
University of Bristol  
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## Abstract

This thesis focuses on empirical findings as well as innovating with methods, with a thread of my development as a feminist researcher. The aim of the study is to examine the identity work of students labelled as low attaining in mathematics, leaning in to listen carefully to the stories they tell about their experiences of learning mathematics. I explore the concept of mathematical identity work, as well as the marginalisation of the voices of students labelled as low attaining. By engaging with literature, I develop a model of the web of meanings that support discourses in the context of low attainment in mathematics, including narrations about what counts as success and failure in mathematics; narrations about students labelled as low attaining; and narrations about others.

Giving attention to methods, through the journey of data collection and analysis, I develop two innovations to the Listening Guide method of analysis. Firstly, I introduce a poetic structure called a “they poem” to give attention to the stories told, about a student, by a significant other, such as a teacher. Extending the method of analysis enables me to re-examine identity work in a way that gives attention to context. Secondly, in response to issues with inconsistency, I develop a rubric, which supports the creation of pronoun poems within the Listening Guide method.

Utilising the extended method, I examine the stories of five students, and their teacher, demonstrating the complex picture of identity work in the context of low attainment in mathematics. Although there are echoes of dominant discourses in the stories told by students, there is also evidence of a counter-narrative, evidence of students re-narrating the dominant discourses. Students did not necessarily talk passively about themselves and their mathematics, with evidence of disassembling and reassembling within their stories told within identity work.

## Acknowledgements

To students and their teacher, who I had the privilege of working alongside in this study, thank you for letting me listen to your stories. I am particularly grateful for allowing me, at the same time as you were negotiating the covid-19 pandemic, to learn from your experiences.

To Alf and Laurinda, thank you for believing in me, even when I did not believe in myself. I am particularly grateful for your constant care as we all had to adapt to working from home. You have encouraged and supported me to develop as a researcher, allowing me to find my own voice. You have given me the confidence to experiment and share my new ideas with the wider research community. I look forward to having the opportunity to work with you again.

To Fiona, Michael and Aehee, thank you for being my constant companions as together we went through the journey of our doctoral studies.

To my family, I am grateful for your patience. To Marc, thank you for allowing me to follow my dream even though I did not know where it might lead. To Joshua and Rebecca, thank you for your constant encouragement and not saying your mum was too old.

## Covid-19 statement

Phase 1 of the study happened pre-pandemic, therefore, this statement relates to the disruptions to phase 2. This statement is an overview of the impact; I have incorporated more detailed discussions around the interruption, and subsequent adaption, to the research within the thesis.

I had planned to use a feminist influenced ethnographic methodology. I intended to work alongside students, and their teacher, from September 2020 to February 2021, at the same college that hosted me for phase 1. As researcher, I would take a dual role of researcher and teaching assistant in a mathematics classroom to hear, and hence centre stage, the students' own stories about learning and teaching mathematics. The data collection methods that were planned included 1-1 interviews; informal conversations in the classroom; photographs of student work; and other lesson artefacts. I intended to act as a conduit, sharing the students' stories with the teacher. In September 2020, although face-to-face classes had resumed at colleges, they were cautious about allowing external visitors. In addition, the University of Bristol research guidance initially restricted face-to-face research, although the guidance was tentatively amended in October 2020, for exceptional circumstances, which did not apply for this project.

After a period of reflection, I revisited the data collection methods, planning how the participants' stories could still be heard using online methods. Although the start of the project was delayed, I had the opportunity to co-plan with the teacher participant. Beginning in December 2020, the plan was formed that I would attend, online, the assessment review meetings between the teacher and the students. However, in the changing world of the covid-19 pandemic, the plan had to be curtailed. I was able to renegotiate, with the teacher, to interview the students using their college email. At the time of recruitment, the college was using mixed participation; some students were in classes, and others were working from home. The impact was that only two students agreed to take part in the study, less than the original plan of, approximately, four to six. One student subsequently left the college, leaving one student participant and her teacher.

Interestingly, with the benefit of hindsight, the enforced interpretation, and subsequent adaption, was more of an opportunity than a hindrance. I had to learn to listen carefully, putting aside my own notion of what a research project would be. I believe that the study may be all the better for it.

## Author's declaration

I declare that the work in this dissertation was carried out in accordance with the requirements of the University's *Regulations and Code of Practice for Research Degree Programmes* and that it has not been submitted for any other academic award. Except where indicated by specific reference in the text, the work is the candidate's own work. Work done in collaboration with, or with the assistance of, others, is indicated as such. Any views expressed in the dissertation are those of the author.

Signed: 

Date: 22/10/22

## Contents

<b>Lists of figures, researcher notes, tables and images</b> .....	12
<b>Notes on how to read this thesis</b> .....	14
<b>Abbreviations</b> .....	16
<b>1. An introduction to the study</b> .....	17
1.1. Introduction .....	17
1.2. Sharing my story .....	17
1.3. Turning to literature - the rationale for the study .....	19
1.4. The aim of the study .....	21
1.5. The structure of the thesis .....	21
1.6. Summary .....	23
<b>2. Identity work</b> .....	24
2.1. Introduction .....	24
2.2. Analysing using the concept of identity .....	24
2.3. Identity in mathematics education .....	25
2.4. Choosing stories-as-identity-work .....	27
2.4.1. Two ambiguities around significant narrators .....	30
2.5. The operationalisation of mathematical identity work .....	32
2.5.1. An example of stories-as-identity-work used in one study .....	33
2.6. Final framework of mathematical identity work .....	35
2.7. Summary .....	36
<b>3. The low attainment label</b> .....	38
3.1. Introduction .....	38
3.1.1. A note about terminology .....	38
3.2. Viewing learners within education systems .....	38
3.2.1. Diagnostic and socially constructed models .....	41
3.3. Deficient discourses - significant cultural narrations .....	43
3.3.1. Narrations about what counts as mathematics .....	44
3.3.2. Narrations about marginalised students .....	45
3.3.3. Narrations about others .....	47
3.3.4. Final model of discourses of low attainment in mathematics .....	49
3.4. Some alternative stories .....	51
3.5. Summary .....	53
<b>4. Methodological issues in research on the voices of students</b> .....	54
4.1. Introduction .....	54
4.2. Researching the voices of students .....	54

4.3.	Identity work and students' voices .....	57
4.3.1.	Mathematical identity work .....	58
4.3.2.	Mathematical identity work and low attainment .....	60
4.4.	A note about ethics .....	61
4.5.	Summary .....	62
<b>5.</b>	<b>The methodology for this study .....</b>	<b>63</b>
5.1.	Introduction .....	63
5.2.	Becoming a feminist researcher .....	63
5.2.1.	A feminist perspective on ethics of care .....	64
5.3.	Poetic inquiry .....	67
5.3.1.	Poetic structures within mathematic education research .....	69
5.3.2.	Grouping poems within poetic inquiry .....	69
5.4.	Summary .....	70
<b>6.</b>	<b>Discussing the methods used in phase 1 of the study .....</b>	<b>72</b>
6.1.	Introduction .....	72
6.1.1.	A note about chapter 6 .....	72
6.2.	Choosing research questions .....	73
6.3.	Recruitment .....	74
6.4.	Data collection .....	76
6.4.1.	Observations .....	77
6.4.2.	Interviews .....	78
6.4.3.	Using objects to elicit stories .....	81
6.4.4.	A teacher-researcher partnership .....	82
6.5.	Data analysis .....	83
6.5.1.	The Listening Guide .....	84
6.5.2.	Extending the Listening Guide – introducing a they poems .....	87
6.6.	Ethics .....	88
6.6.1.	Access .....	88
6.6.2.	Power relations and informed consent .....	89
6.6.3.	Anonymity and confidentiality .....	89
6.6.4.	Safety and well being .....	90
6.7.	Summary .....	90
<b>7.</b>	<b>Analysing data and reflections from phase 1 of the study .....</b>	<b>92</b>
7.1.	Introduction .....	92
7.2.	Research questions in phase 1 .....	92
7.3.	Observations as objects to elicit stories .....	93



7.4.	Analysing narrative data .....	94
7.4.1.	Ava .....	95
7.4.2.	Betty.....	98
7.4.3.	Christine .....	100
7.5.	Introducing a they poem .....	102
7.5.1.	Darren .....	103
7.5.2.	Mike’s stories about Darren .....	105
7.5.3.	A new step 5 in the Listening Guide .....	108
7.6.	Final reflections – thinking about phase 2.....	109
	<b>Interlude - 23<sup>rd</sup> of March 2020: The prime minster addresses the nation.</b> .....	<b>111</b>
	Research interrupted .....	111
	A time for self-reflection – an entry from my research diary .....	112
	A shifting emotional journey – a poem .....	113
<b>8.</b>	<b>Methods and reflections in Phase 2</b> .....	<b>115</b>
8.1.	Introduction .....	115
8.2.	Adapting in a pandemic .....	115
8.2.1.	Evolving research questions .....	116
8.2.2.	Remote recruitment .....	117
8.2.3.	Rethinking data collection .....	117
8.2.4.	Teacher-researcher online partnership .....	119
8.3.	Online ethics in a pandemic .....	120
8.4.	Reflexive positionality .....	120
8.4.1.	A social identity map.....	121
8.4.2.	My social identity map - the first iteration.....	122
8.4.3.	My social identity map - the second iteration .....	125
8.5.	Developing a rubric to create poetic structures .....	127
8.5.1.	Preparing the data .....	128
8.5.2.	Retention or removal decisions .....	128
8.5.3.	The aligned form .....	135
8.6.	Summary.....	136
<b>9.</b>	<b>The journey of analysing Claire’s stories-as-identity-work in phase 2</b> .....	<b>138</b>
9.1.	Introduction .....	138
9.2.	Setting the scene .....	138
9.3.	Listening Guide step 1 - listening for the plot .....	139
9.4.	Listening Guide step 2 - poetic structures .....	140
9.4.1.	Creating the I poems.....	141

9.4.2.	Analysing the I poems .....	141
9.5.	Listening Guide step 3 - listening for contrapuntal voices .....	144
9.6.	Listening Guide step 4 - composing an analysis .....	148
9.7.	Summary .....	152
<b>10.</b>	<b>Analysing Mike's stories-as-identity-work in phase 2 - a foil to re-examine the stories-as-identity-work told by Claire .....</b>	<b>153</b>
10.1.	Introduction.....	153
10.2.	Setting the scene.....	153
10.3.	Listening Guide step 1 - listening for the plot .....	154
10.4.	Listening Guide step 2 - poetic structures .....	155
10.4.1.	Creating the they poems .....	155
10.4.2.	Analysing the they poems .....	156
10.5.	Listening Guide step 3 - listening for contrapuntal voices.....	158
10.6.	Listening Guide step 4 - composing an analysis .....	162
10.7.	Listening Guide step 5 - re-examining the first person-voice .....	165
10.7.1.	Actual stories-as-identity-work.....	166
10.7.2.	Designated stories-as-identity-work.....	167
10.8.	Final poetic summary .....	169
<b>11.</b>	<b>Echoes of dominant discourses – significant narrations within stories-as-identity-work .....</b>	<b>173</b>
11.1.	Introduction.....	173
11.2.	Dominant discourses as significant narrations.....	173
11.3.	Examining the stories shared in phase 1 .....	175
11.3.1.	Theme 1 - ways of thinking in mathematics.....	175
11.3.2.	Theme 2 - personal actions for success .....	176
11.3.3.	Theme 3 - characteristics and affect when learning mathematics .....	177
11.3.4.	Theme 4 - the impact of significant others .....	178
11.3.5.	An overview of echoes of significant narrations from phase 1 .....	180
11.4.	Examining the stories told in phase 2.....	182
11.4.1.	Theme 1 - new ways of thinking in mathematics.....	182
11.4.2.	Themes 2 and 4 - personal actions for success alongside significant others .....	183
11.4.3.	Theme 3 - patterns of characteristics and affect when learning mathematics .....	184
11.4.4.	A re-narrating of echoes of significant narrations after phase 2 .....	186
11.5.	Summary .....	188
<b>12.</b>	<b>The concluding chapter – contributions to knowledge.....</b>	<b>189</b>
12.1.	Introduction.....	189
12.2.	Contribution to knowledge - identity work in the context of the low attainment label .....	189

12.2.1.	The picture of identity work was complex .....	190
12.2.2.	Students labelled as low attaining were active not passive .....	191
12.2.3.	Patterns of identity work involved disassembling and reassembling .....	191
12.2.4.	There were echoes of dominant discourses in students' stories.....	192
12.2.5.	Implications .....	193
12.3.	Contribution to knowledge - innovating with methods .....	194
12.3.1.	Introducing the poetic structure of a they poem.....	194
12.3.2.	Developing a rubric for consistency .....	195
12.3.3.	Wider dissemination outside of mathematics education .....	196
12.4.	Reflecting on the feminist methodological considerations .....	196
12.5.	Limitations of this study.....	199
12.6.	Future work .....	200
12.7.	A brief reflection and a postscript poem about Claire .....	201
<b>References</b>	.....	<b>202</b>
<b>Appendix A – glossary</b>	.....	<b>217</b>
<b>Appendix B - ethics documentation</b>	.....	<b>221</b>
Phase 1	.....	221
Ethics application	.....	221
Information sheets/consent forms	.....	228
Ethic approval	.....	238
Phase 2	.....	239
Ethics application	.....	239
Information sheets/consent forms	.....	248
Ethic approval	.....	256
<b>Appendix C - the creative rubric for pronoun poems</b>	.....	<b>258</b>
Final rubric	.....	258
General guidance	.....	259
Idiosyncratic guidance	.....	260
Notes from early iterations of the rubric and guidance	.....	261
<b>Appendix D – pronoun poems (I poems and they poems)</b>	.....	<b>262</b>
Phase 1	.....	262
Ava's I poem	.....	262
Betty's I poem	.....	263
Christine's I poem	.....	264
Darren's I poem	.....	266
Mike's they poem about Darren	.....	268

Phase 2 .....	270
Claire's I poems .....	270
Mike's they poems about Claire .....	273
<b>Appendix E - examples of data</b> .....	290
Examples of data from phase 1 .....	290
Interview protocol (students) .....	290
A student's lesson artifacts .....	291
A student's interview transcript .....	292
Primary record observation field notes .....	295
Interview protocol (teacher) .....	298
An extract of the teacher's interview transcript .....	299
Examples of data from phase 2 .....	300
Student's interview tasks .....	300
Examples of Claire's data .....	302
Extracts of the teacher's interview data .....	305
<b>Appendix F – examples of data analysis</b> .....	313
Phase 1 .....	313
Trying to find common themes in the students' data .....	313
An iteration of the stanzas in Darren's I poem .....	315
An iteration of teacher's they poem about Darren .....	317
Phase 2 .....	318
Thoughts on an early iteration of Claire's I poem from cycle 1 .....	318
Examining categories of voice in Claire' data .....	319
Examining categories of voice in Mike's stories about Claire from cycle 2 .....	322

## Lists of figures, researcher notes, tables and images

### List of figures

Figure 2-a: Reconceptualising significant narrators, adapting Sfard and Prusak (2005). .....	31
Figure 3-a: A model of the web of meanings supporting deficient discourses, adapted from Adiredja and Louie (2020). .....	43
Figure 3-b: The revised model of the web of meanings supporting discourses in the context of low attainment in mathematics, adapted from Adiredja and Louie (2020). .....	50
Figure 7-a: The teacher’s demonstrated method copied from the board by Ava. ....	97
Figure 8-a: Phase 2 student data collection cycles. ....	118
Figure 8-b: Phase 2 teacher-researcher partnership cycles. ....	119
Figure 8-c: Blank social identity/positionality map (Jacobson & Mustafa, 2019). ....	122
Figure 8-d: Social identity map iteration 1 (December 2020). ....	124
Figure 8-e: Final social identity map after 2 <sup>nd</sup> iteration (Completed January 2021). ....	126
Figure 8-f: Final social identity map after 2 <sup>nd</sup> iteration (Completed January 2021). ....	126
Figure 11-a [the original can be found in subsection 3.3.4, figure 3-b]: The revised model of the web of meanings supporting discourses in the context of low attainment in mathematics, adapted from Adiredja and Louie (2020). ....	174
Figure 11-b: Stories-as-identity-work from phase 1, with echoes of significant narrations (solid arrow) and narrating by students (dashed arrow). ....	181
Figure 11-c: Revisited stories-as-identity-work from phase 1 and 2, with updated (in red) echoes of significant narrations (solid arrow) and narrating by students (dashed arrow). ....	187

### List of researcher notes

Researcher notes 6-a: Reflections on Ava’s interview, researcher’s diary (21/11/19). ....	79
Researcher notes 8-a: Phase 1 (23/10/19). ....	121
Researcher notes 9-a: Online diary (29/01/21). ....	140
Researcher notes 9-b: Online diary (15/04/21). ....	143

## List of tables

Table 2-a: The defining features of mathematics learner identity (Radovic et al., 2018). .....	33
Table 2-b: The framing of mathematical identity work used in this study. ....	36
Table 5-a: Feminist methodological considerations when examining the identity work of students labelled as low attaining, adapted from Wigginton and Lafrance (2019). ....	66
Table 6-a: Contextual information about the student participants in phase 1. ....	76
Table 7-a: A summary of my observations from the classroom in phase 1. ....	94
Table 9-a: Initial voice themes after step 2 of the Listening Guide method. ....	144
Table 9-b: Final voice themes after step 3 of the Listening Guide method. ....	148
Table 10-a: Voice themes from Mike's they poems after step 2 of the extended Listening Guide. ...	158
Table 10-b: Final voice themes after step 3 of the extended Listening Guide. ....	162

## List of images

Image 3-a: What can be done with a student labelled as low attaining? .....	39
Image 9-a: A stock image similar to Claire's initial image of a maze. ....	139
Image 9-b: A stock image similar to Claire's final image of two paths. ....	140
Image 10-a: An example of a screen shared by Mike from Claire's mock examination. ....	154

## Notes on how to read this thesis

In this section, I provide notes on how to read the thesis.

### The journey through the thesis

This thesis is a journey as well as a destination. Although it is possible to read the chapters in isolation, each chapter builds on the discussion of the one preceding it. My research ideas develop and extend as the thesis progresses; for example, the methods in phase 2, discussed in chapter 8, build on reflections from phase 1, examined within chapters 6 and 7.

In most chapters, I finish the discussion using a summary section, however in chapters 7, 10 and 12, I use a final reflection instead. After chapter 7, there is an interlude, formatted differently to the main thesis, to draw attention to a key time during the covid-19 pandemic.

### Abbreviations, acronyms and glossary

I have used a number of abbreviations and acronyms, which I have listed on page 16. On the first use in a chapter, I have spelt out the acronym in full. In [appendix A](#), page 217, there is a glossary to explain the technical or context specific terms used in the thesis. For the first use of a term in a chapter, I have signposted to the [glossary](#).

### Transcripts and extracts of data

In [appendix E](#), you will find examples of the transcribed and written data from this study. The data is presented as conversations, with my voice in red and the participants' voice in black. It was a deliberate choice to retain my own voice as I am explicitly located in the study. I have retained the words of the participant, in the manner they spoke or wrote, to respect their voices, for example, when a speaker seemed to stutter, used "erm" or a word was mis-spelt. The extracts of data, used in the thesis discussions, are taken directly from the transcripts or written data, retaining the participants' ways of talking or writing.

It is important to draw your attention to the form of the extracts in phase 2 of the study, discussed in chapters 9 and 10. As part of the developing methods, all grammar and capitalisation has been deliberately removed from spoken data, with the exception of elisions, such as "she's" for "she is". Written data, for example from emails, is presented exactly as written. There are a small number of exceptions where I have used a word in square brackets [ ] to provide additional information to make sense of the quotation. I have marked pauses or sighs, where present, using curly brackets, for example {sigh}.

In the body of the thesis, I labelled extracts of data with the pseudonym of the participant, the type of data collected and the date, for example: Mike's interview, 26/03/22. Dates are in the form day/month/year, for example 10/03/22 means the 10<sup>th</sup> March 2022.

### Use of names

The names used are all pseudonyms, with the exception of Alf and Laurinda, my supervisors, who appear in a discussion in chapter 9.

### Images

In chapter 9, I discuss images used by a participant. As I was not able to secure permission from the copyright owners to reproduce the original images, I have used stock images that are very similar to the images chosen by the participant.

### Quotations

In quotations, I have kept any American spelling of words, for example authorize.

### Referencing

For referencing, I have used the American Psychological Association 7th edition (APA 7).



## Abbreviations

This is a list of abbreviations and acronyms used in the thesis. Some of these terms will appear again in the glossary [[appendix A](#), page 217].

BSRLM	British Society for Research into Learning Mathematics
CAG	Centre Assessed Grade
DBS	Disclosure and Barring Service
DfE	Department for Education
GCSE	General Certificate of Secondary Education
IAMP	Improving Attainment in Mathematics Project
NCETM	National Centre for Excellence in the Teaching of Mathematics
OECD	Organisation for Economic Cooperation and Development
TAG	Teacher Assessed Grade
UNCRC	United Nations Convention on the Rights of the Child

# 1. An introduction to the study

## 1.1. Introduction

Chapter 1 serves as an introduction to the study. I begin by sharing my own story, referring to my history of being labelled as well as my experiences of working, as a mathematics teacher, with those labelled as low attaining in mathematics [section 1.2]. I turn to literature to discuss the rationale for this study, introducing the value of listening to the voices of students [section 1.3]. In section 1.4, I present the aims of the study, as a journey as well as a destination. Finally, I present the structure of the thesis, describing the content of each chapter [section 1.5].

## 1.2. Sharing my story

I begin the chapter by sharing my own story because, as I will discuss in section 5.2, I believe, as a feminist researcher, that it is important to overtly locate myself in the research process (Wigginton & Lafrance, 2019). I am part of the context to this study, not just in terms of the methods and discussions, but also the life history that led me to this point, this topic, this thesis. My life history affects the lens through which I plan, interpret and discuss the stories told by the participants (Foote & Gau Bartell, 2011). Sharing my story gives insight into the journey that brought me to this study.

It could be imagined that my story would begin with my role as a mathematics teacher. In reality, it started much earlier, not necessarily as particular incidents, but a cacophony of memories from childhood. I remember, at a young age, having to take certain roles in the family home because I was female. In later life, I was disheartened by the sense of inequality, the impact the historic labelling had on how I continued to see myself. I acutely recall the sense of being compared deficiently to my siblings in primary school, of feeling different to everyone else. From a young age, I experienced the impact of being labelled, the frustration of being seen a certain way by others, which was influencing the lens through which I saw myself.

As I became a teacher, the notion of labelling, and being labelled, continued to be present. I came to teaching later in life, training to be a secondary school [\[see glossary\]](#) mathematics teacher in my very late thirties, before working for ten years in a school in the southwest of England. During my teaching, I particularly enjoyed working with students who had been labelled as low attaining in mathematics. The context in which I worked had a system of setting [\[see glossary\]](#), grouping students into classes with others of similar prior attainment. I remember reflecting that for the classes of students with the lowest attainment, the so-called bottom set [\[see glossary\]](#), the experience of learning mathematics did not seem the same as for higher attaining peers. Students' progress, measured through

assessment data, would often not be in line with the school's expectations. As a result, students frequently revisited work they had encountered in previous years. The reason for the lack of progress seemed to be put firmly at the door of the student, rather than, for example teaching and learning practices, curriculum materials or types of assessment. I began to wonder if assessment scores were the only measure of success for students, to what extent positive affect and engagement could also be seen as a win. Whilst still working as a teacher, in 2015, I became involved with the local Maths Hub [[see glossary](#)], a programme coordinated by the National Centre for Excellence in the Teaching of Mathematics (NCETM) [[see glossary](#)], whose aim was to bring together mathematics education professionals, in collaboration, to improve best practice, thereby benefiting all students. I was first involved as a participant teacher, before becoming the facilitator of a Work Group [[see glossary](#)] focusing on reasoning in mathematics. The Work Group introduced strategies for teachers to use in their classrooms to help improve students' mathematical reasoning skills. It was within the context of the Work Group that I began to hear versions of the refrain, "But what about the low ability students? They will not be able to do this, I cannot do this with a bottom set". I wondered, in hindsight judgementally, did the teachers mean "I cannot" or "I will not" use the strategies with certain students. At the time, I reflected on whether the discussions in the Work Group had highlighted an insecurity in the practice of the teacher participants. I started to realise that a change of mindset might be needed before some teachers would be confident to take a risk with the teaching and learning of students they labelled as low ability. At this point in my story, I must pause for two reasons. Firstly, I must clarify that I talk about a change of mindset not as a generalisation; I am not saying that all teachers think in this way, just that I was becoming conscious of how many times I heard the same refrain. The second reason to pause is in regard to the label applied to students, that of "low ability". Although the label is used in the everyday conversations of teachers, describing students who are seen as less able than their peers, I am uncomfortable with the term. Using a label of low ability suggests an inherent trait, something that speaks to future possibilities rather than the results of previous assessment. From this point forward, I will use phrases that refer to the label of attainment, for example "students labelled as low prior attaining".

Returning to my story, I was at a critical moment. Although I was still working with the Maths Hub, I had chosen to resign from my teaching post, embarking on a one-year master's course at the University of Bristol. I wanted to investigate how research spoke about students labelled as low attaining as well as what insights there might be for successful teaching and learning. It was during the master's course that I encountered the work of Watson and De Geest (2005). The authors describe the work of the *Improving Attainment in Mathematics Project* (IAMP), which evaluated the impact, on students labelled as low attaining, of introducing innovations in teacher practice. Watson and De

Geest (2005) concluded that the instances of mathematical thinking by students, reported by teachers, were not necessarily a result of generalisable teaching methods, rather due to overarching principles and beliefs shared by the teacher participants. In an attempt to find a common framework, for teaching mathematical thinking strategies to low prior attaining students, Watson and De Geest (2005) realised that they had identified shared principles about the fundamental rights of students at all levels of attainment. Reading the article was a critical moment for me, a fundamental shift in my thinking. Handal (2003) suggests that the pressures of teaching in the modern education system can hinder teachers from implementing principled beliefs in classroom practice. I reflected on to what extent teachers are impacted by their context, pressured by performance management targets as well as the rules enforced by their work environment. As I embarked on my PhD study, my thinking once again shifted. I began to wonder about the experiences of students labelled as low attaining in mathematics. Who gets to speak to the experiences of learning mathematics in the context of low attainment, the dominant discourses that may influence a teacher, or the students themselves?

### 1.3. Turning to literature - the rationale for the study

Having shared an account of my personal story, which brought me to the study, I now present the rationale from the point of view of research literature. Research shows that, for students labelled as low attaining, the experience of learning mathematics can be different to that of their higher attaining peers (Boaler et al., 2000; Watson & De Geest, 2005). There are a number of dominant discourses of deficiency that persist around the characteristics of students labelled as low attaining in mathematics. Discourses include, for example, that students are disengaged (Francis et al., 2017; Mkhize, 2017), lack capacity or potential (Dunne et al., 2011; Marks, 2014) and exhibit unproductive learning behaviours in the classroom (Hargreaves et al., 2019; Mazonod et al., 2019). The characteristics are often seen as inherent attributes, an innate aspect of a student labelled as low attaining. The label of low attaining becomes synonymous with the deficient characteristics. Boylan and Povey (2020) state that the lens of deficient discourses leads to ability thinking among teachers, a view of mathematics intelligence as fixed for each person. The authors argue that ability thinking can influence the opportunities that teachers provide for students in the classroom. Students labelled as low attaining can be offered a restricted, repetitive curriculum, a cycle of revisiting, rehearsing and reteaching (Coles & Brown, 2021). Assumptions about the teaching and learning needs of students can include, for example, the use of practical resources, even when they do not support learning (Boylan & Povey, 2020) as well as the need for overly structured lessons, mitigating any potential behaviour issues (Alderton & Gifford, 2018). The assumptions made, by teachers, about the way students talk and act in the classroom impact on the way teachers talk and act in the classroom. The assumptions are a viewpoint from which

the learning needs of students labelled as low attaining are seen, through the lens of dominant discourses.

The way that students talk, act and be, in relation to learning mathematics, has been defined as mathematical identity (Bishop, 2012). Drawing from wider social science research on identity, the concept of mathematical identity has been used to describe what someone has, an acquisition, or what someone does, an action (Brubaker & Cooper, 2000; Darragh, 2016). In relation to low attainment in mathematics, students can be seen as being low attaining, a core acquisition that is fundamental to who they are, or the product of actions and discourses, as performing low attainment within certain contexts. Sfard and Prusak (2005) go further, conceptualising identity work as the act of storytelling, the stories are themselves identity work. Acknowledging the impact of context, identity work also includes the stories told by significant others about students. More recently, research into mathematical identity work has moved towards a socio-cultural view, seeing identity work as an act (Darragh, 2016; Graven & Heyd-Metzuyanin, 2019). Mathematical identity work is seen as fluid, situated and multiple, being constantly constructed and reconstructed, negotiated and renegotiated. The notion that mathematical identity, or identity work, is an act, what someone does, holds promise for students labelled as low attaining. If mathematical identity, in the context of low attainment, is seen as the product of, for example, dominant discourses, then there is potential for new stories to be employed, alternative identity work to be negotiated. However, as discussed previously, students' mathematical identity is often seen through the lens of the teacher. The interpretation of the way that students are seen to talk, act and be in the classroom, facets of their mathematical identity work, leads to assumption-led practices that may not meet their needs.

Including the perspectives of students affords the opportunity to understand a context from the students' own lived experience, a catalyst for potentially transforming the practice of teachers and researchers (Cook-Sather, 2012; Fielding, 2004). However, when considering their identity work in the classroom, the voices of the students themselves can be silent. Students labelled as low attaining are marginalised in discourses about their experiences of learning mathematics. Although a number of studies have incorporated the voices of students in research on mathematical identity (see, for example, Andersson et al., 2015; Bibby, 2009; Grootenboer & Edwards-Groves, 2019; Solomon, 2007), there is a gap in the literature where the voices of students labelled as low attaining are the central concern. The opportunity is not afforded to hear the students' own stories of mathematical identity work in the classroom. Examining students' perspectives, as experts within their lived experiences of learning mathematics, provides a means to examine the possibility of alternative stories. By giving attention to the individuality of their stories, through the students' own voices, it may be possible to gain new insights, a counter narrative to dominant discourses.

#### 1.4. The aim of the study

Following on from the story that led me to the study, through personal histories and research literature, I now present the research aims. The aim of the study is to examine the identity work of students labelled as low attaining in mathematics. Focusing on the first-person voices of students, the intention is to learn to listen carefully to the stories they told. Acknowledging the impact of context, the situated nature of identity work, as part of learning to listen, I include the stories told by a significant other, in this case the teacher, about the students. As discussed previously, the voices of students were to be a catalyst for transformation, therefore I introduce a mechanism through which I could act as a conduit between the student and the teacher. The objectives of the study are both empirical and methods based. I examine the stories told by, and about, students as well as developing methods to enable me to lean in to listen carefully. This thesis is a journey, as well as a destination. I include my missteps, and wrong turns, as the study develops. I am honest in my reflexivity, open about my evolution as a beginning researcher. The study took place over two phases. The first phase of data collection, from October to December 2019, was pre-pandemic, before daily life changed beyond recognition. The second phase took place from December 2020 to July 2021, in the middle of the global covid-19 pandemic. Learning to listen became learning to de-centre myself, to begin to silence my own internal dialogue.

#### 1.5. The structure of the thesis

Having shared my story, considering the rationale of the study, in this section, I present the structure of the thesis. I describe each chapter in the order they appear, after this first chapter, providing a description of the key content.

Chapter 2 is the start of the literature review. In the chapter, I introduce the concept of identity as a tool for analysis. I explore the current literature on mathematical identity work, including issues with defining and conceptualising the concept. I detail the conceptualisation of identity work by Sfard and Prusak (2005), considered to be the stories told by, and about, a person. I highlight ambiguities in the work, using the discussion to develop the final framework of stories-as-identity-work for this study.

In Chapter 3, I move to review literature that examines low attainment in mathematics. I discuss how students labelled as low attaining are viewed in education systems as well as diagnostic and socially constructed models of low attainment. Using literature, I develop a model of the web of meanings that support discourses in the context of low attainment in mathematics, that, in chapter 11, I use to relate themes in my data to past work. As one of the contributions of this thesis, I go on to critique the model in relation to the findings of this study.

Chapter 4 is concerned with methodological issues in research on the voices of students. In the chapter, I review literature to examine how the voices of students have been employed in educational research. I talk about students' voices in literature relating to mathematical identity. I identify a gap in research that incorporates students' voices in relation to identity work in the context of low attainment in mathematics.

In Chapter 5, I move away from the literature review to consider the methodology of the study. I discuss being a feminist researcher, introducing both the notion of ethics of care and feminist methodological questions. I present poetic inquiry, the methodology employed in this study, as a means to put the subjective realities of participants at centre stage, discussing poeticity, or poetic function, as found in discourse and language. I talk about the use of poetic structures within research on mathematics education.

As mentioned previously, data collection in the study occurred over two phases. In chapter 6, I discuss the methods employed in phase 1 of the study. I introduce the developing research questions, data collection methods and the Listening Guide method of analysis. I innovate by introducing a "they poem" into the Listening Guide. I finish the chapter by discussing ethics.

Chapter 7 presents the findings from phase 1. I discuss the observations that I used as objects to elicit stories in interviews. I analyse the data of the four student participants, before examining the stories of one particular student and the teacher, demonstrating the innovation of a they poem, discussed in chapter 6. Finally, I reflect on phase 1 in preparation for phase 2 of the study.

In Chapter 8, I discuss the methods used in phase 2 of the study. In between phase 1 and phase 2, the planning process was overtaken by world events, with the study having to move online. I talk about evolving research questions, data collection methods and revisiting ethics, as I adapted to the pandemic. I use a tool called a social identity map (Jacobson & Mustafa, 2019), to explicitly examine the impact of my positionality as a researcher. Addressing one of my reflections from phase 1, I develop a rubric, with general and idiosyncratic guidance, to ensure consistency when creating poetic structures within one study.

In Chapter 9, I start to analyse the data from phase 2. Focusing on the identity work of the student participant, I examine the developing identity work, told as stories-as-identity-work, over the time of the study. I demonstrate the steps of the Listening Guide method in relation to the first-person voice of the student.

In Chapter 10, I continue the analysis of the data from phase 2, presenting the overall findings from this phase of the study. Focusing on the stories of the teacher, the use of the third-person voice about the student, I demonstrate the innovation of the poems within the Listening Guide. I bring together the stories told by, and about, the student, re-examining the findings from chapter 9 in a new step 5 of the Listening Guide method.

In Chapter 11, I return to the model of the web of meanings that support discourses in the context of low attainment in mathematics, developed in chapter 3. I re-examine the findings of both phases of the study for echoes of the dominant discourses in the identity work of students, relating the themes in my findings to previous work. I go on to critique the model in relation to the findings of this study.

Chapter 12 is the concluding chapter. I present the contributions to knowledge of this study in relation to both the findings and innovating with methods, briefly considering dissemination beyond mathematics education. I reflect on the feminist questions raised in chapter 5, before discussing limitations and future work.

## 1.6. Summary

Chapter 1 has served as an introduction to the study. As a feminist researcher, I have overtly located myself in the study by sharing my story. My experiences, as someone who had been labelled as well as a teacher who reflected on the impact of labelling, served as influences that led to this study. I map my journey from a, somewhat, judgemental stance, about the mindset of teachers, to one of empathy about the pressures of context. Finally, I shift my focus to begin to think about the lived experiences of students labelled as low attaining, from the perspective of the students themselves.

Dominant discourses of, for example, disengagement, impact the teaching and learning experiences of students labelled as low attaining. The label of low attainment becomes synonymous with certain deficient characteristics, often seen as inherent. However, the voices of students themselves can be silent in relation to their identity work in the classroom. In order to consider the potential of alternative stories to dominant discourses, it is necessary to listen carefully to the stories being told by students labelled as low attaining.

In chapter 2 that follows, I begin the literature review. I examine literature on the concept of identity as a tool for analysis. I explore the conceptualisation of mathematical identity work, developing the final framework of stories-as-identity-work for this study.



## 2. Identity work

### 2.1. Introduction

The purpose of this chapter is to discuss and develop a framework to examine mathematical identity work in the context of low attainment in mathematics. I begin by discussing the complexity of the concept of identity as a tool for analysis within research [section 2.2]. Within the domain of mathematics education, I talk about the move towards a sociocultural perspective for research into mathematical identity work that is drawn from a small number of key theorists [section 2.3]. I discuss the framework introduced by Sfard and Prusak (2005), which rejects the idea of acquisition in relation to identity, as a means to examine the stories of students labelled as low attaining [section 2.4]. I go on to highlight two ambiguities that exist in the framework in relation to influential others who are said to impact the stories told by students [subsection 2.4.1]. I consider the operationalisation of identity work and the use of a common language for discussing coherence [section 2.5]. By examining an article on mathematical identity by Ingram and Meaney (2022), I exemplify the issues both around coherence within a study and the ambiguities in the framework by Sfard and Prusak (2005). Finally, I present the final framework that will be used in this study to examine mathematical identity work [section 2.6].

### 2.2. Analysing using the concept of identity

I begin this chapter by discussing the concept of identity as a tool for analysis in academic research. The term identity has a long history in western philosophy and has become prominent in social science research in the last half a century (Brubaker & Cooper, 2000). However, as a tool for analysis, the notion of identity has been defined and conceptualised in a number of ways depending on the context of use and theoretical leaning of the researcher. Brubaker and Cooper (2000) found five key uses in academic work:

- As a basis of social or political action, identity is seen as a means to conceptualise ways of acting arising from and shaped by a person's social location. Social location can be seen as categorical, for example race or gender, or conceived, such as occupational status.
- As a collective phenomenon, identity is used to refer to the sameness of members of a group or category, either objectively or subjectively as perceived sameness. The notion of collective identity is particularly found in studies about topics such as gender, race or socioeconomic status in terms of solidarity and collective action.

- As a core aspect of social being, identity is something that is developed and valued, that crystallises over time. Characteristic of a psychological lens, identity is not superficial or fleeting but an acquisition that is fundamental to who a person is.
- As the product of social or political actions (rather than the basis), identity is seen as the process involved in developing group understanding that both arises from and leads to the possibility of collective actions. Identity is seen as rejecting a permanent sameness of the group of people outside of that developed by the contingent action.
- As a product of discourses, identity is seen as multiple and fleeting, with the experience of self as a moving patchwork of various discourses within changing contexts. Identity is seen as changing and constantly in negotiation, described as situated and contextual.

In their critique of identity as a unit of analysis, Brubaker and Cooper (2000) go on to say that these five standpoints are not just different but contradictory, highlighting the dichotomy between the sameness found in the acquisition of collective and core identities, and the rejection of abiding sameness for products of actions and discourses. The authors suggest that the single term of identity cannot take all of these different roles, proposing the use of alternative terms to “unbundle the thick tangle of meanings that have accumulated around the term identity” (p. 14), namely identification; categorisation; self-understanding; social location; categorical commonality; relational connectiveness; and groupness. Some of these alternative terms can be seen in Brubaker’s more recent work on gender and racial identity (see, for example, Brubaker & Fernández, 2019) as well as in studies by other authors (see, for example, Kranendonk et al., 2018). However, the term identity is still widely used in research.

### 2.3. Identity in mathematics education

Having talked about the concept of identity in the wider field of research, I now review how the domain specific mathematical identity is discussed in research into mathematics education. In a similar way to the wider field, the conceptualisation of mathematical identity is varied, which infers there is inconsistency in the field (Radovic et al., 2018). In mathematics education literature, the stances of identity as an acquisition, something a person has, or as an action, something a person does, re-emerge. Studies that consider mathematical identity as an acquisition tend to use quantitative methods to analyse elements that are measurable by a suitable instrument. The elements can include, for example, alignment with statements about collective identity within a school system (Knigge & Hannover, 2011), intersectionality with gender and other characteristics (Axelsson, 2009), and attributes such as affect and self-concept (Kaspersen et al., 2017). Studies that consider mathematical identity as an action talk about working and reworking, with identity as fluid, malleable,

temporal and multiple. Many of the studies focus on narratives in relation to the teaching and learning of mathematics, including the self-reported accounts of participants (see, for example, Bartholomew et al., 2011; Foyn et al., 2018), the discourses in both student groups and teacher-student interactions (see, for example, Bishop, 2012; Heyd-Metzuyanim, 2013), as well as storytelling as forms of identity and positioning work (see, for example, Ingram & Meaney, 2022; Solomon, 2007). The phrase identity work is used to indicate the labour involved in the way people construct various, often conflicting identities, such as within teacher professional development; gendered stories; and dominant discourses, as (re)positioning and a disorder of becoming (Darragh, 2016; Radovic et al., 2018).

In their reviews of literature on mathematical identity, Darragh (2016) and Graven and Heyd-Metzuyanim (2019) noted that much of the literature drew their theoretical framing from the works of Lave and Wenger (1991)/Wenger (1998), Holland et al., (1998), Gee (2000), Boaler and colleagues (see, for example, Boaler and Greeno, 2000), and Sfard and Prusak (2005). Lave and Wenger (1991)/Wenger (1998) and Holland et al., (1998) discuss identity in terms of participation. Lave and Wenger (1991)/Wenger (1998) conceptualise identity as “a way of being in the world” (Wenger, 1998, p. 151) as part of the lived experience within communities of practice. Building identity is creating an entity which is viewed as temporal; there is a constant negotiation between a person and their participation in various spaces of mutual engagement, joint enterprise and shared repertoire. For Holland et al. (1998), the concept of identity is taken from the idea of personhood or selfhood, with a person’s image of themselves formed in relation to their “figured worlds” (p. 49). Figured worlds, as socially organised and culturally constructed activities, shape who people see themselves as, mediating behaviour that becomes embodied over time. Hence, identities are products, lived in and through activities developed in social practice. Finally, Gee (2000) frames identity in terms of multiple perspectives, defining a person’s identity as being recognised by others in certain contexts as acting like a “kind of person” (p. 99). He talks about performance, rather than a core identity, before offering four perspectives that can be used to view identity in educational research. The nature perspective, or N-identity, talks about a state rather than a product of anything accomplished, the source being nature itself, such as genetics. The institutional perspective, or I-identity, talks about positions authorised and officially defined by institutions. A person can actively or passively fulfil the role assigned, as a calling or an imposition. The discursive, or D-identity, arises from the way people can sustain identities through dialogue. Although seen as a personal trait, D-identities are not sustained individually, powered by nature or institutions, being ascribed through the discourses of other people. Finally, the affinity perspective, or A-identity, refers to allegiance to, and participation in, certain practices that are shared with others. To some extent, people choose to join a certain affinity group, creating and sustaining their allegiance.

As influences from within the field of mathematics education, Boaler and Greeno (2000) talk about the ideas of positioning and authorship in relation to identity, drawn from the work of Holland et al. (1998), considering identification as learning to be within the figured worlds of mathematics classrooms. Having interviewed higher attaining students from six different schools in North California, they used the ways of knowing, conceptualised by Belenky et al. (1986), as a means to interpret the students' self-reported perceptions of learning mathematics. Finally, Sfard and Prusak (2005) talk about NewComers and OldTimers in mathematics learning, discussing the idea of narrative-defined identity. The authors introduce the language of actual identities and designated identities found in the collection of stories told by a person, and about a person by a significant narrator. The stories are said not to recount experiences of identity work, being defined as identity-making in themselves, they are stories-as-identity-work. Sfard and Prusak (2005) discuss identity as a possible missing link between learning and the social and cultural context. They talk about identity work as "the activity in which one uses common resources to create a unique, individually tailored combination" (p. 15). The focus is on thinking about how different people behave differently using the same resources or in the same context.

#### 2.4. Choosing stories-as-identity-work

Up to this point in the chapter, I have presented the various perspectives on the concept of identity within research and the move to a sociocultural view within mathematics identity work specifically. I now go on to talk about how the framework of Sfard and Prusak (2005), using stories-as-identity-work, aligns with the feminist perspective taken in this study [see subsection 5.2.1], giving a promising way to listen to the marginalised voices of students labelled as low attaining. I expand on the meaning of actual stories-as-identity-work and designated stories-as-identity-work that Sfard and Prusak (2005) discuss in their framework. In subsection 2.4.1, I highlight two ambiguities in their work around significant narrators and wider cultural messages.

From a feminist point of view, examining identity is attending to the question of who someone sees themselves as, that is how a person feels and thinks, what matters to them, how they act and how others act towards them (Lindemann, 2019). A person's identity is described as follows:

Your identity is a complicated interplay of how you see yourself and how others see you, and both senses of who you are take some of their shape from culturally authorized, shared understandings of what sorts of lives there are and who may (or must) live them. (Lindemann, 2019, p. 54)

The subjectivity of who someone sees themselves as is said to be narratively constituted, consisting of a "narrative tissue" (p. 60) of first-person, second-person and third-person stories, with local narratives as particular stories often connected to master narratives within the wider culture

(Lindemann, 2019). However, despite the use of the singular term identity in the quotation above, from a feminist perspective the multiple realities of a person's perception, as experts on their lived experiences, are complex and nuanced. Identity, or identity work, is seen as multiple, fluid and relational (Burns & Chantler, 2011; Davies & Gannon, 2011; LaFrance & Wigginton, 2019). Aligning with the feminist perspective, Sfard and Prusak (2005) link identity work to communication, stating:

We readily embrace the idea of identity-making as a communicational practice and thereby reject the notion of identities as extra-discursive entities that one merely "represents" or "describes" while talking. (p. 16)

Identity work is not recounted by stories but is the collections of stories themselves, being told by and about a person, as stories-as-identity-work. The word stories is not used to suggest a work of fiction but to indicate the way a person will narrate by providing a vision or perception of their own and other's experiences (Lindemann, 2019; Sfard & Prusak, 2005). In the framework developed by Sfard and Prusak (2005), stories-as-identity-work are stories that are reifying, endorsable and significant:

- Reifying: the stories replace the verbs that relate to doing with verbs about having or being, as well as using adverbs such as always or never. For example, "I am doing research" is replaced by "I am a researcher", the act of doing research is reified to become the label of researcher.
- Endorsable: the protagonist says that the stories reflect the current state of affairs. For example, I support the story that I am currently a researcher.
- Significant: any change in the story would affect the storyteller's feelings about the person. For example, changing the story from "she is a good researcher" to "she is a useless researcher" significantly changes how I am perceived.

The stories-as-identity-work are represented by the notation  ${}_B A_C$  where A is the protagonist of the story, B is the story teller and C is the audience. This allows for the distinct types of stories-as-identity-work to be distinguished as first-person, second-person and third-person stories:

- ${}_A A_C$  = first-person identity stories told by the protagonist about themselves to another. This includes  ${}_A A_A$  where the protagonist addresses themselves.
- ${}_B A_A$  = second-person identity stories told to the protagonist by another.
- ${}_B A_C$  = third-person stories told about the protagonist by another to a third party.

Using these forms of stories-as-identity-work, researching identity can now be seen as researching the dynamics of narratives. Sfard and Prusak (2005) go on to say that narratives by, and about, a person consist of both actual and designated stories-as-identity-work. Actual stories-as-identity-work are the speaker's perceptions of the current state of affairs told as factual statements using the present tense.

Reifying occurs through the use, by the speaker, of the verbs that indicate being rather than doing, for example “I am a researcher” rather than “I am doing research”. Designated stories-as-identity-work are seen as having the potential to become part of a person’s actual stories-as-identity-work, using the future tense or verbs that express a wish or obligation, for example “I want to be a researcher” or “I must try harder”. Hence, it is the choice of verbs that indicate the type of story-as-identity-work being told, that is actual or designated. Sfard and Prusak (2005) suggest that learning is closing the gap between actual and designated stories-as-identity-work. The move between actual and designated is not necessarily one way, with the potential for the actual to impact on the designated stories-as-identity-work. The authors go on to say that students can experience unhappiness when there is a perception that the gap is insurmountable or persistent. In addition, a student’s emotions and motivation, in the context of learning mathematics, are said to be dependent on an alignment, or not, with their own needs and goals (Ingram & Meaney, 2022). The authors go on to say that the emotion of unhappiness is not the only affective response of students, with a range of positive and negative emotions of different intensities, which can be stable or change over time.

For students who are labelled as low attaining in mathematics, their stories-as-identity-work can be predominantly second- and third-person stories, often viewed in relation to master narratives, or cultural stories, within the domain of mathematics education [see section 3.3]. The first-person voice of students is more often than not marginalised in research about their own identity work [see subsection 4.3.2]. The discussions cannot, therefore, attend to the question of who a student sees themselves as. Furthermore, a student’s mathematical identity work can be essentialised, the act of having prior low attainment, often described using the problematic term low ability, becoming the state of being low attaining [see subsection 3.2.1]. The label can be seen as a diagnosis, characterising students as being a particular type, with certain inherent attributes, who require specific methods of teaching and learning. Being allocated the low attaining label infers an identity that is seen as an acquisition, the source of observable classroom and learning behaviours. Sfard and Prusak (2005), although acknowledging as promising the work of other theorists, state that being seen as a certain kind of person (Gee, 2000) or a person’s self-understandings (Holland et al., 1998) suggests that identity is something that stays the same beyond actions, an essentialisation that they reject. For this study, the framework of stories-as-identity-work provides the opportunity to foreground students’ voices, acknowledging the complexity of mathematical identity work, to consider the possibilities of counternarratives to dominant discourses around low attainment.

#### 2.4.1. Two ambiguities around significant narrators

So far in this section, I have given more detail about the framework of stories-as-identity-work developed by Sfard and Prusak (2005) as a promising lens to investigate the mathematical identity work of students labelled as low attaining. However, in this subsection, I discuss two ambiguities around significant narrators that I see in their work.

Sfard and Prusak (2005) explain that designated stories-as-identity-work arise from the tendency to retell stories or parts of stories told by others, with significant narrators being described as the influential voices that carry cultural and social messages. The stories-as-identity-work told by different narrators to different audiences are in interaction with each other. A person can incorporate second- and third-person identity stories into the first-person designated stories-as-identity-work that they tell themselves. In this way, designated stories-as-identity-work presents a type of future that, to some degree, has been authored by others. The first ambiguity comes from to what extent significant narrators are seen as also influencing actual stories-as-identity-work. In their discussion around significant narrators, Sfard and Prusak (2005) consistently talk about the narratives authored by others as being important sources that change and develop designated stories-as-identity-work, implying that they see actual stories-as-identity-work as authored solely by the person themselves. However, in their discussion about an empirical study into NewComers and OldTimers in mathematics, although the focus was on designated stories-as-identity-work in relation to wider cultural stories, the authors also talked about actual-stories-as-identity, as can be seen in the extract below:

The first thing to say in this context is that, given the NewComers' immigrant status, their being well versed in mathematics appeared to be of redemptive value: The universality of mathematical skills was likely to constitute an antidote to these students' sense of local exclusion. To state it in terms of identity, we conjecture that although NewComers were bound to identify themselves as outsiders in their local environment, mathematical prowess was one of those properties that compensated them with the more prestigious, place-independent status of "people of education and culture". (Sfard & Prusak, 2005, p. 20)

The identification by NewComers that they are excluded as outsiders is an actual story-as-identity-work stated by the authors as influenced by the wider cultural narration about the importance of being seen to be good at mathematics. In addition, as demonstrated in a study by Ingram and Meaney (2022) [discussed in more detail in section 2.5.1], the stories told by significant narrators are actual stories-as-identity-work themselves, giving a second- and third-person perspective of the current state of play. Therefore, I argue that both actual and designated stories-as-identity-work are influenced by significant narrators through personal stories and "culturally authorized, shared understandings" (Lindemann, 2019, p. 54).

Sfard and Prusak (2005) talk about actual and designated stories-as-identity-work as having narrators, which could be the learner themselves, or another significant person. In addition, institutional narratives are seen as particularly significant, influencing designated stories-as-identity-work. An example from mathematics education might be, for example, that men are more suited to learn mathematics than women (Solomon, 2012). These dominant discourses or master narratives are pervasive stories from within a cultural context, which influence stories-as-identity-work within domains, such as the teaching and learning mathematics (Heyd-Metzuyanim, 2017). However, wider, cultural stories, described as influential, do not have an identifiable narrator. The second ambiguity arises from the lack of clarity in the conceptualisation of the stories told by significant narrators, which Sfard and Prusak (2005) state as “narratives that are floating around” (p. 18) and “uncontrollable diffusion of narratives that run in families and communities” (p. 21). Despite saying that there is not one sole author of the floating and diffusing narratives, in their study of NewComers and OldTimers they talk about parents and grandparents as significant narrators. In studies that draw on the work of Sfard and Prusak (2005), this lack of clarity continues, with some talking about a particular significant narrator, such as a parent (for example, Ingram & Meaney, 2022) and others not identifying a particular significant narrator at all (for example, Andersson, 2011). It seems to me that there are two forms of significant narrator, an identified personal narrator, who tells stories in relation to a specific person or context, and wider cultural narrations, without an identifiable original narrator, which tell more global stories about people in the context or about the context itself [see figure 2-a]. The significant personal narrator might employ the more global stories as significant cultural narrations, as might the identifying person themselves, but they should be seen as different. I argue that significant cultural narrations can be described as echoing in stories-as-identity-work, reverberating from the wider culture to the particular context.

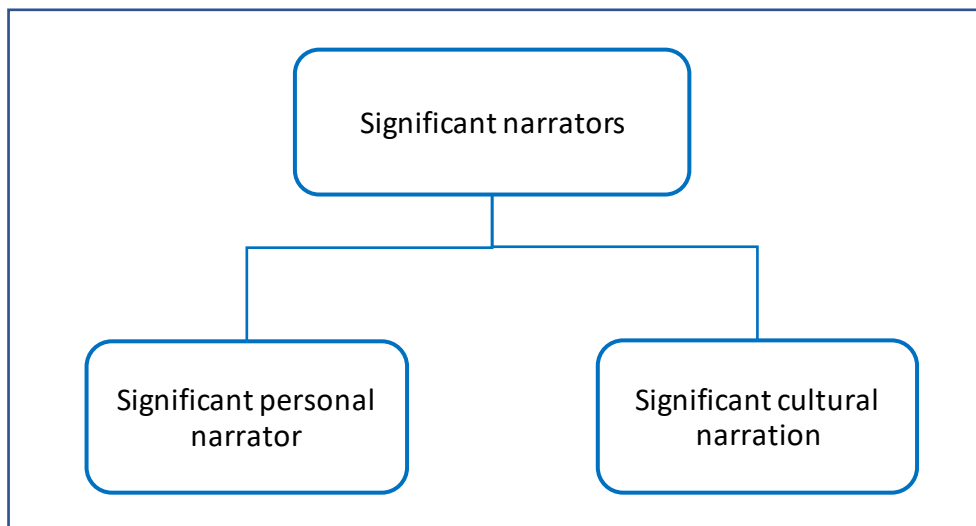


Figure 2-a: Reconceptualising significant narrators, adapting Sfard and Prusak (2005).



## 2.5. The operationalisation of mathematical identity work

In the previous section, I talked about the concept of stories-as-identity-work as a framework for this study in relation to the mathematical identity work of students labelled as low attaining, discussing two ambiguities around significant narrators. In this section I talk about the operationalisation of the concept of mathematical identity work and the use of a common language for coherence. In subsection, 2.5.1, I use an article, by Ingram and Meaney (2022), to exemplify both the use of the common language as well as the significant narrators, discussed in subsection 2.4.1.

The operationalisation of a concept, such as mathematical identity work, explicitly addresses how the concept will be used in research (Radovic et al., 2018). The varied theoretical perspectives taken by authors on mathematical identity work, with no common language (Darragh, 2016), has prevented productive discussion on the topic. That being said, Graven and Heyd-Metzuyanim (2019), reviewing literature from 2014 to 2018, noted that the field of mathematical identity work is showing signs of maturing with the use of the socio-cultural perspective becoming most dominant. The socio-cultural perspective views identity as multi-dimensional rather than as one core identity (or at least is made up of an amalgam of different domain specific facets of identity or identities). We do an identity, which is not an acquisition but an act, never seen as fully formed or complete (Gutiérrez, 2013). As such, identity is multi-voiced, socially situated and domain specific as well as ambiguous, fluid and unstable (Gee, 2000; Hand & Gresalfi, 2015; Verhoeven et al., 2019). However, even though the field of mathematics identity is moving, albeit slowly, towards more conceptual coherence, weaknesses still arise within the operationalisation of the concept, that is explicitly stating how identity can be studied (Graven & Heyd-Metzuyanim, 2019). The authors go on to say that, although the majority of studies operationalise mathematical identity based on participants' narratives, some will include, for example, researcher's observations or the stories told by significant others. For Darragh (2016), issues around operationalisation can arise from a lack of coherence within a study, where researchers who use a theoretical framing that views identity as an action can later discuss the concept as if it were an acquisition, and vice versa.

In their review of literature on mathematics learner identity, Radovic et al. (2018) suggest a model that can be used to examine coherence. The model consists of three dimensions that the authors see as defining features of identity [see table 2-a]. By giving attention to the defining features, the definitions and operationalisations can be used, both retrospectively, to review studies already completed, and in the initial stages of planning for new work.

Dimension		
Subjective/Social	<b>Subjective</b> A private experience of who one is that references a person's senses or experiences e.g., a sense of belonging.	<b>Social</b> Performed in social practice and recognised by others. Referencing the social, e.g., constituted by social discourses.
Representational/Enacted	<b>Representational</b> As mediated by discourse or language e.g., narratives or stories about oneself.	<b>Enacted</b> Expressed or performed through actions, seen as ways of being in action e.g., forms of participation.
Change/Stability	<b>Change</b> Constructed through a process, seen as malleable e.g., changes over time.	<b>Stability</b> Seen as stable personal factors e.g., a core identity.

Table 2-a: The defining features of mathematics learner identity (Radovic et al., 2018).

The defining features within each dimension are not seen as poles where, for example, a leaning for subjectivity would imply a leaning against the social, rather a means to discuss possible tensions. The model provides a common language to discuss, for example, one defining feature over another or possibly how both may be connected. Examining the framework of Sfard and Prusak (2005), identity work is operationalised as the collection of stories told by and about a person, being described as representational rather than enacted. They talk about identities as “a discursive construct” (p. 21) and “man-made and collectively shaped” (p. 16), which are changing rather than stable, but both subjective and social in nature.

### 2.5.1. An example of stories-as-identity-work used in one study

As discussed above, the framework of Sfard and Prusak (2005) operationalises identity as the collection of stories told by and about a person, which they describe as actual and designated stories-as-identity-work. I now examine, for coherence, a recent article that applies the framework as well as demonstrating the ambiguities around significant narrators, discussed in subsection 2.4.1.

In a recent article, taken from a larger study, Ingram and Meaney (2022) discussed how one student, that they call Philip, navigated between his own expectations and the views of his father in relation to mathematics. The authors state they take “an identity approach to learning” (p. 53) drawing on the work of Op 't Eynde et al. (2006), with identity in this context described as participation, situated within a specific context. As such, using the language of Radovic et al. (2018), identity in this case would be described as enacted. Ingram and Meaney (2022), however, go on to say that they use the framework of Sfard and Prusak (2005) in which identity would be described as representational. The authors do not expand on their definition of identity, but Op 't Eynde et al. (2006), on which they draw,

take a sociocultural perspective, inferring that identity is seen as personal, situated and constructed, that is, subjective, social and changing. Although these dimensions align with the work of Sfard and Prusak (2005), the tension within the representational/enacted dimension is not addressed by Ingram and Meaney (2022) and therefore, from this point of view, the study can be considered to be incoherent.

Focusing on the ambiguities around significant narrators, Philip's father was presented by Ingram & Meaney (2022) as a significant personal narrator that influenced Philip's designated stories-as-identity-work, which they grouped under three themes: the utility of mathematics for future careers; an expectation of doing well; and the value of mathematics teachers. However, although there were particular stories in relation to Philip and his father, as well as examples from other students, there were also echoes of more global significant cultural narrations. When discussing the utility of mathematics, the authors gave examples of the misalignments between Philip's and his father's designated stories-as-identity-work in relation to career ambitions, but then went on to state:

Rather than being useful in its own right, Philip and many other year 10 students seemed to see mathematics as an entrance ticket to their chosen career. (p. 58)

The significant cultural narration about mathematics as a gateway to certain careers was not given as specific to the context of Philip only. It was not attributed to Philip's father or other parents as significant personal narrators, although it was utilised by them as told in their particular stories. Further examples can be seen when Ingram & Meaney (2022) discussed the theme of the expectation to do well in mathematics:

In Year 9, Philip scored in the 91<sup>st</sup> percentile for his age level across New Zealand in a standardised mathematics assessment, and he was placed in the top stream, achievement class. Before Year 10, he had consistently got mathematics prizes and had strong assessment grades. Philip endorsed these institutional narratives and believed he was achieving the marks he was capable of. (p. 59)

Perhaps similar stories about it being ok to be not good at mathematics also provided discursive resources for Philip because, as Year 10 progressed he became less willing to engage in mathematics. (p. 60)

Once again, Philip's stories-as-identity-work are presented alongside narratives that were not attributed to his significant personal narrator, his father in this particular context, but described as institutional narratives and similar stories. The extracts suggest that Philip had internalised the notion that high attainment in assessments equated to success. In contrast, not being seen to be good at mathematics was also allowed. Furthermore, the type of stories-as-identity-work being talked about in these extracts are about the current state of play and are therefore actual stories-as-identity-work. In fact, Ingram and Meaney (2022) state that Philip's parents describe him as being independent,

energetic and competent, actual stories-as-identity-work talking about being successful in mathematics.

The discussions around the value of mathematics teachers were more specific in that the authors shared the particular stories told by Philip and his father that related to first-hand experiences. However, the importance of the teacher-student relationship was highlighted as being a more global story when Ingram & Meaney (2022) commented:

If a student “liked” a teacher, they were more likely to engage and more likely to feel confident the teacher would support them when they needed assistance, although this was not the case for Philip up until Year 11 as he never asked for help, even if he liked the teacher. (p. 64)

The authors referenced an unpublished thesis that indicated the influence of the teacher-student relationship on motivation, which indicated that the authors saw this global story as important even though Philip himself did not ask for help. (“year 11” in the extract refers to an educational year group in schools in England [[see glossary](#)]). It could well be as an alternative, that Ingram & Meaney (2022) considered a global story that Philip saw himself as personally responsible for success or failure in mathematics or that a teacher was not seen as a source of support. However, whatever the intentions of the authors, the wider story about the impact of students’ opinions of their teacher was used to highlight a particular story-as-identity-work in relation to Philip.

Examining the study by Ingram and Meaney (2022) demonstrated that Philip’s father was a significant personal narrator with significant cultural narrations being presented in the study as influencing both the actual and designated stories-as-identity-work. The significant cultural narrations of mathematics education as a gateway to a career; being seen as good or not good at mathematics; and the impact of a student’s opinions about a teacher, were influential despite being stories from wider perceptions within and about the domain of mathematics education. It is not possible to know the source of the stories, the original significant narrators for each student. The stories are possibly an amalgamation of many stories repeated over time, being told and retold. They have the appearance of stability or reification as cultural messages within the context of mathematics education.

## 2.6. Final framework of mathematical identity work

Up to this point in chapter 2, I have discussed the various issues around the conceptualisation and operationalisation of identity work as a tool for analysis. In this section, drawing on the work of Sfard and Prusak (2005), I present the final framework that I use in this study.

Taking a feminist perspective and drawing on stories-as-identity-work (Sfard & Prusak, 2005), I see mathematical identity work as an action, not an acquisition, being malleable and fluid. Mathematical identity work is who a person sees themselves as, that is the stories that they choose to share about

how they feel, think and act in relation to the teaching and learning of mathematics, as well as how others as significant narrators make sense of them. The stories are not recalling experiences of identity work but are identity work in themselves. The stories-as-identity-work are operationalised as actual stories about the current state of play and designated stories that talk about possible futures. I recognise the influence of significant narrations by others in their context and from wider culture, however, I view significant personal narrators as telling particular stories-as-identity-work and the significant cultural narrations as echoes within the particular stories being told. I have summarised these points from this discussion in table 2-b.

<b>Mathematical identity work</b>			
Definition	Who a person sees themselves as, that is the stories that they choose to share about how they feel, think, and act in relation to the teaching and learning of mathematics, as well as how others as significant narrators make sense of them.		
Subjective/Social	Subjective The stories-as-identity-work told <b>by</b> a person.	Social The stories-as-identity-work told <b>about</b> a person by a significant narrator.	Social <b>Echoes</b> of significant cultural narrations found within particular stories-as-identity-work.
Representational	Stories-as-identity-work and the dynamics of language. Actual stories-as-identity-work, doing becomes being. Designated stories-as-identity-work, possible futures.		
Change	Action not acquisition; malleable and fluid.		

Table 2-b: The framing of mathematical identity work used in this study.

## 2.7. Summary

Using identity as a tool for analysis is complex due to the range of theoretical perceptions that define and conceptualise identity in different and contradictory ways. In mathematics education, the viewpoint of acquisition or action, found in wider discourse, is present. However, the field is moving towards perspectives that view identity as an action and take account of social and cultural factors. In order to consider the possibility of counternarratives for students who are labelled as low attaining in mathematics, it is necessary to take a perspective that rejects the notion of the acquisition of identity that seems present in the dominant discourses. Sfard and Prusak (2005) introduce the notion of actual and designated stories as one perspective that rejects essentialisation, examining the stories-as-identity-work as narrated by a person as well as the significant personal narrators in their context. However, there are echoes of more global stories, which I call significant cultural narrations, reverberating from the wider context of mathematics, which influence a person's stories-as-identity-work.

In chapter 3, I discuss the diagnostic and sociocultural views of the low attaining label, giving a brief history of the use of various related labels within the English education system. I synthesise the significant cultural narrations that are found in the context of the low attainment label that impact a student's teaching and learning experiences. Finally, I share some studies that demonstrate the potential for alternative stories in the context of students who are labelled as low attaining.

## 3. The low attainment label

### 3.1. Introduction

The purpose of this chapter is to examine dominant discourses that are prevalent in the context of students who are labelled as low attaining in mathematics. I begin by presenting a brief history of the changing language, policy and practice around the low attainment label within the educational system in England [section 3.2]. I go on to compare the diagnostic and socially constructed models of low attainment in mathematical education [section 3.2.1]. I share a model of deficient discourses in mathematics education (Adiredja & Louie, 2020) and debate the dominant cultural narrations, a term defined in chapter 2, found within the context of low attainment in mathematics [section 3.3]. I introduce into the model a third aspect, narrations about others, that gives account of the perspectives about, and of, others presenting a revised model in section 3.3.4. Finally, I share some alternative stories from research that demonstrate the potential for a counternarrative to the dominant deficient discourses [section 3.4].

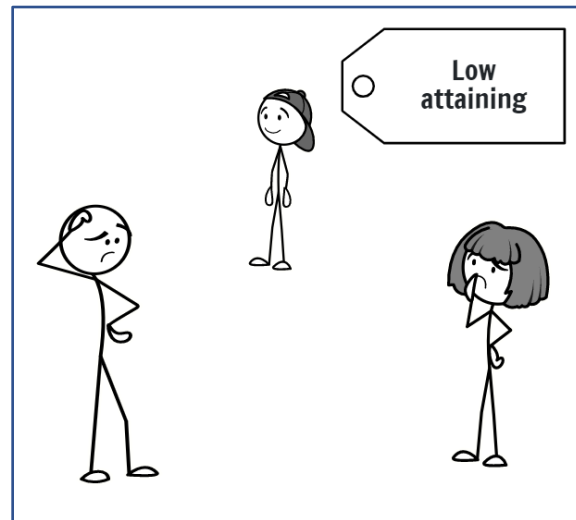
#### 3.1.1. A note about terminology

Before I begin this chapter, I need to talk about terminology. In chapter 2, I used the word “narrative”, the term used by theorists in discussions around identity work, before introducing the term “narration” within the stories-as-identity-work (Sfard & Prusak, 2005). Going forward, I am choosing to use the term narration in the same way as some theorists use the term narrative. For me, the issue with the term narrative is that a narrative can be at a macro level as a master narrative and at a micro level as a particular story being told (Devine et al., 2014). Furthermore, a narrative seems to exist outside the storyteller, essentialised in the same way as identity can be. However, the term narration talks about action. From this point onwards, I will use the term to infer the importance of both the content and the act of telling and/or retelling. This is particularly relevant for cultural narrations where the original narrator cannot be identified, but influence is widespread. As will be seen in section 3.3, I use the term “discourses” as an overall label for the debates that are reinforced by the various narrations.

### 3.2. Viewing learners within education systems

Having established my use of terminology, in this section I present a brief history of the diagnostic use of the label of low attainment in educational discourses, showing the changing language within policy and practice in England.

First Imagine the scene. You are part of a meeting with other mathematics teachers talking about teaching and learning, maybe within your own faculty or in a workshop delivered through an external provider. As a group, you are engaging with activities and strategies to develop mathematical thinking, considering what this would look like in the classroom and how students would respond. The conversations turn to which classes to trial the strategies with. Someone says “Of course, I can’t do these activities with low ability students, they won’t be able to understand what to do, they just don’t engage well enough!”



*Image 3-a: What can be done with a student labelled as low attaining?*

This is not just one story but an amalgamation of many, the various situations where I have heard students described as being certain types of learners using the language of ability. Students who have previous low attainment in assessments are characterised as being of inherently low ability, being seen as kinds of learners who behave in kinds of ways and require kinds of teaching and learning.

Within educational systems worldwide, the treatment of students who are labelled as low achieving in mathematics does vary (Scherer et al., 2016). In the majority of Organisation for Economic Cooperation and Development (OECD) countries including England, most students attend schools where some form of between class attainment grouping is accepted practice for most students, with the notable exception of countries such as Austria, Greece and Norway (Jackson, 2022; Tan & Dimmock, 2022). Specifically in England, it is rare to find that setting by prior attainment is not the norm in mathematics classrooms within most English secondary schools (Taylor et al., 2022). However, the label itself has various forms, such as low attainment; low ability; learning difficulties; disability; deficiency; at-risk; and special needs (Scherer et al., 2016). In the context of the English education system, the term low attainment is a label that is used in political and professional discourses to categorise a student who has achieved a score below government-prescribed expectations,



particularly in high stakes examinations (Hodgen et al., 2021). In their discussion on policy discourse in England, Hodgen et al. (2021) describe how the language around the labelling of students has changed over time, from the explicitly defective language of the 1960, including less than average; backwards; and less able, through to the phrase low educational achievement used in the Warnock Report in 1978, to the more relational term lower attaining introduced in the Cockcroft report in 1982. From that point onwards, there was some move away from deficient language to a greater focus on the language of attainment and equity of opportunity. However, there was still a sense of an inherent, hierarchical viewpoint despite more awareness of how social factors can inhibit learning (Hodgen et al., 2021). It was in the 1990s that the focus of English government policy began to shift to low attainment within specific subject domains such as mathematics and English, with a greater emphasis given to the basics of numeracy and literacy. The rhetoric around the impact of low attainment in mathematics drew attention to the perceived impact on the future of the individual as well as the success of the nation.

Concurrent with the shift in focus towards numeracy and literacy, from 1992 onwards there was an increased use of league tables that assess the value added by a school, measured by the progress that a student makes during their journey in education (Leckie & Goldstein, 2017). Focusing on achievements in General Certificate of Secondary Education (GCSE) [[see glossary](#)], an examination taken by the majority of students aged fifteen or sixteen years old in England at the end of their secondary education [[see glossary](#)], secondary schools have been held accountable for the outcomes of their students compared to those in other schools, using until 2016, the percentage of students who achieved five or more GCSEs between grade A\* to C [[see glossary](#)]. The accountability measures led to schools disproportionately resourcing students who were close to achieving the grade C threshold at the expense of other students (Gewirtz et al., 2021; Leckie & Goldstein, 2017). From 2016 onwards, the GCSE system was reformed with the grading system changed from letters to numbers, introducing grades 9 to 1 (with 9 being the top grade) [[see glossary](#)]. A pass at GCSE is now considered to be a grade between 9 and 4. At the same time, new accountability measures were introduced called Progress 8 [[see glossary](#)] and Attainment 8 [[see glossary](#)], which focused on the progress and attainment across eight qualifications, with mathematics and English given a double weighting to reflect their importance (Department for Education, 2020). However, schools continued to be held accountable for the number of students who achieved a good pass in English and mathematics (Gewirtz et al., 2021). (A grade 5 or above is called a good pass, with a grade 4 described as a standard pass). Hence, although the new measures were meant to indicate a move towards measuring progress over all attainment levels, this seems to not be the case for English and mathematics. In fact, evidence suggests that the reformed GCSEs, introduced in 2016, were more demanding. Teachers believe that

they are less accessible for students labelled as low attaining than pre-2016 examinations (Gewirtz et al., 2021).

### 3.2.1. Diagnostic and socially constructed models

So far, In this section, I have presented a brief history of the practice and policy decisions that occur in relation to the low attainment label, including the changing language of professional discourse and the impact of accountability measures. In this subsection, I discuss the diagnostic and socially constructed models of low attainment, arguing that diagnosis should be seen as interconnected to social values and norms.

Scherer et al. (2016) state that, within education, there is no consensus about the processes that label, classify or characterise low attainment, with the dominant practice of a medicalised model that diagnoses in contrast to a viewpoint of a more socially constructed label. The medical, diagnostic model views low attainment as individual and inherent, an acquisition of a deficiency essentialised as something that exists regardless of a person's actions and circumstance. Diagnosis consists of students being measured using an instrument that is said to be able to identify cognitive discrepancies (Scherer et al., 2016). In England, the grade achieved in a mathematics GCSE examination is used as a diagnostic tool, where a student who achieved a grade 1, 2 or 3 is labelled as low attaining, continuing to study mathematics in order to improve their grade (Department for Education, 2021). In contrast, a socially constructed view of the label of low attainment takes account of the beliefs, expectations and constructs absent in the diagnostic view. The notions of competency and cognition are said to be created against a system of norms, with both teachers and students playing a role (Gresalfi et al., 2009). The viewpoints of failure and difficulties are narrations of mathematical ability endorsed against a sociocultural model where variations in thinking are seen as deficient rather than simply different (Alderton & Gifford, 2018; Heyd-Metzuyanim, 2013). Therefore, from a social view, competency, or its lack, is no longer individual, but dynamically created through interaction and dialogue, the retelling and perpetuation of dominant cultural stories and norms. Heyd-Metzuyanim (2017) describes this process as positioning against dominant discourses, with Sfard and Prusak (2005) as being alongside culturally significant narrations. The stories told by others can impact the stories you tell about yourself. However, I argue that the diagnostic model cannot be viewed as separate from the socially constructed view. The idea of diagnosis often relies on certain social and cultural norms about what is seen to be deficient. For instance, the meaning given within policy and practice to assessment grades. Low attainment in mathematics is based on ideas of a revered level of mathematical knowledge and behaviours, however, using prior attainment is a blunt tool. The scores and grades that rank students against their peers as low, middle or high attaining, or below, meeting

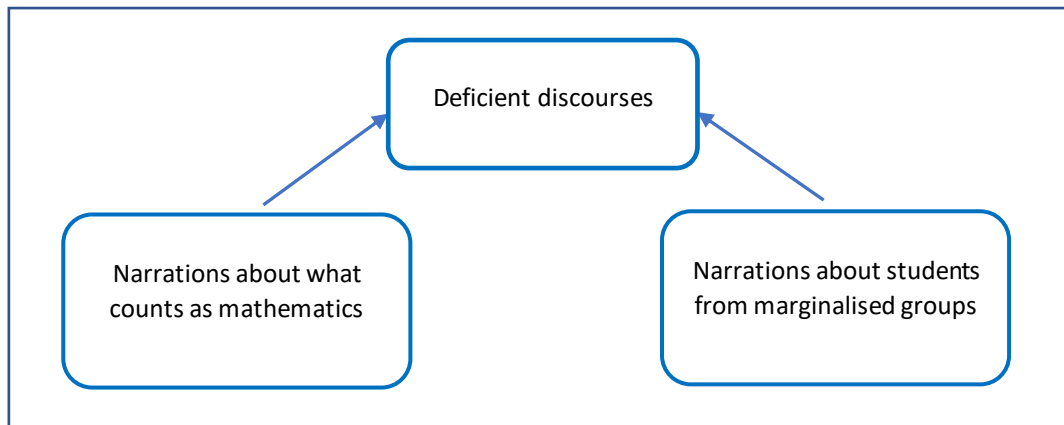
or exceeding expectations can be a matter of one assessment mark or point. Furthermore, instruments such as high stakes assessments are not independent of cultural, formal and informal knowledge (Boylan & Povey, 2020). The view of what is normal often embedded in ableist expectations, that is, ideas, beliefs and related constructs about what it is to be able and disabled, rather than an internationally agreed consensus of characteristics (Jussim, 2013; Padilla & Paulo, 2019; Scherer et al., 2016). In addition, assessment as a diagnostic process does not allow for other factors, such as present wellbeing, socio-economic status and assessment environment that can impact on-the-day performance (Boylan & Povey, 2020). Furthermore, competency is seen as inseparable from opportunity, not only what a student can do but also what they have the opportunity to do (Dunne et al., 2011; Gresalfi et al., 2009). Students who do not have genuine opportunities to, for example, exert agency can be constrained by narrations of nurture and support, perpetuating a culture of dependency where they are seen as not being able to exert agency (Mazenod et al., 2019). Discussing mathematical knowledge specifically, Hodgen et al. (2020) were not able to identify any particular threshold mathematical concepts, holding universally for students labelled as low attaining, which could have been seen as the focus of teaching and learning and by extension a key to progression. There were no mathematics topics that could be labelled as higher or lower attaining, outside of students experiencing different curricula. Hodgen et al. (2020) go on to state that they were not able to discern any patterns that distinguished lower and higher attaining students, with each individual learner, regardless of prior attainment, having their own set of strengths and weaknesses, challenging the idea of a globally being good or bad at mathematics (Holmes & Dowker, 2013). Hodgen et al. (2020) conclude that low attainment is a matter of delay, being behind others in learning, with previous low attainment being the strongest predictor of present low attainment.

Whatever term is used, or model applied, within the English education system, there are students who are being labelled as less than or lower than in relation to their peers. The very act of labelling and being labelled, positioning and being positioned, can go on to impact the behaviours of both the person labelling and the person being labelled. Thompson (2014) states that “we see ourselves as others see us” (p. 459), a form of stereotype threat where, as a result of another’s perception of traits and behaviours, a person can become what they are described as being by others, thereby reinforcing the perception. The authors go on to suggest that labelling has the potential for stickiness, impacting both present and future behaviours, in relation to the context in which the labelling occurs. Sfard and Prusak (2005) describe reifying as when the stories that describe doing become the labelling of being or having. In the case of low attainment, the doing of obtaining lower scores than peers in formal and informal assessment processes can become reified as the being of one who is low attaining (or, more commonly, having low ability).

### 3.3. Deficient discourses - significant cultural narrations

As discussed above, the discourses around the low attainment label are complex. Many factors interact, including environment and socio-economic status; instrument validity and reliability; and political policy and educational practices. In this section, I highlight the significant cultural narrations that exist in discourses around the low attainment label in mathematics, extending an existing model of dominant discourses around marginalised students (Adiredja & Louie, 2020). In subsection 3.3.4, I present the final model of discourses in the context of low attainment in mathematics to synthesise the discussion in this section.

Discourses of deficiency, which Adiredja and Louie (2020) call deficit discourses, are prevalent in the context of low attainment, entangled in, and supported by, a “web of meanings” (p. 42) both about what counts as mathematics and about marginalised or labelled students [see figure 3-a].



*Figure 3-a: A model of the web of meanings supporting deficient discourses, adapted from Adiredja and Louie (2020).*

However, Adiredja and Louie (2020) take a systemic perspective on the pervasive nature of discourses and suggest that reproduction is local and cultural as well as individual. Although individuals participate to reproduce discourses, deficient views are not solely the property of some biased individuals. Teachers might employ deficient discourses in their everyday work through, for example, teaching and learning decisions. Discourses are also nested in shared local practices within school faculties, seemingly naturalised in society at large, as significant cultural narrations.

The impact on students labelled as low attaining is not the allocation of the label per se but through significant personal narrators (such as educators, institutions and researchers) as well as significant cultural narrations that surround the label. In the next subsections [3.3.1, 3.3.2], I discuss the narrations of what counts as mathematics and narrations about students from marginalised groups in the context of students labelled as low attaining. In subsection 3.3.3, I introduce narrations about

others, an aspect that is currently missing from the existing dominant discourses model developed by Adiredja and Louie (2020).

### 3.3.1. Narrations about what counts as mathematics

I begin by examining the first aspect from the dominant discourses model [figure 3-a], that is narrations about what counts as mathematics. For students who are labelled as low attaining, what counts as mathematics is closely related to what counts as success and failure in mathematics (Heyd-Metzuyanim, 2017; Norris, 2022). Mathematics is often seen as objective and universally true, a set of formally established facts, skills and algorithms that are accessible to all (Adiredja & Louie, 2020). However, this fixed viewpoint does not reflect the cultural and political nature of the subject. As a result, no account is given of local knowledge and context as a space to explore mathematics. Engaging in mathematics is often seen as a lonely pursuit, with popular culture, such as films or television programmes, portraying an individual, usually male, activity (Mendick & Moreau, 2014). For students, being successful in mathematics has become characterised as being individual, quick and efficient in your work, following the given rules correctly by not being seen to make any mistakes (Armstrong, 2020; Boaler & Greeno, 2000; Finesilver, 2017). The final product as a correct answer can often be privileged over the process that led to the answer. Therefore, a student whose perception of themselves is that they are slower and less efficient than others may see themselves as failing (Boaler et al., 2000). Furthermore, making a mistake or struggling with a mathematical task can be interpreted negatively rather than as part of the process of developing understanding. Insisting on so called formal, standard knowledge and language, with certain approaches valued over others and externally recognisable changes in understanding, devalues the student's own informal knowledge and ways of thinking (Adiredja & Louie, 2020; Coles & Brown, 2021). However, standardisation and formality does not ask whose standards are being applied and whose processes are being privileged. The teacher is seen as the holder of the mathematical knowledge. As a result, the method or process demonstrated, and therefore sanctioned, by a teacher should be mimicked (Armstrong, 2020; Francome & Hewitt, 2020; Louie, 2017). In this way, the teacher's knowledge is prioritised over any pre-existing knowledge that the student may have. A student who diverges from the sanctioned method can be viewed by the teacher as demonstrating incorrect, rather than different, understanding of the given task (Adiredja & Louie, 2020). However, the ritualistic reproduction by a student of methods and processes, although giving the impression of someone who is good at mathematics, can be a trajectory to eventual failure (Heyd-Metzuyanim, 2015). Students may replicate procedures in a particular lesson but not be able to apply this knowledge to different situations. Evidence suggests that students being given the

opportunity to explicitly utilise mistakes as a learning strategy, discussing the incorrect alongside the correct, can have a positive impact on understanding (Francome & Hewitt, 2020).

The narration of success and failure continues with government policy in England around the status of a pass grade in the mathematics GCSE (historically a grade C but more recently a grade 4 pass [[see glossary](#)]). Although, as discussed in section 3.2, new accountability measures were introduced in 2016, the echo of the status of a grade 4 pass at GCSE still exists. Schools continue to be held accountable for the number of students who achieve a grade 5 or above in their mathematics GCSE. When students enter post-16 education [[see glossary](#)], those who did not achieve a grade 4 must continue to study mathematics in order to improve their overall grade (Department for Education, 2021). The education policy in England exists despite the fact that, for example, for a particular student a grade 3 pass may indicate considerable progress in secondary education, whereas, for another student a grade 4 pass may demonstrate little progress. For students, the grade that they receive in their mathematics GCSE, or more specifically a grade 4 or above, can be seen as future currency rather than the value of studying the subject of mathematics in its own right (Noyes & Dalby, 2020). The notion of a grade 4 pass in mathematics as a ticket or a gateway has devalued the lower grades for students (Norris, 2022). Achieving a grade 1, 2 or 3 in a mathematics GCSE is seen as a failure. A grade 4 continues to be a holy grail, for some, to no longer be forced to study mathematics and, for others, to access their possible future.

### 3.3.2. Narrations about marginalised students

The second aspect of the deficient discourse model [figure 3-a], which I discuss next, relates to narrations about students from marginalised groups. I argue that students who are labelled as low attaining in mathematics can be seen as marginalised given that their first-person voices are more often silent in research about their own identity work. Mathematics is often described using metaphors such as a narrow pathway or stepping stones, being seen as linear, with new knowledge built incrementally on what was previously learnt (Louie, 2020; Norris, 2022). However, these metaphors are hierarchical in nature, a form of ability thinking that allows some students to be described as behind or ahead in relation to other students and mathematics. Ability thinking amongst teachers and students is described as a fixed notion of inherent characteristics and potential capabilities of certain students in relation to learning mathematics (Boylan & Povey, 2020). Aligning with the medical model, the problematic term ability is seen as individual and inherent to the student and hence diagnosable. Students are labelled as high, middle or low ability, seen as having characteristics relative to the label they are given. However, the term ability gives a sense of someone's inherent potential, a limited determination of someone's future outcomes (Marks, 2014).

The most that anyone can talk about is prior attainment, a reflection of a student's past assessment result. The labels are, more correctly, high, middle and low attaining.

Often intertwined with narrations around other social categorisations, such as race, gender and socioeconomic status, low attainment as a diagnosis is seen as an in-person and/or family deficit, having particular characteristics being personal faults (Boylan & Povey, 2020; Dunne et al., 2011; Louie, 2020; Zavala & Hand, 2019). For most secondary schools in England, students are taught in classes that are setted in mathematics [[see glossary](#)], that is, grouped with other students of similar prior attainment (Taylor et al., 2022). However, between class and within class labelling and setting policies give a false sense that students within a group are at the same level mathematically (Francome & Hewitt, 2020). There is an impact both on the positioning by others and the students' self-positioning of teaching and learning behaviours (Boaler et al., 2000; Dunne et al., 2011; Francis et al., 2017; Helme, 2019; Mazenod et al., 2019). Students who are labelled as low attaining are positioned based on assumptions about inherent characteristics, classroom behaviours and learning needs. Students are described as passive, being unable to work independently (Mazenod et al., 2019), lacking in self-confidence and self-concept (Francis et al., 2017); disaffected (Boaler et al., 2000); unmotivated (Mkhize, 2017); and disruptive (Hargreaves et al., 2019). These characteristics are seen as the preserve of low-attaining students despite lack of positivity and disaffection, in relation to learning mathematics, being found in students at all levels of attainment labelling (Boaler et al., 2000; Darragh, 2015; Noyes, 2012). Furthermore, the cultural narration that a student's characteristics are individual personal faults infers that responsibility for improvement is also personal (Bellamy, 2017). If individual motivation and personal effort are characteristics that are key drivers for success in mathematics, then the reverse is seen to be true, that lack of success is a result of lack of motivation and effort (Zavala & Hand, 2019). Students labelled as low attaining report feeling powerless and isolated, experiencing feelings of shame and inferiority, having no means to address the impact of being labelled (Hargreaves et al., 2019). They report that issues around motivation are linked to repeated cycles of failure (Noyes & Dalby, 2020). Particularly in the situation where a grade 4 pass in GCSE mathematics in England is seen as having value as a gateway to possible futures, students reported that if this gateway is seen as distant and unobtainable, they are less motivated. In fact, where the qualifications available do not match a student's perceived purpose, having no exchange value, some students opt out completely by disengaging in lessons or not attending at all (Norris, 2022).

Assumptions around students labelled as low attaining can lead to restrictive, often described as deficient, teaching and learning practices compared to those used with higher attaining students (Boylan & Povey, 2020). The assumptions around the need for nurture and protection can led to a modified curriculum delivery intended as supportive consolidation, which is more often implemented

as revisiting, rehearsing and reteaching topics that have previously been taught (Coles & Brown, 2021; Mazenod et al., 2019). In turn, lower expectations in comparison to higher attaining peers leads to overly structured and controlled lessons, with teachers' perceptions around poor learning behaviours impacting on their teaching and learning decisions (Alderton & Gifford, 2018; Boaler et al., 2000). The opportunity for collaboration is restricted, with a negative correlation seen between students' prior attainment and instruction practice that involves discussion and inquiry (Noyes, 2012). However, rather than being supportive, the assumption-led practice in the classroom can encourage dependency, constructing notions of failure amongst students (Boaler et al., 2000; Mazenod et al., 2019). Marks (2014) describes "educational triage" (p. 38) as being where assumptions about students' potential capabilities are used to justify the distribution of goods and services in relation to teaching spaces and resource allocations. In her study into ability grouping [see glossary] in primary school [see glossary] mathematics, Marks (2014) observed that students grouped together because they were achieving below government expectations, were a lower priority, due to accountability pressures, than students who were at the cusp of meeting expectations. She noted shared assumptions amongst practitioners about classroom behaviour and teaching and learning requirements, which, alongside poor resourcing and a restricted pedagogy, ultimately led to an increased attainment gap for students in lower sets compared to their peers. For students who are labelled as low attaining, it has been shown that they are aware of the impact on their teaching and learning experiences of being labelled and set by prior attainment (Francis et al., 2017; Marks, 2014). Self-reported perceptions of students have indicated that the experiences of different treatment, an othering as a result of class allocation, can lead to the internalising of the label, which is a self-fulfilling prophecy where a student becomes what they are positioned to be (Francis et al., 2017; Thompson, 2014).

### 3.3.3. Narrations about others

So far, I have talked about two aspects of the deficient discourses model [figure 3-a], which I have applied to the context of low attainment in mathematics. However, I believe the model in its current form has a sense of a god's eye view, looking down onto the already marginalised student. The voice of the student themselves seems silent, suggesting they are passive, being talked about but not talking themselves [see subsection 4.3.2]. In this subsection, I introduce a third aspect that I believe is missing from the deficient discourse model in figure 3-a, that is narrations about others.

Adiredja & Louie (2020) describe deficient discourses as entangled in a web of meaning. Despite inferring complexity, the authors do not give account to the narrations that include perceptions about and of relevant others that are also entangled in the web of meanings. For example, from the



discussions above, narrations exist when, for example, a researcher talks about the assumptions and practices of teachers with respect to low attainment in mathematics, which could be seen as narrations about narrations, or at least narrations about actions perceived as related to narrations. Students who are labelled as low attaining talk about being labelled as well as the effect the practice has on their classroom experience (see, for example, Boaler et al., 2000; Francis et al., 2017; Marks, 2014; Noyes, 2012). They can discuss the impact of being labelled, for example, experiencing restricted curriculum but feel disempowered, being unable to address the issue themselves (Hargreaves et al., 2019). Students who achieve below a grade 4 pass in their mathematics GCSE, at the end of their secondary education, talk about the policy of being compelled to resit [\[see glossary\]](#) their mathematics GCSE in college [\[see glossary\]](#) as part of government policy in England (Bellamy, 2017; Norris, 2022). However, they share the impact that repeated failure has on their motivation to continue to make effort in order to improve their mathematics GCSE grade. The examples discussed above show that students are aware of the practice and policy decisions enacted by others and, as such, their perspectives are aspects of the discourses around low attainment in mathematics. This is not about passive acceptance but to some extent recognising, debating and challenging.

As well as enacted policy and practice, students also talk about other specific people that they see as relevant to their experiences of the teaching and learning of mathematics. They reflect on past and present mathematics teachers, sometimes relating these reflections to their own perceptions of teaching and learning quality (Boli, 2020; Noyes & Dalby, 2020). Often these perceptions can be quite black and white, stating like or dislike, good or bad, helpful or not, but to what extent the mutual relationship is seen as the responsibility of the teacher or the student or both is unclear. Students do talk about the importance of having a good relationship with an empathic teacher who understands their challenges (Noyes & Dalby, 2020). In addition, students talk about the impact of interactions with, and perceptions of, other students. These interactions include, for example, comparing others to themselves (see, for example, Bishop, 2012; Francis et al., 2017; Hargreaves et al., 2019) and, in relation to mixed attainment teaching, the opportunities afforded by engaging with students labelled as higher attainers (see, for example, Boaler et al., 2000; Tereshchenko et al., 2019). These narrations cannot be told in isolation but are from and within complex relationships with others.

Discussions about policy and practice and relationships and interactions with others could be seen as narrations about what counts as success and failure in mathematics or about the labelled student themselves. Furthermore, the narrations could not be seen as cultural narrations at all, but as personal stories being told to a listener. However, the prevalence of such stories suggests that they can be seen as narrations common to the culture of learning mathematics, being told and retold over various times and in different spaces. Students who are labelled as low attaining are talking back into the spaces

that are talking about them, giving their own perspectives and insight. The others that are present in the discourses of low attainment are not just those that are talking about students, but also those being talked about and to.

#### 3.3.4. Final model of discourses of low attainment in mathematics

So far in this section, I have argued that discourses, or significant cultural narrations, around low attainment in mathematics include narrations about what counts as success and failure in mathematics; narrations about students labelled as low attaining as marginalised students; and a third aspect of narrations about others. In this subsection, I summarise the narrations discussed above, synthesising them into a revised model of narrations that support discourses in the context of low attainment in mathematics [see figure 3-b].

To summarise, the first aspect of narrations about what counts as success and failure in mathematics includes the status of the grade 4 pass; the individual, quick and mistake-free view of mathematics; and prioritising teacher knowledge. The second aspect of narrations about students labelled as low attaining includes characteristics as personal faults; personal responsibility for improving; and require restricted pedagogy. However, the original model by Adiredja & Louie (2020) does not take account of the third aspect in which others are narrated. In this third aspect, narrations about others include perspectives on policy and practice decisions; and relationships and interactions [see synthesis in figure 3-b below].

In the previous chapter 2 [section 2.6], I introduced the framework of mathematical identity work that I use in this study, defined as who a person sees themselves as through the stories they choose to share, as well as how others make sense of them. The framework has subjective features that focus on stories-as-identity-work told by a person, and social features including both the stories-as-identity-work told about a person by a significant narrator and echoes of significant cultural narrations found within particular stories-as-identity-work. The revised model, found in figure 3-b, represents the dominant discourses, from a synthesis of literature, as cultural narrations that may be echoes in particular stories-of-identity-work. As one of the contributions of this thesis, in chapter 11, I critique the revised model, developed from literature and found in figure 3-b, in light of the findings of this study, reflecting on the manner to which dominant narrations influence stories-as-identity-work. I consider to what extent the speaker themselves may re-narrate, and thereby challenge, the dominant discourses of low attainment in mathematics as well as being constrained by significant narrations.

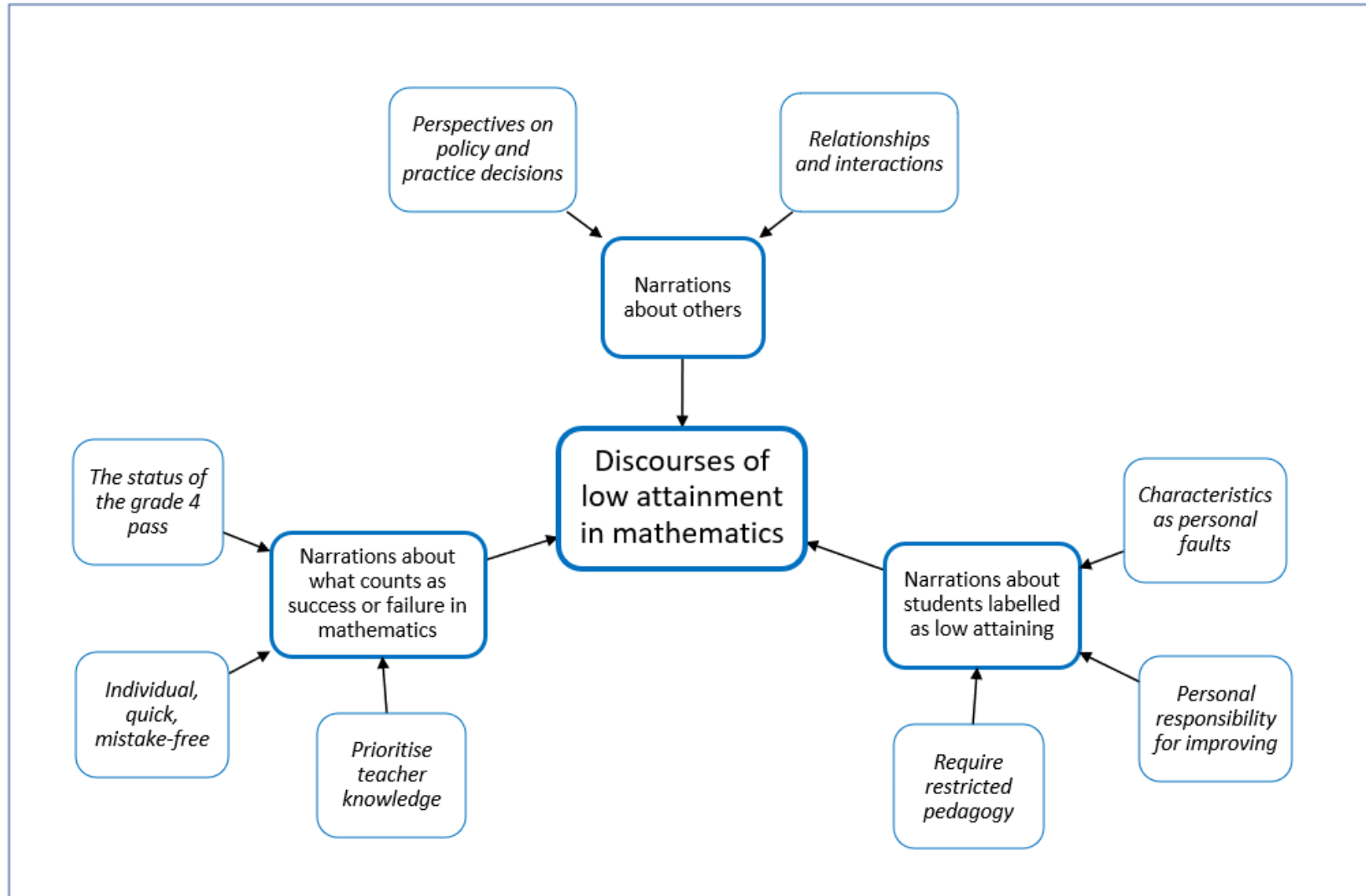


Figure 3-b: The revised model of the web of meanings supporting discourses in the context of low attainment in mathematics, adapted from Adiredja and Louie (2020).

### 3.4. Some alternative stories

Up until this point in the chapter, I have discussed the issues around the use of the label of low attainment in policy and practice in schools in England. I have created a revised model of the significant cultural narrations that support discourses in the context of low attainment as a structure for analysis. However, the focus of this study is not the deficient discourses of low expectations, restricted pedagogy or accountability pressures but on a counternarrative of possibilities for students labelled as low attaining. I now share some alternative stories from research that challenge the seemingly dominant views of students labelled as low attaining.

Where there is not a deficient viewpoint around students labelled as low attaining, there can be an impact on both teachers and students. Stories from research literature demonstrate that where a teacher is given the space and agency, in relation to their beliefs and classroom practice, to challenge dominant discourses, the teaching and learning experiences of students can be impacted. In return, the expectations and beliefs of teachers and students can shift. Watson and De Geest (2005) reported on the *Improving Attainment in Mathematics Project (IAMP)*, where the purpose of the work was to evaluate the impact of introducing innovative classroom practices in the context of low attainment in mathematics. They told the stories of teachers who were seen to innovate in their practice by providing students labelled as low attaining the opportunity to engage with learning activities that focused on mathematical thinking. The study reported improvements in behaviour, attendance, engagement and interest in lessons as well as the confidence to share ideas. The authors went on to highlight that the perceived notion that students cannot tackle mathematical thinking tasks was that they often do not have the opportunity to do so. Watson and De Geest (2005) state that the project did not lead to generalisable strategies of what works. Some practices were contradictory, but there was evidence of collective beliefs and values that the researchers described as principled beliefs. The principled beliefs of teachers in the study, around teaching and learning, included the belief that equity of resources and a broad curriculum was the right of all students. Regardless of their prior attainment, all students should have the opportunity to develop their mathematical thinking. In a similar fashion, although looking more generally at the subjects of English, mathematics and science, Dunne et al. (2011) share stories from in-depth case studies of thirteen local authority schools. By reviewing value-added scores [[see glossary](#)] and attainment data, the researchers chose certain schools as case studies that were making good progress with students labelled as low attaining. The authors found that, although there was variation in practice and policy, teachers in the case-study schools focused on strategies and innovations that they perceived had a positive effect on the self-esteem of students. There was evidence of strong interpersonal relationships and the celebration of different kinds of student achievement rather than just outcomes of assessments. As a result, the

study found that the schools and teachers challenged the deficient views of students that were stereotypically associated with teaching groups set by prior attainment, which the authors suggest led to improved outcomes. However, it is not necessarily beliefs first that lead to actions second. Having the courage to act and reflecting on the impact can lead to subsequent shifts in beliefs and expectations. Coles and Brown (2021) illustrate the use of action research as a space for self-reflection and collaborative work with teachers as part of a university course. The teachers who engaged with the course came from schools that were less successful, using accountability measures [see glossary], compared to other schools nationally, contrasting with the study conducted by Dunne et al. (2011). The authors shared the stories of three teachers, all of whom had chosen as their focus for action research the teaching and learning experiences of students labelled as low attaining. The participant teachers taught topics that they considered to be advanced, being above expectations for students labelled as low attaining. The teachers were starting to challenge their prior assumptions around curriculum choices. As a result of their action research, the teachers reported better performances by students in mock examinations [see glossary] compared to previous assessments. There was anecdotal evidence of positive shifts in student engagement, confidence and a more connected understanding. Furthermore, the teachers spoke about changes in their own expectations as a result of engaging in the action research, recognising for themselves that students were able to engage, think for themselves and take ownership of their learning. It is not necessarily always the teacher that is influential, but the expectations of anyone that engages with a student. Finesilver (2017), in her study of representational approaches by students labelled as low attaining, reported that, although the teacher continued with their usual pedagogical practices, in her own conversations with students the author established different expectations to those in the current experiences of the students. The author removed the time pressure and notions of a particular prescribed methods that students perceived were part of tackling mathematical activities. These alternative expectations gave students the opportunity, over time, to begin to focus on the process over the answer, being able to reason about the journey that led to the answer, whether it be right or wrong.

Povey (2020) states that a transformability perspective, the belief that learners can change, is key to enable students to redevelop a productive relationship with mathematics. The stories discussed illustrate that where a teacher or other significant adult makes conscious decisions in their classroom practice that start to disrupt the dominant discourses of low expectations and disengagement, with persistence, the experiences and perceptions of and about the student change. The positioning by the teacher, and the self-positioning by the student, show different patterns in relation to mathematical possibilities rather than deficiencies. The effects of expectations, attainment based or otherwise, are fragile and fleeting, malleable to context (Jussim, 2013). When students labelled as low attaining are

afforded the opportunity to engage with teaching and learning that is outside of practices that lead to “infantilisation and denegation” (Francis et al., 2017, p. 107), the students are able to engage in ways that could be described as beyond attainment-based expectations.

### 3.5. Summary

The diagnostics use of the label low attaining cannot be separated from sociocultural norms. Any instrument that claims to measure low attainment is embedded in notions of what is considered normal or able. Despite this, in the education system in England, students are labelled and set by attainment in mathematics as general practice in schools. However, a recent study by Hodgen et al. (2020) that focused on low attainment could not find any threshold concepts in mathematics that could be described as difficulties of all students labelled as low attaining. They concluded that the greatest predictor of current low attainment was previous low attainment.

The model of Adiredja and Louie (2020) on deficient discourses showed two narrations that were linked to deficient discourses in mathematics, namely, what counts as mathematics and about students from marginalised groups. For discourses around low attainment, I argue that what counts as mathematics is closely linked to what counts as success and failure in mathematics with narrations about marginalised students aligning with students labelled as low attaining. However, the model of deficient discourses [figure 3-a] does not give account to the narrations about others that occur within discourses of low attainment. This third aspect of narration includes students’, or others’, perspectives of policy and practice decisions as well as the relationships and interactions with teachers and other students [see figure 3-b in section 3.3.4 for the final revised model].

Finally in this chapter, I used the work of Watson and De Geest (2005); Dunne et al. (2011); Coles and Brown (2021); and Finesilver (2017) to illustrate the fragile nature of expectations. In these stories, the focus was on the teacher or another adult. The assumption could be made that it was solely through the voice of the adult that different patterns of classroom behaviour are identified. In chapter 4, I examine methodological issues in research on students’ voices. I discuss the use of students’ voices in research into mathematical identity before considering, in more detail, research on identity work in the context of low attainment in mathematics.

## 4. Methodological issues in research on the voices of students

### 4.1. Introduction

The purpose of this chapter is to investigate the presence of students' voices in literature on mathematical identity work in the context of low attainment. First, I review how the voices of students have been researched in educational literature, including as classroom talk; the use of the term "student voice"; and perspectives on, and within, teaching and learning [section 4.2]. I consider the use of students' voices in research into students' identity [section 4.3]. More specifically, in subsection 4.3.1, I discuss students' voices in research into mathematical identity. I talk about the marginalisation of the voices of students labelled as low attaining in relation to their own mathematical identity, drawing attention to a gap in the literature [subsection 4.3.2]. Finally, I highlight one of the ethical issues around students' voices in relation to perceptions of competency [section 4.4]

### 4.2. Researching the voices of students

In this section, I review how students' voices have been researched in educational literature. I use the word "student" to cover the range of terms, including pupil and learner, that refers to children or adolescents in compulsory and post-compulsory education up to the age of 18 years old.

The voices of students in schools have been researched widely, with a search on Google Scholar using all the terms students, voices, school, returning a figure of 20,500 articles for 2022 alone (retrieved on 19/8/22). From my review of educational literature, I began to notice a distinction between studies where the dialogues of students were the object of study with those where the voices of students were seen as perspectives on an object of study. I have categorised the discussions of students' voices in three different ways, namely examining students' classroom talk; critiquing how educators engage with students using the term student voice; and capturing students' perspectives about their learning experiences. Firstly, debates around classroom productive talk, as dialogue that contributes to learning, have mostly focused on key issues around types of talk interventions, that is, how the pedagogy of teachers can promote productive talk (Khong et al., 2019). Students are said to internalise their experiences of teacher-student interactions, hence making them their own. Sedova et al. (2019) argue that classroom talk that features listening and asking questions supports the quality of a student's retention of knowledge, hence impacting their levels of achievement. Hardman (2019) claims that extending the contributions of students during whole class teaching, prompting them to elaborate on ideas, is a key indicator of quality classroom talk. In mathematics education, students who engage in dialogue as part of small group work are said to learn more as they interact together, despite the possibility of limited talk specifically around mathematics (Wood & Kalinec, 2012).

However, one study argues that the possible link between being vocal in the classroom and improved outcomes is problematic, stating that students who are silent but actively listening learn as much as those who are vocal (O'Connor et al., 2017). A few studies on students' talk focus on the cultural nature of language. The unique structure of discourses used, for example, in mathematics teaching and learning, including by students in the classroom, is said to be linked to the specific word meanings, symbols and procedures within the domain (Sfard, 2008). In addition, students, who are taught mathematics in the medium of English despite this being the second language of both teacher and students, can be hindered from engaging in mathematical reasoning (Robertson & Graven, 2019). However, using the cultural backgrounds of students as contexts for problem solving activities can motivate students to engage in mathematical talk (Moreira & Latas, 2014).

The second perspective when researching students' voices focuses on the activities used in schools to gather the perceptions of students. In 1989, the United Nations Convention on the Rights of the Child (UNCRC) granted all children and young people a comprehensive set of rights around four central principles, namely the right to non-discrimination; the right to have the best interests of the child as a primary concern; the right to life and development; and the right to be heard. The final principle, the right to be heard, said that all children had the right to express themselves freely, participating in decisions and exerting influence on matters that relate to their lives. Since the publication of the treaty, various government directives in England have legally obligated schools and Further Education (post-16) colleges [\[see glossary\]](#) to consult with students about their educational experiences (Hall, 2020). The phrase student voice is widely used to represent both the concept and practices that include students in meaningful processes in order to inform classroom practice (Cook-Sather, 2020). Moving away from the view of passive and silent vessels, students are repositioned as having knowledge, drawn from their various experiences of teaching and learning, that can act as catalyst for transforming the practice of teachers (Cook-Sather, 2020; Fielding, 2004; Mapolelo, 2009; Mayes et al., 2021; McIntyre et al., 2005; Warwick et al., 2019). Having written extensively on the subject of student voice, Fielding (2011) developed a framework called patterns of partnership, which are the range of interactions where adults listen to students. The framework begins with students as data sources at its most basic level, moves through students as active respondents, co-enquirers, knowledge creators, joint authors, to, finally, at the highest level, intergenerational learning as lived democracy. Each form of interaction has different power relations in the way that they enable or prohibit contributions by either the teacher or the student. Despite discussions around effective practice (see, for example, Bloemert et al., 2020; Halliday et al., 2019; McIntyre et al., 2005), many authors argue there are a number of issues that can impact the meaningful processes of student voice in the sense of this second perspective. Mayes et al. (2021) caution that even well-intentioned



teachers may only superficially engage with the voices of students. As teacher listeners, they do not give sufficient thought as to why they are seeking students' opinions. Mayes et al. (2021) go on to say that there is a risk that the insights offered can be translated into a toolbox of what works rather than fundamental changes in thinking. Pearce and Wood (2019) argue that where education is seen as the production of human capital, students' voices are listened to in relation to quality assurance, aligned with both raising outcomes and economic growth. Students are actively-passive consumers evaluating a service that is being provided, actively present but only passively within the boundaries set by the institutional quality assurance requirements (Cook-Sather, 2020; Hall, 2016; Mayes et al., 2021). Student voice initiatives became invited spaces that mimic the structures of adults rather than the informal relational spaces found in students' everyday lives (Horgan et al., 2017; Shier, 2010). Furthermore, students who are invited to participate, who choose to respond, are disproportionately those seen as well behaved. They are not necessarily representative of, or able to advocate for, different types of students (Horgan et al., 2017). The culture of individualism results in school initiatives being often enacted as forms of personal development, such as to enhance an application form for university (Finneran et al., 2021).

The final perspective of research that uses students' voices moves away from what is said (or not) during teaching and learning, or in wider school initiatives, towards gathering students' perspectives. Although seemingly similar to perspectives of student voice discussed above, studies do not talk about how students are consulted by schools but seek to understand about specific school experiences from the students' point of view. However, the use of students' voices is nuanced, with a subtle difference between students' voices on an experience and students' voices from within an experience. Students' voices on an experience talk about perceptions of a particular situation. Researchers have used students' voices to gain insight into a wide range of topics, including, for example, the use of information technology in secondary school [[see glossary](#)] (Olofsson et al., 2018); perceptions of mixed attainment teaching [[see glossary](#)] (Tereshchenko et al., 2019); and, more recently, the impact of online learning during the covid-19 pandemic (Walters et al., 2022). Some authors have synthesised literature on a particular topic to gain a broader picture of how students talk about their experiences (see, for example, Coleman et al., 2015; Miller et al., 2018). With the main focus being the situation, rather than the student, studies often introduced other forms of data, for example, the voices of teachers, classroom observations and attainment data (see, for example, Dunne et al., 2011). However, studies that use students' voices from within an experience, the perspective on students' voices taken in this study, focus on the lived experiences of students in educational settings. Students' voices from within lived experiences may talk about, for example, choices they have made; emotional responses; and the sense they make of themselves. Research into lived experiences takes a narrative

approach, exploring a person's stories about their ordinary lives, seeing them as sources of important knowledge and understanding (Clandinin, 2013). As the main focus is the student within a context, any other data gathered, such as observations, is used primarily for eliciting stories within the interview process (see, for example, Hargreaves et al., 2019; Ruglis & Vallee, 2016). Farrell (2020) states that "the ability to learn from the experiences of others presents one of the greatest opportunities available to us as human beings" (p. 7), claiming that when it comes to what she refers to as purposeful research, educators hesitate to use the experiences of others as a source of information. Despite this claim, there are a number of studies that employ students' stories of their lived experiences. In one such example, in which students shared stories about feeling misrecognised in school, Moensted (2022) studied the intersection between disadvantage and disengagement. The students spoke about internalising emotions such as shame, apathy and indifference, or externalising emotions as anger and opposition. In another study, in which students shared stories about their experiences of social inclusion, Edmondson and Howe (2019) investigated the experiences of students with moderate hearing loss who attend mainstream schools [[see glossary](#)]. The students talked about the impact of supportive peers on their school experiences as well as their own perceptions of their moderate hearing loss. In both these examples, the stories were told from a personal perspective, the students' first-person stories about their lived experiences, or at least a version they chose to tell. Both Edmondson and Howe (2019) and Moensted (2022) talk about how sociocultural discourse can shape perspectives, discussing hierarchies and relationships, giving attention to the individuality of each experience expressed in the students' own terms. As I discuss in subsection 4.3.2 below, for this study, I took a methodological perspective that focused on the lived experiences of students labelled as low attaining. Giving attention to the individuality of students' experiences problematises the essentialisation that occurs when a student is allocated the label of low attaining.

### 4.3. Identity work and students' voices

In the previous section, I reviewed the methodological approaches to using students' voices in educational research, including investigating classroom talk; the term student voice; and perceptions on, and lived experiences in, teaching and learning. However, educational settings such as schools are said to play a pivotal role in the development of students' identity development (Kaplan & Flum, 2012). In this next section, I continue to review the use of student voice in research on learners' identity. More specifically, in subsection 4.3.1, I discuss the use of students' voices in research on mathematical identity. In subsection 4.3.2, I highlight the marginalisation of students' voices in research on mathematical identity in the context of the low attainment label.

In a review of literature into adolescents' learner identity, Verhoeven et al. (2019) found that over half of the studies they examined took a sociocultural perspective, with approximately one third combining a range of perspectives, or not taking a particular theoretical position at all. The authors describe the sociocultural perspective as viewing identity, or identity work, as multidimensional, being investigated through narratives of self-understanding and/or observations of participation. Examining the document that listed the reviewed studies (Verhoeven et al., 2019), I noted that a large majority of the studies included students' voices, mostly, but not exclusively, gathered through interviewing. The use of students' interview data was particularly prevalent where the studies took a sociocultural perspective, a combined perspective or no perspective at all. A large number of the studies used students' voices in combination with other data sources such as observations and teachers' voices, with only 10% of the studies using the voices of students exclusively as their sources of data. I would argue that the low percentage could suggest that the voices of students, although present in studies on students' identity, were not necessarily considered to be the central concern.

#### 4.3.1. Mathematical identity work

Having briefly considered the use of students' voices in relation to students' identity, in this subsection I focus on how studies incorporate students' voices into research on students' mathematical identity. A number of studies investigate participation in the classroom through the lens of identity, with the voices of the students collected as classroom talk. Turner et al. (2013) focus on mathematical discussions amongst groups of students who they described as English as a second language learners. The participants went through several transformations in how they saw themselves (or not) as competent mathematicians, which the authors argue is evidence of dynamic identity formation. Bishop (2012) and Wood (2013) investigate classroom discourses at a microlevel, arguing that identity work responds to minor changes in context. The authors state that small shifts in context, such as changes in how students position each other, can impact learning. Both Andersson and Wagner (2019) and Davis and Williams (2009) consider identity work within discourses that are a fusion of both mathematical and non-mathematical talk. Identity work is described in terms of intersectionality of mathematical and social elements. Grootenboer and Edwards-Groves (2019) and Heyd-Metzuyanin (2013) reflect on the interactions between the teacher and a student, investigating the impact this may have on identity co-construction. For Andersson et al. (2015) and McFeetors and Mason (2005), the talk within the classroom was seen as informal interviewing, both talk about mathematics and talk about the experiences of learning mathematics. As the focus of the studies discussed above were on classroom interactions, data collection methods included classroom observations as video recordings; field notes of peer-to-peer, teacher-student and spontaneous researcher-student conversions; lesson

artefacts such as students' log books and blogs; with some interview data gathered from students, teachers and other adults.

In contrast to classroom talk, other studies investigate students' experiences of learning mathematics through the lens of identity, with the voices of students as perspectives, stories collected mostly through interviews and focus groups. Bibby (2009) takes a psychoanalytical approach to examine the impact of pedagogical practice on students' identity. The students highlighted how their experiences were related to relationships, being seen and valued (or not) by their teacher. Hodgen and Marks (2009) and Solomon (2007) investigate students' experiences in relation to labelling as high and low attaining. The authors discuss the students' perceptions of pedagogical practices, contrasting how differing practices impact on students' mathematical identities. As part of a study into students' identity as a doer of mathematics, Cobb et al. (2009) looks at students' perceptions of classroom obligations and competence as a result of engaging in a class that was organised in a different way to the students' usual experiences. Some studies focused on students' perception of themselves within the teaching and learning of mathematics. Black et al. (2010) use the term "leading identity" (p. 55) to describe students' motivations for studying mathematics in a post-16 college. The authors compare two students in relation to their future aspirations, the students saw themselves as having either a vocational or an academic identity. Chronaki and Kollosche (2019) use discourse analysis to consider about how one student was articulating a dialogue of "refusing mathematics" (p. 461). The authors examine her identity work through the way the student talked about her relationship with mathematics learning, for which she used phrases such as humiliating, pointless and sitting still to listen. Foyn et al. (2018) investigate "clever girls' stories" (p. 80), where female students author themselves as being good at mathematics. The students talk about needing to be clever but not at the social cost of being seen to be a nerd. Hall et al. (2018) discuss the complexity of mathematical identity work, which they describe as negotiated and dialogical. The authors contrast one student's "people pleaser" voice with her "help me" voice, arguing that the notion of listening for one coherent learner identity is problematic. Hodge and Harris (2015) investigate the intersection between mathematical identity and socioeconomic status, highlighting the importance of understanding the perspectives of students, recognising individual stories of success.

Despite the number of ways that students' voices are used, there are few examples of the students themselves having the opportunity to interpret, or comment on the interpretation of, their own mathematical identity work. One such example can be found in a study by Simpson and Quigley (2016), in which the student participants are given the opportunity to review the interpretation of their narratives as part of the analysis process. The authors describe a process of member checking, discussing with participants the researcher's identification of cooccurring voices through the use of an

l-poem within the Listening Guide process of analysis (Gilligan et al., 2006) as well as a diagram that represented the possible connections between words and phrases. The process allowed the student participants to confirm or challenge the interpretation of their own data, informing the findings by including missing perspectives in a way that disrupted the power relations between researched and researcher. Simpson and Quigley (2016) conclude that member checking within mathematical student identity work research, engaging with self-reflection throughout the process, can be a transformative process for both participant and researcher.

#### 4.3.2. Mathematical identity work and low attainment

In this section so far, I have reviewed the use of students' voices in research on learner identity. More specifically, I have discussed the use of students' voices in research on mathematical identity. However, in this subsection, I talk about what I have come to view as the marginalisation of students' voices in literature on mathematical identity in the context of low attainment. Gutiérrez (2013) states that:

Without the voices of marginalized people commenting on their own interpretations of mathematics practices in which they are engaged, we are unlikely to fully understand the possibilities for other arrangements in mathematics education (p. 52)

In order to hear possible alternative stories to dominant discourses, attention must be given to the voices of those historically marginalised. There is a gap in the literature in which the voices of students labelled as low attaining are foregrounded as the central concern in discussions about their own identity work. Although there are studies that incorporate the voices of students who are labelled as low attaining in relation to other themes (see, for example, Dalby & Noyes, 2015; Hargreaves et al., 2019; Hodgen et al., 2020; Johnston-Wilder et al., 2015), there are few studies that use students' voices to talk about the lived experiences of low attainment. The studies that do investigate the voices of students labelled as low attaining often include the voices of others. In one example into the co-construction of learning difficulties, Heyd-Metzuyanim (2013) discussed the case of one student as extremely low-achieving. The voice of the student is found in the extracts from the teacher-student interactions, which the author argued played a pivotal role in the development of a disabled mathematical identity. However, the focus of the study is the interactions, including to some extent the experiences, of the teacher-researcher. The student's own perspectives are not present. In another example, Hodgen and Marks (2009) investigated students' perspectives on pedagogy to examine the pervasive nature of discourses around assessment scores. The study focused on the reifying nature of discourses around assessment with teachers and students said to co-construct mathematical identities. In their analysis, Hodgen and Marks (2009) discuss the voices of students labelled at all attainment levels alongside classroom observations and the voices of teachers, arguing

that students categorise themselves as being good or bad, top or other, in relation to learning mathematics. In a similar way, Solomon (2007) introduced the voices of students to investigate mathematical identities, gathering data from a range of students picked randomly by the head of the mathematics department. The author compared the experiences of students in the top set [[see glossary](#)] with those in lower sets, focusing on the difference between top set identities and lower set identities. As can be seen in the studies discussed in this subsection, there are some examples of the voices of student labelled as low attaining being employed in studies into learners' mathematical identity, however, they are in comparison with other voices, such as higher attaining students and teachers. In this study, I sought to extend these previous works by attending to the question of who a student labelled as low attaining sees themselves as, their lived experiences told through the first-person voice of the students themselves.

#### 4.4. A note about ethics

Up until this point in the chapter, I have talked about how students' voices are used in research, including research into mathematical identity work and the gap in literature that foregrounds the voices of students labelled as low attaining. There is one matter of ethics that I want to highlight at this point. McLeod (2008) argues that when it comes to the voices of children (and by extension students) it is not whether they are heard or not, but how well they are heard, that matters. If students' voices are to be used as experts in their own lived experiences, they need to be seen as competent social actors. Up until the second half of the twentieth century, lawyers, ethicists and researchers saw children as "not yet a person" due to their under-developed reasoning skills (O'Neill, 2018). Children were seen as having diminished decision-making skills, needing to be protected as vulnerable participants in research. O'Neill (2018) goes on to say that through the emergence of "child as person" discourses, and, more recently, "child as agent" discourses, they are now seen as competent social actors. This is not to say they should not be protected as vulnerable participants, but that they should be seen as capable of forming their own opinions and influencing change. In order to foreground the voices of students as valued, it follows that there needs to be a change of mind set around competency (Horgan et al., 2017; McLeod, 2008; Shier, 2010). It is a delicate ethical balance between, on one hand, protecting students and on the other, giving them opportunities to voice their perspectives (O'Reilly & Dogra, 2017). Fielding (2004) states that there are no spaces where educators and students are equal - as such, the voices of students can continue to be marginalised. Despite the inequality, Lundy (2018) argues that it is better to have some chance to listen to voices of students, however tokenistic, than to exclude them entirely. Arcavi and Isoda (2007) say that listening to students should not be a passive activity, stating that careful attention should be given to what they say and do. The activity of listening to the voices of students should not be a tick box activity, but a

valuable way to respond to the unique contribution that students' voices have for others to understand the educational experiences of students.

#### 4.5. Summary

The voices of students have been studied widely in educational research from a range of methodological perspectives. Some studies focus on classroom talk, examining the productive nature of classroom interactions and issues with the cultural forms of language. Other studies discuss the use of student voice initiatives within schools, highlighting the barriers to meaningful process. Finally, students' voices have been used to gather perspectives, with a subtle difference between voices on, and voices within, teaching and learning. Students' voices have been employed to examine mathematical identity using data from interviews and classroom observations. Mathematical identity is discussed in relation to participation (or not) in the classroom and students' stories about the experience of learning mathematics. However, there is a gap in literature where the researcher uses a methodology that focuses specifically on the first-person voices of students labelled as low attaining from within their lived experiences. The students' voices have been marginalised in discussions of their own identity work. In order to understand who a student sees themselves as being in relation to the teaching and learning of mathematics, as discussed in chapter 2, it is necessary to give attention to their stories-as-identity-work. In the context of low attainment, the social dimension of mathematical identity work [see section 2.6] can be given precedence over the first-person voice of students. The echoes of significant cultural narrations [see section 3.3] can serve to essentialise the student mathematical identity. From an ethical point of view, there is an issue found in the use of students' voices. I argue that for the voices of students to be seen as valued, as participants students need to be viewed as competent social actors. There is a delicate balance required between protecting students as vulnerable participants and facilitating their right for opportunities to be heard.

In the next chapter, I discuss the perspective and methodology taken in this study. I position myself as a feminist researcher whose intention is to learn to listen to the voices of students and their teacher. I introduce the methodology of poetic inquiry as a means to examine stories-as-identity-work.

## 5. The methodology for this study

### 5.1. Introduction

In this chapter, I present myself, a feminist researcher, introducing the poetic inquiry methodology used in this study. I begin by sharing some issues that I faced in my journey to labelling myself as a feminist researcher [section 5.2]. I discuss the feminist perspective of ethics of care and the methodological considerations when planning a study [subsection 5.2.1]. I review the methodology of poetic inquiry, chosen for this study, as a way to examine the identity work of students from within their lived experiences, discussing poeiticity, or poetic function, as found in discourse and language [section 5.3]. I share examples of poetic structures used in mathematics education research, drawing attention to a gap in the literature [subsection 5.3.1]. Finally, I discuss the grouping of poems as a method that gives a nuanced understanding of the voices of participants [subsection 5.3.2].

### 5.2. Becoming a feminist researcher

I begin chapter 5 by sharing my journey to becoming a feminist researcher, aligning with the feminist perspective of ethics of care. In a study that focused on the impact of labelling, it was no surprise that I found it challenging to give a label to the perspective that I would take. There was a sense that in labelling a perspective for this study, I was also labelling myself as a researcher, being obligated to act in a certain way because of the label I had chosen. I was uncertain about being defined as a particular kind of person (Gee, 2000) with a specific world view. In hindsight, I realise I was engaging in my own identity work to discover who I saw myself as. Of course, as a researcher I did have a worldview, what I did not have was the specific label.

I began by reflecting on the features of the study. In the context of mathematics, there are a number of dominant discourses [section 3.3] that position students labelled as low attaining in a deficient way. these are part of the status quo that perpetuates marginalisation. My aim was to challenge the objective view of students labelled as low attaining, by foregrounding, putting centre stage, their own voices. I wanted to hear the students' own subjective stories, understanding their experiences from within the context of low attainment in mathematics. I also knew that I wanted to think carefully about myself as a researcher. I wished to be overtly reflexive about my own impact on the research as a subjective human being, ensuring that I worked alongside, rather than on, participants. By focusing on multiple, subjective realities, I rejected the objective knowledge of a positivist. I considered the fit of labelling myself as an interpretivist. However, although the interpretivist paradigm seeks to explore the perspectives of participants, acknowledging the subjective nature of a person's reality (Creswell &



Creswell, 2018; Wellington, 2015), the stance does not challenge pervasive dominant discourses. I wanted to find out what stories were going unheard by listening to other voices, such as teachers, above the voices of the students themselves. I felt that giving myself the label of interpretivist did not fully describe my world view, that is, wanting to engage with the voices of students that I believed were being marginalised. In this study, I had chosen to take a critical stance (Cohen et al., 2018). Critical educational research is concerned with social justice and emancipation, questioning the status quo with the intent to transform and empower (Bronner, 2017; Cohen et al., 2018; Creswell & Creswell, 2018). From a critical perspective, ontologically speaking, the nature of reality is multiple and complex, with some views of reality privileged over others (Cohen et al., 2018). The social realities of marginalised individuals, told from their own point of view as an expert voice, need to be prioritised in order to engage with issues of power and oppression, considering not what is but what could/should be (Bronner, 2017; Hesse-Biber & Leavy, 2006). The worldviews that I considered at this point, resonating within the critical paradigm, were critical theory and feminist research (Cohen et al., 2018). Critical theory investigates issues of oppression and dominance, arguing that one group's freedom is at the expense of another's. Feminist research, closely connected to critical theory, talks about ways of doing research that are emancipatory for marginalised groups. I chose the label of feminist researcher, rather than a critical theorist, to indicate how I would behave as a researcher. A feminist view takes seriously the idea of reflexivity, understanding the impact I have as a researcher on the research that I conduct (Allan, 2020).

### 5.2.1. A feminist perspective on ethics of care

Having shared some of my journey to becoming a feminist researcher, in this subsection I talk about the feminist perspective on ethics of care and five methodological considerations when planning a study. Feminist qualitative practice originally arose in resistance to the objective nature of the positivist paradigm, which was argued to be distorted by a male-dominated viewpoint (Allan, 2020; Hesse-Biber & Leavy, 2007; Lindemann, 2019). As a result, feminist scholars were motivated to develop different ways of doing research, centred within the experiences of women (Leavy & Harris, 2019; Wigginton & Lafrance, 2019). Feminist research is described as a critical scholarship, defined as that which disrupts the power of the status quo (Leavy & Harris, 2019). Originally addressing the experiences of women and girls, contemporary feminist research concerns itself with all forms of social change (Leavy & Harris, 2019). Gilligan (1993) describes women-centred practices as using a different voice, with listening seen as an intensely relational act requiring closeness, dialogue and interactions (Belenky et al., 1986). From an epistemological point of view, knowing is relational and socially situated (Wigginton & Lafrance, 2019), therefore I, as a researcher, cannot be separate from the activity of research. However, if knowing is found in relationship, then the importance of working

ethically is paramount. The idea of doing no harm is an ethical consideration that should pervade every stage of research, from design to dissemination (Calder, 2019; Pole & Morrison, 2003). Although ethics involves regulatory approval [you will find my ethics approvals in [appendix B](#)], thinking ethically goes beyond the sign off by ethics committees. Fetterman (1998) uses the metaphor “walking softly through the wilderness” (p. 129), which gives a sense of treading gently so as not to leave an impression. Ethics from a feminist point of view acknowledges the web of relationships in which, for example, participants and researchers are nested. It is not possible to be in a context without having some impact. It is important to reflect, as an ongoing process, on the power relations that exist in any social situation, especially within research practice. Therefore, reflexivity has become a key tenet within feminist research through the ethics of care (Allan, 2020).

Reflexivity involves the ongoing consideration of the ways in which values and assumptions that arise from, for example, life histories and social position, can shape the research process (Lafrance & Wigginton, 2019). The feminist ethics of care relates to potential issues for imbalance in participant-researcher relationships (Hesse-Biber & Leavy, 2007; Lindemann, 2019). The features of the ethics of care involve:

- A caring relationship: care about participants so as not to be impersonal or self-serving.
- Engagement with another’s’ will: paying close attention to the feelings, needs, ideas and wants of participants.
- Paying attention to the particulars: be aware of abstract thinking, rather be guided by particular situations and particular participants.

(Summarised from chapter 6 of Lindemann, 2019, pp. 107-109)

The ethics of care focuses on the participant-researcher relationship as moral practice, that is ethical practice to avoid exploitation (Hesse-Biber & Leavy, 2007). Wigginton and Lafrance (2019) list five key methodological considerations, for a feminist researcher, to maintain an ethics of care perspective in a study, namely: the politics of asking questions; attention to language and discourse; reflexivity; representation and intersectionality; and mobilising research for social change. Firstly, the politics of asking questions and attention to language and discourse, both focus on the choice of language in a study. These methodological considerations begin with the assumption that language is not neutral (Lafrance & Wigginton, 2019). A researcher needs to examine their choice of, for example, research questions; terms used in recruitment procedures; and interview prompts, to consider how these may influence participant engagement. How we ask is as important as what we ask. Reflexivity, representation and intersectionality consider the impact of the researcher within the project. As a feminist researcher, I needed to be explicitly located within the study, examining the impact of my

own positionality (Allan, 2020; Foote & Gau Bartell, 2011). My own social location, and those of the participants, needed to be acknowledged, with any points of difference made explicit (Lafrance & Wigginton, 2019). It was essential to examine the normative assumptions that I might bring to the research endeavour (Lindemann, 2019). Finally, mobilising research for social change refers to the transformational intention of feminist research. One of the purposes of feminist research is to critique what is the current state of play, which perpetuates marginalisation, in order to reimagine what could be (Lafrance & Wigginton, 2019). The methods used in a study should be intentionally designed to contribute to change. For each consideration, Wigginton and Lafrance (2019) suggest that there are a range of potential questions that I should ask myself as a feminist researcher, which I have adapted for the context of this study [see table 5-a].

<b>Methodological considerations</b>	<b>Questions relevant to this study</b>
The politics of asking questions	How are the interests of students labelled as low attaining served by studying students' voices?  How can I produce a study that confronts the dominant discourses that exist around students labelled as low attaining?  What assumptions are inherent about the mathematical identity work of students labelled as low attaining?
Attention to language and discourse	How could the terms that I use in the study, for example, low attainment and mathematical identity, act as barriers for participants?  Do the data collection methods position students as experts in their own stories-as-identity-work?
Reflexivity	What impact does my personal experiences of being labelled have on the study?  How can I address the potential for hierarchy in my participant-researcher relationships?  In what ways can I be open to negotiate, rather than control, the realities of the project?
Representation and intersectionality	How will I address the differences between myself, as a previous mathematics teacher, and the participants, as students resitting their mathematics GCSE <a href="#">[see glossary]</a> ?  How will I represent the voices of students in a way that does not perpetuate dominate discourses?
Mobilising research for social change	How do I conduct myself within the teacher-researcher partnership [see section 6.4.4] to allow students' voices to be listened to by their teacher?  In what ways will I amplify the need to centre stage the voices of students, beyond this particular project?

*Table 5-a: Feminist methodological considerations when examining the identity work of students labelled as low attaining, adapted from Wigginton and Lafrance (2019).*

These methodological considerations draw attention to the research process, allowing me to think carefully about how I engage with the study. However, Allan (2020) cautions that the idea of being

able to carry out an entirely ethical study is problematic, despite attention to care, as to some extent the researcher will gain compared to the participants. Lindemann (2019) argues that the ethics of care, which creates a morally responsible feminist researcher as caregiver, reinforces the outdated sexist stereotype of certain roles in society. Keeping these cautions in mind, an ethics of care was necessary for a study in which I investigated the voices of students, marginalised in their own identity work, so as not to perpetuate dominant discourses. I return to the statement I made in the first paragraph of section 5.2: “There was a sense that in labelling a perspective for this study, I was also labelling myself as a researcher and would be obligated to act in a certain way because of the label I had chosen”. In identifying with the feminist perspective of ethics of care, I did not feel obligated, rather I had chosen to behave in a certain way which happened to have the label of feminist researcher. I came to understand my world view before I allocated the label. I am not suggesting that my journey of reflexivity was easy, in fact, at times, it was very emotional [see section 8.4 for my reflexive journey]. I felt some liberation in being able to choose my own label. As a form of self-reflection, I employ the five methodological considerations (Wigginton & Lafrance, 2019) as I discuss the journey of my chosen research methods [see chapters 6 and 8]. I return to the questions in table 5-a throughout the thesis, specifically in my final reflections in chapter 12.

### 5.3. Poetic inquiry

In the previous section, I shared my journey to becoming a feminist researcher, aligning with the feminist perspective of ethics of care. In this section, I consider methodologies that put the subjective realities of participants at centre stage, choosing poetic inquiry for this study. I discuss the use of poetic structures in mathematics education research. Finally, I talk about grouping poems within poetic inquiry for a nuanced understanding.

Examining stories-as-identity-work, from the point of view of lived experiences, requires a methodology that puts at the forefront the voices of the participants. Both ethnography and phenomenology take account of subjective knowledge, understanding from the point of view of the participant (Cohen et al., 2018). Ethnography is the study of the social world, examining shared behaviours, beliefs and values by being immersed in a context over an extended period of time (Hammersley & Atkinson, 2019). Phenomenology describes the multiple realities of a phenomenon as perceived by participants (Creswell & Creswell, 2018). However, Green et al. (2021) argue that introducing poetry into research is a rich and evocative way to reach beyond surface knowledge towards the experiential world. Poetry is as much about feeling language as it is about understanding the content. Faulkner (2019) describes poetic inquiry as embodied, experiencing emotionally the words of participants. The purpose of this study was to examine the identify work of students labelled

as low attaining, hearing their stories in a way that connects both facts and feelings. Using poetic inquiry enabled me to be sensitive to students' emotive stories in the context of being labelled as low attaining. Since the 1960s, there have been a range of studies that use poetry-based methods, most often to examine topics within the affective domain, with most appearing in the last two decades (Prendergast, 2009; 2015). Poetic inquiry is an umbrella term for the various ways that poetic structures, the arrangement of words and phrases in a poetic form, are utilised in qualitative research (Butler-Kisber, 2020; Faulkner, 2019). More specifically, poetic inquiry includes methods that craft poetic structures for collecting, analysing and/or representing data, as well as a tool for researcher reflexivity. Fitzpatrick and Fitzpatrick (2020) state that the use of poetry enables a researcher to attend to "aesthetic knowledges" (p. 9), an appreciation of the form of narratives, introducing emotion into academic writing that is usually dominated by prose. From a feminist perspective, the use of poetic structures is a powerful way to foreground the voices of participants, inviting the reader to make connections with participants' stories (Ward, 2011). The evocative nature of poetic inquiry aligns with the ethics of care, emphasising the importance of sensitivity and reflexivity in representing the storytelling of participants (Butler-Kisber, 2020; Faulkner, 2019).

Poems, or poetic structures, have been described as found or generated (Butler-Kisber, 2020). Found poems are those crafted, by a researcher, using the original words from, for example, interview transcripts (participant-voiced) and literature reviews (literature-voiced), reordering or reframing to draw attention to particular insights (Prendergast, 2009). Generated poetry is authored by the researcher (researcher-voiced), or the participant (participant-voiced), using their own words to craft poetry that, for example, represents interpretations of personal experiences (Prendergast, 2009). Jakobson (1960) states that poeticity, or poetic function, in language oversteps the limits of poetic genres, such as lyrical first-person poems, towards considering verbal structure and semiotics. Poetic function, in spoken or written language, is found in the repetition of elements at any level, drawing attention to the form of the message rather than just attending to the meaning of the words (Staats, 2008; 2021). Repetition can be found, for example, within phrases, syntax or metaphors as well as amongst sounds, vocalisation or rhythms (Jakobson, 1960; Staats, 2021). Poetic patterns can be found in the use of salient, vivid or poignant words as a form of repetition that can go beyond the sameness of the words used (Butler-Kisber, 2020). The poetic structures created can be used to disseminate, presenting the poeticity from the data, and as a vehicle to draw out the poeticity in a person's data, as used in the analysis within this study [see the Listening Guide method in section 6.5]. There is no prescribed approach for creating poem structures from poetic function within discourse, with poetic inquirers using both existing formats, for example, dramatic dialogues spoken from the point of view of a character, and developing their own poetic forms (Butler-Kisber, 2020; Faulkner, 2019). As such,

although poeticity or poetic function, is found in a participant's data, the impact of the noticing of the researcher-listener cannot be ignored. For a feminist poetic inquirer, reflexivity, explicitly examining the impact of your own positionality on what you notice, is key to being transparent about subjectivity within the poetic research process.

### 5.3.1. Poetic structures within mathematic education research

Within mathematics education research, using poetic structures within analysis is less established compared to wider educational research (Staats, 2021). Staats (2021; 2017; 2008) argues that using poetic structures is a promising technique for mathematical discourse analysis. In her study into students' talk as they engaged in an algebraic activity, Staats (2021) identified eight different types of poetic structure in the dialogue, namely, list; echo; comparison; contrast; interposed list; consolidation; expansion; reversal; and general. The author argues that the various poetic repetitions used in the dialogue contributed to the students' mathematical reasoning about the algebraic relationship in the task. Some authors have used poetic structures to examine the mathematical identity work of students. Drawing from a larger study, Hall et al. (2018) used poetic structures, alongside drawings produced by the student, to investigate how one student makes sense of herself in relation to mathematics. The authors suggest that the student was negotiating her identity work within the expectations of her parents and teachers. Simpson and Quigley (2016) used poetic structures to explore the various coexisting voices within students' mathematical identity work. The authors explicitly introduced into their analysis a vehicle to gather insights from the student participants on the voices that the researchers had identified. Neither Hall et al. (2018), nor Simpson and Quigley (2016), looked specifically at students' mathematical identity in the context of low attainment in mathematics. In this study, I extend the work of the studies discussed in this subsection, engaging with the gap in the literature by using poetic structures to examine the identity work of students labelled as low attaining. I utilised poetic structures in two ways, firstly, for the analysis of the participants' stories-as-identity-work, and, secondly, as a form of reflexive self-expression. I drew on poetic inquiry as a means to engage with the voices in this study, both that of the participants and my own as a researcher, in order to acknowledge the complexity of investigating identity work.

### 5.3.2. Grouping poems within poetic inquiry

So far in section 5.3, I have talked about the use of poetic inquiry in research, discussing the limited use of poetic structures in mathematics education research. In this subsection, I will discuss grouping of poems as a method within poetic inquiry.

The method of clustering or grouping poems under a common theme is said to provide a nuanced, holistic understanding of a particular situation or experience that might not be apparent in a single

poem (Butler-Kisber, 2020). In one example, Ohito and Nyachae (2019), in their study into the use of black feminist poetry, created three poems that the authors describe as being “in conversation with each other” (p. 847). The first poem was crafted from raw data, the second three-voiced poem incorporated the voices of both authors with the initial analysis of the data and the third poem was free verse crafted from insights gleaned during the creation processes of the first two poems. Ohito and Nyachae (2019) stated that, although each poem could be read separately, it was in clustering them together that they were able to gain a textured understanding of black girls’ lived experiences of girlhood. In another example, Görlich (2016), in her study of youth at the margins of education in Denmark, clustered poems crafted from the interview transcripts of eleven participants. The author states that the different themes in each of the poems, when read together, demonstrated the complexity of the youths’ experiences that marginalisation was multifaceted. Görlich (2016) goes on to say that using poetic structures enabled her to recognise, in the context of marginalised youth, “the complexity of processes that pull and push, motivate and engage, support and become barriers” (p. 533).

In my own study, to investigate students’ identity work within their lived experience of low attainment in mathematics, I grouped the participant-voiced poems in two ways. Firstly, I grouped poems crafted from the students’ narrative data with those crafted from the teacher as a significant narrator. This first clustering allowed me to investigate how the poems were (or were not) in dialogue with each other, examining the interplay between both the students’ and the teacher’s stories-as-identity-work. Secondly, in phase 2, alongside the first type of clustering, I focused on the individuals, grouping poems from the participant’s narrative data, told at different times within the study. In this way, I was able to investigate the patterns of stories-as-identity-work, for each participant, developing over time. Using the two clustering techniques enabled me to analyse the patterns between, and across, stories-as-identity-work in a way that acknowledged the fluid nature of identity work.

#### 5.4. Summary

The perspective of a researcher and the methodology chosen are the lenses that guide the design of a study (Creswell & Creswell, 2018). It was important, before discussing particular methods, to understand my perspective as a feminist researcher. A feminist perspective, although originally focusing on the experiences of women and girls, in contemporary research concerns itself with all forms of social change. The key notion of ethics of care considers the need for explicit reflexivity about the web of relationships in which participants and researchers are embedded. There are five methodological considerations that I have chosen to guide my planning from a feminist perspective, namely: the politics of asking questions; attention to language and discourse; reflexivity;

representation and intersectionality; and mobilising research for social change. The methodology of poetic inquiry involves the crafting of poems within research for data collection, analysis and representation, as well as researcher reflexivity. Poetic inquiry draws attention to the aesthetic form and evocative nature of narratives when presented as poems. The clustering or grouping of poems under a common theme is a method that adds a nuanced understanding to a particular context or experience. There are few examples of the use of poetic structures within mathematics education research. In this study, I contribute to the discussion through the use of poetic structures to investigate stories-as-identity-work in the context of low attainment in mathematics.

For this study, I took a feminist perspective, focusing on the ethics of care. Ontologically, I saw reality as multiple and complex, with some views of reality privileged over others. Epistemologically, I considered knowing as relational, hence, as a researcher, I was not invisible in the research process. I chose the methodology of poetic inquiry, grouping poems to allow for a nuanced understanding of the identity work of students labelled as low attaining. In the next chapter, I begin to map the methodological journey through this study by discussing the methods chosen for the first phase of data collection. Phase 1 took place before the covid-19 pandemic, very early in my development as a researcher, hence the metaphor of a journey is appropriate. The chapter that follows represents the starting point for my own thinking, developing the methods that were used within this study.



## 6. Discussing the methods used in phase 1 of the study

### 6.1. Introduction

The study took place over two phases - phase 1 took place from October to December 2019 and phase 2 from December 2020 to July 2021. Phase 1, discussed in this chapter, was in pre-pandemic times, being a methods-based study to consider the appropriateness of the methods I had chosen. In this chapter, I talk about the methods I used in phase 1. First, I share my process of choosing research questions, which were developed to give attention to the stories told by students [section 6.2]. I talk about recruiting both teacher and student participants from within a post-16 college [section 6.3]. In section 6.4, I discuss ethnographic data collection methods used in phase 1 of the study, including observations [subsection 6.4.1]; interviewing [subsection 6.4.2]; using objects to elicit stories [subsection 6.4.3]; and a partnership between the teacher and myself as researcher [subsection 6.4.4]. In section 6.5, I move on to talk about the method of data analysis. I explain the processes involved in using the Listening Guide as a voice-centred, relational method [subsection 6.5.1]. As one of the contributions of this study, in subsection 6.5.2 I extend the Listening Guide by introducing a poetic structure called a “they-poem”, which investigates the stories told by a significant narrator [as defined in the discussion on stories-as-identity-work in section 2.4]. Finally, I discuss the ethics of phase 1 [section 6.6], including issues of access [subsection 6.6.1]; power relations and informed consent [subsection 6.6.2]; anonymity and confidentiality [subsection 6.6.3]; and safety and wellbeing [subsection 6.6.4].

#### 6.1.1. A note about chapter 6

In this chapter, I discuss phase 1 of the study, which happened before the global pandemic, in a time before government guidelines were in place that restricted movement. I was able to plan to visit the field site, meeting with participants face-to-face, helping in lessons. At times in chapter 6, I talk about intended methods as well as those I was able to implement. The journey of methods described in this chapter should be understood as messy realities, entanglements within a research study (Huisman, 2008). Due to my inexperience as a researcher, I took decisions in phase 1 that contradict my later thinking, particularly around the definition and operationalisation of identity work discussed in chapter 2 [see section 2.6]. I was inconsistent in attending to the feminist methodological considerations discussed in chapter 5 [see subsection 5.2.1, table 5-a]. In the same way that the study was in development, I was developing as a researcher.

## 6.2. Choosing research questions

Having highlighted the messy reality of research, in this section I share the process of developing research questions in phase 1. The aim of the study was to research the identity work of students labelled as low attaining, focusing on their first-person voice. The first phase was a methods-based study to allow me to consider any issues that had been unforeseen in the research planning (Wellington, 2015). I intended to test the methods that I had chosen for data collection and analysis, investigating the students' identity work, initially planned for four months from September 2019 to December 2019. I wanted to understand the practicalities of my research, including the impact I may have on the workload of the teacher. At this stage, I took a definition of identity work from Bishop (2012):

I use the term mathematics identity to mean the ideas, often tacit, one has about who he or she is with respect to the subject of mathematics and its corresponding activities. Note that this definition includes a person's ways of talking, acting, and being and the ways in which others position one with respect to mathematics. (p. 39)

A person's ways of talking and acting were described as enactments of mathematical identity, which Bishop (2012) operationalised as evident through examining discourse. As an initial theme, I assigned the following research question to the study:

**RQ1v1: What are the enactments of mathematical identity in the context of low prior attainment in mathematics?**

At this stage, using the first version of the research question (RQ1v1), I was seeing identity as observable in the classroom, a student's way of acting, talking and being in relation to learning mathematics. The stories that I planned to collect from students would be their interpretations of what I had observed in the classroom. I intended to discuss the students' interpretations with their teacher in order to investigate "the ways in which others position" (Bishop, 2012, p. 39) in relation to low attainment in mathematics. Cohen et al. (2018) state that research questions change over time as the researcher becomes immersed in the study. I had not given attention to the feminist methodological considerations around either the politics of asking questions, or my role as a knower. The research question, focusing on my own observations, had the inherent assumption that I would be able to observe enactments of identity. There was a sense of hierarchy, with my role as a researcher giving me privileged access, where students' enactments of identity were to be observed for my own benefit. I realised that to place the first-person voice of students at the centre of the study, I needed to focus the research question on the stories that they told. I developed two alternative research questions, RQ1v1 and RQ2.

**RQ1v2: What stories are shared about/as enactments of identity in the context of low prior attainment in mathematics?**

**RQ2: What patterns of identity emerge when attention is given to the (self)positioning of students, through the work of a teacher-researcher partnership?**

The new first research question (RQ1v2) focused on how the students themselves understood their experiences in the classroom, as stories about and as identity work. I had not excluded my own classroom observations but wanted to be explicit about hearing the students' interpretations of what I had seen. I wanted to provide the opportunity for the students' voices to be listened to about their own experiences (O'Reilly & Dogra, 2017). I was beginning to acknowledge the feminist consideration of representation, the differences between myself as a researcher and the student participants, impacting my interpretations of what I observed in the classroom. The second research question (RQ2) focused on the partnership between the teacher and me as a researcher. In the feminist consideration of mobilising for social change, I asked how do I conduct myself to allow students' voices to be listened to by their teacher? Introducing research question 2, I wanted to investigate the patterns of identity that might emerge when the teacher was given the opportunity to listen to the interpretations of the students. I wondered how the stories told by the teacher, about the students, might develop when I acted as a conduit for the students' first-person voices [see subsection 6.4.4 for my discussion of the teacher-researcher partnership]. In subsection 8.2.1, I describe how I refined the research questions further in phase 2, with the final versions using the language of stories-as-identity-work.

### 6.3. Recruitment

In the previous section, I shared the process of developing research questions based on an initial definition of identity work. In this section, I talk about the recruitment of teacher and student participants from within a post-16 college [see glossary]. A number of colleges in England were engaged in a national project to improve the experiences and outcomes of students resitting [see glossary] their mathematics General Certificate of Secondary Education (GCSE) [see glossary]. I identified one such college, based in the south-west of England, as a potential field site for the study. I made contact with the head of the mathematics faculty from my professional networks within the local Maths Hub [see glossary] (Hennink et al, 2011). Mike (a pseudonym) had begun working at the college in the early part of 2019, having been offered his first role as head of faculty. There were a number of classes attended by students labelled as low attaining, having achieved less than a grade 4 [see glossary] in their mathematics GCSE, some on multiple occasions. (In England, the grading system for a GCSE examination is between 1 and 9, with 9 being the highest. A grade 4 or above is a pass, with a grade below 4 considered to be a fail). For phase 1, I planned two stages of data collection. A whole

departmental stage, interviewing a number of teachers in the faculty, and a class-based phase, working alongside one teacher in a volunteer role as a teaching assistant. The sample frame for teacher participants was those who currently taught students resitting their mathematics GCSE. The student participants would be purposively sampled as members of one teacher's classroom (Wellington, 2015).

It soon became evident that the logistics of fieldwork in a real-life situation would not fit the theoretical planning of my research. The college did not have processes in place to engage with a researcher, delaying the start date until late October 2019. From a feminist perspective, reflexivity is an important consideration, understanding how I was located in the research process (Wigginton & Lafrance, 2019). Initially, I saw myself as an insider, a member of the community, due to my previous history as a secondary mathematics teacher. However, my idea that I was insider was problematic as I had entered the field influenced by my personal life history (Hennink et al. ,2011). In spite of who I saw myself as, in the college I was an outsider. It was necessary to negotiate my role, rather than assume that I would be granted access. Having received the relevant permissions from the gatekeeper of the college, I began recruiting teachers. I was invited to attend a professional development afternoon at the college, where I presented the research study to the teachers, providing an information sheet for them to read. In addition to Mike, I was able to recruit one other teacher for the departmental interviews. However, the additional teacher subsequently resigned from his post at the college, meaning the department stage of data collection could not take place as planned. For participants, being willing to given up their time to take part in research can often be related to how valuable they see the aims of the project (Hammersley & Atkinson, 2019). Thinking about the feminist consideration of the politics of asking questions, it could well be that the teachers did not see their interests being served by the project. As a researcher, I had to learn to be adaptable, allowing the research project to be shaped by what was possible, rather than fixed by my own planning (Wellington, 2015). I moved on to the classroom-based stage of the study. Mike chose one of his classes in which the students had all achieved a grade 3 [\[see glossary\]](#) in their mathematics GCSE. The class had weekly three-hour lessons of which I attended six, between late October 2019 and the Christmas break in December 2019. I shared the purpose of the research with the students in a classroom presentation, being transparent about my role as a researcher by wearing my university lanyard at all times in the classroom. I explained that I would assist any student with their mathematics work in the classroom, regardless of whether they had chosen to be involved in the study. Initially, five students agreed to be involved in the research study, however one did not attend any subsequent lessons, giving a final group of four student participants, Ava; Betty; Christine; and Darren (all pseudonyms). See table 6-a for contextual information about the student participants.

Student (pseudonym)	Contextual information
Ava	<ul style="list-style-type: none"> <li>• Started college in September 2018</li> <li>• Moved to the UK from an eastern European country</li> <li>• Studying cookery</li> <li>• Completed functional skill mathematics level 2 [<a href="#">see glossary</a>]</li> <li>• Achieved a GCSE mathematics grade 3 in June 2019</li> </ul>
Betty	<ul style="list-style-type: none"> <li>• Started college in September 2018</li> <li>• Previously taught by Mike in year 10 in a different setting</li> <li>• Studying travel and tourism</li> <li>• Mathematics GCSE grade 3</li> <li>• Sat the mathematics GCSE three times</li> </ul>
Christine	<ul style="list-style-type: none"> <li>• Started college in September 2018</li> <li>• Studying travel and tourism</li> <li>• Mathematics GCSE grade 3</li> <li>• Sat the mathematics GCSE four times</li> </ul>
Darren	<ul style="list-style-type: none"> <li>• Started college in September 2017</li> <li>• Changed to study business in September 2018</li> <li>• Mathematics GCSE grade 3</li> <li>• Sat the mathematics GCSE four times</li> </ul>

*Table 6-a: Contextual information about the student participants in phase 1.*

#### 6.4. Data collection

Having talked about recruitment, in this section I discuss the data collection methods used in phase 1. Choosing ethnographic methods, I examine the links to the feminist methodological considerations as I discuss each specific technique.

For this study, I chose ethnographic data collection methods as I wanted to describe a comprehensive, multi-layered picture, conveying the subjective realities of the students' lived experience (Fetterman, 1998; Pole & Morrison, 2003). Ethnography has its origins in 19<sup>th</sup> and early 20<sup>th</sup> century anthropological life-history studies, focusing on a discrete location or setting (Pole & Morrison, 2003). An ethnographer will engage with a context over an extended period of time, drawing on a range of sources of data, including observations; informal conversations; formal interviews; and artifacts (Hammersley & Atkinson, 2019). The aim of ethnography is to understand the context of study from the inside, developing understanding from the participant's viewpoint (Carspecken, 1996; Hammersley & Atkinson, 2019). From a feminist perspective, ethnography involves highly relational work, developing a relationship of trust with participants (Leavy & Harris, 2019). This study was not an ethnography. I was not involved for an extended period of time, but this did not exclude the use of ethnographic methods to collect data. The principle is not the length of time, but characteristics of

the study, namely, examining the circumstances in which people act; paying attention to detail; not jumping to conclusions; avoiding evaluations; and seeking opinions without judgement (Hammersley & Atkinson, 2019). I used an open-ended approach, focusing on investigating what may happen within everyday contexts, to collect data albeit within a shorter timeframe.

#### 6.4.1. Observations

In this section, I have introduced ethnographic methods as the choice of data collection for this study. I now move to talk about specific techniques, starting, in this subsection, with observations.

Observation, as a method, is used widely in research, a continuum from an observer who watches without engaging to being embedded within the context (Wellington, 2015). Observations can be the prime method of data collection or, as I used in phase 1 of this study, can be used to inform subsequent stages of the research (McNaughton Nicholls et al., 2014). Observation as an ethnographic method involves participating in the context as a way to record the norms, processes and atypical dramas of a setting (Pole & Morrison, 2003). There are two different stages of ethnographic observation, non-participatory and participatory. In the early stages, the observer watches without participating, producing a highly detailed primary record of routines and norms, giving a broad sense of the study context (Bishop, 2012; Pole & Morrison, 2003). Moving on from the early stages of the research, the process becomes participatory, defined as observing through active involvement (Hennink et al., 2011; Fetterman, 1998). At this stage, the observer will choose a particular focus, contrasting the broad view taken in the early stages (Pole & Morrison, 2003). However, observation as a method is not without issue. The idea of being non-participatory in ethnographic observations is problematic. A researcher is always present, influencing the context they are observing (Hennink et al., 2011; McNaughton Nicholls et al., 2014). Observation, at the early stages, is more accurately described as low-participatory. Observations are rich in data, but by nature unpredictable given the detail of what will happen cannot be known beforehand (McNaughton Nicholls et al., 2014). Observation is inherently subjective, the approach taken will influence what is, and what is not, recorded (McNaughton Nicholls et al., 2014). Some researchers use proforma to help focus their observation activities, however, even with a particular focus, an observer will only see a part of an event, in a certain place, for a portion of the time (Hammersley & Atkinson, 2019; Mason & Houssart, 2009).

I observed students working in the classroom, as well as collecting lesson artefacts, to inform the interviewing stage of the project. Collected artifacts included copies of students' work, worksheets and teaching slides. I began my observations by creating primary record field notes [[see appendix E](#)]. In my field notes, I wrote down what I observed in the lessons, including lesson timings, learning activities and the actions of students. As I began observing, I faced a dilemma in the dual role of

researcher-observer and classroom assistant, what was I potentially missing when I was assisting another student? I had to create boundaries for my fieldwork, times when I would solely observe, and times when I would assist students, fulfilling my obligation to the teacher. Mason and Houssart (2009) say that a researcher learns a lot about themselves when they observe what others say and do. From a feminist perspective, acknowledging the researcher as explicitly located in the research is essential (Lafrance & Wigginton, 2019). Subjectivity cannot be eliminated, but the feminist consideration of reflexivity examines the personal and social influences that shape a researcher activity. I began to recognise the impact of my own subjectivities, making judgements about why an incident happened, rather than simply recording what I saw in the classroom. I had not fully considered my own identity work, the bias and values that I brought to the fieldwork that were informing what I noticed in the classroom (Day, 2012; Foote & Gau Bartell, 2011). This moment was the start of the introspective journey that would lead to me, in phase 2, to the reflexive tool called a “social identity map” (Jacobson & Mustafa, 2019) as a means to explicitly examine the impact of my own positionality [see section 8.4].

#### 6.4.2. Interviews

I have discussed the choice of ethnographic methods and the specific technique of observations. In this subsection, I talk about interviewing as a means to explore the perspectives of participants.

The feminist consideration for representation in research views participants as active experts, not passive vessels (Hesse-Biber & Leavy, 2007; Lindemann, 2019). The question I asked myself was, how can I represent students’ voices so as not to be perpetuating dominant discourses? My intention was to create a space for the voices of students labelled as low attaining to be listened to, centring the stories of students in discussions about their experiences. Interviewing provided the opportunity to explore the perspectives of participants, valuing their subjective knowledge (Leavy & Harris, 2019). Types of interviewing are on a continuum, from those that are highly structured, with pre-determined questions, to those that are less structured, such as open-ended, social encounters (Marvasti & Tanner, 2020). The plan for phase 1 was to use a combination of semi-structured interviews, post-observation focus groups and informal conversations. However, as a result of the delayed start, as well as a somewhat sporadic attendance by the students, I had to abandon the plan for a specific post-observation focus group. I focused on ensuring I had scheduled time for a semi-structured interview with each participant. Semi-structured interviews involve a researcher having a set of themes that they would like to cover, often starting with one key, open-ended question (Wellington, 2015). The flow of the interview is flexible, with the researcher asking probing questions that adapt to the stories of the participants. In addition to semi-structured interviews, I also noted down spontaneous

conversations, between myself and participants, that occurred in the classroom. These are seen as informal interviews, although often difficult to discern from observations (Hammersley & Atkinson, 2019). As an ethnographic method, interviewing is seen as a friendly conversation, although within the researcher's agenda (O'Reilly & Dogra, 2017). Through the frequency of contact, the researcher is able to build rapport with participants (Hammersley & Atkinson, 2019). From a feminist point of view, interviewing is not a one-way process, with the researcher mining for information, but a respectful, reciprocal relationship (Allan, 2020). A key feature of interviewing is active listening, showing an interest in participants' stories, asking questions to encourage the speaker to elaborate (Leavy & Harris, 2019; Weger et al., 2014). However, even for a researcher who is fully focused on listening, what is heard is only part of what is said (Mason & Houssart, 2009). Hammersley and Atkinson (2019) remind us that considering interview data as an authentic, real version of the lived experience is problematic. The biases of the researcher, the site of the interview and expectations of a participant, will all impact the nature of the data collected (Burns & Chantler, 2011; Fetterman, 1998; Pole & Morrison, 2003). A participant will choose to present their own version, what they say they do, think and say (Hammersley & Atkinson, 2019).

Mason and Houssart (2009) say that a researcher learns a lot about themselves when they are watching what others say and others do. Thinking about the dynamics of an interview goes beyond choosing what questions to ask (Yeo et al., 2014). As I interviewed the students, I reflected on the impact of how I (mis)managed by own voice in the interview process. The first student interview was with Ava, taking place during the timetabled lesson in a slot agreed with the teacher. The interview, located in the college library, was adjacent to the classroom. I used an interview protocol based on themes around time at college; general experiences of learning mathematics; and specifically, asking for perspectives on what I had observed in class [see appendix E]. Ava and I found a quiet corner to talk but were quickly disturbed by other students using the library facilities. As there was no time to arrange another suitable venue, I began audio recording our conversation. Afterward the interview, I reflected on my performance in the interview, writing:

**Today I learnt a very important lesson.** I need to stop talking!! In both the interview and the primary record notes that I have written up, I notice that I am giving MY opinion of what the participant means and says, rather than LISTENING for their own. I have written up and kept the transcript from Ava's interview as a reminder of how NOT to interview someone!!

*Researcher notes 6-a: Reflections on Ava's interview, researcher's diary (21/11/19).*

Roulston et al. (2003) discuss that for a novice researcher, it can be difficult to be present in the interview process, they are often distracted by the mental noise of analysing responses, their own values and assumptions and self-talk about quality of their performance as an interviewer. Listening



back on the interview, I recognised that I had talked over Ava's responses, sometimes not letting her finish her sentence. I had inserted my own interpretations into the conversation, rather than listening properly to what she was saying. As a result of my novice behaviours, I wondered if I had lost an important data collection opportunity, learning a valuable lesson about the impact of my talk (and silence) in an interview. As I moved to interview the next students, Betty and Christine, my novice self-talk focused on not talking over the students' responses, as I had with Ava, allowing the students to answer my questions. I decided to interview Betty and Christine together as a way to attempt to mitigate any imbalance that might occur in an interview between an adult and student (O'Reilly & Dogra, 2017). Being part of a group of peers can allow participants to feel more secure compared to a 1-1 interview, with students reacting to each other's answers in the manner of a three-way conversation (Wellington, 2015). Participants can nudge each other's thinking, enabling deeper discussions. As a result of the disturbances in Ava's interview, I arranged to interview Betty and Christine in the classroom after the lesson. Mike had arranged a tutorial with another student at the same time in the classroom, which meant that I would not be alone with Betty and Christine at any time. However, the presence of Mike and another student in the room, albeit in a different corner, was not without challenges, leaving me wondering to what extent we all (Mike, Betty, Christine and I) acted differently because of the listening ears of the others. Listening back on the discussion, there did not seem to be any issues of dominance, neither student was more prevalent than the other, which can be an issue in group interviews (O'Reilly & Dogra, 2017). I did reflect on issues of privacy (O'Reilly & Dogra, 2017; Punch, 2002). Prior attainment in mathematics can be seen as a sensitive subject, where neither student may have given honest answers to my questions. I was not able to judge if I had obtained better data with this format as, although there was some dialogue, in reality I was interviewing two students in succession, albeit in the same space. My reflections from the first two interview experiences fed into the interview with the final student Darren. Having decided to return to 1-1 interviewing, once again the conversation took place during the lesson, located in the library adjacent to the classroom. There were disturbances by other students, as with Ava's interview, but this time I anticipated the interruptions. I recognised that the conversation could still take place even in these circumstances. I did reflect on the fact that using a more private location would have been unethical, with regard to the safety of the student and myself as researcher. In my interview with Darren, I practised my silence as a listener, certainly in comparison to the interview with Ava, obtaining what I believed were relatively fuller responses, his own words rather than my interruptions.

In my final reflections, addressing my feminist methodological question around the potential for hierarchy in my participants-researcher relationships [see subsection 5.2.1], I considered the value of silence. I had to allow the interview process to be led by the stories of the participants. I needed to

redress the balance between my desire to ask questions and the participants' right to be listened to. Choosing the physical location of the interview related to an ethical issue. I reflected on my, as a researcher, assumption that interviews should happen in a quiet, controlled placed. Ensuring safety of the participants by using open spaces when interviewing, although affecting the process, was paramount. What needed to change was not the physical space but my expectations. Addressing one of my feminist methodological questions [see subsection 5.2.1], I needed to practise being open to negotiating, rather than controlling, the realities of the project.

#### 6.4.3. Using objects to elicit stories

Up to this point in section 6.3, I have talked about my choice of ethnographic methods, examining the specific techniques of observation and interviewing. In this subsection, I continue the discussion around interviewing by introducing the idea of using objects as a means to elicit stories.

An object interview is an interview that incorporates objects into the process as a means to elicit stories (Woodward, 2020). Objects might be selected by participants or by the researcher, be discussed in situ or brought to the interview. The interview centres on dialogues around the object, interchanges between the participant and the researcher. Story elicitation, using objects such as photographs or copies of classwork, enables different types of narratives to be articulated, invoking accounts that might otherwise be unspoken in other types of interview (Rose, 2016; Woodward, 2020). Viewing an object within an interview context can allow participants to engage with the object in a different way to how they might when the object is in its usual setting. Object elicitation draws much of its thinking from photo elicitation methods. Rose (2016) states that a photograph is able to offer particular visions of reality in relation to the subjectivities of those who view the image, described by Metcalfe (2016) as "necessarily and essentially personal" (p. 85). For the researcher, a visual image can elicit the perspectives of a student in a way that is collaborative, emancipatory and democratic (Harkness & Stallworth, 2013; Shohel, 2012). Bridging the gap between the researcher and the participant (Harper, 2002), a visual image can reduce the potential for hierarchy between student participant and the (adult) researcher (Cooper, 2017; Vecchio et al., 2017). Attending to hierarchical relations is particularly important in educational research, where the actions of a student are subject to the interpretations of an adult (for example, a teacher or a parent), positioning the adult as the expert. A number of studies have visual images as a means to investigate students' identity work (see, for example, Beeser & Chik, 2014; Cooper, 2017; Croghan et al., 2008; Ruglis & Vallee, 2016; Sarti et al., 2015; Young, 2017). Said to be responsive to the fluid and transitory characteristics of identity (Cooper, 2017), a visual image can be considered to have agency, evoking information, memories and affective responses (Harper, 2002).

The basis of object elicitation is using objects to generate talk. However, the word object gives a sense of something tangible. In this study, my classroom observations, alongside lesson artifacts such as classwork, acted as catalysts to elicit stories when interviewing students. The perspectives of students, alongside my observations and collected lesson artifacts, were also used to elicit stories in discussions within the teacher-researcher partnership [see subsection 6.4.4]. My observations could be considered to be either an object, a story used to elicit other stories, or a dialogue, with the object being what originally happened in the classroom. Woodward (2020) suggests that using the alternative word “things” goes beyond the implied boundedness of objects. I argue that the focus in this study is on elicitation. Defining the object, making the distinction between an incident that was observed and my story about what was observed, is unnecessary. My observations can be the things around which dialogue occurs within student interviews. Students’ perspectives can be things around which dialogue occurs in teacher interviews.

#### 6.4.4. A teacher-researcher partnership

Within feminist methodological considerations, mobilising research for social change is described as research that considers not what is but what could be (Kincheloe & McLaren, 2005; Wigginton & Lafrance, 2019). In this subsection, I discuss the beginnings of the teacher-researcher partnership as a conduit for the voices of students.

The purpose of this study was to listen to the first-person voices of students, marginalised by the low attainment label in mathematics, considering a possible counternarrative to the dominant discourses. I did not regard listening as giving voice to students but amplifying what is already being said (Dobson, 2014). From the feminist consideration of reflexivity, I wanted to address the potential for hierarchy in participant-researcher relationships. A teacher-researcher partnership, as a collaborative relationship, challenged any imbalance between myself, as researcher, and Mike, the teacher I was working with (Bergmark, 2020; Wigginton & Lafrance, 2019). The teacher-researcher partnership was a form of interview, framed as discussions between peers. The idea was to research with, rather than on, working alongside as a conduit for the stories told by the students. Mike was initially interviewed 1-1, using a semi-structured protocol that focused on his personal history as a teacher, his experiences about teaching low attaining students and stories about the specific students who had consented to take part in the research [see appendix E]. At the time of the interview with Mike, I had been assisting in one out of the six lessons. I had not spoken to or observed any of the students who had consented to take part. As such, I did not have the perspectives of students, intended as objects to elicit stories. In hindsight, I recognise the inconsistency of my aim to foreground the student voice, whilst in practice interviewing the teacher first. Subsequently, I used my observations, as well as the students’

perspectives, as objects for spontaneous conversations with Mike, often carried out as we tidied up after the lesson. From a practical point of view, I was acting as a conduit, drawing attention to what was said by the students, rather than gathering data. The spontaneous conversations, intended as informal interviewing, became focused on the experiences of participants rather than my need for data. As such, the conversations in phase 1 were not audio recorded or analysed in the same way as the semi-structured interviews. However, I recognised the potential of these spontaneous conversations as a means to gather data, not asking about the students directly but talking together about their work or their perspectives. With these insights in mind, I developed the teacher-researcher partnership further in phase 2 [see subsection 8.2.4].

## 6.5. Data analysis

In the previous section, I discussed the ethnographic methods that I used in phase 1 of the study. I reflected on the links to feminist methodological considerations as ongoing ethics of care. In this section, I move on to talk about listening within data analysis. Listening to the narratives of participants implies going beyond categories and coding, leaning in carefully to hear what is said. I begin by explaining the Listening Guide method, a voice-centred, relational method that uses a poetic structure called an “I poem” to draw attention to the first-person voice of students [subsection 6.6.1]. As one of the contributions of this study, I describe an extension to the Listening Guide where I introduce a “they poem”, investigating the stories told by significant narrators [subsection 6.6.2]

The Oxford English Dictionary states that the verb “to listen” means to hear attentively; to give ear to; to pay attention to a person speaking or what is said (Oxford University Press, n.d.). In research, listening does not have a static definition, often depending on the context of use and the positionality of the researcher. Listening can be seen as information processing, the listener extracting meaning from what is said by the speaker (Burlison, 2011; Davis, 1997). Others argue that giving priority to what is being said, ignores the variety of other vibrations that move bodies in different ways (Gallagher et al., 2017; Williams, 2019). From a feminist point of view, listening to someone is about care and empathy (Arcavi & Isoda, 2007; Lafrance & Wigginton, 2019). Belenky et al. (1986) talk about leaning in closely with a listening ear, rejecting the notion of the objective all seeing eye. Both speaking and listening are relational, embodied in cultures, life histories, values and norms (Davis, 1997; Gilligan et al., 2006; McLeod, 2008). Listening to someone means decentring self, recognising preconceptions, making space for the words of the speaker (Arcavi & Isoda, 2007; Dobson, 2014).

To be able to listen to the stories of the students, I wanted a method of analysis that explicitly acknowledged my subjectivities, putting centre stage the words of participants. One possible option was thematic analysis, a systematic procedure that can be used to generate themes from qualitative

data (Cohen et al., 2018; Wellington, 2015). Reflexive thematic analysis is described by Braun and Clarke (2019) as welcoming the subjectivity of the researcher. The authors talk about six stages of analysis, data familiarisation; data coding; initial theme generation; developing and reviewing themes; refining, defining and naming themes; and writing up thematic analysis. However, the focus of thematic analysis is on the content of the data, developing themes from what has been said. By the second step, the researcher is already immersed in coding the data. I wanted a method that considered the voices within the data, not only what was said but how was it said, what type of voices were speaking? what type of voices were silent? The use of poetic structures is a way to appreciate the form of a narrative, being sensitive to the storytelling of participants (Butler-Kisber, 2020; Faulkner, 2019; Fitzpatrick & Fitzpatrick, 2020). The Listening Guide is a voice-centred, relational method, developed within the feminist tradition, that uses a poetic structure called an “I poem”, which will be explained below, to analyse qualitative interviews. The method replaces judgement with curiosity, moving away from identifying themes to listening for voices (Gilligan & Eddy, 2021). Hall et al. (2018) have used the Listening Guide to investigate one student’s self-positioning voice within mathematics learner identity.

#### 6.5.1. The Listening Guide

In this section, I talk about the Listening Guide (Gilligan et al., 2006) which was the method of data analysis that I used in the study. The method uses four sequential listenings to bring the researcher into relationship with the speaker, listening for the multi-layered, coexisting voices in a person’s lived experience. Drawing attention to a person’s voices means considering the nuances of each voice, what does it sound like? What words, rhythms and silences does it have? What does it feel like to listen to? (Gilligan & Eddy, 2021). The Listening Guide acknowledges the cultural contexts in which a person expresses their experience(s), described as the “interplay between self and relationship, psyche and culture” (Gilligan et al., 2006, p. 268). The participant’s co-existing voices are seen as situated, temporal and fluid, occurring simultaneously in the same way as different instruments in an orchestra produce melodies creating one symphony of music. In line with the tenets of feminist thinking, the subjectivities of the researcher are explicitly examined as part of the method, with listening seen as a complex choreography, an orchestra of voice between speaker and listener (Davis, 1997; Gilligan et al., 2006). The Listening Guide method comprises of four sequential steps or listenings as follows:

- Step 1 - listening for the plot
- Step 2 - I poems
- Step 3 - listening for contrapuntal voices
- Step 4 - composing the final analysis.

Each step is interconnected, working with the findings of the previous steps, focusing the listener onto the different levels of the story being told.

The first step of the Listening Guide involves two parts, listening for the overall plot, and recording the listener's initial response to the narrative. The first part of the process begins with reading the complete text, getting a sense of the landscape of the narrative, attending to what stories are being told. The listener starts to consider what is happening in the stories, about whom are they told and in which sociocultural contexts. The listener notes down repeated metaphors and linguistic devices that they identify being used by the speaker as well as any possible contradictions and absences. Consideration is given to the wider environment within which the participant and researcher are present, how and where are the stories being shared. The second part of this first step explicitly locates the researcher in the analysis process, a key tenet of the feminist tradition, recognising the impact of subjectivities on the interpretation process. Researcher positionality, impacted by life histories and social identities, both informs and constrains what is noticed (Foote & Gau Bartell, 2011; Jacobson & Mustafa, 2019). It is important to give attention to the participant-researcher relationship. The self-reflection step involves acknowledging emotional responses, connections I make (or not) with the stories told, feelings I experience as I read the narrative. It is not just about recognising the emotional responses but examining why I am responding in this way, how might my responses impact on my ways of listening? The impact of my own subjectivities is explicitly examined in step 1 but is ongoing throughout the analysis.

The second step of the Listening Guide focuses on the first-person voice of the speaker, through the creation and inspection of a poetic structure called an I poem. Poetry in research is said to communicate evocatively, opening the listener to new ways of knowing, using form and affect to invoke and convey meaning (Butler-Kisber, 2020; Maynard & Cahnmann-Taylor, 2010). The creation of a poetic structure is key for the relational method in that it focuses on the speaker's use of the first-person pronoun. (I acknowledge that, in some languages, the first-person pronoun is not used in the same way as it is in English, speakers will use different pronouns depending on the audience, see, for example, Ng & Choi, 2009). The construction of an I poem follows two guidelines: firstly, underline the use of the first-person in the narrative as well as the verb including any other words that seem important for meaning:

I can double check if I have got it right or not I have to go off my instincts which is not always right so like in class I will be like 'is this right?' and it will be but sometimes I will be a little bit away from it so will get the right answer but I need to do more {pause} expand the answer {pause} but in the exam I have to write it down and I start questioning it if it is right.  
(Darren's interview, 11/12/19)

then secondly extract the underlined phrases, organising them on to a separate line to create the poetic structure:

I can double check  
I have got  
I have to  
I will be  
I will be  
I need to do more  
I have to  
I start questioning

Creating an I poem allows the listener to focus closely on the words the speaker uses about themselves, without the noise of the complete narrative, which could overwhelm the first-person voice. The listener then reads and rereads the poetic structure, listening for changes in tone of voice and shifts in meaning that may, or may not, lead to different stanzas in the structure. In this way, the listener begins to identify variations used by the speaker in the way they talk about themselves.

It is only in the third step of the Listening Guide that the analysis moves back into relationship with the researcher's own focus or theoretical framing. Building on the first two steps, the researcher begins to identify the different co-existing strands or voices as they appear in the full narrative, a listening that is shaped by the research questions but influenced by the first two listenings. The researcher considers each voice, how can that voice can be recognised? and what characteristics or markers identify a particular voice compared to another? Through listening and relistening, separately for each voice, the researcher highlights examples in the narrative, fine-tuning the definition of the voice through an iterative process of repeated listenings. The voices may be revisited, refined and newly defined, going back and forth through the narrative, thinking and rethinking, giving time and space to the process. Having distinguished various voices, the listener moves on to reflect on how the voices interact, contemplating what is said and which voices are silent. The melody of voices (and silence) may work in harmony or discord with each other, complementing or counteracting, acknowledging the multiplicity of a person's identity work.

The final step of the Listening Guide brings together all of the previous listenings, composing the final analysis. This stage synthesises what has been learnt in relation to the research question, including sometimes the appropriateness of the question itself, as well as what evidence has been identified through the previous listenings. All four steps work together to focus the listener, with final step bringing the voices back into relationship with each other. The interplay between different voices is examined, recognising the complexity of a person's identity work.

### 6.5.2. Extending the Listening Guide – introducing a they poem

Gilligan et al. (2006) describe the Listening Guide method as somewhat fluid, a framework rather than a rigid set of rules. Although the authors say each step is necessary in the method, they state that a researcher should make the final decision on how to execute each step of the guidance for their particular research project. The Listening Guide has been extended to include a person's voice that uses other pronouns, including second-person and third-person pronouns (see, for example, Chadwick, 2016; Macaulay & Deppeler, 2020). For this study, rather than different pronouns used by one person, I began to think about the stories told about students by a significant narrator, in this case a teacher. A monological approach, focusing on one narrative only, has been described as insufficient when analysing narrative data, the student's and teacher's voices should be seen as in dialogue (Ohito & Nyachae, 2019; Wortham, 2001). In phase 1, I initially focused on the first-person voice of the students, considering the stories they told in relation to the domain of mathematics. However, an element of identity work is the stories told about a person by others. I did not have a mechanism within the Listening Guide to analysis the voices of significant narrators. To close this gap, I extended the Listening Guide by introducing a novel poetic structure called a "they poem" into the analysis process (Helme, 2021a). Using narrative data from interviews in which Mike talked about Darren, I used the Listening Guide's four steps, focusing on the third person rather than the first-person voice, such as he says; he did; Darren saw. In step 2, using the same guidelines as for the creation of the I poem, I underlined the phrases that used the protagonist's pronoun and the proper name, as demonstrated by the extract below:

I think Darren has now realised that actually because he is one of the oldest in the class as well he has got himself a job so he is working outside of college but he is also doing something in college that for him is something that he wants to do, which is travel and tourism I think it is, erm and he now understands that maths wasn't something that he had to do because that's what the rules were, maths is something he has to do because it will benefit him later on.

(Interview with Mike, 6/11/19)

and extracted the underlined phrases in the same way as the I -poem, changing any proper names to the students' pronoun:

He has now realised  
He is  
He has got  
He is  
He is also doing  
He wants  
He now understands  
He had to do  
He has to do



Having inspected the they poem, I moved on to step 3, listening for contrapuntal voices, before composing the final analysis in step 4 in the same way as the original method. By introducing a they poem into the analysis, I was able to investigate the voices used by the teacher to talk about Darren. The introduction of a they poem meant that initially there were two separate analyses happening in parallel, one analysis focused on the student's own stories, a second analysis on the teacher's stories about that student. The additional final step 5 step in the method brought the voices of the student and their teacher back into relationship. The first-person voice of the student is continued to be prioritised, with the teacher's voices, exposed by the they poem, acting as a contextual foil to the identity work of students [see section 7.5 for a demonstration of the extended method as I analyse Darren's data].

## 6.6. Ethics

Up to this point in chapter 6, I have talked about the data collection and analysis methods for phase 1 of the study. However, ethical thinking, the idea of doing no harm, should pervade every stage of the research cycle (Pole & Morrison, 2003). In this section, I discuss how I gave attention to ethic issues that arose in the study. Although written as a distinct section, ethics matters were constantly revisited before, during and after fieldwork. My favourite metaphor when talking about ethics is "walking softly through the wilderness" (Fetterman, 1998, p. 129) , giving the sense that as a researcher I am present in the context but treading gently so as not to leave a lasting impression. However, the feminist ethics of care acknowledges the web of relationships in which all actors are nested, it is not possible to be in a context without having some impact. It is paramount to demonstrate care for the participant, not as an object, but respected as a living, breathing, unique individual (Hesse-Biber & Leavy, 2007; Lindemann, 2019). All ethics documentation referred to in this section can be found in [appendix B](#).

### 6.6.1. Access

Within educational research, access to field sites can often be through opportunistic sampling (Wellington, 2015). Although I knew the post-16 college was interested in improving the experiences of students who were resitting their mathematics GCSE, there was an element of convenience. I had already made contact with the head of faculty through my professional networks. Despite initially seeing myself as an insider, I realised I could not to make assumptions about access. I needed to negotiate how and when I could talk to teachers and students. I provided an information sheet for the college, a copy of my Disclosure and Barring Service (DBS) certificate (held by anyone who works with children in England) and signed a non-disclosure agreement requested by the college. It was important to practise patience, relinquishing control, adapting the project was necessary (Lindemann, 2019). I

gave control to Mike over which class I would attend, negotiating the schedule of my interviews to fit with the rhythm of his teaching.

#### 6.6.2. Power relations and informed consent

Enabling participants to decide anonymously to give informed consent is fundamental to any research project (Hesse-Biber & Leavy, 2007; O'Reilly & Dogra, 2017). It is essential to be attentive to any situation in which participants might feel vulnerable (Calder, 2019). Being observed within education circles can, for teacher participants, have a sense of being monitored. The study did not take a deficient standpoint in that I was investigating, not judging, what was happening in the classroom and how they positioned their students. I was transparent about my previous working relationship with Mike, emphasising that all data would be confidential, with the caveat that I would follow the college procedures in relation to any safeguarding issues. For student participants, as members of a class where the teacher had agreed to take part in the study, they would be a captive audience (Wellington, 2015). I faced the ethical issue of potential coercion, where students might feel that they had to agree to be part of the research. Whilst I acknowledge that it was difficult to explicitly know whether the students felt compelled to take part, the students were made aware that their participation was voluntary, highlighting the right to withdraw at any time without consequence (O'Reilly & Dogra, 2017; Pole & Morrison, 2003). Information sheets and consent forms were left on the desk, face down, not being collected until after the students had left at the end of the lesson. Out of twelve students, four agreed to take part in phase 1. I wore my University lanyard at all times in the classroom as a visible reminder of my dual role as teaching assistant and researcher, highlighting that I would help anyone in the class who asked for assistance. As the students were aged 16 and over, they were able to provide their own consent to be part of the study (O'Reilly & Dogra, 2017)

#### 6.6.3. Anonymity and confidentiality

For anonymity, I used pseudonyms for all participants, however issues of anonymity were more difficult to maintain within the college environment. To ensure the safety of both me and the participants, I conducted my interviews in spaces that were visible to other people in the college. There was the potential for other teachers and students to see who had consented to be part of the study. In lessons, the plan was to avoid drawing attention to students who had agreed to take part, however, as the student interviews took place during, or straight after, lessons, other students in the class would know who was taking part. The most that I was able to promise was non-traceability of the data.

A key aspect of the project was the extent to which students' interpretations would be shared, without being anonymised, with the classroom teacher. Being listened to as a student in this study involved

both researcher and teacher, with the teacher-researcher discussions as conduits for the voice of the student. I could not provide anonymity for students when talking specifically to their teacher. The students were made aware that in this one particular aspect, the data was not confidential. In all other situations, data was confidential, with the caveat that I would follow the college procedures in relation to any safeguarding issues. However, outside of the classroom environment, and in wider discussions, I used pseudonyms for all participants in the study. The students were fully informed that their data would be shared with the teacher, however the discussions about the students between the teacher and I within the teacher-researcher partnership remained confidential, preserving the relationship between the teacher and students was paramount. The issues around confidentiality and anonymity were reiterated on the consent forms, information sheets, during presentations and in the interview preambles.

#### 6.6.4. Safety and well being

The wellbeing of both participants and researchers should not be compromised at any stage of research (Piper & Simons, 2011). Although I hold a current DBS certificate, I made sure to take practical measures to ensure safety when collecting data. I made sure to follow the safeguarding procedures of the college, wearing the college visitor lanyard, as well as my university lanyard, at all times. Observations of students took place in the classroom with the teacher present. All interviews took place in areas that were open, visible to others in the college. No interviews took place outside of the classroom or the library that was adjacent to the classroom. Student participants, although aged 16 to 18, require extra caution to protect them from harm (O'Reilly & Dogra, 2017). Being labelled as low attaining is a potential sensitive issue for students. The label of low attainment is in the rhetoric of teachers, more commonly as low ability, but is not a term used by students. Students are more likely to use labels in relation to their class, such as bottom set [[see glossary](#)]. I chose to work with students in a post-16 college because they would already be aware of their attainment level, having achieved less than a grade 4 in their mathematics GCSE. Giving attention to the feminist consideration around language, I replaced the potentially sensitive term “low attainment” with the term “resit students” in all documentation for the study.

### 6.7. Summary

In chapter 6, I have discussed the methods that I used in phase 1 of the study, the purpose of which was a methods-based study to consider the appropriateness of the methods I had chosen. Recruiting from a post-16 college in the south-west of England, the sample frame for the study was teachers teaching students who were resitting their mathematics GCSE. I volunteered as a classroom assistant [[see glossary](#)], purposefully sampling students from within one of Mike's classes. Observations from

my time in the classroom, alongside artifacts such as students' work, were objects to elicit the perspectives of students in semi-structured interviews. Working as a teacher-researcher partnership, the students' perspectives, alongside observations and lesson artefacts, were objects to elicit stories about students in spontaneous conversations with the teacher. I recognised the potential of talking about students' work or perspectives within a teacher-researcher partnership, which I developed further in phase 2 [see subsection 8.2.4]. In order to centre the voices of students, acknowledging my subjectivities, the data analysis method chosen was the Listening Guide. From the feminist tradition, the method uses the poetic structure of an I poem to draw attention to the different characteristics of a person's co-existing voices. As one of the contributions of this study, I extended the Listening Guide method by introducing a poetic structure called a they poem to examine the stories told by significant narrators.

As part of the discussions on methods, I have reflected on my own development as a researcher during the realities of fieldwork. I had to challenge my initial view that I was an insider, learning to negotiate rather than assume access. The dilemma of taking a dual role of teaching assistant and researcher-observer meant I learnt to create boundaries in the classroom, times when I would observe and times when I would help students. Reflecting on the interview dynamics, beyond choosing the questions (Yeo et al., 2014), my novice behaviours as an interviewer enabled me to understand the importance of managing my own voice in the process. There was somewhat of a dichotomy between the aspects where I focused to a greater extent on my needs as a researcher, observing rather than helping, and the aspects where I learnt to relinquish my needs, being silent in interviews. In section 8.4, I return to the importance of reflexivity about how I locate myself in the research.

In chapter 7, I share the findings from phase 1. I examine the data that I was able to collect, demonstrating the method of analysis, including the introduction of the they poem. I reflect on the data collection and analysis in phase 1 as preparation for phase 2.

## 7. Analysing data and reflections from phase 1 of the study

### 7.1. Introduction

The purpose of this chapter is to present the initial findings from phase 1 of the study. The analysis took place prior to planning phase 2, as a means to reflect and refine the process in preparation for the next phase. In chapter 11, I return to the findings from phase 1, alongside phase 2, to consider the echoes of dominant discourses [see section 3.3, figure 3-b] on the identity work of students labelled as low attaining. I begin this chapter 7 by presenting the research questions that I developed in phase 1 [section 7.2]. I talk about the observations that I used to elicit stories within the interview process [section 7.3]. I go on to demonstrate the use of the Listening Guide method, analysing poetic structures called “I poems” for three participants, Ava [subsection 7.4.1], Betty [subsection 7.4.2] and Christine [subsection 7.4.3]. In section 7.5, as one of the contributions of this study, I introduce a poetic structure that I call a “they poem” into the analysis of Darren’s data [subsections 7.5.1 and 7.5.2], creating a new step 5 into the Listening Guide process [subsection 7.5.3]. Finally, in contrast to the summary used in previous chapters, in section 7.6, I reflect on the processes of data collection and analysis, discussed in chapter 6 and 7, in preparation for phase 2 of the study.

### 7.2. Research questions in phase 1

The research questions for phase 1, discussed in section 6.2, were as follows:

**RQ1v2: What stories are shared about/as enactments of identity in the context of low prior attainment in mathematics?**

**RQ2: What patterns of identity emerge when attention is given to the (self) positioning of students, through the work of a teacher-researcher partnership?**

The first research question (RQ1v2) focused on the stories told by students labelled as low attaining, as and about identity work. The aim was to put at centre stage the interpretations of students about their own identity work in the classroom. The second research question (RQ2) focused on the stories told, about students, by the teacher Mike. The aim was to investigate the patterns of identity that might emerge when the teacher is given the opportunity to listen to the interpretation of students. As I reflect in section 7.6, my schedule of interviews meant that Mike was interviewed before the student participants. Mike did not have the opportunity, during his interview in phase 1, to comment on the perspectives of the students. However, during spontaneous discussions as part of the teacher-researcher partnership, I was able to share the data I had gathered from my observations and student interviews [see subsection 6.4.4 for a discussion about the teacher-researcher partnership].

### 7.3. Observations as objects to elicit stories

I began phase 1 of the study by observing in the classroom [[see appendix E](#) for an example of my field notes]. In this section, I talk about my classroom observations, highlighting one observation session that arose after listening to the interview data of one of the participants. The observation data was not analysed but extracts were used as objects to elicit stories in the interviews with student participants [see subsection 6.4.3].

I began observing by creating primary record field notes [see subsection 6.4.1]. I recorded lesson timings, learning activities and the actions of students, such as Ava photographing her work. I collected lesson artifacts, such as photographs of students' work and copies of the worksheets used in the lesson. Given that Mike provided class work labelled as normal, challenge or extension, I noted the level of work that the students self-selected, observing how they progressed through (or not) the different levels. I recorded the students' involvement within whole class teaching episodes, who would contribute and who would stay silent. I documented interactions between Mike and the student participants. Examples of interactions included, for example, discussions with Darren about not showing workings out, Christine being vocal about her frustration with her mistakes and Betty and Christine talking about the timings of the lesson. One observation session arose after I had interviewed the first student, Ava. As a result of listening to Ava, as well as my observations of Darren, I began to wonder about the various methods students used in the class. For one lesson, I focused my attention on the different ways that the students tackled the fraction and percentage work set. I was interested to note that no student faithfully followed the method demonstrated by the teacher. Ava copied the process provided by Mike into her book, but relied on her prior knowledge of the topic, using her own methods to tackle the work. Darren used a combination of methods, some of which mirrored the processes demonstrated by Mike, and some which did not. On some occasions, Darren made jottings in his exercise book to support some of his calculations, except when he was using the calculator, when he just recorded the answer to each calculation. Betty, who came to the lesson late, did not have any significant evidence in her book of the methods she had used. Both Ava and Betty, when calculating a percentage on a calculator, used the fraction button, even though this process had not been mentioned by Mike. Ava and Darren self-allocated work labelled challenge, with Betty choosing work labelled as normal. Christine was absent on this day. I was left wondering about how a teacher can orchestrate the different methods being used within one classroom. A summary of my observations can be found in table 7-a.

Student (pseudonym) Interview date	My field notes from observing in the classroom
Ava 20/11/19	<ul style="list-style-type: none"> <li>• Attentive in class, starting work immediately</li> <li>• Often completed all the work (normal, challenge, and extension) without asking for assistance</li> <li>• Used the method demonstrated by the teacher, but would use an alternative method if she did not understand</li> <li>• Worked silently in class</li> <li>• In whole class discussion, she did not volunteer answers, but would respond when asked directly</li> <li>• Photographed the work she had completed in her exercise book</li> </ul>
Betty 27/11/19 (joint interview)	<ul style="list-style-type: none"> <li>• Started with work labelled as normal rather than challenge</li> <li>• Did not complete all the tasks</li> <li>• Used the method demonstrated by the teacher, but would also use an alternative method</li> <li>• Vocal in class: “I would prefer this in the afternoon”</li> <li>• In whole class discussions, she did not volunteer answers, but would respond when asked directly</li> </ul>
Christine 27/11/19 (joint interview)	<ul style="list-style-type: none"> <li>• Completed work labelled as normal but not challenge</li> <li>• Used the method demonstrated by the teacher, although on one occasion she used an alternative method</li> <li>• Answered questions that matched the teacher’s demonstration, but did not apply to more unfamiliar questions</li> <li>• Vocal in class: “this is boring”</li> <li>• In whole class discussions, she would volunteer responses</li> </ul>
Darren 11/12/19	<ul style="list-style-type: none"> <li>• Chose challenge rather than normal work</li> <li>• Finished work quickly, but did not request additional work</li> <li>• Got distracted by his phone or talking to other students, but would refocus when challenged by the teacher</li> <li>• In whole class discussions, he would volunteer answers and comments</li> <li>• Used alternative methods rather than that demonstrated by the teacher</li> <li>• On occasion he could not explain his alternative method, “I just do it this way”</li> </ul>

Table 7-a: A summary of my observations from the classroom in phase 1.

#### 7.4. Analysing narrative data

Having presented the research questions for phase 1 as well as the observations that I used to elicit stories in the interview process, I now go on to demonstrate the Listening Guide method of analysis described in section 6.5. Firstly, I use a poetic structure called an “I poem” to analyse the data of Ava,

Betty and Christine. For each student, I begin each discussion with my initial subjective impression, discussing the overall plot as per step 1 of the Listening Guide. As step 2, I create and analyse the poetic structures constructed from the narrative data. In each case, I return to the full narrative, step 3 of the Listening Guide, before presenting the final analysis, as step 4. In section 7.5 that follows, as one of the contributions of this study, I extend the analysis method. I introduce a poetic structure called a “they poem” into the analysis of Darren’s data to consider the stories told by a significant narrator (in this case, Darren’s teacher Mike) [see section 2.4 for a discussion about significant narrators within identity work]. I introduce a new step 5 in the Listening Guide method, using the voices identified in Mike’s they poem, as a foil to re-examining Darren’s coexisting voices.

#### 7.4.1. Ava

I begin with the analysis of Ava’s data. From my observations, Ava was a student who worked quietly in the classroom. She started her work immediately, often completing all of the work available. As I read through her data in step 1 of the Listening Guide, my initial impression was of someone who was positive and proactive, who had a sense of her own contribution towards the success of obtaining a grade 4 pass [see glossary] in her mathematics General Certificate of Secondary Education (GCSE) [see glossary]. I noted how her outlook seemed to be in contrast to my experiences (in hindsight, my assumptions) of a student who was in a mathematics resit classroom [see glossary]. I wondered whether this related to the fact that she had been educated outside the UK or she may have been a few years older than the other students in the college [see glossary].

In step 2 of the Listening Guide, I constructed Ava’s I poem [see appendix D, phase 1, Ava’s I poem]. The guidance provided by Gilligan et al. (2006), about the construction of an I poem, described underlining the first-person pronoun and verb, as well as any seemingly important words. As I constructed Ava’s I poem, my decisions about which additional words to include were somewhat haphazard. I did not think about why I had made particular retention choices or decided to use a different format for some of the lines [see my reflections on consistency in section 7.6]. Moving onto the subsequent stage in step 2 of the Listening Guide, as listener-researcher I was guided to see if sections of the poetic structure fall into stanzas, where the narrative of the speaker seemed to change in, for example, their tone of voice.

When I examined Ava’s I poem, I identified a stanza, from line 5 to line 16, where Ava was introspective:

I don’t think so  
I already know some things  
but I forgot them  
I was ok



I think about it  
I think differently  
I don't know  
I am thinking  
I am thinking  
I am trying  
I was struggling  
I tried

In this section she used verbs, such as thinking; struggling; forgetting; and knowing, which I labelled as a voice that indicated an internal struggle. However, from lines 17 to line 22, in a new stanza, the story changed towards actions:

When I use it, I got some of them wrong  
I am ok with those  
I did do  
I always leave my book  
So when I have time at home  
I am looking at it

In this section, Ava was talking about her own positive actions, the responsibility she was taking to improve her situation with mathematics learning by looking at her classwork at home.

In step 3 of the Listening Guide method, I returned to the full narrative, examining how the voices identified in step 2 coexisted. Ava used a voice I labelled as action to talk about her own impact on learning mathematics. She shared how her lack of confidence had previously influenced the way she behaved:

I did not revise back then because I was not confident enough in the [inaudible] so I thought I want to have this year to be confident with everything because I thought there is no point to start [sic] and learn things that I haven't learnt.  
(Ava's interview, 20/11/19)

It seemed that the decision she made was purposeful, she wanted to improve her confidence before she started to revise. She talked about her successes, having passed her Functional Skills examination [[see glossary](#)], and subsequently achieving a grade 3 [[see glossary](#)] in her mathematics GCSE examination. She went on to say that, in an effort to improve her mathematics grade, she was now photographing her work to look at when she got home. Ava shared her perspectives about her experiences of the teaching and learning of mathematics in college, saying there were a greater number of hours for mathematics compared to her previous experience. She stated that, in college, mathematics was enjoyable because teachers made the work engaging and relevant. However, the introspective struggle voice highlighted the challenges that Ava faced, as can be seen in the discussion about her classwork:

I was ok with everything but when I think about it I think differently. Yes I don't know it is just [sic] so for example when I am thinking about kilometres I am thinking about one thousand

like one thousand metres and I am trying to convert it like this, and now it is quite hard to convert it on that [sic]. Yes and so that is why I was struggling.  
(Ava's interview, 20/11/19)

Ava had attempted to use the process that had been demonstrated by the teacher, to convert it "like this" indicating the teacher-demonstrated diagram she had copied from the board [see figure 7-a].

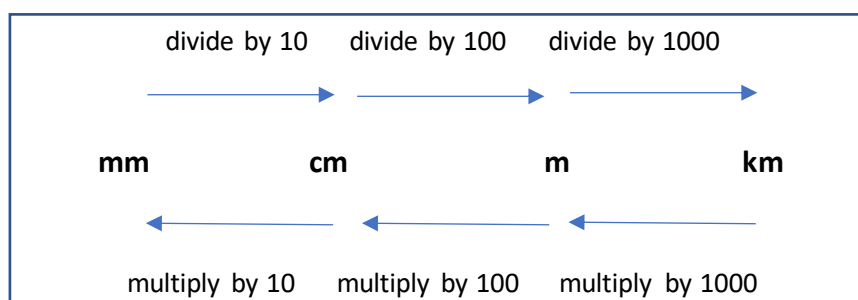


Figure 7-a: The teacher's demonstrated method copied from the board by Ava.

Ava stated that the method demonstrated by the teacher did not align with her own understanding of the topic of converting measurements. As a result, she felt that she struggled to complete the practice work which had been subsequently set. She implied that, because she was thinking differently to the teacher, she was having difficulty with understanding the topic. In fact, it was not that Ava had not understood a method to convert between metric units, from her prior knowledge of mathematics, she had not understood the method provided by the teacher. There was a conflict that had disrupted her thinking for this topic. A recent meta-analysis by Simonsmeier et al. (2022) suggested that, although prior knowledge is an excellent predictor of achievement, there is some evidence that differences between individuals' prior knowledge can interfere with learning, as was the case with Ava.

Step 4 of the Listening Guide, composing the final analysis, brought together all the previous listenings. For Ava, although I initially noted positivity in the overall plot, there was also a sense of struggle in her narrative. The differences between the methods demonstrated by the teacher and her own methods resulted in Ava believing she was at times struggling in mathematics. However, the voice that I labelled as struggle was tempered by the voice that I labelled as action. Ava responded to the sense of struggle by introducing her own methods when working in class and looking at her classwork at home. As I continued to observe Ava in the lessons after the interview, I noticed that she consistently recorded in her exercise book the method demonstrated by the teacher but would often use an alternative method when completing practice work.

#### 7.4.2. Betty

Having analysed Ava's data, I now move on to Betty, who was interviewed together with Christine. Betty and Christine seemed to be a pair, they arrived and left lessons together, working next to each other in class. Initially, they both declined my offers of support, becoming more receptive as I spent time in the classroom. From my observations, I noticed that Betty would start with the practice work that the teacher labelled as normal, often not completing the exercises. I made a note to myself that I wondered if she was just doing enough to get by. In step 1 of the Listening Guide, I read through Betty's narrative data. My initial impression was one of passivity, that Betty felt it was not her fault that she was not being successful in obtaining a grade 4 pass in her mathematics GCSE. She was a victim of circumstance and inherent characteristics.

In step 2, I constructed Betty's I poem [[see appendix D, phase 1, Betty's I poem](#)]. In the same manner to Ava's poem, I attempted to identify portions of the poem that fell into stanzas. Although there were to be some distinct sections in the I poem, this was not always the case. In lines 7 to 14, Betty talked about incidents that had happened to her:

I think Mike was the only decent teacher  
I had  
I had loads of different teachers  
I was put ... I don't know why  
I had to drop  
I literally just got into the exam  
I went into foundation again

Using a voice that I labelled as mitigating, Betty talked about incidents that happened to her at school, for example, frequent changes in teaching staff. She moved on to talk about her own issues with retention, for example, "I forget [line 18] and "I can't remember" [lines 19 and 20]. However, from line 22 onwards, the poem did not seem to fall into distinct sections. In the short extract below Betty talked about her inability to concentrate (highlighted in *italics*), interweaved with her desire to be doing anything other than learning mathematics (underlined):

I prefer Mike over who I had last year  
I just want to fall asleep  
I could  
I could literally  
*I can't concentrate*  
I would rather  
*I just can't concentrate*

Although, in this extract, Betty was using a voice that I labelled as mitigating, she also seemed somewhat frustrated. She preferred to be elsewhere, still in bed rather than in mathematics, a fact she repeatedly stated.

Returning to the full narrative in step 3 of the Listening Guide, the voice I labelled as mitigating voice was dominant, highlighting issues that were outside of Betty's control. She talked about the impact of external factors, such as the teacher's curriculum decisions:

And then I was put in higher in year 11 for some reason I don't know why and then I had to drop back down to foundation so like that was {pause} that was like towards the end of year 11 so literally [sic] just got into the exam just as I went into foundation again  
(Betty's interview, 27/11/19)

Betty felt that the unexplained decision made by her previous school to change her examination tier in year 11 [[see glossary](#)], a move from a higher to a foundation tier curriculum [[see glossary](#)]. Alongside frequent changes of teacher, the move had impacted her outcomes in secondary school [[see glossary](#)]. Betty used the same mitigating voice to talk about what she saw as inherent traits:

as soon as I leave classroom it just leaves {pause} leaves my head and I forget all of it. It's just so much to deal with I can't remember all of it like I can't remember what I had for breakfast this morning I don't even eat breakfast but pretend I do.  
(Betty's interview, 27/11/19)

She repeatedly stated that she had issues with retaining information, an inability to concentrate which affected the way that she acted in the classroom. However, when she did talk about her own behaviour, an element that arguably she did have control over, it felt very reactive rather than purposeful:

The attentions gone. I can't sit and do anything for a long time let alone maths. Even on my actual course I can't just sit there and just do my assignments the whole lesson or I will start just chatting.  
(Betty's interview, 27/11/19)

Betty did not talk about how she was overcoming issues with concentration, focusing on what happened as a result of her lack of focus. It was almost as if she is saying that becoming distracted is inevitable, that she was just not capable of engaging fully.

Betty's second voice, which I labelled as frustrated, suggested a somewhat affective response alongside her mitigating voice. In the extracts above, Betty stated, "for some reason I don't know why" and "it's just so much to deal with I can't remember it all". These statements gave insight into how Betty was feeling as she talked about, for example, the mitigating factor of curriculum decisions, the frustration of not understanding why certain decisions had been made. My initial definition of the frustrated voice, in which Betty talked about wanting to be elsewhere, was extended to include instances where she seemed to be having an affect response. She talked with frustration about learning mathematics and her general college experience. She stated that, although she prefers her other courses, she is frustrated with college in general, stating, "I am just trying to get through college" (Betty's interview, 27/11/19). She stated that she preferred Mike to her previous teachers, who she felt did not explain the work properly, describing mathematics as something she hated. She shared

her perceptions of teaching and learning in college, stating that in school lessons were more frequent, preferring one and half hour lessons to the current college arrangement of weekly three-hour lessons. She talked about the distance between the marks she had achieved in her mathematics GCSE, and what was required to achieve a grade 4, highlighting her repeated failure.

Step 4 of the Listening Guide brought all of the previous listening back into relationship with each other. There were a number of mitigating factors that Betty believed were impacting her learning, all of which seemed outside of her control. However, there was sense of frustration in her narrative. Betty would rather be anywhere else than in her mathematics lesson, often talking about the fact that she could fall asleep or her frustration of wanting to still be in bed. It was not clear whether she is referring to learning mathematics in general, or the timings of the morning lessons. It seemed that for Betty, being at college, as well as having to continue to study mathematics, is not a positive experience. It was something that she just had to endure before she got to work full time.

#### 7.4.3. Christine

Following on from analysing Ava's and Betty's data, I now consider the narrative of Christine. Compared to other students in the classroom, Christine was more vocal. She volunteered responses to the teacher's questions in the whole class portions of the lessons, openly expressing frustration at her mistakes. She completed the worked labelled as normal by the teacher, seeming to faithfully follow the method demonstrated by the teacher. As I read through Christine's data in step 1 of the Listening Guide, my initial impression of the overall plot was a lack of motivation, tinged with sadness, recognising that a mathematics GCSE was a gateway to university study. I sympathised with her frustration at doing all the right things at school, such as attending additional revision sessions, but still not passing her mathematics GCSE. I reflected on the number of times, as a secondary school mathematics teacher, I had told my students, "if you work hard, you will be successful".

In step 2, I constructed Christine's I poem [[see appendix D, phase 1, Christine's I poem](#)]. As I examined Christine's I poem for stanzas, there was a portion from line 36 to 47 where she spoke about completing classwork:

I just  
I wrote  
I can't remember  
I did  
I just saw  
I don't know  
I just did that  
I don't know why  
I think  
I can't remember how I was taught  
I think I was always taught

that is what I did

It seemed that Christine could explain what she had done in her classwork but was not clear about why she had used a particular process. For the rest of the poem, in the same way as with Betty's I poem, I was not able to identify distinct stanzas, with the various voices in the poem seeming to intertwine. I identified two coexisting voices, one around affect, lacking motivation (highlighted in *italics*), the other describing her relationship to a pass in her mathematics GCSE (underlined):

*I don't like it hate it  
but I don't enjoy it  
I chose it  
nothing else I really wanted  
I wanted to do  
was it worse in school  
I don't know  
I don't have any motivation  
I obviously went  
because I wanted  
I don't {sigh} I don't know  
I have failed four times  
*I literally can't be assed  
I need to get maths  
but I just can't be bothered  
I failed  
I just like {pause} I can't be bothered  
I just  
I can't concentrate  
I have gotten worse**

In this extract from her I poem, lines 1 to 20, Christine used the language of motivation and affect, found in phrases, such as "I just can't be bothered" and "I don't enjoy it", which I labelled as a discouraged voice. Christine was introspective, she was aware of the impact of her lack of motivation. Interspersed with the discouraged voice, was a contrasting voice about success (or lack of) found in phrases, such as "I need maths" and "I failed", which I labelled the want/need voice. Christine reflected on her past repeated failures in her mathematics GCSE alongside her desire to achieve a pass.

Returning to the full narrative in step 3, now at college Christine used the voice I labelled as her want/need voice to state the importance of achieving a grade 4 in her mathematics GCSE:

If I fail this [examination] we have just done I will actually start revising because I need to get it before I leave college. Yea but they said that sometimes [universities] can be lenient. Before only a couple of months ago I decided to go to uni [sic] so like last year when I was in maths it was kind of the same because I didn't know what I wanted to do after college.  
(Christine's interview 27/11/19)

Having recently retaken her mathematics GCSE, Christine talked about the importance of achieving a grade 4 pass as a means to be able to attend university after leaving college. She stated that she would

start to revise if she did not pass her most recent attempt, despite the strategy of revision not leading to success when she was previously at school. Christine, using the voice that I labelled as discouraged, consistently related her motivation to her sense of failure:

Obviously in year 11 I went to PO and stuff because I wanted to pass. It's like you go to a lesson a maths lesson before the day starts. So you go from half seven to half eight but {pause} I don't know {sigh} I don't know I have failed four times and I literally can't be assed {pause} I need maths but I just can't be bothered to do anything about it.

(Christine's interview, 27/11/19)

Christine was stuck between a rock and a hard place. Whilst she was at school, she had attended revision sessions before the school day, but had not achieved her grade 4 pass in her mathematics GCSE. She had continued to not achieve her grade 4 repeatedly at college. She was demotivated, talking about becoming distracted in lessons. My definition of the discouraged voice talked about motivation, however Christine, in a similar way to Betty's frustrated voice, also discussed issues with teaching and learning. She talked about preferring Mike as her teacher, as her previous teacher "just wasn't very nice" (Christine's interview, 27/11/19). She talked about not hating, but not enjoying, learning mathematics. She shared her perspectives on the teaching and learning of mathematics, stating that she could not concentrate for the three-hour lessons, comparing the arrangement to the more frequent one-hour lessons that she had in secondary school.

Step 4 of the Listening Guide brought together all of the previous listening to compose a final analysis. Christine stated she had a reason to achieve a grade 4 pass in her mathematics GCSE, she wanted to attend university. Despite this, the voice I labelled as a need/want voice seemed overwhelmed by the voice I labelled as a discouraged voice. She highlighted her repeated failure that was impacting her motivation. As a listener, it felt as if Christine was saying that she did not know what else to do, she had done what had been asked of her in the past but had still not been successful. She seemed unsure about how to overcome the influence of her discouraged voice on the actions required for her future aspirations.

### 7.5. Introducing a they poem

Up to this point, the analysis process had been a light touch, focusing on the construction of the I poem, examining the initial insights the structures provided. As discussed in subsection 6.5.2, when analysing Darren's data, as one of the contributions of this study, I extended the method of analysis by introducing a structure called a "they poem" into the process. An article discussing this extension was first published in the journal *For the Learning of Mathematics* (Helme, 2021a). In this section, I first focus on Darren's identity work using an "I poem", before going on to introduce a they poem as a joint analysis process.

### 7.5.1. Darren

I begin the discussion by analysing Darren's first-person voice. In addition to the article referred to above, an initial analysis of Darren's first-person voice was presented at the conference for the *British Society for Research into Learning Mathematics* (BSRLM), appearing in the conference proceedings (Helme, 2020).

Darren was, on occasion, late for the lesson, often becoming distracted by his phone or conversations with other students. He seemed to have a good relationship with the teacher, engaging in conversation, mostly in relation to the fact that he did not copy down any of the teacher-demonstrated examples or show workings out. He consistently started on practice work that had been labelled as challenge by the teacher, finishing as quickly as he could. He was vocal in class, volunteering answers and comments during the whole class portions of the lesson. From my observations in the classroom, I noticed that Darren would often use a different method to that demonstrated by the teacher. Evidence of his own processes would sometimes be recorded in his exercise book and at other times not. At one point, interested by an alternative method Darren had used, I asked him to explain his thinking. Despite a confident persona, the conversation exposed the first moment of uncertainty. He explained some but not every aspect of his process, saying, "I just do it this way". In a later lesson, when comparing the cost of various holidays, he explained that he did not need to calculate every cost, as, having calculated that a trip to Australia was £1600, he could see by inspection that Hawaii would be cheaper. In his interview, we discussed a further incident from the lesson, where the teacher had posed the following question:  $0.7 \times \_ = 140$ . Darren had quickly answered 20, but when I privately asked him to explain this thinking, he could not provide a coherent reason. (20 is in fact not the correct answer, he was a factor of 10 out). As part of the interview, we returned to both the issues of working out in his exercise book and his difficulties explaining his alternative methods.

As I read through Darren's data in step 1 of the Listening Guide, I noticed that he was looking inwards, focusing on his own actions. He discussed his responsibility for past underperformance as well as the potential for future change. Alongside responsibility, there was a sense of vulnerability as he shared seemingly insurmountable challenges. I reflected on the fact that a student's classroom behaviour could be misinterpreted, wondering how much time I had given as a mathematics teacher to understand any reasons behind a particular persona.

In step 2, I constructed Darren's I poem, dividing the structure into stanzas [[see appendix D, phase 1, Darren's I poem](#)]. In my signposting within this discussion, I have included the stanza number to help with orientation, the line number refers to the line in the I poem. As I inspected Darren's I poem, I identified two co-existing voices, one of his own actions and another more poignant voice of struggle.



The voice I labelled as an action voice was the most dominant. Appearing in stanzas 1, 2, 4, 5 and 7, Darren used variations of phrases that implied lack of past actions or the need to act, such as “I wasn’t” [stanza 2, line 12]; “I didn’t” [stanza 1, line 4; stanza 2, line 13; stanza 4, line 61]; “I need to” [stanza 4, lines 59, 60; stanza 6, lines 74, 75; stanza 7, lines 84, 87]; and “I have got to” [stanza 4, line 62, 63; stanza 5, lines 66, 67]. However, in stanza 2, he was reflective about his actions, moving from “I didn’t really try” [stanza 2, line 13] through “I just feel like I can” [stanza 2, line 15] to “I don’t know I have matured” [stanza 2, line 20]. Darren’s identity work was taking place within the act of storytelling itself. The second, more poignant, voice, found in stanzas 3 and 6, I labelled as a struggle voice. Darren described an internal struggle, the issue of explaining the processes he used to be able to show working out. Darren used variations of phrases, such as “I know how” [stanza 6, lines 69, 71, 73, 76, 81]; “I can just see” [stanza 3, lines 25, 27, 48, 56]; “I get confused” [stanza 3, line 29]; and “I start questioning” [stanza 3, line 46]. In stanza 6, both the action and the struggle voices are present, a stanza of two voices intertwining. Darren responded to the frustration of “if I have to explain” [stanza 6, line 70] (a struggle) with “I need to” [stanza 6, lines 74, 75] (an action).

Step 3 of the Listening Guide involved listening for contrapuntal voices, moving the analysis back into relationship with the research questions. The process involved returning to the full narrative, examining the characteristics of each voice identified in the previous step 2. The first research question used in phase 1 [see RQ1v2 in section 7.2] focused on the stories shared by students about/as enactments of identity. Darren had used two voices; the bravado of a voice I labelled as action and the poignancy of a voice I labelled as struggle. When Darren talked about his actions in relation to learning mathematics, he talked about past (in)action:

I hated [mathematics] I wasn’t that good at it, it was alright but I didn’t really try, no it was alright. I probably prefer it now I just feel like I can learn more now. Yea like I just couldn’t learn it. Not really I think it was like the teacher in class because I knew like everyone in the class so like just joke [sic] about in his lessons and now I feel it is better now.  
(Darren’s interview, 11/12/19)

Darren stated he “didn’t really try” and “joke about in lessons” before saying that he feels that he can learn in his present class. However, he did not go on to talk about his present actions, what he had already changed, rather what he needed to start doing, for example, “I need to write it out” (Darren’s interview, 11/12/19). It may well be that Darren was aware that some form of transformation was needed but was not sure how to enact that change. Darren went on to share his thoughts around the struggle he had with showing working out. He knew he could complete the work, but was not confident to explain how, even to himself.

The voices of action and struggle often occurred together:

I can double check if I have got it right or not I have to go off my instinct which is not always right so like in class I will be like 'is this right?' and it will be but sometimes I will be a little bit away from it so will get the right answer but I need to do more expand the answer but in the exam I have to write it down and I start questioning it [sic] if it is right.  
(Darren's interview, 11/12/19)

Darren talked about the necessity of acting in a different way, "I need to do more" and "I have to write it down", embedded in the internal dialogue of low confidence "is it right?". Darren's use of the voice I labelled as struggle exposed a vulnerable side that was impacting his mathematics work:

I know how to do it but it is tricky to explain I just leave it at least I know how to do it but in the exam I need to get those marks so I need to write it down.  
(Darren's interview, 11/12/19)

However, there seemed to be a juxtaposition between the voice I labelled as action and the voice I labelled as struggle. On the one hand, Darren shared his uncertainties, the difficulties with explaining his thinking in mathematics, and, on the other hand, he talked about the need to show working out to gain marks in his mathematics GCSE examination. Darren gave a sense that he believed that the issues around not showing workings were as result of his own inaction, being resistant to the instruction by the teacher to show his workings, rather than a struggle for which he needed additional support.

Step 4 of the Listening Guide brought together everything learnt in the previous listenings. Focusing on Darren's stories about/as identity work, he predominantly talked about the impact of his own actions. He suggested that it was through his own actions, not trying in lessons, that he was having to continue to study mathematics. Looking forward, he saw his own actions, needing to show working out, as a way to achieve marks in his mathematics GCSE examination. However, Darren did not talk about his present actions, but shared a more poignant story about his issues with explaining his thinking in mathematics. The struggle he described seemed to contradict his story of inaction. It was not that he did not want to show working out but that he did not know how, his difficulty was explaining the processes that he had used. As one of the contributions of this study, I have extended the Listening Guide method to include the stories told about a student by a significant narrator, in this case the stories told by Mike as Darren's teacher. In subsection 7.5.3, later in this section, I introduce a new step 5 where I use the voices I identified in Mike's narrative, as he talks about Darren, as a foil to re-examine Darren's voices.

#### 7.5.2. Mike's stories about Darren

Having considered the first-person voice of Darren, I now introduce a poetic structure, which I called a "they poem", into step 2 of the Listening Guide process. For this study, despite the name they poems, the gendered pronouns "he" or "she" are retained if used by the original speaker.

I created a they poem using the same process as the I poem, focusing on the third-person voice of the teacher about Darren, such as “He likes” or “Darren had to”. All references to a proper name were replaced with the pronoun used by the speaker. At one point in the interview, Mike began to talk in more general terms about resit students, using pronouns they and some, which I retained as a sub-poem in stanza 3. Initially, I retained more additional words in each line compared to the previous work on the student’s I poems, which distracted from the third-person stories being told. I subsequently pared down each statement, creating the teacher’s they poem about Darren [[see appendix D, phase 1, Mike’s they poem about Darren](#)]. In my signposting within this discussion, I have included the stanza number to help with orientation, with the line number referring to the line in the they poem. I identified two co-existing voices as I listened to the they poem. The first voice talked about Darren, reporting on observable actions, and the second talked more personally about the teacher-student relationship, working with Darren. The first voice, focusing on observable actions, I labelled as an about voice. In stanzas 1, 3, 4 and 6, the teacher described what he had observed about Darren, both physically noticing and perception of behaviours. Mike talked about what Darren had said, how he acted both inside and outside the classroom, using phrases, such as “he is turning up” [stanza 4, line 47, 48] and “he smokes” [stanza 6, line 52, 53]. The action voice also included changes in attitude, such as “he wants this year” [stanza 1, line 5] and “he has decided” [stanza 3, line 10]. The second voice identified in the they poem, I labelled as a with voice. The voice focused on interactions in the teacher-student relationship, describing conversations, influences and sentiments that emerged as Mike and Darren worked alongside each other. In stanza 5, Mike reported the words of Darren, suggesting conversations between the two actors. These responses seemed quite defensive, with Mike reporting that Darren used the phrases “I can” [stanza 5, line 49]; “well I will” [stanza 5, line 50]; and “why should I” [stanza 5, line 51]. In stanzas 2 and 7, Mike shared the mutuality of the relationship, “he is not building my ego” [stanza 2, line 6] and “he has taught me” [stanza 7, line 61]. Embedded in stanza 3, there was a section of narrative where Mike did not refer directly to Darren, speaking in more general terms about mathematics resit learners [stanza 3, sub-poem, lines 11 to 32]. Referring to the full narrative, I noticed that Mike talked about some students not being ready to be assessed at the age of 16, sharing his insights on changes that happen in the college environment. I wondered to what extent this could be a hidden reference to Darren, not addressing him directly but aligning him as a member of the group who had reinvented themselves. I decided to retain that portion in the poem, keeping the original pronouns as used by Mike.

Step 3 of the Listening Guide involved returning to the full narrative, listening for contractual voices alongside the research questions for the study. As discussed in section 7.2, although the second

research question for phase 1 (RQ2) considered the patterns of identity that emerge through the work of a teacher-researcher partnership, Mike's interview happened before those of the student participants. In our discussion, Mike used two voices to share stories about Darren, the voice I labelled as about, reporting on Darren's observable actions, and the personal voice that I labelled as with, highlighting teacher-student interactions. Mike used the voice I labelled as about to discuss issues around Darren showing working out:

But the biggest thing I saw with Darren was this "I can't see the answer I am just going to write the answer down" and I said to him that is all well and good if you get the answer correct and it tells you, you know, it doesn't say you must show your working and you get the right answer, yes you have saved so much time cos [sic] it is all up here and you have put it on there and the answer is right, but if you get the answer wrong, what happens if you get the answer wrong and he went "well I will get nothing for it" right ok so what can you do to guarantee that you are going to get some marks there and he is like well " why should I have to show my working out?"

(Mike's interview, 06/11/19)

Mike talked both about what he observed (not showing working out), and a student-teacher interaction, attempting to convince Darren of the importance of showing working out. The voices, labelled as about and with, often intertwined in Mike's stories. In one example, Mike shared that, although he had been told by Darren's previous teachers that Darren was lazy, this was not his perception:

I spoke to both his previous teachers and the kind of the overall impression I have got is that Darren is lazy and doesn't want to listen which couldn't be further from the truth on my initial impressions of six weeks of Darren. He has told me that he knows he has messed around the last couple of years, but this year wants to be the year that he passes his GCSE. Erm you know he is not he is not [sic] building my ego and saying you're better than the other teachers are I think it is because I am the teacher with him here and now that I am going to be the one that he is most loyal to.

(Mike's interview, 06/11/19)

Mike talked about Darren's actions in the classroom, contradicting the stories he had been told by previous teachers, before introducing a story about an interaction, reflecting on their teacher-student relationship. Mike went on to say later on that he believed Darren saw learning mathematics as something that would benefit him in the future, changes that could only be inferred rather than explicitly observed, a perception of Darren's behaviour.

Mike used the voice, which I labelled as with, describing not only how Darren had changed, but how Darren had changed him:

I still know there are probably two or three other routines that would work but it is knowing whether it is the right level to pitch here with students, then he will come up with something and I think you know what [sic] I wouldn't have expected somebody to get that at college but

now that you have that gives me more confidence to try it with different people and that is what I will do because he doesn't realise he has taught me something.  
(Mike's interview, 06/11/19).

Mike reflected on challenging his own assumption about classroom practice, reflecting that he was willing to teach and be taught.

Step 4 of the Listening Guides brought together the findings of all the previous steps of listening. Mike's stories about Darren are not just about actions, objectively observed from a distance, but about relationships, working together with Darren. He talked about Darren's past conduct, highlighting changes in classroom behaviour, which Mike believed stemmed from a shift in attitude towards learning mathematics. Mike consistently used stories about interactions with Darren, reflecting on the value of the teacher-student relationship in influencing change, for both Darren and Mike as a teacher. It seemed that for Mike, changes in observable actions, or potential changes, such as starting to show working out, could be influenced through building relationships.

### 7.5.3. A new step 5 in the Listening Guide

Having considered Darren's first-person voice, and the third person voice of his teacher Mike, as a new step 5 in the Listening Guide, I now go on to introduce the voices of the teacher as a contextual foil in dialogue to re-examine Darren's voices. Both Darren and Mike talked about actions, particularly around showing working out in mathematics, with some alignment between the words they used:

I think I need to start doing it in exams but if I get into the habit of doing it in class I will do it in the exams.  
(Darren's interview, 11/12/19)

If you get in the habit of showing your workings out in the stuff we do in class it becomes normal and then when you are doing it in the exam it is normal to show your working out.  
(Mike's interview, 06/11/19)

In discussion with Darren, Mike suggested that showing working out in class as a way to "get in the habit" ready for the mathematics GCSE examination. It seemed that Darren has internalised the voice of the teacher, revoicing the need to make the effort to show working out. This revoicing could explain the apparent juxtaposition between Darren's action and struggle voices. Darren was revoicing the teacher's apparent assumption that he just needed to apply himself, getting into the habit of showing working out. In fact, the issue was one of confidence, not knowing how to explain his thinking. There was further evidence of an alignment between Darren and Mike in relation to reinvention, changes in attitude in relation to learning mathematics:

I knew everyone in the class so like joke [sic] about in his lesson and now I feel it is much better now. I don't know I matured and it got better.  
(Darren's interview, 11/12/19)

He now understands that maths wasn't something he has to do because that's what the rules were, maths is something he has to do because it will benefit him later.  
(Mike's interview, 06/11/19)

For Mike, Darren's change in attitude related to his understanding of the importance of learning mathematics. For Darren, the shift in attitude towards mathematics lessons was a result of maturing as an adolescent.

Despite Mike's focus on the student-teacher interaction between himself and Darren, there was no evidence in the stories told by Mike that he was aware of the struggles that Darren faced. The issue of showing working seemed to be attributed to defiance, choosing not to, rather being unable to explain his process in mathematics. Darren had not been able to find a resolution to his struggle because the solution proposed by Mike, and internalised by Darren, did not address the challenge of "it is difficult to explain" (Darren's interview, 11/12/19). Foregrounding Darren's voice had given me access to a counternarrative of struggle to the dominant discourse of lack of effort, which was influencing Darren's teaching and learning experience.

## 7.6. Final reflections – thinking about phase 2

In chapter 7, I have discussed the findings from phase 1 of the study. I have demonstrated the analysis of interview data using the Listening Guide, extending the method by introducing a poetic structure called a they poem to account for the stories told by a significant narrator. In chapter 11 of the thesis, I return to the findings from this chapter 7 to discuss the echoes of dominant discourses [see section 3.3, figure 3-b], significant narrations within the identity work of students labelled as low attaining.

I now reflect on the processes of data collection and analysis in phase 1, in preparation for phase 2 of the study. After phase 1, I was satisfied that 1-1 interviews were an appropriate method to investigate the potentially sensitive subject of low attainment. The use of observations, alongside lesson artifacts such as student work, had worked sufficiently well as objects to elicit stories within student interviews. In one of my questions, from the five feminist methodological considerations (Wigginton & Lafrance, 2019) [subsection 5.2.1, table 5-a], I asked "do the data collection methods position students as experts in their own stories-as-identity-work?". By asking for reflections on a specific event in a lesson, I was afforded the opportunity for a nuanced, student led interpretation (Dempsey, 2010). Using the voice of the student to interpret the event, rather than the teacher (or observer), I was able to listen to what could have been an unheard narrative. However, despite the use of student led interpretations, the participants were commenting on observations I had chosen to share. I was controlling which objects were discussed in the interviews. In addition, the way I scheduled the interviews meant that my discussion with Mike happened before I interviewed the students. The perspectives of the students were not the objects to elicit stories in Mike's interviews. In Phase 2, I

needed to consider how to make the use of objects to elicit stories more participant-centred, handing over autonomy of which objects they choose to bring to the interview process. In order to centre-stage the stories of student participants, I needed to think carefully about my schedule, ensuring that I gathered the perspectives of students before my discussions with Mike.

Reflecting on the data analysis process, I was satisfied that using the Listening Guide allowed me to focus on the co-existing voices of students. The data analysis showed the different experiences of students labelled as low attaining, beginning to challenge the essentialisation of their mathematical identity work. Through introducing a poetic structure called a they poem, I gained a nuanced understanding of Darren's stories-as-identity-work, with the potential for revoicing the words of the teacher. However, the final stage of analysing the dialogue between the I and the they voices felt underdeveloped. I would need to revisit the process in phase 2 of the project. The creation process of the pronoun poems, I poems and they poems, had been inconsistent, particularly around which verb phrase and additional words to retain, with each poem created from scratch with their own individual set of rules. Although Gilligan et al. (2006) describe the creation process as somewhat fluid, as guidelines rather than fixed instructions, countering these inconsistencies felt important when creating a number of pronoun poems within one project. In addition, I became aware of the influence of my own subjectivities on what I saw and heard. Within the Listening Guide, as well as for the five feminist methodological considerations, reflexivity is key. I recognised that I did not have an explicit process to examine my own positionality, to consider the impact of my life history.

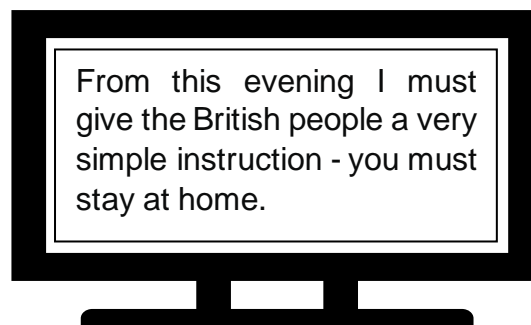
Before the planning of phase 2, the project was overtaken by world events. The covid-19 global pandemic changed what was possible for fieldwork. The interlude that follows represents a pause, a period of self-reflection. Following the interlude, in chapter 8, I discuss the negotiations that took place to be able to deliver phase 2, online, during the pandemic. I talk about the tool that I used to explicitly examine the impact of my positionality as part of phase 2 of the study. I discuss the development of a set of guidelines that I used in phase 2 to ensure consistency when creating pronoun poems.

## Interlude - 23<sup>rd</sup> of March 2020: The prime minister addresses the nation.

This interlude is a moment to pause. Written in a different font and format to the main thesis, the interlude talks about a key period of time during the covid-19 pandemic. The planning of phase 2 of the study had been disrupted, possibly impacting the whole study. I share my personal story, using prose, a diary entry and poem, as I found a way forward.

### Research interrupted

On the 23<sup>rd</sup> of March 2020, the prime minister of the United Kingdom addressed the nation.



It is five days before my daughter's wedding and the nation goes into what turned out to be the first lockdown in the global pandemic. In order to slow the spread of the covid-19 virus, protecting the NHS, we were told to stay at home. We are instructed to work from home where they can, only going out for limited reasons. Education providers are told to move to online learning, with buildings only open to vulnerable children and those whose parents were designated as key workers.

At this stage, I have no idea of the disruption that would follow. My progression document had been submitted on the 20<sup>th</sup> of March 2020, with the progression meeting booked for the 30<sup>th</sup> of April 2020. The face-to-face ethnography had been planned, with classroom observations, photographs of work and interviews, research ethics had been approved. Surely in four months, when the field work is planned to begin, everything will be normal again.



But it was not.

I was frozen in time with my research all planned, packaged and approved but a world unrecognisable and inaccessible. What should I do? I cannot walk away saying that I will return when it is more convenient for me, when my field work can be carried out as I had planned. If I am to claim to be interested in lived experiences, then the experience of covid-19 is very much being lived by my potential participants. I needed to find a way to carry on, to change and adapt.

### A time for self-reflection – an entry from my research diary

I am writing this at the beginning of the data collection in phase 2 but so much has happened over the last few months. The project is not what it was planned to be, and I am not really sure how I feel about that. I know that I had to mourn what was planned and try to let go, I wonder if the new plan feels like second best. I am not able to be in the context of study, watch and talk to people, see the work and actions in the classroom for myself, but maybe that's the whole point. Why do I see my own experiences as a superior way of data collection? Do I feel that I can only be a success if I am physically there? I have come to terms, to some extent, with the change to online methods because there is no other option besides pausing and returning to the study when covid-19 restrictions are over but that feels like a convenience for me and not respecting the lived experiences of what is happening now. I know I feel out of control, what if no one signs up? What if no one responds to my follow-up emails? I have realised lately that I am saying that the participants are the experts, but I feel that I have to control the data in a way that feels right for me. I need to think about how I can let go and allow participants to be the experts of their own interpretations, walk the walk and not just talk the talk. But I am scared! Is that the right word? I am nervous of letting go and allowing what may happen to happen. But isn't that the whole point? What might emerge rather than what I can confirm based on my assumptions. If I don't get responses then that is the data of silence which is the right of the participants, they are not equals if they have to respond. Self-efficacy, which is Mike's aim, surely does not come from blindly doing what you are told, there is an element of resistance, what will this resistance look like? Silence is

resistance! A response to a sense of research “on” rather than truly “with” and alongside. Maybe my own thoughts about lack of control will be reflected in the actions of the students, giving visibility to the actions of the students? How do they feel about having no control over their learning? Do they resist by being silent, not attending, not engaging with the work? Can I use this experience to reflect on what I am able to notice? How is this for the teacher? Does [the teacher] feel that he has to be in control of everything? What would happen if he gave over some control to the students? Site of resistance or compliance?

Digital diary entry, December 2020

### A shifting emotional journey – a poem

It starts with the sadness of “not”

Not planned  
Not sure how I feel  
Mourning  
Trying to let go  
Not able  
Second best

Then became self-centred

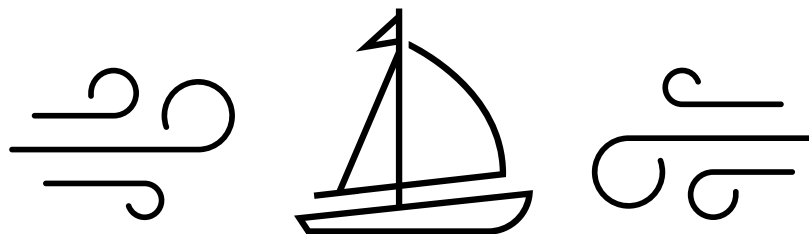
Why do I?  
Do I feel?  
Out of control  
What if no one?  
What if no one?  
I am scared  
I am nervous of letting go  
I have to control

But then there is a shift

isn't that the point?  
Allowing what may happen  
What might emerge  
Silence is a right  
Resistance and compliance

Not equals if they have to  
With and alongside  
How do they feel?  
How is it for them?

The poem, found from the words of my digital diary, shows the emotional toll of the research endeavour. I had to mourn, letting go of "the" plan, my plan, that focused on my own needs as a researcher. The project up to this point had been relative to what I needed, what fitted with my concept of the research. This global event, this moment of enforced delay, had given me the space to consider how this dilemma of control could be an opportunity to grow personally and academically. Alison Cook-Sather (2012) talks about the translation of the researcher, revising traditional versions of themselves, relinquishing the claim to be the primary knower. Becoming a different type of interpreter, changing and being changed. I was definitely being changed, as a result the way I planned and carried out my research in the field was shifting. I started to understand how the research endeavour could be more democratic, a meeting point between researcher and researched. But I would need to learn to relax, to allow myself to be blown by the winds of change, manoeuvring my metaphorical research boat on its anticipated, but unpredictable, journey.



## 8. Methods and reflections in Phase 2

### 8.1. Introduction

Phase 2 of the study took place from December 2020 to July 2021, during the time of covid-19. In this chapter, I talk about how the study evolved in phase 2, both in response to working remotely, and addressing the issues of reflexivity and poetic structure consistency discussed in section 7.6. I begin by sharing how I adapted the study to move to online data collection methods [section 8.2]. I discuss the evolving research questions [subsection 8.2.1]; recruitment [subsection 8.2.2]; rethinking data collection [subsection 8.2.3]; and moving the teacher-researcher partnership online [subsection 8.2.4]. In section 8.3, I expand on the ethics, previously discussed in section 6.7, to account for online methods. In section 8.4, I revisit the issue of reflexivity discussed in phase 1. I introduce a social identity map (Jacobson & Mustafa, 2019) as a tool that I used to explicitly examine my positionality [subsection 8.4.1]. I go on to develop my own social identity map over two iterations [subsection 8.4.2/8.4.3]. In section 8.5, as one of the contributions of this study, I discuss the development of a rubric for consistency when creating poetic structures. I talk about preparing the data [subsection 8.5.1]; developing general and idiosyncratic guidance for the removal or retention of words [subsection 8.5.2]; and using a final aligned structure [subsection 8.5.3].

### 8.2. Adapting in a pandemic

In this first section, I talk about moving the study online because of covid-19 restrictions. I discuss the evolution of the research questions, moving away from observable actions towards listening to stories-as-identity-work. After sharing the process of recruitment, I discuss how I adapted the data collection methods by using email and video conferencing software, surrendering control over the objects for eliciting stories.

The design of research is shaped by what is seen as permissible (Pink et al., 2017). In late 2020, during covid-19, what was possible for this research was impacted by national restrictions imposed by the UK government. As a result, the decisions made by the college [[see glossary](#)] field site, as well as guidance from the university, meant that the study had to become remote. Postill (2017) states that remote ethnographic methods, whether planned or unplanned, are not inferior to being physically located, especially when the researcher has some local knowledge. Issues that exist in the mind of the researcher, such as concerns about the richness of data, are not substantiated (Postill, 2017). As the educational world moved online, the digital became, in some sense, the physical, no longer chairs and tables, but the virtual world of laptop cameras and software tools. Adapting to online methods, I co-created the research design with Mike, the teacher participant. I was addressing one of my feminist

methodological questions [subsection 5.2.1], being open to negotiate, rather than control, the realities of the project. Mike became both a partner and a participant, described by Pink et al. (2017) as “entangled practice” (p. 177). It was in our discussions that Mike suggested that I could use the digital forums already in place at the college. As a response to the national restrictions, the college had enhanced their use of online forums and software for the teachers to teach lessons, view students work and communicate with learners, most of whom were working from home. The online forum presented the opportunity to enter, albeit remotely, into the world of the students.

### 8.2.1. Evolving research questions

As discussed in section 6.2, the research questions had developed in phase 1 to focus, to a greater extent, on the stories told by students and their teacher about what I observed in the classroom. In phase 2 the questions evolved further. Initially, I continued to use the definition of mathematical identity from Bishop (2012), as the way a person talks, acts and the ideas they have about themselves in relation to mathematics, as well as how others see them. As phase 2 developed, so did my conceptualisation of identity. I was not listening to stories about identity work, but identity work in the storytelling itself. As discussed in section 2.6, I was listening to stories-as-identity-work, the stories a person chooses to share about themselves in relation to mathematics, as well as how significant narrators make sense of them. These stories-as-identity-work may have the echoes of wider cultural narrations. The research questions became:

**RQ1v3: What stories-as-identity-work are shared in the context of low prior attainment in mathematics?**

**RQ2v2: What patterns of stories-as-identity-work are perceived when attention is given to the (self) positioning voice through working as part of a teacher-researcher partnership?**

These final research questions moved away from observable actions to focus on stories told by participants. From a feminist methodological consideration, putting the stories told by students at centre stage was a way to privilege their point of view, drawing attention to the influence of dominant discourses. For RQ2, the patterns of stories-as-identity-work may (or may not) have emerged as a result of working as part of a teacher-researcher partnership. The most that could be said was that working as a teacher-researcher partnership gave time and space for reflection, enabling patterns of stories-as-identity-work to be perceived. Hence the word “emerged” was replaced by the word “perceived” in RQ2v2.

### 8.2.2. Remote recruitment

As phase 2 of the project was located in the same college, with the same teacher as phase 1, I had some local knowledge of the context (Postill, 2017). I created a video presentation explaining the project, emailing the information sheets and consent forms to Mike to administer. Mike showed the presentation to his students, some of whom were in the classroom, others of whom were learning remotely. Two students initially consented to take part; however one learner did not respond to my emails, leaving one student participant called Claire (a pseudonym). Claire began attending the college in September 2020. She had been allocated a grade 3 [\[see glossary\]](#) in her mathematics General Certificate of Secondary Education (GCSE) [\[see glossary\]](#) by her previous school, meaning she had to continue to study mathematics in college to improve her grade. Claire had been able to sit her mathematics GCSE in November 2020 but did not know the outcome at the recruitment stage.

### 8.2.3. Rethinking data collection

My lack of physical presence in the classroom led to the question: how would observations feature as objects for elicitation if I was not there to observe? This question brought the entanglement of participant as partner into focus. Cook-Sather (2012) talks about the translation of researchers as “actively engaging in perceiving differently, interacting differently, and representing what we see and how we interact differently” (p. 3). Part of my own translation as a researcher was to realise that I am not any more expert in the context than anyone else. With observations being inherently subjective, my own observations should not be considered any more precise than another person’s (Pole & Morrison, 2003). In my reflection on phase 1 [\[see section 7.6\]](#), I highlighted the need for autonomy, allowing participants control over the objects to elicit stories in the interview process. Relinquishing control to Mike, discussing his own observations of Claire, gave me the opportunity to consider what stories-as-identity-work he felt were important to share in the teacher-researcher discussions. In phase 1, my observations of students were used as objects to elicit stories in the student participants’ interviews. However, in phase 2, these were not my observations, but Mike’s observations of Claire. I felt that it was not my place to share Mike’s observations with Claire as this may have impacted their teacher-student relationship.

The move to the virtual meant that I had to change from face-to-face interviewing onto an online space. Online interview techniques are embedded in the everyday lives of participants, despite the removal of the usual social cues that are found in the physical environment (James & Busher, 2009). In fact, the authors go on to say that, particularly for asynchronous forms of data collection, such as emails, the participants benefit from the space to give considered answers, due to the lack of social presence of the researcher (Hammersley & Atkinson, 2019). I negotiated with Mike to use the student

participants' college email for interviews. For her initial and final interviews, Claire chose a photograph that represented her experiences of the teaching and learning of mathematics, used as an object to elicit her stories-as-identity-work. The plan for collecting informal narrative data, which in phase 1 happened in the classroom, was to join the online post-topic review meetings held between Mike and Claire. The object to elicit stories-as-identity-work would be the student's online assessment work. In the messy realities of research, compounded by the ever-changing pandemic world, the data collection plan had to be once again adapted. Although Claire's initial and final interviews continued as planned, the assessment process was overtaken by the need for Mike to collate evidence for the Teacher Assessed Grades (TAGs) [see glossary]. TAGs were used in the summer of 2021 to allocate GCSE grades, as, due to the pandemic, students did not sit examinations. The examination session in November 2020 had continued as planned as students were able to attend college. A second four-week lockdown began soon afterwards, with the college moving the students to mixed participation, some in class and others learning remotely. On the 6<sup>th</sup> of January 2021, England entered a third lockdown, which lasted until the 8<sup>th</sup> of March 2021. During the third lockdown, as a way to gather evidence for the TAGs, students who were resitting their mathematics GCSE completed a mock examination [see glossary] using online software. Discussions around the outcomes of the mock examination, as well as the November examination, took priority for Mike over the post-topic review meetings. Renegotiating my access, I continued to interview Claire using her email for the duration of the project, with the final interview completed using an online video conferencing platform. The email interviews took the form of a discussion, a chain of conversation over the period of time. The discussions happened over three cycles, detailed in the figure 8-a.



Figure 8-a: Phase 2 student data collection cycles.

There were a range of objects used to elicit stories-as-identity-work, including images provided by Claire; post-topic assessment results; continuations of previous conversations; and Claire’s comments about the I-poems I created as part of the Listening Guide method (Gilligan et al., 2006). Taking account of feedback in order to maintain relationships within (and beyond) the field was essential (Hesse-Biber & Leavy, 2007; O’Reilly & Dogra, 2017). In phase 1, although I gathered the students’ perspectives on what I had observed in the classroom in 1-1 interviews, the students were not involved in the analysis process. In phase 2, I ensured that Claire was given the opportunity to give feedback on the I poems created from her narrative data, providing her own interpretations of what she saw when reading the poem.

#### 8.2.4. Teacher-researcher online partnership

The plan to share the analysis of Claire’s data with the teacher during the project remained unchanged, with the timings of the online meetings carefully negotiated to avoid conflicting with any challenging periods in the college. Using video conferencing software, as well as some email communication, there were three cycles of teacher-researcher partnership discussions, taking place after the student’s interviews, detailed in figure 8-b.

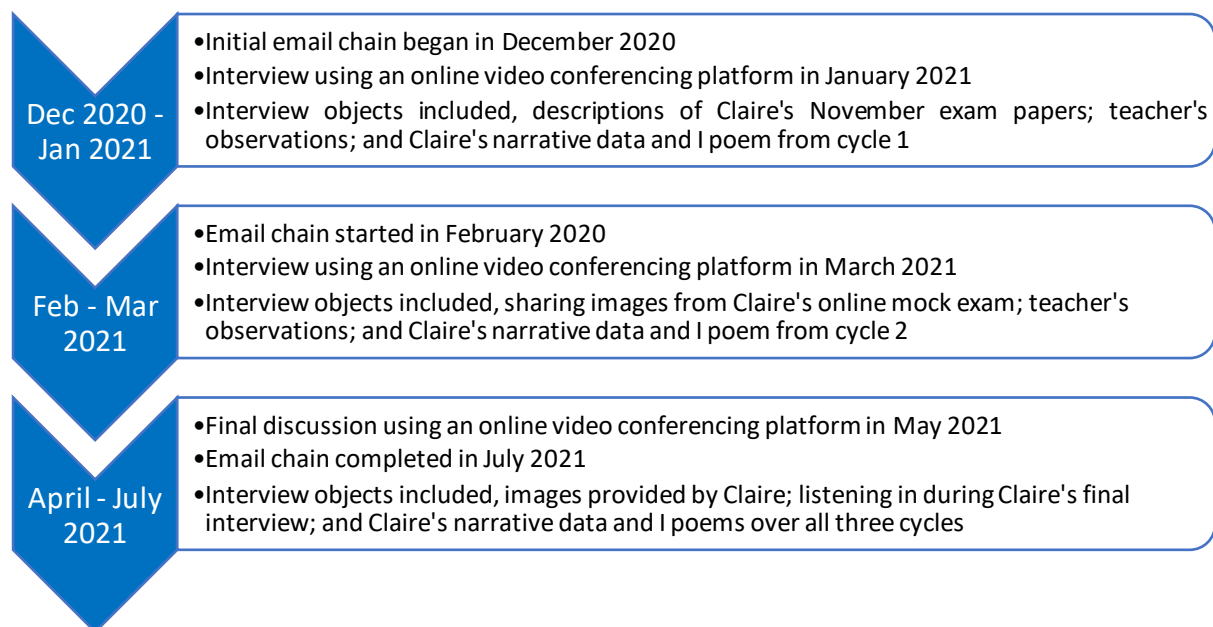


Figure 8-b: Phase 2 teacher-researcher partnership cycles.

The objects used to elicit stories-as-identity-work were brought to the discussions by both Mike and I. Mike provided descriptions of Claire’s November examination paper; images from her online mock examination; and his own observations. I shared Claire’s narrative data and I poems that I had created during each cycle of data collection. Mike had control over the objects to elicit stories he brought to the discussion, I did not make any requests, for example for class or examination work, before the



interview. In fact, choosing objects happened during the conversation, rather than before. For each online interview, I did not know what (if any) work of Claire's that we would discuss. To a greater extent, compared to phase 1, the interview process became democratic, more a discussion between peers than an interview. On some occasions, Mike had previously reviewed the work we discussed, on others it was his first look at her work. As a result, the stories-as-identity-work that he told about Claire were fluid, seemingly (re)constructed during the conversation.

### 8.3. Online ethics in a pandemic

Having talked about the adaptations that I made to the study as a result of the covid-19 restrictions, in this section, I extend my previous discussion about ethics [see section 6.6] to account for the online methods. The ethics of online work is an extension of the ethical thinking involved in face-to-face research (Eynon et al., 2017). The authors state that ethical issues that arise are related to the remoteness of the researcher. The cues that a researcher normally uses, noting the reactions of participants, are more difficult to judge. Eynon et al. (2017) do suggest that the issue around informed consent can be tempered by participants feeling less pressured to take part. For recruitment, I had to rely on the actions of Mike, who played the video presentation to students, administering the information sheets and consent forms. I made sure to talk to him about the importance of each document, to convey to the students that taking part is voluntary. I included my email address in the presentation and on documentation so that students could ask questions. Adaptability and patience were particularly relevant as participants were navigating the ever-changing government guidance as a result of the covid-19 pandemic. I made sure to be sensitive to the needs of the participants. I signed a non-disclosure agreement required by the college; a DBS recheck was not required as it was carried out in phase 1. For the ongoing email conversations with Claire, I chose not to chase for responses, allowing her to respond in her time. I restricted the number of emails sent in each cycle, thinking carefully on each occasion about what additional questions I would ask. I ensured that Claire was fully informed at each stage, for example that I was sending the last email of the cycle or when I would be in touch again for the next cycle. For Mike's online interviews, I was led by his timetable, arranging the interviews when Mike said he was available, within the cycles of data collection. All ethics documents for phase 2 can be found in [appendix B](#).

### 8.4. Reflexive positionality

Up to this point in chapter 8, I have discussed the impact of covid-19 restrictions on the design and implementation of phase 2 of the project. Now I return to my reflections after phase 1 [see section 7.6]. I address the need for explicit reflexivity by using a tool called a "social identity map" during phase 2 (Jacobson & Mustafa, 2019). The discussion about this experience was first presented at the

conference of the *British Society for Research into Learning Mathematics* (BSRLM), being published in the conference proceedings (Helme, 2021b).

The way that a researcher perceives the social world is related to their position within it (Jacobson & Mustafa, 2019), influenced by the values, beliefs and subjectivities that arise from their life histories (Day, 2012; Hammersley & Atkinson, 2019; Hennink et al., 2011). A researcher's positionality, their mode of seeing, goes on to inform all aspects of the research life cycle, from conception through to dissemination (Foote & Gau Bartell, 2011). Understanding their position in comparison to others, for example research participants, helps a researcher explicitly address the potential for imbalance, a key feminist consideration (Day, 2012; Jacobson & Mustafa, 2019; Sultana, 2007; Wigginton & Lafrance, 2019). The concept of positionality has been described as relational, rather than individual. Transient markers, rather than fixed qualities, that are located within, as well as travelling across, multiple social and political contexts (Foote & Gau Bartell, 2011; Hoskins, 2015; Roegman et al., 2016). The life courses of both the researcher, and the researched, be that the participants or the field itself, are interlinked, transforming and being transformed, not just within the specific field site, but also within the wider arenas that they inhabit (Lewis, 2017; Sultana, 2007).

#### 8.4.1. A social identity map

In this subsection, I introduce a social identity map, developed by Jacobson and Mustafa (2019). As a feminist researcher, it was important to overtly locate myself in the research process (Wigginton & Lafrance, 2019). As a listener in the Listening Guide method, step 1 of the process guided me to record my own subjective responses, noting my social locations and emotional reactions that might interfere with my listening (Gilligan et al., 2006). Within phase 1 of the project, I had not considered my positionality that would impact my field work. At an early stage of the study, I made a note in my research diary, as can be seen in researcher notes 8-a.

Why am I slightly miffed that some students will not respond to me? In fact, why should they, this project is important to me but why should it be to them, they just want to pass their exam.

*Researcher notes 8-a: Phase 1 (23/10/19).*

Following on from my reflections in section 7.6, for phase 2, I needed to find a way to be explicitly reflexive. Jacobson and Mustafa (2019) developed the social identity map [see figure 8-c] as one such tool for reflexivity for the critical researcher. Jacobson and Mustafa (2019) state that the task of reflexivity is complex, due to the fluid, abstract nature of social identities. There can be difficulties around recognising which facets of social identity are influential on the research process. Despite these difficulties, developing a social identity map affords the opportunity to explicitly consider the

intertwining of facets of identity, analysing a researcher’s positionality, the lenses that impact the development, delivery and interpretation of their research.

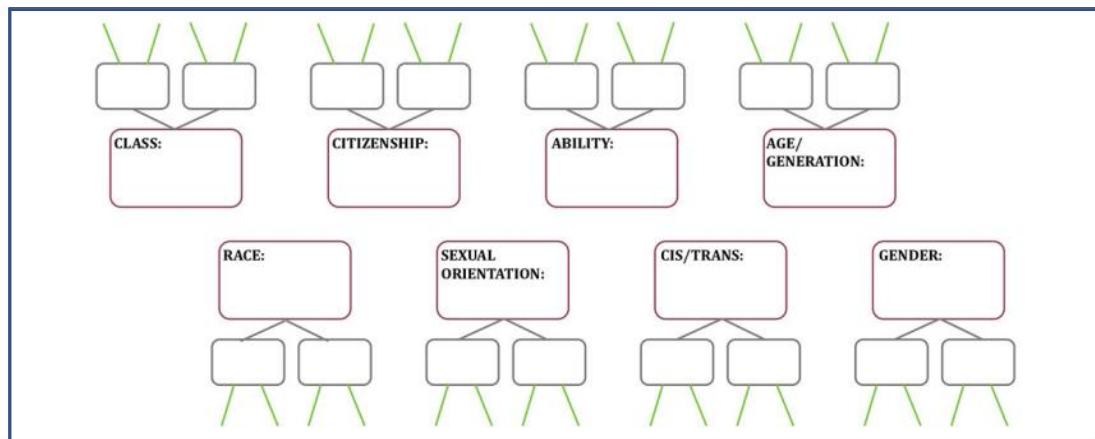


Figure 8-c: Blank social identity/positionality map (Jacobson & Mustafa, 2019).

As shown in figure 8-c, a social identity map has three tiers, namely, tier 1, different types of social identity; tier 2, the perceived impact of the social identities; and tier 3, the emotional responses or impact on interactions. For Tier 1, the researcher identifies the social categories that they belong to, for example class or gender. As with social identities themselves, the social identity map is not considered to be a rigid device but is fluid and iterative (Jacobson & Mustafa, 2019). It may well be that different categories are added, amalgamated or removed. For tier 2, the researcher reflects in a broad sense on the impact of their social categories. As an example, if middle class or white, the researcher has experienced a privileged position in society. Within tier 3, the researcher analyses their emotional responses to the influence of their social identities, discussed in tier 2, on a specific research context. Jacobson and Mustafa (2019) suggest asking the following questions:

- How do facets of my identity, individually or in combination, impact the way I approach, interact with, and interpret my research?
- How do these facets impact the way I understand and interact with my participants? (p. 4)

In line with the flexible nature of the device, the researcher may want to focus, for example, on the topic or methodological approach chosen; how they interact with participants in the field; or the processes of interpretation.

#### 8.4.2. My social identity map - the first iteration

I began working on my social identity map in December 2020, the start of the phase 2. In this subsection, I share my experience of creating the first iteration. I wrote in my research diary, should I focus on my own thoughts or my relationships with others? Am I forcing the task or letting it emerge?

I decided at this point that there would be two maps, or at least two different tier 3 layers, one inward looking and one outward looking. Focusing on tier 2, the broad view of the impact of social identities, I noted that there were categories to which I was having the same response, which I amalgamated into single categories. The social identities of race; sexual orientation; and cisgender/transgender, were amalgamated under race and the social identities of class and citizenship were amalgamated under class (the amalgamated headings were chosen because they appear first in the list). Being uncomfortable with the term ability, I replaced this category label with the term attainment. There were three additional social identities that I believed would be worth reflexively investigating. Firstly, following a comment from a colleague that I was the mother of the group, I included the category of my family role as a mother, acknowledging how the social identity of caregiver would affect how I interacted with others. The second additional category was my presentation in the field site as a researcher, reflecting how participants may position me as something different to other adults in the college. Finally, there was the social identity of my past role as a mathematics teacher, considering in what sense the participants would see me as an insider or an outsider in the college. My final tier 1 categories were presentation; past; attainment; age; race; family; class; and gender [see figure 8-d].

Examining the impact of social identities, although challenging, is necessary to expose what may be “hidden, assumed and denied” (Pole & Morrison, 2003, p. 103). In the first iteration, I looked inward. I focused on how my social identities interacted with my internal dialogues [see figure 8-d]. Recorded in my research diary as the “impact of myself on myself”, this was a deep reflection before I could begin to understand the impact on my specific study. The most challenging moment (quite correctly) was my realisation that I regarded my white, middle class labelling as neutral identities. I was not fully aware of my implicit privilege, which, in turn, impacted how I saw others. I recognised, in hindsight, that removing categories of sexual orientation, cisgender/transgender and citizenship may have related to my normative thinking as a straight, cisgender, British person. I had to be sensitive to any assumptions I might make about, for example, a participant’s past experiences, their access to resources and the options available to them.

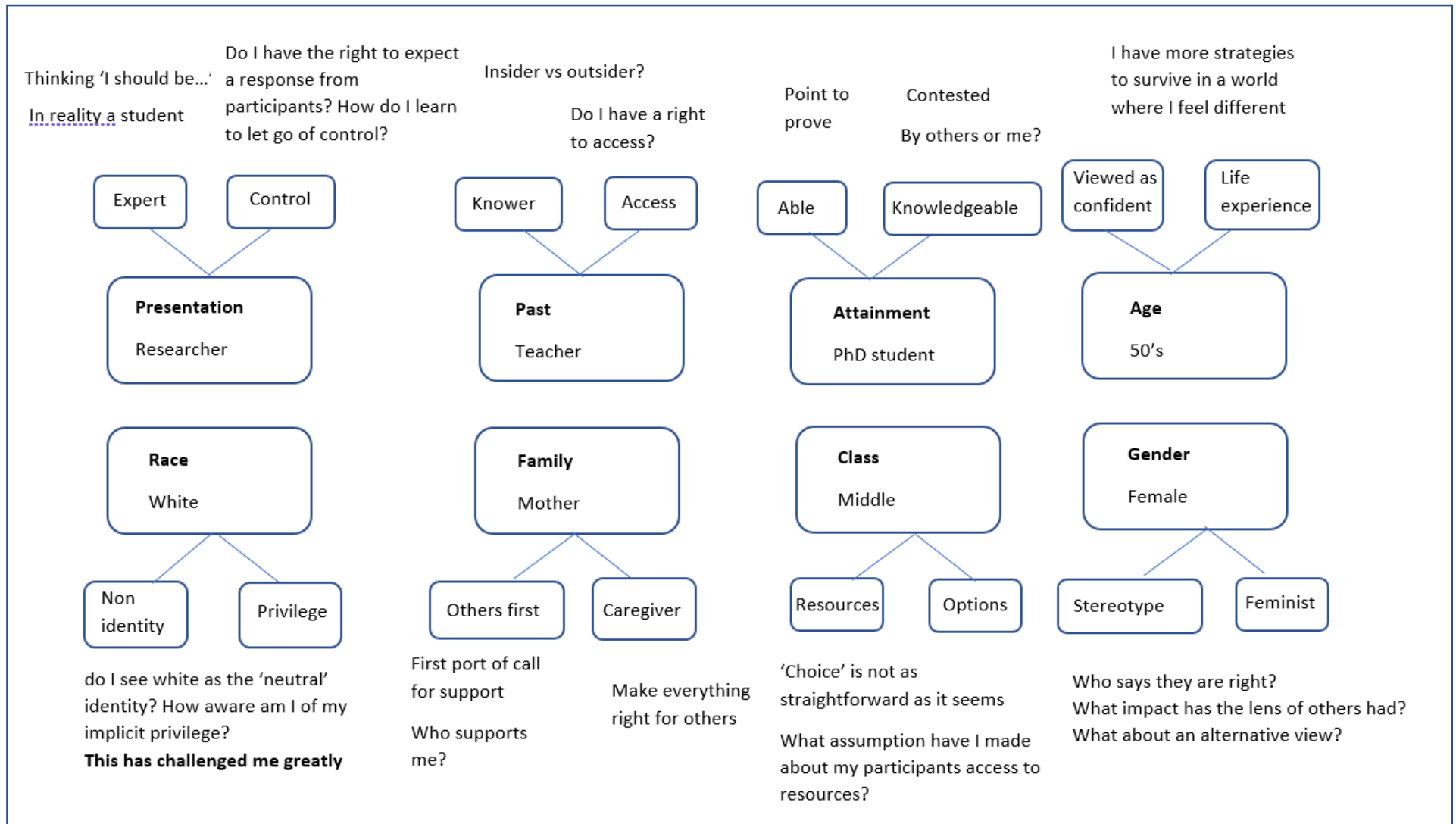


Figure 8-d: Social identity map iteration 1 (December 2020).

As I continued to create the map, I noticed an imbalance between my view of my private, uncertain self and who I believe I should be. My social identity of a researcher, as someone who should be expert, in control, was tempered with thoughts of myself as someone learning to be a researcher. Not an expert, but a student, due to inexperience needing to micro-manage every aspect. Focusing on my identity as a former teacher, seeing myself as understanding the teaching practices as well as the learning experiences, I considered my own right to access the field site. I initially saw myself as an insider, part of the larger teaching community. However, I was for any particular set of participants an outsider, not a member of their specific learning context. Lewis (2017) reflects that a researcher's assumption about the right to be in, subsequently talking about, a field site can often be ill-conceived. I recognised that I needed to give attention to my assumptions, what I could access, what I believed I saw in relation to teaching and learning. Moving on to the social identities of a PhD student, in her 50s, my internal dialogue turned once again to the contrast between what I should be seen as and how I saw myself. I saw myself as an imposter, contesting the view of able, knowledgeable and confident with life experience, which I did not recognise in myself. Along with the gender label as female, I began to wonder about the impact the assumptions of others in my past had on the lens through which I view myself, what stereotypes I had internalised? My sense of being a mother (hen), supporting others, putting their needs before my own, made me wonder about who supports me, where is my own mother hen? [see figure 8-d for the first iteration of my social identity map].

#### 8.4.3. My social identity map - the second iteration

Aligning with positionality as reworked and negotiated in context (Sultana, 2007; Wilson et al., 2020), in January 2021 I moved on to a second iteration of the social identity map. In this subsection, I extend my previous discussion, describing the evolution of the second iteration. As I returned to work on my social identity map, I revisited tier 3, developed in the first iteration of my social identity map, creating what could be called tier 3 part 2, an extension of my previous thinking. I considered the impact of my internal dialogues on my interactions within the field site, both with participants and the topic of study. I chose to add my reflections from this second iteration as a tier 3 part 2 [see figure 8-e] rather than start a new social identity map. Tier 3 part 2 [boxed in red on figure 8-e] is in reality an extension of my inward-looking tier 3 thinking, as reworking that retained my previous introspections. Following from iteration 1, I needed to be aware of two issues. Firstly, focusing on my assumptions, my disrupted thinking around my social identities as a white, middle class, female meant that I needed to check my social view of others, the assumptions that I might make about their world view. I reflected on the necessity to privilege the identity work of others, learning to listen, to discover what could be heard rather than confirming what I might anticipate hearing. I had no rights to the data. It was a gift given by the participants. I should respect it as such.

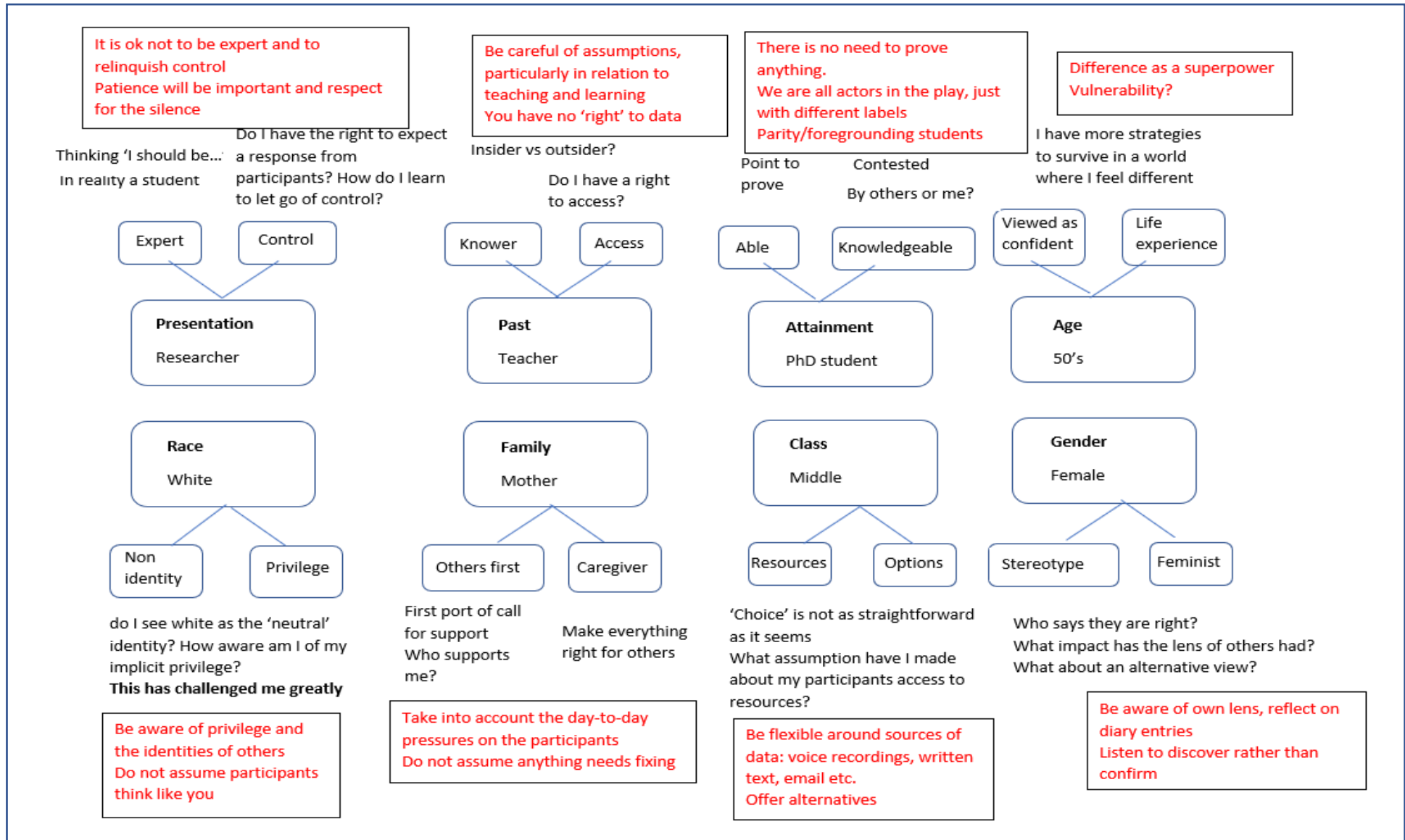


Figure 8-e: Final social identity map after 2<sup>nd</sup> iteration (Completed January 2021).

I recognised that I had made my own plan about the best way to engage with students, rather than discussing possibilities with the student participants themselves. I needed to be flexible around access, sources and objects for data collection. This final point intersects with my second issue of my need to be seen to be in control, having a plan and sticking to it regardless of the situation. Cook-Sather (2012) describes the translation of researchers, becoming a different kind of listener; investigating with, rather than on, students, through recasting authority, expertise and agency; and being deliberate about disrupting the power dynamics. The phrase that I used in my research diary was “practice patience”, to relinquish the need to have email responses within a certain time scale, to respect the silence. I was not a priority in the day-to-day pressures in the field site resulting from the ever-changing government guidance during the covid-19 pandemic.

As I reflected on the process, I was aware of the vulnerability of relinquishing an element of control, to let the project develop as it may. However, this was necessary if I was to allow the participants to be expert in their own lived experience, both in space and over time. As a feminist researcher, I needed to give attention to whose interests were being served by this research, myself as researcher to deliver a project, perfected and packaged, or the students, whose voices I aimed to put at centre stage. I wanted to embrace the messy realities of the research process that occurs when working with real people in actual contexts (and during the challenges of covid-19), to recognise the multiple realities from their point of view (Fetterman, 1998). Using the social identity map gave me the opportunity to think deeply about my own lenses, examining the viewfinders that I was using as I metaphorically walked alongside my participants. In line with the comments by Jacobson and Mustafa (2019) and Pole and Morrison (2003), I found the whole journey more personal than I expected. I was challenged, at one point, revisiting the impact of being labelled as a child, taking a break as my emotions became too intense. I persevered, resulting in a sense of catharsis. I had been able to acknowledge some personal issues around being labelled, explicitly facing others around normative thinking of which I had not been aware. Certainly, reflecting on the impact of past experiences and internal dialogues was a personal journey, taking me beyond the research at hand. I had laid the foundations to examine, accepting to some extent, the complex histories that influenced my current positionality.

### 8.5. Developing a rubric to create poetic structures

In the previous section of chapter 8, I demonstrated the use of a social identity map as a tool that I used for explicit reflexivity in phase 2. A second issue raised in my reflections at the end of phase 1, [see section 7.6], was the inconsistencies when creating the poetic structures within the Listening Guide method of analysis. Gilligan et al. (2006) purposefully frame the Listening Guide method as a flexible process, involving the active engagement of the researcher. In step 2, creating the poetic



structure involves identifying the pronoun and verb, as well as any seemingly important words. However, which verbs and words to choose is not straightforward. Below, as one of the contributions of this study, I discuss my development of a rubric to overcome the issue of inconsistency when creating poetic structures.

#### 8.5.1. Preparing the data

The challenges of working with narrative data began with the transcription process. In this subsection, I talk about the decisions I made when preparing the data, before attempting to create the poetic structures. I transcribed the online, recorded interviews verbatim, including the speakers' use of pauses, "erm" and "um", within the conventions of oral history (Merrill & West, 2009). Before I was able to create the poetic structures, three issues arose as I prepared the data. The first issue related to punctuation in the transcripts. As a first step, I used auto-captioning which had introduced punctuation and capitalisation into the narrative. As it was not possible to know the punctuation and capitalisation of the original spoken dialogue, I made the decision to remove all punctuation, with the exception of the apostrophe in elisions. I removed all capitalisation, including the first-person pronoun and proper nouns. Any sense of priority was removed, all words were equal when analysing speech. For Claire, the majority of the interviewing was through email. As her punctuation and capitalisation were intentional, I retained the narrative exactly as written, privileging her voice in the way she had offered it. The second issue concerned my own voice in the transcriptions as I talked with the participants in both spoken and email conversions. I wanted to preserve the turn taking to retain the context in which the interviews happened, the wider sociocultural context of the narrative (Gilligan et al., 2006). I removed my own voice, keeping the responses in separate paragraphs to maintain the rhythm of the discussion. The final issue was found in the speaker's use of a pronoun, which matched that of the central character of the story but was for another context or person. Examples included reading out examination questions verbatim or telling a story about another person that used the same pronoun. In preparing the data, I made sure the pronoun was correctly referring to the protagonist, excluding all other uses.

#### 8.5.2. Retention or removal decisions

Gilligan et al. (2006) give instructions to retain the pronoun and the verb, as well as any additional words that seem important. These instructions are at best flexible, and at worse vague. With decisions about data preparation made, in this subsection I move on to consider the processes of retaining or removing words to create the poetic structure. I develop general guidance, which could be applied to any narrative, and idiosyncratic guidance, which was applied to the particular speakers in this study.

The development of any device is messy, involving a process of mental imagination, searching the environment and stores of knowledge for possibilities (Adams et al., 2021). I began by using a literal interpretation of the Listening Guide instructions, underlining the pronoun, verb and additional words that I considered to be important:

i just wasn't sure about how much she knew because i haven't gone through the whole content what i am finding is she's really strong with algebra, which is really good, erm and she's quite, she's quite [sic] confident with geometry as well the bits that she struggles with is ratio which is where this kind of insecurity was coming from and i thought does she know as much as what the school of [sic] said she knows? and then [sic] and i now feel [sic] i don't feel bad but i feel like i misjudged her at the beginning  
(Mike's interview, 04/02/21)

As I had not established at this point how I would define important, the decisions were definitely subjective. I created the poem below:

how much she knew  
she's really strong  
she's quite  
she's quite confident  
she struggles  
does she know?  
she knows?

Noticing the use of elisions, abbreviations in speech for certain verbs, such as "she's" for "she is", I wrestled with the idea of replacing with the expanded version. Lines 2, 3 and 4 of the above poem would become:

she's -> she is really strong  
she's -> she is quite  
she's -> she is quite confident

However, I was uncomfortable with the expanded versions. I was changing the words of the speaker, rather than listening to the form they used themselves. I decided that all words would be retained in the form used by the speaker. Wondering if I had not reduced the statements enough, I tested using the pronoun and the main verb only, removing all additional words to create the version of the poem below:

she knew  
she's  
she's  
she's  
she struggles  
she know?  
she knows?

The purpose of a poetic structure is to draw attention to the rich, lived experience found in the co-existing voices used by the speaker. The extraction of the pronoun and main verb, without additional

words, created a sterile poem, not retaining the rhythm or the emotion of the original narrative. The uniqueness of the storytelling, found in analysing the poetic structure, was supported by the inclusion of the additional words, rather than a strict extraction of the pronoun and main verb only. I was already making decisions about how I was going to manage the creative process, having the beginnings of a rubric. As discussed above, I had decided to retain elisions as they were spoken in the narrative.

#### 8.5.2.1. *General guidance*

Through cycles of testing, creating and recreating a poetic structure, I highlighted particular difficulties, recording in my notes how I could resolve the issues. I began by forming an interim version of the poetic structures, which I called the “long phrase form”, underlying and extracting the whole wordstrings. From the extract discussed in the section above, the interim long form poem would be:

i just wasn't sure about how much she knew  
what i am finding is she's really strong with algebra  
she's quite she's quite confident with geometry  
the bits that she struggles with is ratio  
i thought does she know as much as what the school of [sic] said she knows

The long phrase form removed the noise of the complete narrative, focusing the listener as a step towards creating the final poem. I moved on to think about the words that I should retain for the final poetic structure and those I should remove. I initially reviewed each example separately [see iterations in [appendix C](#)]. However, through reading about the syntax of language, I realised that a number of the examples could be grouped together. I did not need to review, for example, each verb separately, just how it is used in the dialogue. Below is a portion of narrative data that I use to discuss how I addressed the issues that arose when attempting to construct the poetic structures. Although I have used an example of spoken dialogue, the discussion also relates to written narratives, such as emails. The extract was taken from an interview with Mike, in February 2021, in which he discussed some of the logistical issues with online teaching:

so yeah i [sic] and i know that some schools have been quite draconian and watching on twitter watching the kind of the threads unfold i'm just like oh my god you know i wouldn't i wouldn't [sic] force somebody to show their face on camera but i would encourage them to share their screen which i think is a different thing because i think screen sharing is evidence of engagement turning the camera on isn't they don't even want to speak they're quite happy to type and i get that which is really bizarre because when they're in the class they are quite happy to talk to each other and share ideas but as soon as they're on the internet they instantly become timid you might get one person that will speak all the time but when we then drop out of the main group thing and i get them to go off and do work and i'm checking them on the mathswatch etc i'll then ring them up i can't shut them up because it's just me and them and you know to me that's really good because obviously the relationships i've built with them has worked because they're still confident talk to me  
(Mike's online interview, 04/02/21)

As previously discussed, all punctuation and capitalisation has been removed from the spoken narrative. In attempting to construct the final poetic structure, as well as the decision already made about elisions, I identified five additional issues, not addressed in the original guidance, that I discuss next.

The first difficulty related to the choice of the verb to be extracted:

#### Examples 1

a: **i think** screen sharing is evidence of engagement (lines 4 and 5)

b: **i wouldn't force** somebody to show their face on camera (lines 2 and 3)

In example 1-a, extracting the pronoun-verb phrase was straight forward, “I think” would be included in the poetic structure. However, in example 1-b there are two verbs present, “wouldn’t” as the negated past tense of the verb “will”, and the verb “force”. The verb “wouldn’t” is an auxiliary verb, a helping verb alongside the main verb, referencing the past, present or future (Tallerman, 2015). The main and auxiliary verbs work together to create meaning. Example 1-b also shows that auxiliary verbs can be present as an elision, which, as previous discussed, I retained in the form used by the speaker. Other examples of auxiliary verbs included, be; have; do; and should. It was necessary for me to extract both the main and auxiliary verb, to retain a sense of the original narrative.

The second and third complications related to additional words that modify the main verb:

#### Examples 2

a: i'll then ring them **up** i can't shut them **up** because it's just me and them (line 10)

b: because they're **still** confident to talk to me (line 12)

Example 2-a shows the use of verbal particles, small words that go together with verbs to create a verbal phrase (Tallerman, 2015). The verbs “ring” and “shut” both have the verbal particle “up”, creating the phrases “ring them up” and “shut them up”. Although the verbs “ring” and “shut” can have a range of definitions, the verbal particle gives the specific definitions in relation to telephoning and silencing. In example 2-b, the speaker used an adverb “still” to modify the main verb “confident”. Often, but not always, ending in -ly, an adverb will express a relationship to, for example place, time and degree (Tallerman, 2015). In this example, the use of the adverb indicates more than confidence alone, but a degree of continued confidence. I chose to retain both verbal particles and adverbs, alongside the main verb, to keep the precise meaning of the speaker. Where the pronoun and verb were separated, as in example 2-a by the word “then”, or verbal particle is separated from the verb, as in example 2a by the word “them”, the complete phrase is extracted, for example “I’ll then ring them up”.

The fourth issue related to the use of conjunctions, words that connect clauses or sentences (Tallerman, 2015):

### Examples 3

a: i wouldn't force somebody to show their face on camera **but** i would encourage them to share their screen (lines 2, 3 and 4)

b: i get them to go off and do work **and** i'm checking them (lines 9 and 10)

In example 3-a, the conjunction “but” connected the statement about showing faces on camera to the statement about screen sharing, highlighting a contrast between the two statements. By retaining the conjunction, giving the pronoun-verb phrase “but i would encourage”, I gave a better sense of the original narrative than just “i would encourage”. In contrast, in example 3-b, the conjunction “and” was used to connect the statements about students working and the teacher checking. Removing the conjunction did not change the sense of the pronoun-verb phrase when excluded from the poetic structure. Other conjunctions include once; when; if; because; and that. The decision to retain or remove a conjunction was subjective. In most cases, I retained the conjunction positioned immediately before the pronoun, where I thought that removal would change the original meaning of the phrase.

The final complication arose when isolating the pronoun-verb phrase where there were multiple examples in one word string:

### Examples 4

a: **i would encourage** them to share their screen which **i think** is a different thing because **i think** screen sharing is evidence of engagement turning the camera on isn't (lines 3, 4 and 5)

b: **i'll then ring them up i can't shut them up** because it's just me and them (line 10)

In example 4-a, the speaker used three pronoun-verb phrases in succession, as such, they would be on separate lines of the I-poem:

i would encourage  
i think  
i think

I viewed the phrases as working together to create meaning, making the subjective decision to retain the additional words:

i would encourage  
which i think is a different thing  
because i think

the three lines of the I-poem, read together, gave a better sense of the original word string than strictly using the pronoun-verb phrases only. In example 4-b, multiple examples were in one wordstring,

including the use of a verbal particle. The pronoun-phrases were in immediate succession with the extracted form keeping the meaning of the original. In this case, retaining additional words was not necessary.

#### 8.5.2.2. *Idiosyncratic guidance*

The issues discussed in the previous subsection could be described as general issues that are not covered in the original Listening Guide method. The general guidance developed could be applied to the narrative of any speaker over different projects. Within a particular study, each participant will also have a way of speaking, idiosyncratic characteristics of that one person. Any guidance that is developed should allow the researcher-listener to apply subjective decisions for each participant speaker. For this study, I made six subjective decisions related to the idiosyncrasies of the speaker/writer.

To demonstrate the first four decisions, I use the same excerpt discussed in subsection 8.5.2.1 for the general guidance. Three of the idiosyncrasies relate to the speaker's manner and one is a response to the aim of the study. Firstly, I will discuss the speaker's manner as demonstrated by examples 5 and 6 below:

#### Examples 5

a: i'm just like oh my god you know **i wouldn't i wouldn't** force somebody to show their face on camera (lines 2 and 3)

b: so yeah **i and i know** that some schools have been quite draconian (line 1)

In example 5-a, the speaker repeated the phrase "i wouldn't" in a way that could suggest a stutter. Using both instances in the poetic structure would imply two separate instances in the narrative, rather than a stuttered repeat by the speaker. In example 5-b, although the pronoun "i" is repeated, with the conjunction "and" between the repeats, this was not necessarily a stutter. I made the subjective decision that where the speaker uses an identical repeat, as in example 5-a, that only one instance would be extracted. Where an additional word is present, as in example 5-b, between the phrases, or there is an elision in the repeat, both would be extracted to the final poem. In example 5-b, the speaker used the pronoun "i" before saying, "and i know that", truncating the first instance of a pronoun-verb phrase. I made the subjective decision to use the pronoun exactly as the speaker, meaning the poetic structure would potentially have a line that is just the pronoun with no verb.

#### Example 6

a: watching on twitter watching the kind of the threads unfold **i'm just like** oh my god (lines 1 and 2)

In example 6-a, the speaker used the verb “like”, to indicate speech or thought, rather than the meaning of having the characteristics of something else. Extracting the pronoun-phrase “i’m just like” in isolation, does not capture the inference by the speaker. I made the subjective decision that where the speaker used other verbs that implied speech or thought, I would retain additional words, adding speech marks and ellipses to indicate ongoing speech or thoughts, for example “i’m just like “oh my god...””. By retaining examples of speech or thought, I kept the intention of the speaker in the poetic structure.

The fourth subjective decision related to the aim of the study, rather than the participant’s ways of speaking. A key focus was to retain the intention of the speaker’s narrative in the poetic structure. The retention of additional words, which appear both before and after the pronoun-verb phrase, are not covered by the general guidance, as shown in the examples below:

#### Examples 7

a: to me that's really good because obviously **the relationships i've built** with them has worked because they're still confident talk to me (lines 11 and 12)

b: when we then drop out of the main group thing and **i get them to go off** and do work (line 9)

In example 7-a, the pronoun-verb phrase extracted to the final poem would be “i’ve built”. In isolation, the phrase could imply the construction of, for example, a wall. I chose to retain the additional words of “the relationships” as these were the focus of the speakers’ act of building. In example 7-b, the pronoun-verb phrase that could be extracted is “i get”, which could imply obtaining an object rather than influencing the actions of students. I chose to retain the additional words to give the phrase “i get them to go off”. In both these examples, retaining additional words, although a subjective decision, gave a greater sense of the original meaning than extracting the pronoun-verb phrase alone.

The final two idiosyncrasies are not evident in the excerpt discussed previously. The first is a feature of a they poem, relating to the use by Mike of his own perspectives, when discussing Claire, as shown in the following extract:

#### Example 8

yeah so she's really really happy with that so like I say she's thriving within the environment of the college which is which is good and **i think she's going to be** successful so you know i had initially thought that possibly she was overgraded  
(Mike’s interview, 26/03/21)

Looking at line 2, using the general guidance, the phrase “she’s going to be” would be extracted to the final version of the poem. Extracting just this phrase, without Mike’s own voice “I think” preceding the phrase, suggests a definite fact rather than a belief or opinion. There is a subtle difference between

Mike saying she will be successful, and, in his opinion, she will be successful. Other examples that proceeded the pronoun-verb phrases for the they poem included the teacher's use of versions of, for example I didn't think; I wasn't sure; I believe; and I know. All of these phrases relate to a perception or opinion of the teacher about Claire. Removing the teacher's voice would change the meaning of the word string. I decided, for this study, to retain in the they poem the proceeding voice, where Mike indicates perspectives and opinions.

The final idiosyncrasy relates to the written narrative, where the author is using an incorrect word, or a word spelt incorrectly, as can be seen in the examples below:

#### Examples 9

a: I personally think that **I am approving** [sic] massively in maths

b: I used resources such as mathswatch and onmaths to help me to understand more about **Probablility** [sic] and **Stastics** [sic]

In example 9-a, the student used the word "approving" instead of what I would suggest should be the word "improving". In example 9-b, although not relating to the creation of a poetic structure, is an example of where Claire has misspelt words in the original narrative. Following on from the notion of using the language in the way presented by the author, I decided to retain the words and grammar exactly as used in the emails, not putting my own assumptions of what I see as correct into the narrative.

The decisions discussed in this subsection, as one of the contributions of this study, formed the general and idiosyncratic guidance, decisions on retaining or removing words, within the creative rubric [[see appendix C](#) for a summary table of the general and idiosyncratic guidance].

#### 8.5.3. The aligned form

I had made decisions about the preparation of the data, general guidance for any speaker and idiosyncratic guidance for the particular speakers of this study. In this subsection, I talk about the aligned form, as the last step in the final creative rubric. Creating poetic structures within the Listening Guide method is a means to listen for what a person knows about themselves, how they present themselves to others, which I have extended to include significant narrators (Gilligan et al., 2006). To this end, once you have identified the pronoun-phrase, the pronoun itself becomes less significant compared to the other words in the poem. The analysis process moves to focus on the speaker's use of verbs and additional words to identify the coexisting voices.



I aligned the pronoun in the final poem, creating a structure with three columns, as can be seen in the example below:

how much	she	knew
	she	's really strong
	she	's quite
	she	's quite confident
	she	struggles
does	she	know
	she	knows

Parsing the poem, which I called the “aligned form”, revealed the verb phrase and additional words used by the speaker, exposing the structure of each statement. I was able to focus on the rhythms of the speaker and the type of verbs used, which had been less evident in a non-aligned form. The full rubric, the recipe used for creating the poetic structures that included the general and idiosyncratic guidance, began as a simple set of instructions. The rubric was tested and retested, each time developing additional instructions for clarity within the creative process. Through the process of testing, as one of the contributions of this study, I developed a device with greater precision, with clearly labelled interim versions of the poetic structures [see appendix C for the final rubric developed as one of the contributions of this study; general and idiosyncratic guidance; and some iterations in the development process].

## 8.6. Summary

Using remote ethnographic methods is not inferior to being physically located in the field site, especially if the researcher has some prior knowledge (Postill, 2017). In phase 2 of the study, the field site, and the teacher participant, were the same as in phase 1. The challenge was to move the face-to-face ethnographic methods originally planned to online methods. Working in collaboration with Mike, the teacher participant, we co-created aspects of the study, concentrating on what was permissible in the time of covid-19. The research question evolved, with the final versions focusing on the stories-as-identity-work told during online interviews. The choosing of objects to elicit stories was more democratic than in phase 1. Claire, the student participant, brought images that represented her experiences of learning mathematics as well as her own thoughts on the poem structures I created from her narratives. Mike provided descriptions and screen shots of Claire’s examination work, as well as his own observations of the way she worked in the classroom (remote and face-to-face).

As part of this chapter, I revisited two of the reflections from phase 1 [see section 7.6], namely, issues of reflexivity; and inconsistencies when creating poetic structures. Firstly, for reflexivity, I demonstrated my use of a social identity map to explicitly examine my positionality in phase 2. The

process was challenging, but also cathartic. Facing some issues from my past, as well as exposing thinking that I had not been aware of, was beneficial. Secondly, relating to consistency of creating poetic structures, as one of the contributions of this study, I developed a rubric, a set of decisions that I made to aid the creative process. The rubric included preparing the data; creating a long phrase form; general and idiosyncratic guidance on decisions to retain or remove words; and the final aligned form.

In chapter 9 that follows, I use the Listening Guide to analyse the narrative data of Claire, the student participant in this study. Focusing on the first-person voice, I discuss her co-existing voices exposed by the analysis process.

## 9. The journey of analysing Claire's stories-as-identity-work in phase 2

### 9.1. Introduction

In chapter 9, I compose the first stage of the analysis of Claire's data, taken from email and online interviews, using the Listening Guide method [as described in section 6.5]. I focus on her first-person voices that coexist in her narrative, telling actual and designated stories-as-identity-work [see section 2.6 for the framework of identity work for this study]. In chapter 10, I analyse Mike's data, where he tells stories-as-identity-work about Claire, as a foil to continue to examine Claire's own stories. In this chapter 9, I begin by setting the scene, sharing information about Claire and the data collection process [section 9.2]. I then move to the data analysis process using the Listening Guide method. In section 9.3, I talk about step 1 of the method, listening for the overall plot and addressing my subjectivities. In section 9.4, I focus, in step 2 of the method, on the poetic structures called "I poems". I create the I poems for each of the three cycles of data collection [subsection 9.4.1], examining for coexisting voices evident in the poetic structures [subsection 9.4.2]. Moving to the third step in the Listening Guide method, I return to the full narrative, considering the voices identified in step 2 in relation to the research questions for this study [section 9.5]. In section 9.6, I bring all the previous listenings together to compose a first-stage analysis of Claire's stories-as-identity-work.

### 9.2. Setting the scene

I begin the chapter by setting the scene of the data collection. As discussed in section 8.2.2, the student participant, for whom I used the pseudonym Claire, began attending the post-16 college [see glossary] in September 2020. Due to government covid-19 restrictions in England, in the summer of 2020, she had not physically sat her mathematics General Certificate of Secondary Education (GCSE) examination [see glossary], being allocated, by her previous school, a grade 3 [see glossary]. As a result, she was required to continue to study mathematics at college in order to improve her GCSE grade. In November 2020, she had sat a mathematics GCSE examination, but did not know the result at the time of recruitment. She subsequently found out she had achieved a grade 3.

I collected data over three cycles, aligning somewhat with the rhythm of the academic year, mostly asynchronously using email. The final discussion with Claire was synchronous, using the online conferencing software available at the college. As discussed in section 8.5.1, the extracts of data from Claire's email retained the punctuation and grammar of the original narrative, with extracts of data from Claire's online interview having all punctuation and grammar removed. The objects to elicit stories [see subsections 6.4.3 and 8.2.3] included Claire's own found images, the I poems that I created

in each cycle and some college assessment data provided by her teacher. The cycles of data collection, although primarily led by the rhythm of the college, was influenced by Claire herself. On some occasions, Claire would reply with some detail, at other times her responses were shorter, seemingly hurried. Some email responses were received quickly, at other times I had to wait. At one point, I did wonder to what extent the data could be described as having any depth, rather than being superficial, performative stories she had chosen to present to me as researcher (and by association, her teacher). As I both waited for, and listened to, the data, I realised that I had to be patient. From a feminist point of view, I needed to address the hierarchy in my participants-researcher relationship [see subsection 5.2.1, table 5-a]. I did not have the right to any data, within my own time frame. In addition, what could be identified in the data, or more accurately what I identified through my own lenses, needed time and space. Being anxious to see what I expected to see, forcing my own assumptions, was not prioritising the speaker's own voice. If the speaker chose to share what I would see as superficial then so be it, who was I to decide what is superficial.

### 9.3. Listening Guide step 1 - listening for the plot

Having set the scene, I now share the process of analysis using the Listening Guide [see section 6.5 for a discussion of the data analysis method]. The first step in the Listening Guide involved two parts: reading the data to listen for the overall plot; and taking note of my own responses that may influence my listening. Listening for the overall plot, I noticed that Claire began by talking about her struggle to understand mathematics. She represented her experiences, using a found image similar to the one seen in image 9-a.



*Image 9-a: A stock image similar to Claire's initial image of a maze.*

She talked about struggling to understand, represented by the maze, which she described as long and not straight. She went on to attribute her difficulties to the lack of support by her previous school teacher. I noted that, in cycle 1 of data collection, she did not mention her own actions, how her own learning behaviours may have been a factor in the struggle. As I began to reflect on my own subjectivities as part of step 1, I realised that I was solely focusing on Claire's description of struggles. My listening was being influenced by one of the themes from phase 1, going on to impact my follow-

up interview questions with Claire. In my researcher notes, I talked about the curse of knowledge, being led by my findings from phase 1, rather than listening properly in this new situation:

Listening is about really listening. Hearing what is being said. I missed Claire trying to tell me she felt differently now. I have been focusing on her past experiences, but she has been trying to tell me that it is no longer that way, she is not that Claire anymore.

*Researcher notes 9-a: Online diary (29/01/21).*

Relistening for the overall plot, I became aware that I had missed patterns of change in the stories. As Claire continued to tell her stories, she shared how her teaching and learning experiences were different in college. The overall plot of her narrative was that she had struggled, sometimes still doing so, but now she felt supported, she had the tools needed to be successful. By examining my own subjectivities, I was stepping away from my assumptions, what I was expecting to hear as a result of my previous listening in phase 1. From a feminist perspective, I was learning to listen to Claire's expert voice over that of my own [see section 5.2.1, table 5-a, for the feminist methodological questions in this study].

As I continued to listen over all three cycles, the themes of struggling, understanding and support were consistently present. However, I noticed that Claire was increasingly locating herself in her stories, although often referring back to the support she was receiving from Mike. Claire began to introduce the language of affect, becoming more focused on positive experiences than negative ones. Her found picture for our final conversation was of two paths, similar to the one found in image 9-b.



*Image 9-b: A stock image similar to Claire's final image of two paths.*

Claire described the image of two paths that represented two potential futures. Learning mathematics was now about leading to possibilities, rather than facing challenges.

#### 9.4. Listening Guide step 2 - poetic structures

Having discussed step 1 of the Listening Guide above, I now move on to talk about the second step in the analysis process. Step 2 of the Listening Guide method involved the creation and analysis of a poetic structure called an "I poem". The purpose of the poetic structure was to focus on the distinctive cadences and rhythms in the speaker's first-person voice. The data could be used as a whole, or by

extracting different sections to analyse separately, depending on the purpose of the study. For this study, I chose to listen to the data both as a whole, retaining the chronological order, and separately within each of the three data collection cycles, in order to listen for the patterns of the stories-as-identity-work over time. From this point onwards, I use the notation “I poem<sub>c1</sub>” when discussing each poem, where the subscript “c1” refers to the cycle of data collection, in this example, the I poem created from the data in cycle 1. A numbering system is used to identify lines of the I poems in my discussion. The numbers refer to a specific I poem and the line within that poem, for example line 1.15, is I poem<sub>c1</sub> indicated by the 1 before the decimal point, and line 15, the numbers after the decimal point.

#### 9.4.1. Creating the I poems

The first stage of step 2, discussed above, was to create the I poems, which I demonstrate in this subsection. For Claire, the majority of the interview data was collected from email conversations. I chose to stay true to Claire’s way of writing (and speaking), even if it was grammatically incorrect. I created the three I poems, one for each cycle of data collection. I used the poetic structures rubric, discussed in section 8.5, adding to the idiosyncratic guidance where appropriate [[see appendix C](#) for the rubric, general and idiosyncratic guidance]. There was one occasion in cycle 1 where Claire began to use a second-person voice:

Finally my opinion of maths is that it is a very difficult subject to get and understand and acknowledge but if you just keep trying and keep persevering you can get through the hurdles of maths and you do very well.  
(Claire’s email, 25/12/20)

Initially I decided to retain the lines “if you keep trying”, “you can get through” and “you do very well” in the I poem<sub>c1</sub> as I believed Claire was still referring to herself. I later chose to remove the second-person voice from I poem<sub>c1</sub>, focusing on the use of the first-person voice. I created three poems, I poem<sub>c1</sub> in cycle 1, I poem<sub>c2</sub> in cycle 2 and I poem<sub>c3</sub> in cycle 3, which can be found in [appendix D](#).

#### 9.4.2. Analysing the I poems

Having created the I poems, I now discuss the process of analysis in step 2, examining the poetic structures. The purpose of the examination in step 2 was to discover how the author talks about themselves, attending to rhythms and cadences, as well as shifts in tones of voice that run through the narrative (Gilligan et al., 2006). For me, analysing the I poems was not a linear process. There was a muddle of listening and relistening, working forwards and backwards through the data, revisiting and redefining voice categorisations.

As the initial analyses took place during the data collection cycles, the first poem I created was during cycle 1. On listening to the poem in my first iteration of analysis, I noticed that in I poem<sub>c1</sub>, Claire used both past and present tenses. I identified the recurring use of variations on the phrases “I struggled” [I poem<sub>c1</sub>, lines 1.3, 1.12, 1.21, 1.22, 1.23] and “I understand” [I poem<sub>c1</sub>, lines 1.6, 1.7, 1.17, 1.19, 1.25], as well as one repeat of “I kept trying” [I poem<sub>c1</sub>, lines 1.8, 1.20]. I wondered if, alongside the image of a maze chosen by Claire to represent her past experiences of learning mathematics [see subsection 9.3, image 9-a], the language inferred a difficult learning journey of hurdles and perseverance, of struggle and relief. Gilligan et al. (2006) state that sometimes, but not always, I poems will fall into stanzas, as I had used with Darren’s data in phase 1 [see section 7.5.1]. I attempted to create stanzas in the I poem<sub>c1</sub>, however the poetic structure did not seem to fall easily into distinct groups of statements. I noted, in my researcher notes, that through my attempt to force stanzas, the I poem was no longer Claire’s story. The ways I was attempting to chunk the poem privileged my interpretation of Claire’s stories, over her own. I opted not to revisit the possibility of stanzas until later in the analysis process.

Learning from the first iteration of analysis in cycle 1, having completed cycle 2 of the data collection, I created I poem<sub>c2</sub>. I placed the aligned poem for each cycle alongside the narrative from which it was sourced, using coloured pencils and informal notes to highlight the different voices I was identifying [see appendix F for an example of this process]. I started the second iteration of analysis by revisiting I poem<sub>c1</sub>. As with my first listening of I poem<sub>c1</sub>, I noticed the repeat of phrases using the verbs struggle and understand, which, at this stage, I labelled as two different voices. I defined the two voices, one I labelled as struggle and the other I labelled as understand, as relating to Claire’s relationship to mathematics learning, either in a state of struggle, or a state of understanding. I did not make a distinction between the verb and negative form, for example “understanding” and “not understanding” were seen as versions of the same understand voice. Highlighting Claire’s use of phrases such as “as I kept trying” [I poem<sub>c1</sub>, line 1.8] and “I also work” [I poem<sub>c1</sub>, line 1.29], I defined a voice, which I labelled as action, where Claire told stories about her own actions in relation to learning mathematics. Finally, noticing Claire’s use of phrases such as “I didn’t get much help” [I poem<sub>c1</sub>, lines 1.11, 1.14] and “now I get” [I poem<sub>c1</sub>, line 1.16], I labelled a voice as receiving, where Claire shared stories about what she did (or did not) receive in terms of support as a mathematics learner. I had four initial categories identified from I poem<sub>c1</sub>, which I labelled as struggle; understand; action; and receiving. Newly visiting I poem<sub>c2</sub>, I found that some of the voices identified in I poem<sub>c1</sub> were also present. Claire talked about struggle [I poem<sub>c2</sub>, line 2.6] and her own actions [I poem<sub>c2</sub>, line 2.13, 2.17, 2.19, 2.25]. However, on further inspection, I identified another voice in I poem<sub>c2</sub> that I had not been aware of in I poem<sub>c1</sub>. Claire used the verbs that related to feelings, thought and affect, including “I

see” [I poem<sub>c2</sub>, lines 2.3, 2.9]; “I notice” [I poem<sub>c2</sub>, line 2.5]; “I personally think” [I poem<sub>c2</sub>, lines 2.11, 2.15]; “I was very pleased” [I poem<sub>c2</sub>, line 2.23]; and “I’m really thankful” [I poem<sub>c2</sub>, line 2.20]. I labelled this voice as the inner voice. I returned back to I poem<sub>c1</sub> to examine Claire’s use of her inner voice, which I found in versions of the phrase “I felt” [I poem<sub>c1</sub>, line 1.4, 1.9].

As I reflected on my analysis so far (cycle 3 had not taken place at this stage), I began to rethink the categories of struggle and understand. I decided that rather than the blunt tool of identifying just the verbs themselves, I would include other verb phrases that inferred the same meaning. I chose to define struggle as various phrases that alluded to the negative of not being able, for example “as I struggled” [I poem<sub>c1</sub>, line 1.3] and “like I couldn’t understand” [I poem<sub>c1</sub>, line 1.7]. I chose to define understand as the positive of being able, for example “I could finally answer” [I poem<sub>c1</sub>, line 1.10] and “I can progress” [I poem<sub>c2</sub>, line 2.8].

The process of analysis was a journey rather than a destination. Given that sharing was an important aspect of the study, having the input of others in the analysis seemed a natural step (Braun & Clarke, 2019) . I wrote in my researcher notes:

I might send the copies to Alf and Laurinda without my notes to see what they see and prompt discussion. This seems a risky move, but I like it!

*Researcher notes 9-b: Online diary (15/04/21).*

I shared the I poems from cycle 1 and cycle 2, alongside the narrative from which they were sourced, with Alf and Laurinda [my supervisors] for discussion. Through the discussion, I realised that for Claire’s two different voices, labelled as struggle and understand, my initial focus on the specific verb being used had created a dichotomy where one did not need to exist. Claire was using a single voice of struggle/understand, talking about her state or relationship to learning mathematics. Her stories were moving, at various times, between struggling and not struggling, not understanding and understanding, as facets of the same voice. I returned to Claire’s use of the second-person voice in the full narrative in cycle 1, as a possible hidden I. In contrast to the sub-poem in Mike’s they poem about Darren [see subsection 7.5.2], I chose not to reintroduce the second-person in I poem<sub>c1</sub> [see subsection 9.4.1]. However, I did note that the second-person voice was only used in the cycle 1 data, where there were less instances of Claire’s own action and inner voice compared to the later cycles. As I return to later in section 9.6, it may well be that Claire did not recognise herself, in cycle 1, as a person who could get through the hurdles of maths. Finally, as discussed in section 2.4, Sfard and Prusak (2005) describe reification in identity work as stories that replace the verbs relating to doing, with verbs about having or being, as well as using adverbs such as always or never. I recognised that Claire talked about, for example “I am finally understanding” [I poem<sub>c1</sub>, line 6] where the word



understanding, sounding like a process, was a description of her current state in relation to mathematics, an actual story-as-identity-work reified by the use of “I am”.

Having completed cycle 3 of the data collection, I examined I poem<sub>c3</sub> for the voices that were present in the previous cycles. Claire used the voice that I now labelled as struggle/understand, not explicitly using the verbs, but similar phrases that inferred the same meaning, such as “when I was really stuck” [I poem<sub>c3</sub>, line 3.17] and “further than I expected” [I poem<sub>c3</sub>, line 3.21]. Claire continued to use the voice that I labelled as her inner voice, for example “I’m much more confident” [I poem<sub>c3</sub>, line 3.12]. In I poem<sub>c3</sub>, I noted an increased number of instances where Claire had used the auxiliary verb “I am”, seeming to add emphasis to the action, receiving and inner voices, for example “I’m actually finding” [I poem<sub>c3</sub>, line 3.16]. I also identified an additional auxiliary verb, “I can”, that stressed the idea of being able, for example “that I can now see” [I poem<sub>c3</sub>, line 3.2]. Revisiting I poem<sub>c1</sub> and I poem<sub>c2</sub>, there was one use of “I can” found in “so I can progress” [I poem<sub>c2</sub>, line 2.8], with some instances of the past tense of the verb found in “could” [I poem<sub>c1</sub>, lines 1.7, 1.10; I poem<sub>c2</sub>, line 2.21], but not as significantly as in the I poem from cycle 3. I did not see the use of “am” and “can” as a different voice when they were used as an auxiliary verb, but as evidence of reification within stories-as-identity-work (Sfard & Prusak, 2005).

The second step of the Listening Guide method of analysis was completed, with the voice themes that I identified summarised in table 9-a:

Initial themes	Description	Examples (can be past, present or future verbs)
Struggle/understand	State or relationship to learning mathematics	<ul style="list-style-type: none"> <li>• I still struggle</li> <li>• I could finally answer</li> </ul>
Receiving	Support (or not) from a teacher	<ul style="list-style-type: none"> <li>• I didn’t get much help</li> <li>• I have/had</li> </ul>
Action	Claire’s own actions	<ul style="list-style-type: none"> <li>• I work</li> <li>• I am currently revising</li> </ul>
Inner	Claire’s thoughts, feelings and affect	<ul style="list-style-type: none"> <li>• I personally think</li> <li>• I am now feeling happy</li> </ul>

Table 9-a: Initial voice themes after step 2 of the Listening Guide method.

### 9.5. Listening Guide step 3 - listening for contrapuntal voices

In the previous sections on the Listening Guide method, I have discussed the first step, listening for the overall plot, and second step, creating and analysing I poems. In this section, I move the analysis to step 3 of the process, listening for contrapuntal voices. The third step of the Listening Guide returned to the full narrative data. This step brought the analysis back to the research questions, providing a means to examine the different layers of a person's lived experience, listening and

relistening to the multiple aspects of the story that has been told. The intention was to consider what is said, determining the characteristics of each voice, refining and redefining where necessary, as well as to reflect on what is not said, the silence in the narrative. For this study there were two research questions, finalised in subsection 8.2.1:

**RQ1v3: What stories-as-identity-work are shared in the context of low prior attainment in mathematics?**

**RQ2v2: What patterns of stories-as-identity-work are perceived when attention is given to the (self) positioning voice through working as part of a teacher-researcher partnership?**

As discussed in section 2.4, stories-as-identity-work are the stories someone tells that are considered to be reifiable, endorsable and significant, consisting of both actual and designated stories-as-identity-work (Sfard & Prusak, 2005). Actual stories-as-identity-work are the speaker's perceptions of the current state of affairs, factual statements using the present tense. Designated stories-as-identity-work are seen as having the potential to become part of a person's actual stories-as-identity-work, the future tense or verb that expresses a wish or obligation. Reifying occurs when the speaker uses verbs that indicate being or having rather than doing.

I began the analysis in step 3 of the Listening Guide method by listening for the voice I labelled struggle/understand, as it had seemed prominent as I listened for the overall plot in step 1. With this voice, Claire talked about her relationship with mathematics learning, the stories about facets of struggle and understand, underlined in the extract below:

It wasn't always easy for me as I struggled to understand maths therefore this image is a perfect example of how I felt about my experiences of maths however during the college period that I am in I am finally understanding maths and being able to recognise and interpret maths.

(Claire's email, 25/12/20)

In this extract, Claire moved from the past tense of "I struggled to understand" to the present tense of "I am finally understanding", stressing the difference between the time frames. Claire was emphasizing the contrast between her before and her now, moving the story away from her previous experiences of struggle and towards understanding at the post-16 college. There was evidence of this voice reflecting on the relationship with mathematics learning, using other phrases of similar meaning, for example "i'm actually finding it a lot easier to do maths" (Claire's online interview, 06/05/21), often relocating the stories in elements of success. Claire's actual stories-as-identity-work told the story of someone who perceived themselves as understanding in mathematics, one who struggled less than she had previously.

Although the stories where Claire described struggle predominantly used the past tense, there were a few examples of Claire using the same voice to talk about some of her present experiences. In the following extract, where Claire was reflecting on a question-level analysis of a recent assessment, I have underlined the voice I label as struggle/understand:

I still struggle to understand the area marked in red and I will need to brush up on my skills so that I can progress further. I also see that I am quite good at maths which are shown in the colour green. I personally think that I am approving [sic] massively and that I am pushing myself to get the correct grade that I need to get to pass maths this year.  
(Claire's email, 10/03/21)

Claire began by writing about how she still struggled with the topics that gained no marks in the assessment, marked as red in the question-level analysis. However, once again she moved the story away from the struggle towards the understanding. The initial statement was tempered by going on to talk about the questions that gained full marks, indicated by the colour green. Claire talked about her actual stories-as-identity-work as being “quite good at maths” and “approving (improving) massively”. Her actual story-as-identity-work about her relationship with learning mathematics was no longer a struggle to understand mathematics at a global level, but rather a matter of not understanding only some areas of mathematics. There was evidence in the extract of a designated story-as-identity-work, found in the line “to get the correct grade that I need to get to pass maths this year”. Claire used the phrase about her improved understanding in the same sentence as getting a pass grade in her mathematics GCSE, suggesting she saw an association between the statements. This particular designated story-as-identity-work, related to a pass grade in her mathematics GCSE, reoccurred in cycle 3, as can be seen in the following extract from her recorded online interview [as discussed in subsection 8.5.1 as this is spoken narrative, all punctuation, including capitals, has been removed]:

i am hoping to get my grade 4 in maths and english and carry on to do an early years in education at level 2 go on to do an apprenticeship as a teaching assistant  
(Claire's online interview, 06/05/21)

For Claire, using the voice I labelled as struggle/understand, she saw success as the potential to get a grade 4 pass [[see glossary](#)] in her mathematics GCSE, understanding was equated to an examination outcome. In addition, she associated a new designated-story-as-identity-work with her understanding in mathematics, her desire to become a teaching assistant [[see glossary](#)].

As with the I poems, the stories told by Claire did not appear as distinct sections in the narrative. There would often be a combination of the various voices interacting in the story telling. As I began to trace the voice I labelled as receiving, identified in step 2 as indications of support (or not) from the teacher, I saw that Claire would use this voice alongside the voice I labelled as struggle/understand.

The receiving voice is highlighted in *italics* and the struggle/understand voice is underlined in the extract below:

*I didn't get much help* therefore I struggled a lot and every time *I asked for help and support I wouldn't get it*. When my school teacher set homework he didn't do it on a platform which benefited me and *he didn't really explain* the work or homework well therefore it was a daily struggle that I had to face. Whereas now *I get support and help* from my maths teacher and *he always explains* it in a way which I understand and secondly *he always gives us feedback* which I understand and lastly *he uses a platform for the classwork and homework which is more suitable for me*

(Claire's email, 08/01/21)

Claire described her view of a connection between her struggle/understand relationship with mathematics learning and the actions of her teachers, contrasting her perceptions of no help in the past with her present supportive college teacher. As well as talking about the teacher themselves as a resource, Claire also mentioned the impact of the teacher choice of online platforms for classwork and homework. Claire went on to talk about online software as resources, provided by her current teacher, which she had used to help her to understand. The voice that talked about receiving, getting and having support, was extended to include any resource, both human and nonhuman, external to Claire herself, which she talked about in relation to her mathematics learning.

When discussing her struggle/understand relationship with mathematics learning, as well as using the voice I labelled as receiving, Claire also introduced the voice I labelled as her action voice. Claire used her action voice to talk about her own personal actions in relation to learning mathematics. In the extract below, Claire's action voice is highlighted in **bold** and her struggle/understand voice is underlined:

Maths did annoy me at times and made me feel like I couldn't understand maths but **as I kept trying and trying** to understand it got a lot clearer to me and I felt like I could finally answer questions and be able to get maths it just would of taken me longer to do so.

(Claire's email, 25/12/20)

Claire associated her personal effort with the move from struggle to understanding. Other examples in her narrative indicated that Claire was conscious of the importance of her own actions, for example "I am pushing myself" (Claire's email, 10/03/21), and "I will need to brush up on my skills" (Claire's email, 10/03/21). Claire saw herself as someone who was putting in the work to improve, a key factor in her actual story-as-identity-work. There was evidence of Claire's introspection found in her story telling, an inner voice of awareness as Claire shared her feelings that she could understand mathematics as long as she was given enough time.

Claire used the voice I labelled as her inner voice, underlined with dots and dashes, intertwined with both her voice of struggle/understand, underlined, and voice of receiving, highlighted in *italics*. In the extract below Claire described her choice of a found image of two paths [see section 9.3, image 9-b]:

I am now feeling happy about how much I have progressed in maths and that I am no longer thinking maths like a maze. I can now clearly see two paths in front of me both of which will help me to progress to my future career. Personally it was difficult to start with because *I didn't have much help at school* however now I am at college and *I am getting more help from Mike* I feel like I have come so much further than I thought I would.

(Claire's email, 30/04/21)

Claire not only identified the change in her struggle/understand relationship with mathematics learning, but also an emotional response, a change in the way she was thinking. Telling her actual stories-as-identity-work about her move from struggle to understanding, Claire used the phrases "I am no longer thinking" and "I am now feeling happy" to share the changes in her own thoughts and affect. Using "I can now clearly see", she talked with positivity about the potential to achieve her designated-story-as-identity-work of her future career. The changing relationship with mathematics learning, which in this extract she attributed to the support of her teacher, was impacting her self-efficacy.

The final voice themes, reviewed and for the voice labelled as receiving redefined, are summarised in table 9-b.

Final voice themes	Description	Examples (can be past, present or future verbs)
Struggle/understand	State or relationship to learning mathematics	<ul style="list-style-type: none"> <li>• I still struggle</li> <li>• I could finally answer</li> </ul>
Receiving	External support (or not), for example from a teacher, including the use of online software	<ul style="list-style-type: none"> <li>• I didn't get much help</li> <li>• A platform for classwork and homework which is more suitable</li> </ul>
Action	Claire's own actions	<ul style="list-style-type: none"> <li>• I work</li> <li>• I am currently revising</li> </ul>
Inner	Claire's thoughts, feelings and affect	<ul style="list-style-type: none"> <li>• I personally think</li> <li>• I am now feeling happy</li> </ul>

Table 9-b: Final voice themes after step 3 of the Listening Guide method.

## 9.6. Listening Guide step 4 - composing an analysis

The final step of the original Listening Guide brought together the insights from the separate listenings back into relationship with each other. Having completed the first three steps of the Listening Guide method, listening for the overall plot, creating and analysing I poems and listening for contrapuntal voices, in the discussion that follows, I synthesized all the evidence from my previous listenings to examine the stories-as-identity work as told by Claire.

At the start of the study, Claire had been attending the post-16 college for four months. The initial task I gave her was as follows: "I would like you to think carefully about your experiences of learning maths up to this point" [[see appendix E](#) for the interview tasks in phase 2]. Claire shared a found image

of a maze [see section 9.3, image 9-a] to represent her experiences of learning mathematics. She chose to highlight how her experiences had changed in the new learning environment of college. In the first cycle of data, Claire overwhelmingly intertwined the voice I labelled as struggle/understand, her relationship to learning mathematics, with the voice I labelled as receiving, having support (or not) from the teacher. In her actual story-as-identity-work, she began to describe the move from struggling globally, with the subject of mathematics itself, to talk about struggling in just some areas of mathematics:

I kept trying and things do become clearer and I also used to struggle a lot with maths but now there is still some topics that I struggle with but there is the right material for me to get better with what I am struggling at.

(Claire's email, 25/12/20)

The use of the phrase "some topics" suggested that she was aware both of the subject matter she struggled with and what she did understand. Claire talked about overcoming struggle given the right resources, mostly through the support from her current teacher. I shared I poem<sub>C1</sub>, created at the end of cycle 1, with Claire, asking what she noticed when she read it. Her response can be seen below:

I have just read the poem over and I felt like I've achieved great things and at the start of it I struggled but I kept on persevering and I finally understood how I managed to deal with my challenges in maths.

(Claire's email, responding to the I poem from cycle 1, 22/02/21)

Claire reflected on the impact of her own actions, the possibility of overcoming her challenges with learning mathematics, using the phrase "I finally" to evidence different patterns of self-efficacy.

In cycle 2, Mike shared with me a question-level analysis of both an initial and an exit assessment on the topics of probability and statistics. The analysis used the colours red, amber or green to indicate questions that gained no marks, partial marks or full marks, respectively. The two assessments were used to measure progress, comparing the outcome before teaching a topic unit with the outcomes afterwards. As Mike had already shared the outcomes with Claire, I used her assessment results as an object to elicit stories in an email conversation. Initially, Claire used the voice I labelled as struggle/understand to discuss the questions marked in red (no marks), talking once again about "some areas" of mathematics in which she struggled. She immediately went on to talk about her own mitigating actions, to "brush up on my skill so I can progress further" (Claire's email, 10/03/21). Her actual stories-as-identity-work were told through stories of personal success:

Yeah I have become campus officer which is great news for me! After all my hard work :) I have been doing a lot better with my math this term and mike [sic] has been very supportive of me and I'm really thankful for that. The face to face [sic] were a lot more effective for me because it meant that I could have personal support if I needed to. I was very pleased with what I got in my statistics and probability assessment as I worked really hard.

(Claire's email, 29/03/21)

Claire shared that her own hard work, alongside her teacher's support, was leading to her sense of being successful. When comparing cycle 2 to cycle 1, to a greater extent Claire used the voices that I labelled as an action voice and an inner voice. She shared stories that included, for example, what was happening in relation to understanding mathematics, what she thought were the reasons in terms of external resources and her learning behaviours and emotional responses to feeling successful. Whereas in cycle 1, the experiences of learning of mathematics felt quite abstract, something that happened to her, in cycle 2, it became more personal, something that she influenced herself. Claire was including herself in her actual stories-as-identity-work, emphasised by her use of the phrases "I am" and "I can". In cycle 2, there was the first instance of Claire relating understanding to a designated story-as-identity-work of receiving what she described as "the correct grade" (Claire's email, 10/03/21), a grade 4 pass in her mathematics GCSE. When I emailed Claire her I poem<sub>c2</sub> for comment, her response was briefer than before. She stated, "I notice that I have got a letter [lot] better at maths since September" (Claire's email, 27/04/21), however she did state early in the cycle that the term had been busy, which may account for the brief response.

Finally, in cycle 3, I asked Claire to repeat the task that she completed at the beginning of the project, finding an image that represented her current experiences of learning mathematics [[see appendix E](#) for the interview task for phase 2]. She responded by providing a found image of two paths [see section 9.3, image 9-b], accompanied by an email describing her choice of image. I had been able to negotiate with Mike that I could ask Claire to take part in a final online synchronous discussion, using the college's voice conferencing software, to which she agreed. In the online interview, Claire described her choice of the new found image, using positive language to reflect back on the patterns of identity work since her previous choice of an image of a maze. She spoke with the voice I labelled as inner, being somewhat emotional about her progression in mathematics:

I am now feeling happy about how much I have progressed in maths and I am no longer thinking maths like a maze. I can clearly see two paths in front of me both of which will help me to progress to my future career.

(Claire's email, 30/04/21)

Claire highlighted the different patterns of her inner voice, stressed by the auxiliary verbs "I am" and "I can". She went on to say that she was "very proud" (Claire's online interview, 06/05/21) and "much more confident" (Claire's online interview, 06/05/21), stating "I feel like I have come so much further than I thought I would" (Claire's online interview, 06/05/21). In the narrative from cycle 3, Claire consistently used the voice I labelled as inner, alongside her other voices, suggesting a more personal view of the learning experience. I noted that she used the emphases of "I am" and "I can" in various stories to draw attention to her ability to tackle the mathematics work, possibly achieve a grade 4 pass in her mathematics GCSE, her perception of two possible future career paths and her access to

external support. In Claire's stories-as-identity-work, the voice of the struggle/understand relationship to learning mathematics, as well as the receiving voice of help from her teacher, are still intertwined, as in the previous cycles, with less reference to her own actions compared to cycle 2. Her stories-as-identity-work, in cycle 3, not only talked about understanding differently but also feeling and thinking differently.

To gain Claire's final reflections, as part of cycle 3, I sent her all three of the poetic structures, created over the cycles of data collection. Claire reflected on the whole journey of the project:

The big thing that I have noticed is that I have greatly improved with maths and that I have overcome many obstacles which I personally think I have improved with my maths a lot and this shows that.

(Claire's email, responding to the I poems from all cycles, 25/05/21)

Claire focused on the improvement that she recognised in her mathematics learning, not mentioning struggle as she did in her reflections in cycle 1, rather talking about overcoming obstacles. It could well be that the obstacles she was referring to were the struggles of not understanding mathematics, but as a listener I wondered also about the hurdles that could be located in herself, her self-belief about the possibility of success alongside the impact of her own hard work.

As Claire told her actual stories-as-identity-work, she consistently highlighted a distinction between her past experiences in school and those of her present college. She talked about the move from a global struggle to some struggle and finally understanding. Claire attributed the move to understanding to the practical ways that her teacher, Mike, had been supportive, for example using more suitable online platforms. She contrasted Mike's support to the lack of help in her previous school. Although initially less evident in cycle 1, Claire went on to introduce her own resources of effort, persistence and awareness. Claire's stories-as-identity-work moved from a position of the learning happening to her, somewhat external and out of her control, toward the more personal of her own thoughts and actions, she happened to the learning. Over the time of the project, Claire began to talk about her designated stories-as-identity-work, her vision of the future. Initially, she talked in general terms about understanding, before becoming more specific. She equated future success to achieving a grade 4 pass in her mathematics GCSE, which would, in turn, enable her to study to become a teaching assistant. By following her inner voice, I noted developing patterns in how she saw herself and her future, her designated story-as-identity work. Reflecting back on Claire's use of the second person voice in cycle 1, seen below:

Finally my opinion of maths is that it is a difficult subject to get and understand and acknowledge but if you just keep persevering you can get through the hurdles of maths and you do very well.

(Claire's email, 25/12/20)



I had previously wondered whether Claire used the second person pronoun because she did not believe that this was referring to her, that she could be someone who was able to overcome the hurdles of learning mathematics. However, comparing the statement above to her final reflections on the I poems at the end of the project email, the tone of the statement had changed, becoming, as discussed previously, less detached and more personal:

The big thing that I have noticed is that I have greatly improved with maths and that I have overcome many obstacles which I personally think I have improved with my maths a lot and this shows that.

(Claire's email, responding to the I poems from all cycles, 25/05/21)

Claire no longer talked about "you can get through" rather "I have overcome". The hurdles might still have existed, but she now recognised herself, as she told the stories-as-identity-work, as someone who had successfully overcome.

## 9.7. Summary

In this chapter, I have used the Listening Guide method of analysis to examine the first-person voices that co-exist in Claire's narrative. The process enabled me to identify four voices that I labelled as struggle/understand; receiving; action; and inner, with the most prominent being the struggle/understand voice. The various voices intertwined as Claire told actual stories-as-identity-work about the move from struggle to understanding in relation to learning mathematics. Over time, the actual stories-as-identity-work became more personal, introducing her inner voice of thoughts and affect. Claire associated understanding in mathematics with her designated stories-as-identity-work of both achieving a grade 4 in her mathematics GCSE and being able to study to become a teaching assistant. As discussed in subsection 6.5.2, as one of the contributions of this study, I have extended the Listening Guide method to include the voices of a significant narrator, in this case, Claire's teacher Mike [see section 2.6 for the framework of identity work used in this study]. Including the voices of a significant narrator, as a foil to examine Claire's stories-as-identity-work, meant that, in contrast to the original method by Gilligan et al. (2006), step 4 labelled as composing the final analysis, was no longer the final step. In chapter 10 that follows, I use the extended version Listening Guide to examining Mike's "they poems", poetic structures that focused on his use of the third person voice about Claire. In a new final step 5 of the extended Listening Guide, I bring together my listening of both Claire's stories-as-identity-work about herself and Mike stories-as-identity-work about Claire.

## 10. Analysing Mike's stories-as-identity-work in phase 2 - a foil to re-examine the stories-as-identity-work told by Claire

### 10.1. Introduction

The purpose of chapter 10 is twofold. First, I compose the analysis of Mike's narrative data using the extension of the Listening Guide discussed in section 6.5, after which I use the Mike's stories-as-identity-work to re-examine Claire's own stories-as-identity-work [see chapter 9]. I begin by setting the scene, sharing information about the data collection process [section 10.2]. I then move to the data analysis process, using, as one of the contributions of this study, an extended version of the Listening Guide. In section 10.3, I talk about step 1 of the method, listening for the overall plot and addressing my subjectivities. In step 2, I create the poetic structures called "they poems" [subsection 10.4.1], examining Mike's coexisting voices as he talked about Claire [subsection 10.4.2]. In step 3, I return to the full narrative, tracing and redefining the voices identified, alongside the research questions for this study [section 10.5]. In section 10.6, I compose an analysis of Mike's stories-as-identity-work as he talks about Claire. Introducing a new step 5 into the Listening Guide, in section 10.7, I re-examine the actual [subsection 10.7.1] and the designated [subsection 10.7.2] stories-as-identity-work told by Claire. In the final section 10.8, I use a poem, created from participants' transcripts, as a way to disseminate the developing patterns of stories-as-identity-work that I identified in the analysis process.

### 10.2. Setting the scene

I begin chapter 10 by setting the scene of the data collection. As mentioned in subsection 8.2.2, the teacher who was the participant in phase 1, for whom I used the pseudonym Mike, continued as the teacher participant in phase 2. I organised the data collection over three cycles, aligning somewhat with the rhythm of the college [[see glossary](#)] [see subsection 8.2.4, figure 8-b]. In order to centre-stage Claire's voice, the online discussions with Mike were scheduled later in each cycle, after I had begun to talk to Claire. Due to the impact on teachers' practice of the covid-19 pandemic, the timings of the discussions had to be flexible, responding to the pressure points in Mike's workload. The objects to elicit stories [see subsection 6.4.3 and 8.2.4], provided by Mike, included copies of Claire's examination work and his own observations. I provided Claire's found images [see section 9.3, figures 9-a and 9-b], her narrative data and the I poems that I created during each cycle of data collection. For Claire's final interview, using online conferencing software, [see section 8.2.3, figure 8-a], Mike joined the call, remaining silent, with his camera and microphone off. After Claire had left the call, he

reflected on what he had heard. Listening to Mike’s narrative data included reading email conversations, looking at Claire’s work that Mike had shared and listening to recorded online conversations, alongside the associated transcript. As discussed in subsection 8.5.1, as I prepared the data for analysis, I removed all punctuation and grammar from the transcripts of the online interviews.

### 10.3. Listening Guide step 1 - listening for the plot

Having set the scene of the data collection, I now move on to the process of analysis. In chapter 9, I analyse Claire’s stories-as-identity-work as she talked about herself in relation to learning mathematics. As one of the contributions of this study, I introduce a poetic structure called a “they poem” to consider the stories-as-identity-work told by Mike, as a significant narrator [see sections 2.4 and 2.6], about Claire. I begin with step 1, listening for the plot. I have written about part of this analysis in a paper presented at the conference for the *International Group for the Psychology of Mathematics Education* (PME) in July 2022, which appeared in the conference proceedings (Helme, 2022).

The first step of the Listening Guide involved listening to the whole data, noting down both the overall plot and my emotional responses as the researcher-listener. The work that Mike chose to share in our discussions was from summative assessments, including examination papers from Claire’s mathematics General Certificate of Secondary Education (GCSE) [see glossary], taken in November 2020, which he chose not to screen share, her pre- and post- topic college assessment results and her online mock examination [see glossary], organised by the college. For the online mock examination, Mike shared the images of Claire’s responses, with the exception of the first eight questions. An example of a screen that Mike shared can be seen in figure 10-a, see appendix E, phase 2, for further examples.

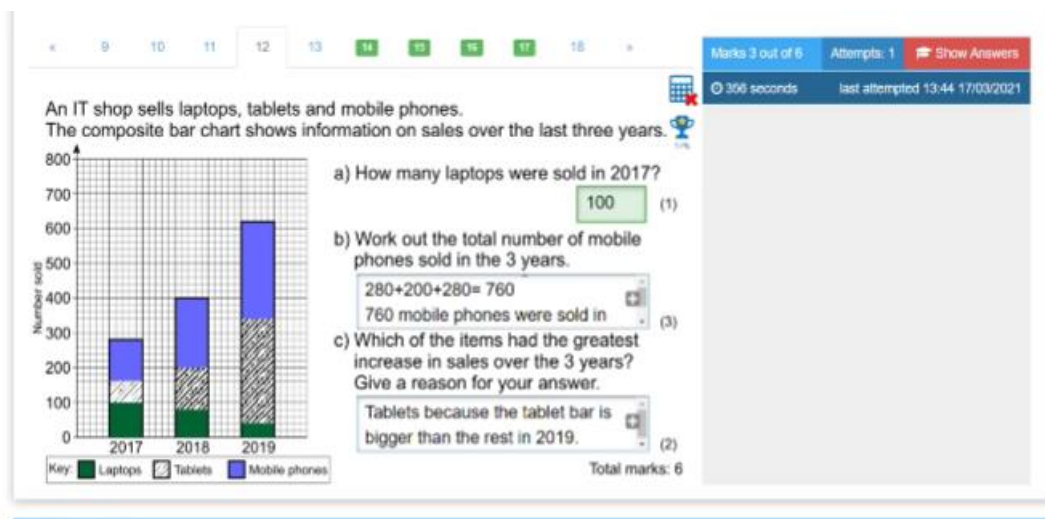


Image 10-a: An example of a screen shared by Mike from Claire's mock examination.

Mike discussed Claire's responses to the examination questions, including those scored as fully correct, partially correct or incorrect. I was struck by the positive tone of the narrative, noting the repeated refrain that she was good at algebra and geometry. He described critical moments, where different patterns in his thinking were developing, reflecting on his past deficient assumptions about Claire. I noted that he repeated the theme, where he reflected on his assumptions, throughout the cycles of data collection. Mike seemed to be emphasising success over failure, what Claire could do over what she could not. In a manner that echoed the stories told about Darren in phase 1 [see section 7.5], the stories that Mike told about Claire were predominantly his recollections of teacher-student interactions. He recounted discussions with Claire involving, for example, attempting to understand concepts and mathematical processes, evidence for Claire's Teacher Assessed Grade (TAG) in mathematics [see glossary], a temporary measure introduced by the government in England to replace examinations in 2021, due to the pandemic, and her future aspirations. The stories about their interactions had elements of care, supporting and celebrating Claire as a whole person rather than a potential mathematics GCSE grade.

#### 10.4. Listening Guide step 2 - poetic structures

Following on from step 1, where I considered the overall plot and my emotional responses to the data, I now discuss step 2 of the Listening Guide, creating and analysing the poetic structures. As one of the contributions of this study, in the second step of the Listening Guide, I created poetic structures called "they poems" to focus on how Mike talked about Claire [see section 7.5], as a contextual foil to Claire's own stories-as-identity-work. In this section, I continue to use the subscript notation introduced in section 9.4, using, for example, "they poem<sub>c1</sub>". The subscript in the notation refers to the cycle of data collection, in the example above, cycle 1. For the they poems, I have numbered each line to help the reader locate the verb phrases used in my discussions. The line numbering system refers to the specific they poem and the line within that poem, for example line 1.235, is they poem<sub>c1</sub> indicated by the 1 before the decimal point, and line 235, the numbers after the decimal point.

##### 10.4.1. Creating the they poems

So far, in this section, I have introduced the poetic structures called they poems, alongside the notation I use in the discussion that follows. Moving on to the first stage of step 2, I now present the they poems. The majority of Mike's data came from online interviews, with a small amount of email discussions. As discussed in subsection 8.5.1, as I was using spoken narrative, I prepared the data by removing all punctuation and grammar. I replaced all occurrences of Claire's proper name with the pronoun "she", as used by Mike, removing the sections of data where Mike used the pronoun when

referring to someone other than Claire. For convenience, Mike's data was further sectioned in relation to the type of work being discussed. Paper 1, paper 2 and paper 3 refer to the three examination papers in a mathematics GCSE. The they-poems have the following sections:

- they poem<sub>c1</sub> sections: emails and introduction; paper 1; paper 2; paper 3; final section
- they poem<sub>c2</sub> sections: emails and introduction; paper 1; paper 2; paper 3
- they poem<sub>c3</sub> sections: discussion after Claire's interview

The separate sections are for convenience rather than being stanzas in the poetic sense. There were three poems created in this study, they poem<sub>c1</sub> from cycle 1, they poem<sub>c2</sub> from cycle 2 and they poem<sub>c3</sub> from cycle 3. The they poems can be found in [appendix D](#).

#### 10.4.2. Analysing the they poems

Having constructed the they poems, I moved on to what Gilligan et al. (2006) describe as foregrounding subjectivity, attending to "a range of themes, harmonies, dissonances, and shifts" (p. 262). Initially, I listened to the they poems in chronological order. However, as I listened to the poems, or, in reality, relistened, some parts felt familiar and some less so, some parts seemed to draw my attention more than others. I noticed, as in step 1, that Mike often used verbs positively rather than negating with a "not". There seemed to be more verbs that indicated, for example, what Claire was, could and had, rather than what she was not, could not and had not. Although not all verb phrases were a positive statement, for example "she would disrupt" [they poem<sub>c1</sub>, 1.22], I noted that Mike saw Claire as sufficient rather than deficient. The objects used to elicit stories, which Mike chose to share, were mostly from Claire's examination work, with Mike talking about the actions involved when engaging with mathematical work. There were variations of phrases, such as "she has written" [they poem<sub>c1</sub>, lines 1.40, 1.66, 1.69; 1.129, 1.141; they poem<sub>c2</sub>, lines 2.95, 2.129]; "she has worked out" [they poem<sub>c1</sub>, lines 1.36, 1.116, 1.190.1.190, 1.194, 1.200, 1.211; they poem<sub>c2</sub>, line 2.145]; and "she has answered" [they poem<sub>c1</sub>, lines 1.71, 1.72, 1.177; they poem<sub>c2</sub>, line 2.153]. He talked about particular mathematical processes, such as adding [they poem<sub>c1</sub>, line 1.228; they poem<sub>c2</sub>, line 2.143]; dividing [they poem<sub>c1</sub>, lines 1.102, 1.244, 1.247]; and subtracting [they poem<sub>c1</sub>, lines 1.145, 1.245]. To identify voices in the they poems, I chose to look for instances where Mike talked about something other than the actions of engaging with mathematical work. I examined the way that Mike talked about Claire, the stories-as-identity-work that he chose to tell as he talked about her work.

Having listened to the they poems in chronological order, I reflected on the words of Gilligan et al. (2006) about becoming aware of rhythms, shifts in meaning and tone of voice. I realised that I had been focusing on identifying the specific verbs that Mike used, rather than engaging with the ebb and

flow of the poems. I decided to listen to the poems again, but for this second listening, in order to try to make the familiar unfamiliar, I read the poems from back to front. Initially reading the final poem, they poem<sub>c3</sub>: discussion after Claire's interview, I moved through the sections in reverse chronological order. Through this alternative way of listening, I identified themes and stories that I had not previously noticed. The first theme I identified was a thread that went through all the poems, involving the use of verb phrases that indicated a focus on Claire's inner thoughts, attitudes and affect. In a manner that echoed Claire's inner voice, where she highlighted her thoughts, feelings and affect [see subsection 9.4.2, table 9-a], Mike used verb phrases that suggested that he saw Claire as a thinker, such as "she's reflected" [they poem<sub>c3</sub>, lines 3.22, 3.24, 3.58]. Using the voice that I labelled as inner, Mike talked about Claire in terms of, for example beliefs [they poem<sub>c3</sub>, lines 3.42, 3.60]; confidence [they poem<sub>c1</sub>, lines 1.9, 1.16, 1.49, 1.86, 1.160; they poem<sub>c2</sub>, line 2.160; they poem<sub>c3</sub>, line 3.4]; and self-actualisation [they poem<sub>c3</sub>, line 3.15]. He used phrases relating to affect, such as "she's really really pleased" [they poem<sub>c3</sub>, line 3.13] and "she was so happy" [they poem<sub>c1</sub>, line 1.133]. In seeming contrast, Mike also talked about Claire experiencing negative emotions and responses, for example "she was concerned" [they poem<sub>c2</sub>, line 2.57] and "she just crumbles" [they poem<sub>c3</sub>, line 3.14].

As discussed previously in this subsection, there was reference, in the they poems, to Claire carrying out specific procedures, such as adding and dividing. However, the they poems also gave a sense of ways of being as well as ways of doing. The second theme that I identified in the they poems was in relation to Claire's work ethic. Mike used phrases that highlighted the effort that he had observed as Claire worked. By using the verb phrases, such as "she's still working" [they poem<sub>c2</sub>, line 2.15] and "she's cracking on with" [they poem<sub>c2</sub>, line 2.17], Mike indicated that he saw Claire as having a positive mindset to tackling work. Using a voice that I labelled as work ethic, he talked about her being willing to make an effort, with a repeated refrain throughout the poems of "she's had a go/stab" [they poem<sub>c1</sub>, lines 1.114, 1.120, 1.122, 1.261, 1.263, 1.332; they poem<sub>c2</sub>, lines 2.211, 2.212]. The third voice I identified, in a manner that echoed Claire's struggle/understand voice [see subsection 9.4.2, table 9-a], Mike used verb phrases that implied proficiency, a relationship with learning mathematics. He used variations of phrases, such as "she struggles" [they poem<sub>c1</sub>, lines 1.18, 1.81, 1.144, 1.220, 1.221, 1.258; they poem<sub>c2</sub>, line 2.189] and "she didn't understand" [they poem<sub>c1</sub>, lines 1.3, 1.25, 1.32, 1.34, 1.35, 1.174; they poem<sub>c2</sub>, lines 2.25, 2.103]. He used the voice, which I relabelled as struggle/understand, to talk about, for example "she's strong apart from" [they poem<sub>c1</sub>, line 1.242] and "she's quite good" [they poem<sub>c3</sub>, line 3.51].

The final voice that I identified in the they poems could be seen as different from the voices discussed above. The voice related to examples of Mike sharing his perspectives, evident through the additional words retained before the pronoun-verb phrase. Mike used phrases, such as "I just wasn't sure about

how much she knew” [they poem<sub>c1</sub>, line 1.14]; “my overall impression of how she’s doing” [they poem<sub>c2</sub>, line 2.157]; “I’m surprised that she didn’t know” [they poem<sub>c2</sub>, line 2.168]; and “I think she doesn’t give herself” [they poem<sub>c3</sub>, line 3.59]. Mike was sharing his perspectives and thoughts about Claire, using a voice I labelled as reflective. He did not state, for example, that “she believes” but that “I think she believes” [they poem<sub>c3</sub>, line 3.60], an opinion rather than a fact.

The second step of the extended Listening Guide method was complete. The interim voice themes that I identified from the they poems have been summarised in table 10-a.

Interim voice themes	Description	Examples
Struggle/understand	Relationship with learning mathematics	<ul style="list-style-type: none"> <li>• she struggles</li> <li>• she’s quite good at</li> </ul>
Reflective	Expressing an opinion, thought or assumptions about Claire	<ul style="list-style-type: none"> <li>• i think she believes</li> <li>• my overall impression of how she’s doing</li> </ul>
Work ethic	Highlighting effort	<ul style="list-style-type: none"> <li>• she’s had a go</li> <li>• she’s cracked on with</li> </ul>
Inner	Claire’s thoughts, attitudes and affect	<ul style="list-style-type: none"> <li>• she’s reflected</li> <li>• she’s really really pleased</li> </ul>

Table 10-a: Voice themes from Mike’s they poems after step 2 of the extended Listening Guide.

### 10.5. Listening Guide step 3 - listening for contrapuntal voices

Up to this point, I have set the scene for data collection and completed the first two steps of the Listening Guide method. The previous two listenings led to step 3, listening for contrapuntal voices. The third step of the Listening Guide brought the analysis back to the research question, providing a way of listening to the multiple aspects of the story being told. The intention was to characterise each voice identified in step 2, refining and redefining where necessary, as well as to reflect on what is not said, the silence in the narrative. For this study there were two research questions, finalised in subsection 8.2.1:

**RQ1v3: What stories-as-identity-work are shared in the context of low prior attainment in mathematics?**

**RQ2v2: What patterns of stories-as-identity-work are perceived when attention is given to the (self)positioning voice through working as part of a teacher-researcher partnership?**

As discussed in section 2.4, and summarised in section 2.6, for this study the framework I used for mathematical identity work consisted of both stories-as-identity-work told by a person and the stories-as-identity-work told about a person by a significant narrator, in this case, Mike. Returning to the full narrative, I started examining the data using the narrative from the second interview

(26/03/21) where Mike had shared the images of Claire's work from her online mock examination. I categorised each image as "correct", "partially correct" or "incorrect", allocating the category "other" for the dashboard of the online software, intervention work and post-topic assessment results. For the first interview (04/02/21), as Mike did not share the images, I used evidence from the narrative to consider whether he was discussing a question that had received full marks, partial marks or no marks. I found it was not possible to distinguish between questions that received partially marks and those that received no marks. Therefore, I use the categories "correct" and "partially correct/incorrect", retaining the category "other" as for the first interview.

The first voice I traced was the voice I labelled as inner, underlined with dots and dashes, where Mike was indicating Claire's thoughts, attitudes and affect. There were examples where Mike talked about Claire using the language of negative affect:

i did speak to her yesterday 'cause she was concerned and she's oh yeah you can't use my november resit paper because that was rubbish and i was like well why's it rubbish and and [sic] she said because i didn't pass it and I said well if you didn't [sic] if you did pass it then we wouldn't be having this conversation now i agree I says [sic] but you were only 12 marks away (Mike's interview, 26/03/21)

In this extract, from a conversation between Mike and Claire, he shared the negative impact, on Claire's affect, of the perceived distance to her designated-story-as-identity-work [see section 9.5], as one who could achieve a grade 4 pass [see glossary] pass in her mathematics GCSE. In a later interview, Mike reported that Claire's affective response had become positive:

she's very shrewd she knows what is a good mark to get her over over over [sic] that like grade 4 hurdle and then when she's seen that she's got that mark she's really really [sic] pleased with herself (Mike's Interview, 06/05/21)

No longer "concerned", Mike reported that Claire was now "really pleased" as she closed the gap between her actual story-as-identity-work, one who did not achieve a grade 4 pass in her mathematics GCSE, and her designated story-as-identity-work, as one who could achieve a grade 4 pass in her mathematics GCSE. The inner voice, again underlined with dots and dashes, was, on occasion, used alongside the voice I labelled as reflective, highlighted in *italics*:

she's really really [sic] happy with that so like I say she's thriving within the environment of the college which is which is [sic] good and *i think she's going to be successful* so you know *i had initially thought that possibly she was overgraded* because of how her number [sic] *i don't think her number skills were as strong as where they should have been.* (Mike's interview, 26/03/21)

Mike described Claire's positive affect, before using the voice I labelled as reflective to share his initial assumptions about her. Mike's initial actual story-as-identity-work, told about Claire, had been that



she was “overgraded”, referring to the grade allocated to her by her school in the summer of 2020. Mike was challenging his previous assumptions, telling a new actual story-as-identity-work that she was “thriving” and, in his opinion, “she’s going to be successful”, a designated story-as-identity-work of achievement. Mike returned to the reflective voice, highlighting, in every interview, how he had challenged his initial assumptions about Claire. Mike also used the reflective voice (in *italics*) to reflect, in the moment, when sharing Claire’s examination work:

*oh wow she has answered a trig [sic] question which i've gone nowhere near um and she's got it right so i wouldn't be surprised if she was somebody that they [her previous school] were potentially looking at higher tier option*  
(Mike’s interview, 06/05/21)

Mike expressed surprise that Claire had been able to answer a question on trigonometry, challenging the story-as-identity-work that she would not have been taught the topic in school. He talked about the “they” of her previous school, recognising his assumption that she had been taught the foundation, rather than the higher, tier curriculum [[see glossary](#)].

The next voice that I followed was the voice I labelled as work ethic, initially defined as instances where Mike either talked about Claire’s effort or her willingness to attempt work. Highlighted in **bold** in the extract below, Mike used the voice I labelled as work ethic to describe Claire’s response to intervention work:

then we looked at common areas for development which **she cracked on with yesterday and completed that** and then i give her the intervention on the stuff I thought she could do better but hadn’t in the paper and and [sic] again so **there you go look over an hour’s worth of work and completed both of them**  
(Mike’s interview, 26/03/21)

Mike was describing Claire as taking an active role in her learning, an actual story-as-identity-work that through her own effort she is attempting to be successful. As I listened to the work ethic voice in the full narrative, I noticed a way of speaking, a tone of voice giving the sense that Mike was proud to share what he was seeing. The tone of voice, highlighted in **bold**, did not only relate to work ethic but also, when describing other examples of Claire’s work, for example, correct images:

I don’t expect you to get any of them wrong **so there you go look the first 8 questions not problem at all**  
(Mike’s interview, 26/03/21).

Mike’s sense of pride was evident, drawing attention to her success through the phrase “there you go look”. Mike used the phrase “there you go” seven times in the second interview (26/03/21) when he was sharing the images of Claire’s online mock examination. He continued to reflect, highlighting Claire’s successes, using phrases, such as “the only one in the class” (Mike’s interview, 26/03/21) and “that’s lovely what she has done there” (Mike’s interview, 04/02/21). The voice, initially defined as

commenting on work ethic, I redefined as instances where Mike expressed pride in relation to Claire. Mike used the voice, which I now relabelled as proud, to share stories of success. Mike told stories-as-identity-work that portrayed Claire in terms of what she was capable of as a learner, which aligned with the sense of a positive voice that I noticed when listening to the overall plot in step 1. There were examples of the proud voice (highlighted in **bold**) and the voice I labelled as reflective (in *italics*) appearing together, as can be seen in this extract where Mike is discussing Claire's partially correct/incorrect examination work:

changing the subject *i'm surprised that i thought she would have got that* er but the simplifying with negative indices **spot on so that was nice as well**  
(Mike's interview, 04/02/21)

Mike was continuing to reflect in the moment, "surprised" that she got one question incorrect, before quickly moving on to celebrate her success, stating "spot on that was nice as well".

The final voice that I traced was the voice I labelled as struggle/understanding, initially defined as Claire's relationship with learning mathematics. In the extract below, Mike talked about an examination question on the topic of time calculations, categorised as partially correct/incorrect, incorporating the voice I labelled as struggle/understand (underlined):

that's where she's made a mistake instead of saying 1.5 hours which then equals 1 hour 30 minutes she's just gone and saw ½ an hour that must be 50 minutes or 0.5 of an hour and it's a simple so she's not quite understood how this works and a lot of them do that  
(Mike's interview, 04/02/21)

Mike did not talk globally about Claire not understanding mathematics but used a specific example of a topic where she had made a mistake. As I listened to the struggle/understand voice in the full narrative, I noticed that Mike would often mitigate Claire's mistakes. As an example, in the extract above, Mike followed "she's not quite understood how it works" with "a lot of them do that". Mike went on to use phrases, such as "not a huge error" (Mike's interview, 26/03/21) and "there's a partial strength there" (Mike's interview, 04/02/21) as well as talking about "this caught lots of people out" (Mike's interview, 26/03/21). Mike also discussed reasons for Claire not gaining full marks in terms of external factors:

she's struggling with the drawing tools and stuff again i don't worry too much about that because when they do the graphs on paper they can draw them  
(Mike's interview, 26/03/21)

Mike highlighted the struggle as being an issue with the online software tools rather than with Claire's own understanding. Mike gave further mitigations, such as content that he had not taught; poorly marked examination papers; and questions that he felt were badly worded. Within the interview where Mike was reviewing the online mock examination, he discussed examples for which he would

be allocating additional marks, suggesting that he was not fully confident with the online software's ability to mark correctly. The voice I initially labelled as struggle/understanding, I redefined as mitigating, stories-as-identity-work where Mike reframed Claire's incorrect answers in a way that moved away from a lack of understanding, towards an issue with, for example, software tools or a minor slipup by Claire.

The final voice themes, reviewed and redefined in step 3, are summarised in table 10-b.

Final voice themes	Description	Examples
Mitigating	Mitigating Claire's nonunderstanding/errors/struggle	<ul style="list-style-type: none"> <li>• she struggles with the drawing tools</li> <li>• this caught lots of people out</li> </ul>
Reflective	Expressing an opinion, thought or assumptions about Claire	<ul style="list-style-type: none"> <li>• i think she believes</li> <li>• my overall impression of how she's doing</li> </ul>
Proud	Demonstrating pride in Claire's successes and effort	<ul style="list-style-type: none"> <li>• there you go look</li> <li>• she's cracked on with</li> </ul>
Inner	Claire's thoughts, attitudes and affect	<ul style="list-style-type: none"> <li>• she's reflected</li> <li>• she's really really pleased</li> </ul>

Table 10-b: Final voice themes after step 3 of the extended Listening Guide.

#### 10.6. Listening Guide step 4 - composing an analysis

Having listened for the overall plot, created and analysed the poems and listened for contrapuntal voice, step 4 of the Listening Guide, which I discuss next, brought the separate listenings back into relationship with each other. In the discussion that follows, I synthesised the evidence from the previous listening to examine the stories-as-identity-work told by Mike about Claire. In contrast to the original work by Gilligan et al. (2006), the analysis composed in step 4 is not the final step. As one of the contributions of this study, I used the analysis of the poems as a contextual foil to re-examine Claire's own stories-as-identity-work, creating a new final step 5 in the process.

Mike told stories-as-identity-work about Claire that often centered around teacher-student interactions. He talked about patterns of behaviour that he had observed as Claire worked in the classroom:

when i pose a question but she would she would [sic] disrupt the take up time by shouting out an answer so and it was it was [sic] trying to get her to recognise you know discreetly about the behaviour for learning and everybody's got a voice etc and then slowly she started to get used to that and then i knew then once she started to get used to that i knew that if she didn't understand something i could then probe her to find out what [sic] you know about where her level of understanding was instead of worrying  
(Mike's interview, 04/02/21)

The patterns of Mike's actual stories-as-identity-work, in relation to Claire's classroom behaviour, had developed, and were developing, over her time at the college, having an impact on teaching and

learning experiences. Mike talked repeatedly about his previous assumptions, sharing his opinions of the reasons leading to Claire's behaviour, such as "overcompensating for potentially a lack of ability" (Mike's interview, 04/02/21). Mike talked about his initial assumptions around the possible misallocation of her Centre Assessed Grade (CAG) by her previous school [see glossary], the alternative method, due to the pandemic, introduced by the government in England to replace examinations in the summer of 2020. Mike used variations of the phrase, "perhaps she'd been overgraded" (Mike's interview, 26/03/21) alongside statements, such as "i misjudged her at the beginning" (Mike's interview, 04/02/21) and "before I got her wrong" (Mike's interview, 06/05/21). Mike recognised that his initial actual stories-as-identity-work about Claire, as someone who was overgraded by her school, had impacted on his assumptions of her potential. The patterns of Mike's stories-as-identity-work had already begun developing, he identified changes in his thinking, which were opening up the possibility of Claire's designated-story-as-identity-work, told by Mike, as being someone who could achieve a grade 4 pass in her mathematics GCSE. Mike continued to talk with pride about Claire's evolution in college, which he believed would impact her self-efficacy:

in terms of Claire and how she's evolved from school to college the transition's been phenomenal and i think that as a result she now is going to be more confident in how she conducts herself moving forward  
(Mike's interview 04/02/21)

Mike's actual story-as-identity-work about Claire, as someone for whom the "transition's been phenomenal", influenced the designated story-as-identity-work, the idea that she is "going to be more confident". Mike talked about the holistic person as well as the grade 4 pass in her mathematics GCSE examination. Different patterns of designated stories-as identity-work, told by Mike, developed as he listened in to Claire's final interview. After the interview, I continued the discussion with Mike as he reflected on Claire's found image of two paths [see section 9.3, figure 9-b]:

it's like say I [sic] you know had had [sic] I not spoken to her before and just seeing the pictures I would thought right ok she's at a fork in the road now and she didn't know which way to go whereas actually no she she [sic] knows where she's on the road and she hasn't decided whether she wants to take one path or the other but they're both positive paths  
(Mike's interview, 06/05/21)

Mike talked about making assumptions about the images that Claire had chosen, recognising that to correctly comprehend her choice of image, he needed to hear Claire's own interpretation. Making assumptions was a common theme of Mike's stories about Claire. It seemed that, for Mike, the stories reflecting on his assumptions were important stories to tell. It may well have been that he was constantly reminding himself of the potential impact of making assumptions, which could influence the teaching and learning experiences of students.

There were different patterns of stories-as-identity-work that were developing within the online interviews, as we discussed Claire’s work together. In one example, when reviewing Claire’s November 2020 examination papers, we discussed Claire’s difficulty with questions on the topic of ratio. I shared with Mike one of Claire’s stories, where she had talked about struggling with mathematics questions presented as a real-life context, so called wordy questions. Our exchange was as follows (as this is spoken narrative, all punctuation and grammar has been removed [see subsection 8.5.1]):

Me: but i wonder i mean i don't know this this is just me thinking out loud are ratio questions more likely to be stories about things

Mike: quite possibly yeah

Me: she's saying she she [sic] finds more difficult [sic] the stories than she does if it's just the sum in front of her

Mike: let me just go back up [sic] another question 'cause you might have just hit on something that i completely missed

Me: that's what's so interesting about this whole process Mike is is [sic] that

Mike: yeah there was a question about the tv right in in [sic] yeah she's yeah she's [sic] misinterpreted the question which is which is [sic] what i'm i'm [sic] looking at there now which is different to what the examiner's report was and i looked at the examiner's report on [sic] and saw that she scored two marks and had a quick flick over what she was doing and i thought yeah she's she's [sic] misread no it's not she hasn't misread it she's read it in her mind (Mike’s interview, 04/02/21)

Within this moment of the teacher-researcher partnership discussion, Mike stated, “you might have just hit on something that I completely missed” and “no it’s not she hasn’t misread it she has read it in her mind”. It seemed that he was beginning to connect Claire’s interview data with what he was seeing in her examination responses. He began to reconsider whether Claire had not read the question correctly, which could be seen as student error, or whether there was another reason for her error. In another example, as he was discussing Claire’s errors in a question relating to money calculations, Mike stated “i’m seeing it more now as we go through the mock” (Mike’s interview, 26/03/21) and “that's me discovering it this afternoon” (Mike’s interview, 26/03/21). The statements were a culmination of comments made throughout the interview as we viewed Claire’s work together. The process of looking at a student’s work with someone who could be seen as peer, in this case, as part of a teacher-researcher partnership, reflecting on her work as a whole, rather than individual questions in isolation, enabled Mike to identify themes in Claire’s struggle. In another example, Mike was reviewing a portion of Claire’s examination work for the first time. As discussed earlier, in response to a correctly answered question about trigonometry, he stated “oh wow she has answered a trig question which i've gone nowhere near and she's got it right” (Mike’s interview, 04/02/21) followed by “so i wouldn't be surprised if she was somebody that they were potentially looking at

higher tier option” (Mike’s interview, 04/02/21). In discussing Claire’s work, Mike was also discussing Claire herself, using the insights from her work to develop patterns of stories-as-identity-work.

The stories-as-identity-work, told by Mike about Claire, demonstrated that he had a positive view of Claire as a mathematics student. On reflection, he recognised that the positivity had developed despite his initial assumptions about Claire, as someone who had been overgraded, by her school, as a grade 3 [[see glossary](#)]. He repeated his own story of misjudgement alongside stories about observed changes in Claire’s learning behaviours. Mike talked about Claire in terms of beliefs, confidence and affect, as well as the improvement of mathematical knowledge. Mike presented the stories using both a proud and a mitigating voice, valuing Claire’s work and progress alongside framing her errors as not necessarily a result of lack of understanding. He stated that external factors and minor misunderstandings can impact a student’s struggle, which may, in a different situation and with support, be overcome. Mike stories-as-identity-work about Claire had developed, and was developing, during college, impacting the designated stories-as-identity-work. Initially, as Mike talked about Claire, it seemed that the designated story-as-identity-work, as someone who had the potential to achieve a grade 4 pass in her mathematics GCSE, was an impossibility. There was a sense of frustration about Claire’s classroom behaviours that he observed, which he believed stemmed from a global struggle with mathematics. However, over time, the global became the particular, the struggle become understanding for some topics and strengths for others. As he gained a personal understanding of Claire, the designated story-as-identity-work, as someone who could achieve a grade 4 pass in her mathematics GCSE, became Claire’s own story told by Mike, no longer an impossibility but a possibility.

### 10.7. Listening Guide step 5 - re-examining the first person-voice

Up to this point in the chapter, I have used the extended version of the Listening Guide to analyse the stories-as-identity-work told by Mike about Claire. As one of the contributions of this study, I have introduced into the Listening Guide method a new step 5. In the fifth step of the method, which I discuss next, I use the voices drawn from the narrative of Mike, as a significant narrator [see sections 2.4 and 2.6], as a foil to re-examine the stories-as-identity-work told by Claire [see chapter 9].

For Claire, I identified four co-existing voices as she told stories-as-identity-work [see section 9.4, table 9-a], namely, struggle/understand, talking about her relationship to learning mathematics; receiving, reflecting on the level of support she received from her teachers; action, commenting on her hard work, alongside sharing stories of success; and inner, sharing her thoughts, feelings and affect. For Mike, I identified four co-existing voices as he told stories-as-identity-work about Claire [see section 10.5, table 10-b], namely, mitigating, previously struggle/understand, to reframe Claire’s errors;

reflective, sharing his opinions, thoughts and assumptions about Claire; proud, previously work ethic, highlighting Claire's successes; and inner, talking about Claire's thoughts, attitudes and affect.

#### 10.7.1. Actual stories-as-identity-work

Having presented the various coexisting voices of Claire and Mike from my previous analysis, I now consider Claire's actual-stories-as-identity-work, the current state of affairs as described by Claire and Mike. In Claire's actual stories-as-identity-work, she reflected on patterns that had already developed as well as patterns that were developing over the study. She predominantly talked about her relationship to learning mathematics, being in a state of struggle or a state of understanding. Initially using the verbs as a dichotomy, she went on to talk about various facets of struggle and understanding. She reflected on the move from a global struggle, not understanding the domain of mathematics, towards the particular, sharing examples of some struggles and finally understanding. Early in the study, although Claire highlighted the shift from struggle to understanding, it seemed that she did not see herself as someone who could "get through the hurdles of maths" (Claire's email, 25/12/20), talking in the second-person voice. However, by the second cycle of data collection, she described herself as "quite good at maths" (Claire's email, 10/03/21) at the same time as identifying topics for which she needed to "brush up her skills" (Claire's email, 10/03/21). Claire consistently attributed her struggle and understanding to the support that she received from her teachers. She talked about not receiving help from her previous teacher, when she asked for assistance, and software tools that did not match her needs. She contrasted her previous experience with the way Mike was supporting her in college, using software tools that she felt were more appropriate. Claire went on to introduce the impact of her own hard work. She focused on her successes, such as improved marks in an assessment and becoming a campus officer at the college. It seemed that recognising repeated successes influenced her actual-stories-as-identity-work. With the teacher's support and through her own hard work, she was no longer seeing herself as someone who struggled globally with learning mathematics.

Mike also talked about patterns of stories-as-identity-work that had already developed as well as patterns that were developing over the study. He talked about his initial assumption that Claire struggled globally with learning mathematics, that the grade 3 allocated by her previous school was incorrect [[see glossary](#)]. From the evidence he observed, her behaviour in the classroom, he aligned Claire with his notion of a learner whose disruptive behaviour, and lack of confidence with the topic of number, implied a lack of ability (his word). As he reflected, he went on to challenge his initial assumptions. He described a move towards recognising that she understood some topics, such as probability, being strong in other topics, such as algebra and geometry. He often reframed Claire's struggle, mitigating her errors as, for example, issues with software tools or a minor slip up. It seemed

that, for Mike, in a similar way to Claire, the global struggle had become the particular, still some struggle but also evidence of understanding. Although Mike often told stories-as-identity-work by reporting on teacher-student interactions, he attributed Claire's successes to her own hard work, not mentioning his own support as a teacher. He used a proud voice to highlight her work ethic, talking about how she engaged, outside of the class, with intervention work set for her. He drew attention to her examination work, focusing on her mathematical knowledge, on one occasion being surprised that she had been able to answer a question on trigonometry. Mike consistently highlighted his initial assumptions about Claire, that she had been overgraded by her school, but it was the evidence of Claire's own actions and successes in her mathematics work that seemed to convince him otherwise, stating, for example "when you see that somebody is quite weak with number that's why i thought you know perhaps she'd been overgraded but no she backed it up with her algebra stuff" (Mike's interview, 26/03/21). Through Claire's hard work and repeated successes, the patterns of Mike's actual-stories-as-identity-work about her had developed as he got to know her personal strengths in mathematics. In a similar way to Claire, he no longer saw her as someone who was struggling globally with learning mathematics, an overgraded student.

It was evident, in the actual stories-as-identity-work told by, and about, Claire, of the move from the global to the particular, being seen as someone who struggled with the domain of mathematics to someone who still struggled with some mathematics topics but demonstrated strengths in others. Both Claire and Mike focused on Claire's successes, her work ethic and mathematical knowledge. They talked about what she could do rather than what she could not. It may well be that Mike's reframing of Claire's struggles as issues with, for example, software tools or minor slipups, was influential. Mike did report on interactions with Claire, such as a conversation where he reframed the examination result that Claire described as "rubbish" as "you were only 12 marks away". Claire would have listened to the way that Mike viewed her work, which may have changed her point of view about learning mathematics. Conversely, listening to Mike, by focusing on Claire's successes, her strengths over her struggles, he talked about seeing her differently compared to his initial assumptions. Mike's reframing of Claire's errors led to them both focusing on successes, as well as the converse, focussing on successes led to the reframing of Claire's errors. What was evident, in the milieu of reframing and successes, patterns of actual-stories-as-identity-work developed that moved Claire from struggling to understanding.

#### 10.7.2. Designated stories-as-identity-work

A person's identity work consists of both actual stories-as-identity-work, which I have discussed above, and designated stories-as-identity-work [see section 2.4, summarised in section 2.6].



Designated stories-as-identity-work, which I discuss next, are seen as having the potential to become actual stories-as-identity-work. Early in the study, it was not clear what the designated story-as-identity-work Claire told, beyond a sense of becoming someone who understood mathematics. It seemed that she had already closed the gap, the designated story-as-identity-work of understanding was already becoming her actual story-as-identity-work. Over time, as Claire's actual stories-as-identity-work developed, the designated-stories-as-identity-work told by Claire moved from generic understanding to become the potential to achieve a grade 4 pass in her mathematics GCSE, allowing her to study to become a teaching assistant. Sfard and Prusak (2005) talk about the emotional impact of not knowing how to bridge the gap between actual and designated stories-as-identity-work. For Claire, it seemed that the gap between her actual stories-as-identity-work and her designated stories-as-identity-work was closing, or certainly that she could see that closing the gap was a possibility. As a result, there was evidence of developing patterns in her use of the inner voice of thoughts, feeling and affect. She initially talked about the image of a maze [see section 9.3, figure 9-a] as representing how she felt about learning mathematics, that "maths did annoy me at times" (Claire's email, 25/12/20). Over the time of the study, she talked about "I feel like I've achieved great things" (Claire's email, responding to the I poem in cycle 1, 22/02/21) and "I am now feeling happy about how much I have progressed" (Claire's email, 30/04/21).

For Mike, there was no sense, in his early reflections, that the designated-story-as-identity-work, as someone who could achieve a grade 4 in her mathematics GCSE, was a possibility for Claire. He talked about Claire as potentially overgraded, that the grade 3 allocated by her previous school was incorrect. It could well be that the designated story-as-identity-work, as someone who could achieve a grade 4 in her mathematics GCSE, was not initially part of the identity work of Claire because it was imposed by government and college policy, a requirement for all students who achieved a grade 3 or less. Over the time of the project, the patterns of Claire's actual stories-as-identity-work developed, through celebrating her success and identifying her strengths, which, in turn, influenced the designated stories-as-identity-work being told. In a similar way to Claire, Mike highlighted her thoughts, attitudes and affect in his stories-as-identity-work. He talked about developing patterns of confidence, that "she now was believing in herself more" (Mike's interview, 06/05/21), stating "i think she's going to be successful" (26/02/21). He recognised that Claire's outlook had changed, that she saw herself as someone who could possibly achieve a grade 4 pass in her mathematics GCSE, which was impacting her emotional responses.

It was evident that the designated stories-as-identity-work being told were both influenced by, and influencing, Claire's actual stories-as-identity-work. Initially, neither Claire nor Mike, talked about the possibility of Claire achieving a grade 4 in her mathematics GCSE. However, over the time of the study,

recognising her successes, the designated story-as-identity-work, as someone who could achieve a grade 4 in her GCSE, became a possibility, which may, in turn, have influenced Claire's identity work in the context of learning mathematics. It was not so much that the gap was closing as such, the actual stories-as-identity-work were not somehow moving closer to a designated stories-as-identity-work that was already being told. Both Claire and Mike could, through the developing patterns in Claire's actual stories-as-identity-work, begin to employ alternative designated stories-as-identity-work. The patterns of both the actual, and designated, stories-as-identity-work were developing during the study.

### 10.8. Final poetic summary

In this chapter 10, as one of the contributions of this study, I have extended the Listening Guide method to include the use of a poetic structure called a they poem, considering the stories-as-identity-work told by Mike about Claire. I have introduced into the method a new step 5, using the voices identified in the they poems as contextual foils for re-examining the first-person voice of Claire, the student participant. In chapter 11, I return to the model of dominant discourses in the context of low attainment in mathematics that I developed, as one of the contributions of this study, in section 3.3 and summarised in figure 3-b. I examine the stories-as-identity-work, told by participants in both phase 1 and phase 2 of the study, for echoes of dominant discourses.

In place of the summary used in the previous chapters, for this chapter I present a transcript poem. The use of poetry to re-present narrative data is said to centre stage the voice of the participant over the intrusive voice of the researcher (Ward, 2011). The found poems are participant-voiced, reusing the words of the storyteller from interview transcripts. I used a transcript poem to highlight and disseminate the emotion of what I identified, the move to positivity as patterns of both Claire's actual and designated stories-as-identity-work developed during the study (Faulkner, 2019; Prendergast, 2009). For my transcript poem, I removed, for the most part, the use of a pronoun to allow the reader to focus on the words being said, using left alignment for Claire's words, and right alignment for Mike's words. In order to ensure Claire's words are at centre stage, I used an italic font to highlight her words in the poem.

## A poem by Claire and Mike

A weak grade 3  
Not confident with number  
Potentially overgraded  
Muddled like a maze  
Always wanting to be the first to speak  
Shouting out  
Disrupting the take up time  
Overcompensating for potential lack of ability  
The wrong kind of attention  
Going to have a difficult job to do

*Like a maze  
Not straight at all  
A very long way I had to go  
There were mistakes  
Wasn't easy for me  
A difficult start  
Plans all over the place  
A daily struggle  
Hurdles of maths  
I couldn't understand*

You can only act on the information in front of you  
I misjudged her  
Now seeing her strengths  
Strong 3 in the November resit (12 marks away from a 4)  
Stronger in algebra  
Confident with geometry  
Still struggles with ratio  
Falls down with money (a common theme)  
Some knowledge of probability (back in her element again)  
Knows to answer the question for a chance of a mark  
Explains reasoning (although not fully correct)  
Makes mistakes at the simple end  
Overcomplicated that answer  
Look at this, answered like a higher tier student  
A grade 4 in the first mock paper  
Just short on the second (not finished the third)  
Potential for that next level at the end of the year

*Now I get help and support  
Finally understanding  
It got clearer to me  
It just would take me longer  
Quite good at maths shown in green  
Still struggle with some areas in red  
Would need help with this worded question*

Mistakes that are not mathematical  
Not knowledge but understanding  
Not comprehending what the question is asking  
Not looking at the wording  
Misinterpreted the question  
Maybe some form of reading technique  
You might have hit on something there  
She hasn't misread she's read it in her mind  
If the instructions follow directly she's ok  
No correlation between the lines she can't make it  
Possibility a misfiring in her mind  
Maybe access arrangements  
I think she has been assessed  
I need to chase up

*Need to brush up  
Kept trying and trying  
Pushing myself  
Keep persevering  
After all my hard work!*

Focused on her learning  
Awesome in attitude  
Ever present (100% attendance)  
Puts in the effort  
Has a good go  
Look at this independent work  
Cracked on with it  
Made the connections  
Reflected on the mistakes  
Will make improvements  
Growing into a competent mathematician

*I have progressed  
Much further than I thought I would  
Come through a lot  
Dealt with my challenges  
Overcame many obstacles  
No longer a maze  
Two clear paths  
Career goals  
Much more confident  
Certain, meeting, hoping for a grade 4  
It is different this year  
Finally understand what to do*

Reimagine yourself at college  
Evolve, growth spurt, develop, thrive  
More confident moving forward  
Self-actualisation  
Believing in herself more  
Knows the end goal (and how to get there)  
Doesn't give herself enough credit  
One of my causes for celebration  
One of my shining things

## 11. Echoes of dominant discourses – significant narrations within stories-as-identity-work

### 11.1. Introduction

The purpose of chapter 11 is to re-examine the stories-as-identity-work, told in the context of low attainment in mathematics, alongside dominant discourses, which I call significant narrations. I begin by revisiting the idea of significant narrations, discussed in chapter 2, in relation to mathematical identity work [section 11.2]. In section 11.3, I consider the stories-as-identity-work told in phase 1 of the study, which I categorise as: ways of thinking in mathematics [subsection 11.3.1]; personal actions for success [subsection 11.3.2]; characteristics and affect when learning mathematics [subsection 11.3.3]; and the impact of significant others [subsection 11.3.5]. In subsection 11.3.5, I present an overview of the echoes of significant narrations found in the stories-as-identity-work told in phase 1. In section 11.4, I investigate the stories-as-identity-work told in phase 2 of the study, revisit the categories from phase 1 as: new ways of thinking in mathematics [subsection 11.4.1]; the merged theme of personal actions for success alongside significant others [subsection 11.4.2]; and patterns of characteristics and affect when learning mathematics [subsection 11.4.3]. In subsection 11.4.4, I update the overview in light of the discussion around stories-as-identity-work told in phase 2.

### 11.2. Dominant discourses as significant narrations

I begin with a brief reminder of dominant discourses, which I call significant narrations, in the context of low attainment in mathematics. Within identity work, Sfard and Prusak (2005) use the term “significant narrators” to describe the influential voices that carry cultural and social messages within a particular context. In subsection 2.4.1, I argue that, as well as significant personal narrators, such as a teacher, there are also significant cultural narrations, dominant discourses that echo in stories-as-identity-work. In the final framework for this study [see section 2.6], I consider mathematical identity work as having subjective features, the stories-as-identity-work told by a person and social features, both stories-as-identity-work told about a person and echoes of significant cultural narrations. As one of the contributions of this study, I have developed, from literature, a web of meanings that support discourses in the context of low attainment in mathematics, reproduced in figure 11-a [see original in subsection 3.3.4]. Adapted from the work of Adiredja and Louie (2020), the revised model includes narrations about what counts as success and failure in mathematics; narrations about students labelled as low attaining; and narrations about others [see section 3.3]. A grade 4 pass refers to the outcome of a General Certificate of Secondary Education (GCSE) examination [[see glossary](#)].

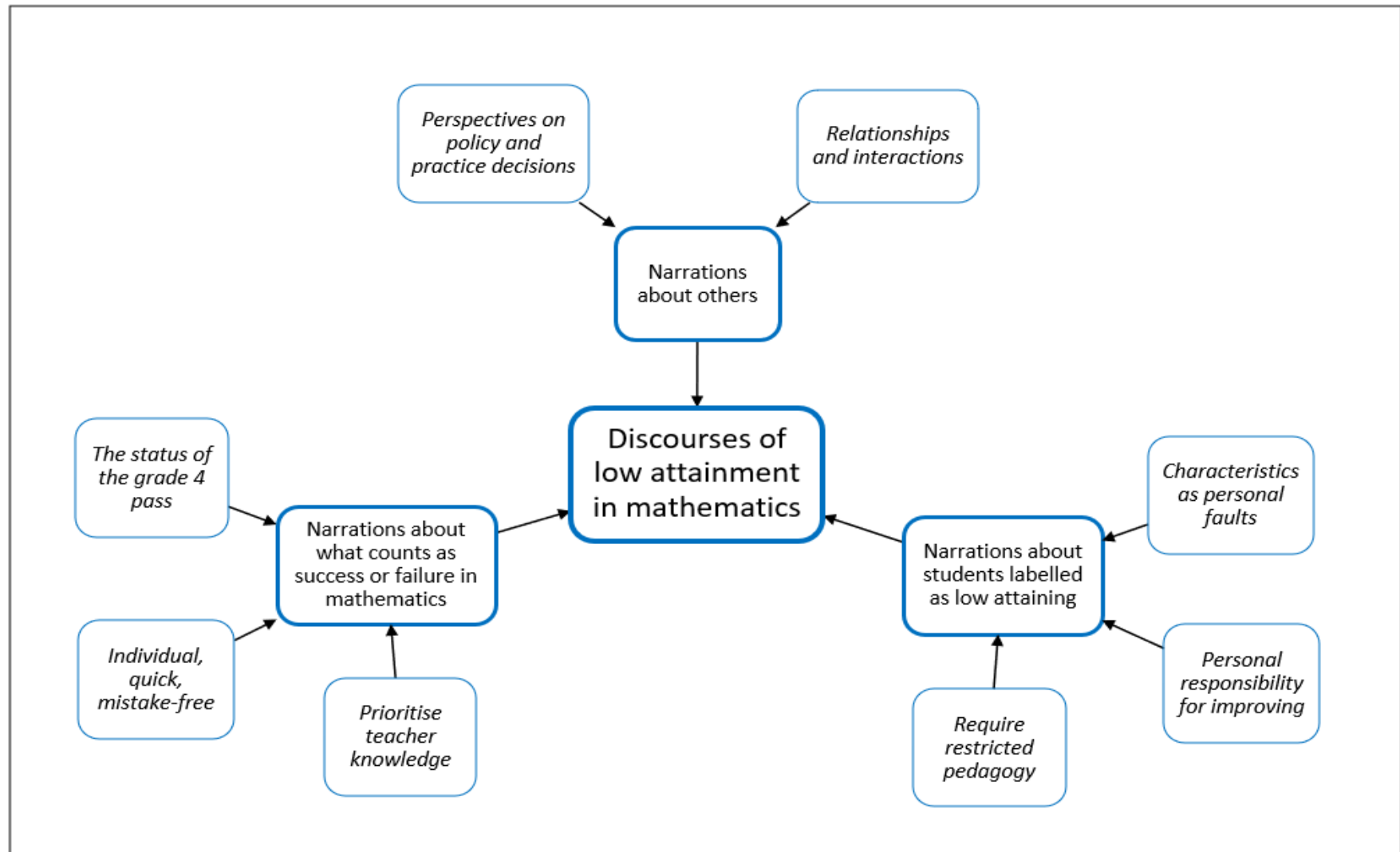


Figure 11-a [the original can be found in subsection 3.3.4, figure 3-b]: The revised model of the web of meanings supporting discourses in the context of low attainment in mathematics, adapted from Adiredja and Louie (2020).

### 11.3. Examining the stories shared in phase 1

Having presented a brief reminder of significant narrations within identity work, I now examine the stories-as-identity-work, told in phase 1 of the study, for echoes of significant cultural narrations [see figure 11-a]. The model of the web of meanings supporting discourses in the context of low attainment, reproduced in figure 11-a, was developed from a synthesis of literature, which I now use to relate the themes in my data to past work.

In phase 1 of the data collection [see sections 7.4 and 7.5], Ava, Betty, Christine and Darren shared stories about their teaching and learning experiences, as well as their thoughts about the future. I began by looking for similarities between the stories-as-identity-work told by Ava, Betty, Christine and by, and about, Darren. I found that, although the details of each story were different, it was possible to organise the stories around four themes. Firstly, Ava and Darren shared stories about issues they faced when tackling classwork, which I categorised as ways of thinking in mathematics. In the second theme, Ava, Christine and Darren talked about the impact of their own actions, which I categorised as personal actions for success. For the third out of the four themes, Betty and Christine reflected on their own characteristics and affect that were impacting their learning, which I categorised as characteristics and affect when learning mathematics. Finally, Ava, Betty and Christine told stories about others, such as teachers and institutions, which I categorised as the impact of significant others.

#### 11.3.1. Theme 1 - ways of thinking in mathematics

I begin the examination of the stories-as-identity-work, from phase 1, with stories about ways of thinking in mathematics. Two students, Darren and Ava, shared stories about their ways of thinking, focusing on the way they tackled mathematical questions. In their stories-as-identity-work, they used words such as confusion, tricky, thinking and forgetting. Darren used a poignant voice, which I labelled as struggle, to talk about the issue that he had with articulating his mathematical thinking, both verbally and in written form [see subsection 7.5.1]. He shared that he could answer mathematics questions but, often, could not explain how he had worked them out. Darren went on to share that when he was not able to provide an explanation, he would get confused, doubting whether he was correct. Darren revoiced the words of the teacher, Mike, that he needed to overcome what was considered to be defiance, to get into the habit of showing his workings out [see subsection 7.5.3]. Ava also used a voice I labelled as struggle to share her issues with thinking in the classroom [see subsection 7.4.1]. She talked about the uncertainties she faced when completing the work set by the teacher. She said that she was thinking differently. Her own prior knowledge of, for example, converting metric measures, did not match the method demonstrated by the teacher. When Ava had



tried to calculate in the same way as the teacher, she had found his method difficult to use. Ava stated that she had struggled, as she had got some of her answers wrong. (She had in fact only rounded her answers differently to the teacher). There was no indication in her stories-as-identity-work of whether she saw herself as a different thinker in a more general sense. I did, however, observe, on various occasions, that she used a different method to the one demonstrated by the teacher.

For both Darren and Ava, in their stories-as-identity-work, there were echoes of two different significant narrations [see section 11.2, figure 11-a], namely, that they should prioritise the teacher's knowledge, and that mathematics was an individual, quick and mistake-free endeavour. Darren prioritised the knowledge of the teacher Mike, revoicing the need to start showing his working out. It seemed that knowing the answer to a mathematics question was not sufficient to be seen as mistake free [see section 11.2, figure 11-a], without the evidence of how he had worked out the answer. In the stories-as-identity-work told by Darren, he talked about his own actions, that, as an individual, he needed to put in the effort to show his working out in mathematics. Although Darren had used a poignant voice of struggle, there was no sense in his stories-as-identity-work, told by Darren or Mike, that he had received any support to overcome his difficulties [see subsection 7.5.3]. He consistently returned to the idea that, through his own individual actions, he had to improve the issue of not showing working out. Ava initially prioritised the method demonstrated by Mike, rather than rely on her own prior knowledge. In one such example, the lesson on converting metric measures, she had copied down the method demonstrated by Mike [see subsection 7.4.1, figure 7-a], before going on to use an alternative method. Ava talked about being a different thinker, that she was forgetting, rather than there being a difference between what she had previously been taught and the method demonstrated by the teacher. Ava took the fact that she had different answers to Mike, albeit issues with rounding, as evidence that she was forgetting, being, in her own eyes, not mistake-free [see section 11.2, figure 11-a]. It seemed that Ava believed that being a different thinker was an individual issue, something that she needed to take responsibility to overcome. Both Ava and Darren looked inwards, considering how, as individuals, they could overcome the challenges that arose when they prioritised the knowledge of their teacher, that their own thought processes were somehow less appropriate.

### 11.3.2. Theme 2 - personal actions for success

Three students, Ava, Christine and Darren, talked about their own past and present actions, both within and outside of the classroom. Ava and Christine told stories about using revision as one of their personal learning strategies. In her stories-as-identity-work, Ava stated that she had, previously, not revised as she had not been confident [see subsection 7.4.1]. She used the voice I labelled as action

to say that she was photographing her work so that she could look at it again at home, using revision as a means to improve her grade in her mathematics GCSE. In contrast, Christine used a discouraged voice to share that in school she had attended revision sessions but had not achieved a grade 4 pass in her mathematics GCSE [see subsection 7.4.3]. Her comment, saying that she would start revising if she failed her most recent examination, suggested that she saw revision as a strategy to improve her grade, despite the evidence of her own experience suggesting otherwise. Darren told stories-as-identity-work of personal effort, reflecting on his previous behaviour in the classroom, commenting that he had not put any effort into his learning [see subsection 7.5.1]. He used the voice I labelled as action to talk about the designated story-as-identity-work that he needed to get into the habit of showing his working out in the classroom to translate into his work in the mathematics GCSE examination. However, Darren did not talk about how this might happen or what he might do differently, just that he needed to change.

For Ava, Christine and Darren, in their stories-as-identity-work, there were echoes of the significant narration that they were personally responsible for improving [see section 11.2, figure 11-a]. Ava shared how she was using the action of revision to improve her outcomes, but Christine was discouraged by the lack of effectiveness when she had previously revised. Darren had internalised that trying harder to show workings out would lead to success, without knowing what this might look like. For Ava and Christine, there was also an echo of the significant narration of the status of a grade 4 pass [see section 11.2, figure 11-a], that the grade 3 [[see glossary](#)] they had already achieved in their mathematics GCSE was not sufficient, they should be aiming for a grade 4. For both Ava and Christine, the personal action of revising outside of lessons was seen as an effective strategy. However, for Christine, her previous personal action of attending revision classes, as extra work in preparation for the mathematics GCSE examination, was overshadowed by her final outcome of a grade 3 in her mathematics GCSE. The message that revision was the key to success had conflicted with the message that you have to achieve a grade 4 in the mathematics GCSE to be considered as successful. She had acted in a way that could be seen as a successful learning behaviour but had continued to fail in her eyes. For Ava, Christine and Darren, they believed that they had the personal responsibility to do more, act differently or try harder to be successful, measured in terms of the grade achieved in their mathematics GCSE examination.

### 11.3.3. Theme 3 - characteristics and affect when learning mathematics

Two students, Betty and Christine, shared stories-as-identity-work about characteristics and affect that they saw as impacting their learning. Betty used a voice I labelled as mitigating to talk about her issues with concentration, saying she was not able to stay focused, often getting distracted instead of

completing her classwork [see subsection 7.4.2]. Betty went on to say that she cannot retain information, forgetting any learning as soon as she left the classroom. She saw these characteristics as part of who she was, seemingly inherent. She did not talk about wanting to overcome the issues with concentration and retention or what this might look like. For Betty, there was no mention of a designated identity story, outside of leaving college [see glossary] to work full time. She did talk about her repeated failure in her mathematics GCSE examination in terms of the distance of her total score to a grade 4 pass. Christine also talked about problems with concentration, using a discouraged voice to relate her difficulties to issues with motivation [see subsection 7.4.3]. She connected getting distracted in the classroom with her lack of motivation, which she aligned with her view of repeatedly failing her mathematics GCSE. She used her want/need voice to share that she had decided to go to university, stating that getting a grade 4 pass in her mathematics GCSE was important for this ambition. Christine faced a dilemma in that she wanted to attend university, recognising that she needed to pass her mathematics GCSE, but she lacked the motivation to work towards this goal. In a similar way to Betty, Christine did not share how she could overcome her issues with motivation, although she knew that she needed to do so for her designated story-as-identity-work of one who can apply to university.

For both Betty and Christine, in their stories-as-identity-work, there were echoes of the significant narration that their characteristics were personal faults [see section 11.2, figure 11-a]. They talked about characteristics and affect, such as concentration, retention and motivation. They did not share about any ways that they had tried to find solutions. They were disappointed to have obtained a grade 3 in their mathematics GCSE, despite retaking the examination a number of times, which represented standing still rather than making progress. Betty and Christine saw their characteristics as personal faults, which, in turn, influenced their learning behaviours in the classroom. For Christine, there was, as discussed in subsection 11.3.2, an echo of the significant narration of the status of the grade 4 pass [see section 11.2, figure 11-a]. Passing her mathematics GCSE examination is a gateway to her future plans. There was a sense that by achieving a grade 3, she saw herself as a failure, her lack of motivation potentially impeding her future success. For Betty, in her stories-as-identity-work, she talked about inherent characteristics, a fixed part of who she was rather than who she was in that moment. Both Betty and Christine seemed to look inwards, seeing their characteristics as personal faults as opposed to the possibility of, for example, issues with teaching practice or assessment policies.

#### 11.3.4. Theme 4 - the impact of significant others

Having examined the echoes of significant narrations in stories-as-identity-work relating to ways of thinking in mathematics, personal actions for success and characteristics and affect when learning

mathematics, I now consider the final category in phase 1, the impact of significant others. Three students, Ava, Betty and Christine, shared stories about their past teaching and learning experiences, referring to significant others, such as teachers and institutions. In their stories-as-identity-work, they simultaneously narrated themselves, looking inwards, and narrated others, looking outwards to their learning context. Their perceptions of significant others were factors in how Ava, Betty and Christine viewed the teaching and learning of mathematics. Ava, who was relatively new to England, talked about her previous learning experiences, comparing the number of hours given to learning mathematics in her home country with the greater amount of time allocated in college [see subsection 7.4.1]. She reflected that the teachers in college made learning fun, using activities that were both engaging and demonstrated the usefulness of mathematics. In Betty's stories-as-identity-work, in relation to others, she talked about the impact of decisions made by teachers [see subsection 7.4.2]. She reported that, in her previous school, there had been more hours for learning mathematics compared to college. Using a frustrated voice, Betty talked about the impact of having different teachers, due to poor student behaviour, as well as the unexplained, last minute, decision to move her from a higher tier to a foundation tier mathematics GCSE examination. Betty stated she disliked her previous teachers because they did not explain anything, preferring Mike as her current teacher. Christine talked, rather tentatively, about her previous teacher not being nice, without expanding on what particularly she was referring to [see subsection 7.4.3]. In the same way as Betty, Christine stated that there were fewer teaching hours given to learning mathematics in college compared to her previous school. Betty and Christine spoke about affect, alongside a judgement of the teaching they experienced, reporting how they felt as well as what had happened. Both students talked about disliking learning mathematics, suggesting that the timings of the lesson, as one three-hour lesson in the morning, meant that they had difficulties with concentration. For all three students, Ava, Betty and Christine, the teacher and the teaching were seen as one and the same. Their relationship to learning mathematics was, in fact, a relationship with a teacher, with only Ava talking about any future utility of the subject of mathematics itself.

For Ava, Betty and Christine, in their stories-as-identity-work, there were echoes of two connected significant narrations [see section 11.2, figure 11-a], namely, their perspectives on policy and practice decisions, and relationships and interactions. All three students talked about the numbers of hours allocated to mathematics in college, with Betty and Christine lamenting about the timing of lessons. Betty went on to talk specifically about decisions, made by teachers in school, in regard to her mathematics GCSE examination, as well as the impact of staff changes. Ava talked in general terms about teacher-student interactions, that teachers in college made learning mathematics fun. Betty and Christine talked about particular teachers, stating that they preferred Mike, their current

mathematics teacher. However, the echo in these stories seemed different from the other significant narrations. Ava, Betty and Christine were not only being narrated but narrating, with the students themselves being significant narrators [see subsections 2.4 and 2.6]. It was evident that as well as the stories told by, and about, a student, there were also stories told by the student about the others. The students were not passive but active, both being influenced by, and attempting to influence, their experiences of the teaching and learning of mathematics.

#### 11.3.5. An overview of echoes of significant narrations from phase 1

So far in this section, I have examined the echoes of significant narrations found in the stories-as-identity-work told in phase 1 of the study. I now present a brief overview of my discussion, which I have synthesised in figure 11-b.

In summary, Ava, Betty, Christine and Darren told stories-as-identity-work that had echoes of significant narrations [see subsections 2.4 and 2.6]. For Darren, the analysis included stories-as-identity-work told about Darren by the teacher Mike. The first category, stories-as-identity-work told about ways of thinking in mathematics, had echoes of two significant narrations, prioritising teacher knowledge and mathematics as individual, quick and mistake-free. Secondly, for stories around personal actions for success, there were echoes of having personal responsibility for improvement and the status of the grade 4 pass. The third categorisation was stories about characteristics and affect when learning mathematics, with significant narrations of characteristics as personal faults and the status of the grade 4 pass. Finally, for the stories-as-identity-work that I categorised as the impact of significant others, there were echoes of significant narrations around relationships and interactions, and perspectives on policy and practice decisions. For the final category of stories-as-identity-work, the impact of significant others, students were influenced by significant narrations, but also influencing as significant narrators themselves. In the stories-as-identity-work, told in phase 1, despite being present in the literature (see, for example, Francis et al., 2017; Marks, 2014), there were no echoes of the significant narration that students labelled as low attaining require a restricted pedagogy [see section 11.2, figure 11-a].

In figure 11-b, a synthesis of the discussion in section 11.3, the blue hexagons are used to represent the stories-as-identity-work told by students in phase 1 of the study, with the rounded cornered rectangles representing the significant narrations [see section 11.2, figure 11-a, a reproduction of figure 3-b from subsection 3.3.4]. Solid arrows show the echo of a significant narration within a particular story-as-identity-work, with a dashed arrow demonstrating the narrating by students.

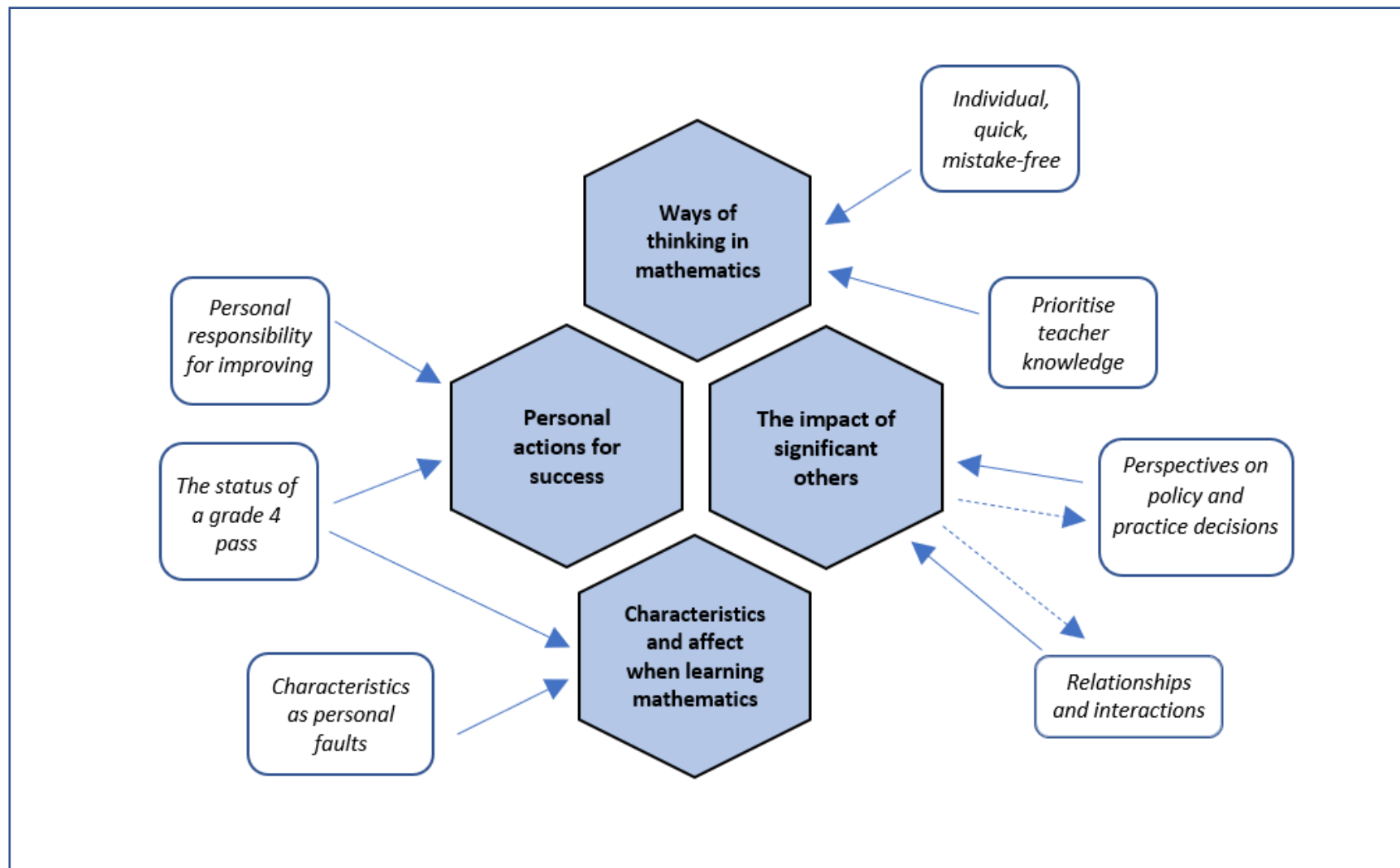


Figure 11-b: Stories-as-identity-work from phase 1, with echoes of significant narrations (solid arrow) and narrating by students (dashed arrow).

## 11.4. Examining the stories told in phase 2

So far in this chapter, I have presented a brief reminder of the dominant discourses, which I called significant narrations, in the context of low attainment in mathematics. I have examined the stories-as-identity-work, told in phase 1, for echoes of significant narrations, synthesising my discussion in figure 11-b. In this section, I bring both phases together, using the themes identified in phase 1, as a starting point to examine the stories-as-identity-work told by, and about, Claire in phase 2. I consider the echoes of significant narrations in Claire's stories-as-identity-work, reflecting on the similarities, and differences, between phase 1 and phase 2.

### 11.4.1. Theme 1 - new ways of thinking in mathematics

I begin the examination of stories-as-identity-work, from phase 2, with the stories Claire shared about her ways of thinking in relation to learning mathematics. In contrast to Darren and Ava [see subsection 11.3.1], Claire's stories-as-identity-work, about ways of thinking in mathematics, moved away from the specifics of how to tackle classwork. She talked in more general terms about her relationship to learning mathematics. Using the voice I labelled as struggle/understand, Claire talked about the developing patterns of her relationship to learning mathematics, moving from seeing herself as not understanding to a self-view as understanding [see section 9.6]. Her actual story-as-identity-work, as she started college, was of someone who struggled with mathematics at a global level. Over time, the struggle/understand voice became more focused, giving specific examples of some continued struggle, as well as examples of developing understanding. Patterns of stories-as-identity-work developed, first as someone who understood some aspects of mathematics and later as someone who had improved. The adverb "finally", which she often used with the verb "understanding", was the finally of aiming to achieve a grade 4 pass in her mathematics GCSE. In a similar way, Mike used a reflective voice to talk about his initial assumption about Claire, sharing that he had interpreted her classroom behaviour as a sign of low ability (his word) [see section 10.6]. He subsequently realised that he had misjudged the situation, that Claire had understanding in some topics and strengths in others. He used the voice I labelled as proud, highlighting her successes as he talked about her work. Both Claire and Mike told stories-as-identity-work that moved from the global, to the specific, before returning to the global. Examining the patterns of Claire's actual, and designated, stories-as-identity-work involved processes of disassembling and reassembling. Claire had to disassemble the previous actual stories-as-identity-work, around lack of understanding to reassemble herself as one who understands enough to be allocated a grade 4 pass in her mathematics GCSE. As her significant narrator, Mike also disassembled and reassembled his actual stories-as-identity-work about Claire to talk about her as one who was demonstrating understanding in mathematics. His previous designated

story-as-identity-work about Claire, as someone who, having been overgraded, would not be able to achieve a grade 4 pass in her mathematics GCSE, had begun to develop into a designated story-as-identity-work of someone who potentially could. He used examples of Claire's own actions, and learning behaviours, which had influenced the stories he told, her actual stories-as-identity-work were influencing her designated stories-as-identity-work.

In contrast to Darren and Ava in phase 1 [see subsection 11.3.1], in Claire's stories-as-identity-work, there was not an echo of the significant narration that she should prioritise the teacher's knowledge [see subsection 11.3.5, figure 11-b]. In some sense, there was an echo of the significant narration that mathematics is individual, quick and mistake-free when Claire told stories-as-identity-work that aligned her sense of understanding with having correct answers in an assessment. For Claire, the most prominent significant narration, as she discussed her ways of thinking, was the status of the grade 4 pass in a mathematics GCSE, which she equated to evidence of understanding. In the academic year from September 2020 to July 2021, a grade 4 was not the outcome of sitting a mathematics GCSE examination in the same way as phase 1. As a result of the government's covid-19 guidance in England, students were continuously evaluated in their place of study. Students' final grades in their GCSEs were allocated, through a Teacher Assessed Grade (TAG) [see glossary] by the college. In phase 2, the outcome of grade 4 in a mathematics GCSE was not isolated to specific days in an examination hall. The actual, and designated, story-as-identity-work, as someone who can understand enough to be allocated a grade 4 in a mathematics GCSE, was being played out in every lesson, through each unit assessment and mock examination [see glossary].

#### 11.4.2. Themes 2 and 4 - personal actions for success alongside significant others

Having considered the echoes of significant narrations in Claire's stories-as-identity-work about new ways of thinking in mathematics, I now turn to consider Claire's stories-as-identity-work about personal actions for success, which, due to the way Claire told stories of success, I have merged with theme 4, the impact of significant others.

Claire shared stories-as-identity-work that talked about her personal actions, the effort she was making to improve her understanding in mathematics. Using an action voice, she talked about impact, sharing her successes that resulted from personal effort, both in general terms, such as a clearer understanding, and by giving specific examples, such as a result from an assessment. However, Claire not only looked inwards, she also looked outwards. She used the voice I labelled as receiving to introduce the impact of significant others. She talked about the actions of her previous schoolteacher, where she had asked for, but not received, any support, as well as what she felt was an inappropriate online platform for homework. She went on to highlight, over all the interviews, that she was getting



support from Mike, her current teacher at college, which she saw as a factor in the move from someone who struggles to someone who understands. In contrast, in his stories-as-identity-work about Claire, Mike did not refer to his own actions, continuing to use a proud voice to talk about the successes that he saw in Claire's work [see section 10.6]. He drew attention to how Claire's own actions had changed, and were continuing to change, his ways of thinking. Alongside the proud voice, Mike used a mitigating voice to frame Claire's errors as minor issues, a slip up that could easily be rectified or factors outside of Claire's control, such as difficulties using software tools or examination marking errors. It seemed that Mike was framing Claire in terms of success, as sufficient not deficient.

In Claire's stories-as-identity-work about success in mathematics, there continued to be echoes around the significant narration of the status of the grade 4 pass, seen in her stories about ways of thinking in mathematics [see subsection 11.4.1]. Claire equated understanding, and hence success, to being seen as someone who could be allocated a grade 4 in the mathematics GCSE, as well as, conversely, that a grade 3 represented not understanding. Claire's own actions, and those of a significant other, her teacher Mike, were key in the disassembling and reassembling of her stories-as-identity-work. Claire was seeing herself in a new way, as someone who understands [see subsection 11.4.1], as well as recognising herself, and being recognised, for example as hard working. In a similar way to phase 1, there was an echo of the significant narration that she was personally responsible for improving [see section 11.2, figure 11-a and subsection 11.3.5, figure 11-b]. However, Claire seemed to be re-narrating the significant narration of personal responsibility, discussing the responsibility of others, a joint accomplishment between teacher and student. It seemed for Claire that both actors shared the responsibility for improving her outcomes, a coming together between the personal actions of a hard-working student and the impact of having a supportive teacher. For Mike, the author of Claire's improvement was Claire herself, through her own personal actions and attitudes. He saw Claire's actions in terms of a process and a product. It was the fact that she was acting differently, as well as the successful result of her actions, which seemed important for Mike. He did not mention his own role in the reassembling of her stories-as-identity-work, consistently using his proud and mitigating voices to share her successes. It seemed that Mike and Claire saw her both as the author of her own success, and being authored by her context, at the same time responsible and not responsible.

#### 11.4.3. Theme 3 - patterns of characteristics and affect when learning mathematics

I have examined, for echoes of significant narrations, the stories-as-identity-work categorised as new ways of thinking in mathematics and the merged themes of personal actions for success alongside

significant others. I now consider the final theme around patterns of characteristics and affect when learning mathematics.

In Claire's stories-as-identity-work, where she talked about her specific actions, struggles and successes, she introduced facets of her characteristics, inner thoughts and affect. She told stories-as-identity-work about effort and persevering, actions and attitudes that she saw as having a positive impact on her understanding in mathematics. She used the voice I labelled as inner to share her thoughts and affect about her experiences of struggle and success as the year progressed. She talked about initially feeling that learning mathematics was like a maze [see section 9.3, figure 9-a and the discussion in section 9.6], using a second-person voice to talk about how persevering can result in overcoming obstacles. Over the course of the study, the inner voice became increasingly personal. Learning mathematics was no longer a maze, she saw success as achieving a grade 4 in her mathematics GCSE, enabling two clear paths to her future aspirations [see section 9.3, figure 9-b and the discussion in section 9.6]. Improving her understanding of mathematics was no longer something abstract, a result of another person's hard work, but something concrete that was happening to Claire herself. Mike also spoke about actions with characteristics, initially viewing Claire as overcompensating by being eager in class, shouting out answers whether she was right or wrong. Over the course of the study, he began to talk about her as someone who had evolved, with the potential to be more confident as a result.

In a similar way to Christine, who talked about her experiences of revision and current lack of motivation [see subsection 7.4.3], Claire told stories-as-identity-work that connected her actions with her characteristics and affect. The echo of the significant narration that characteristics were personal faults [see section 11.2, figure 11-a and subsection 11.3.5, figure 11-b] was being re-narrated as characteristics are personal strengths. Echoes of the significant narration of the status of the grade 4 pass [see section 11.2, figure 11-a] were present, as Claire continued to equate success to achieving a grade 4 pass in her mathematics GCSE. She was beginning to see the possibility of attaining her designated story-as-identity-work, the potential of a grade 4 in her mathematics GCSE, which was motivating her to work hard. She used her action and inner voices, in combination, to tell the stories-as-identity-work, reflecting a move towards an increasing personal way of thinking. Struggle, and understanding, were no longer something that happened to Claire, passively out of her control, but something that Claire happened to, having an active role in the improving. In a similar way, Mike talked about Claire in terms of beliefs, confidence and affect. He repeatedly shared stories-as-identity-work about his misjudgement of Claire, with a subtle change from eagerness, as a sign of lack of understanding, to confidence through understanding. Her similar characteristics, eagerness and

confidence, developed different patterns in Claire's stories-as-identity-work over the course of the study.

#### 11.4.4. A re-narrating of echoes of significant narrations after phase 2

So far, in this section, I have examined the echoes of significant narrations found in the stories-as-identity-work told in phase 2 of the study, using the categories drawn from the stories-as-identity-work told in phase 1. I now revisit the synthesis creating an updated version of echoes of significant narrations [see the revised figure 11-c].

In summary, Claire and Mike told stories-as-identity-work about her new ways of thinking in mathematics. In this first category, although there were no echoes of the significant narration that Claire should prioritise the knowledge of the teacher, as there had been in phase 1 [see subsection 11.3.1], there was some evidence of the significant narration that mathematics is individual, quick and mistake-free. The most prominent significant narration in Claire's stories-as-identity-work was around the status of a grade 4 pass in her mathematics GCSE. In subsection 11.4.2, personal actions for success alongside significant others, I amalgamated two categories from phase 1, personal actions for success [subsection 11.3.2] and the impact of significant others [subsection 11.3.4]. The merger happened because of the way Claire told her stories-as-identity-work, as joint responsibility for improving, alongside the, ever present, significant narration around the status of the grade 4 pass. In the third and final category in phase 2, patterns of characteristics and affect when learning mathematics, Claire re-narrated the significant narration of characteristics as personal fault to become characteristics as personal strengths. In the stories-as-identity-work, shared by Claire and her teacher Mike, there was evidence of re-narrating for some of the echoes of significant narrations identified in phase 1 [see subsection 11.3.5, figure 11-b]. In phase 2, Claire and Mike had both disassembled and reassembled stories-as-identity-work, moving from a global to an increasingly personal viewpoint. Claire was influential in developing patterns of her actual, and her designated, stories-as-identity-work. As a result, Mike was viewing Claire in new ways. Claire was herself a significant narrator, not passive but active, choreographing her own identity work.

In figure 11-c, an updated synthesis incorporating the discussions in section 11.3 and section 11.4, the blue hexagons continue to represent the stories-as-identity-work told by students, retaining the categories from phase 1 of the study, with the rounded cornered rectangles, representing the significant narrations [see section 11.2, figure 11-a]. Solid arrows show the echo of a significant narration within a particular story-as-identity-work, with a dashed arrow demonstrating the narrating by students. The arrows shown in red are updates after the discussion in section 11.4. The rounded cornered rectangles shown in red are narrations that go beyond those found in the literature.

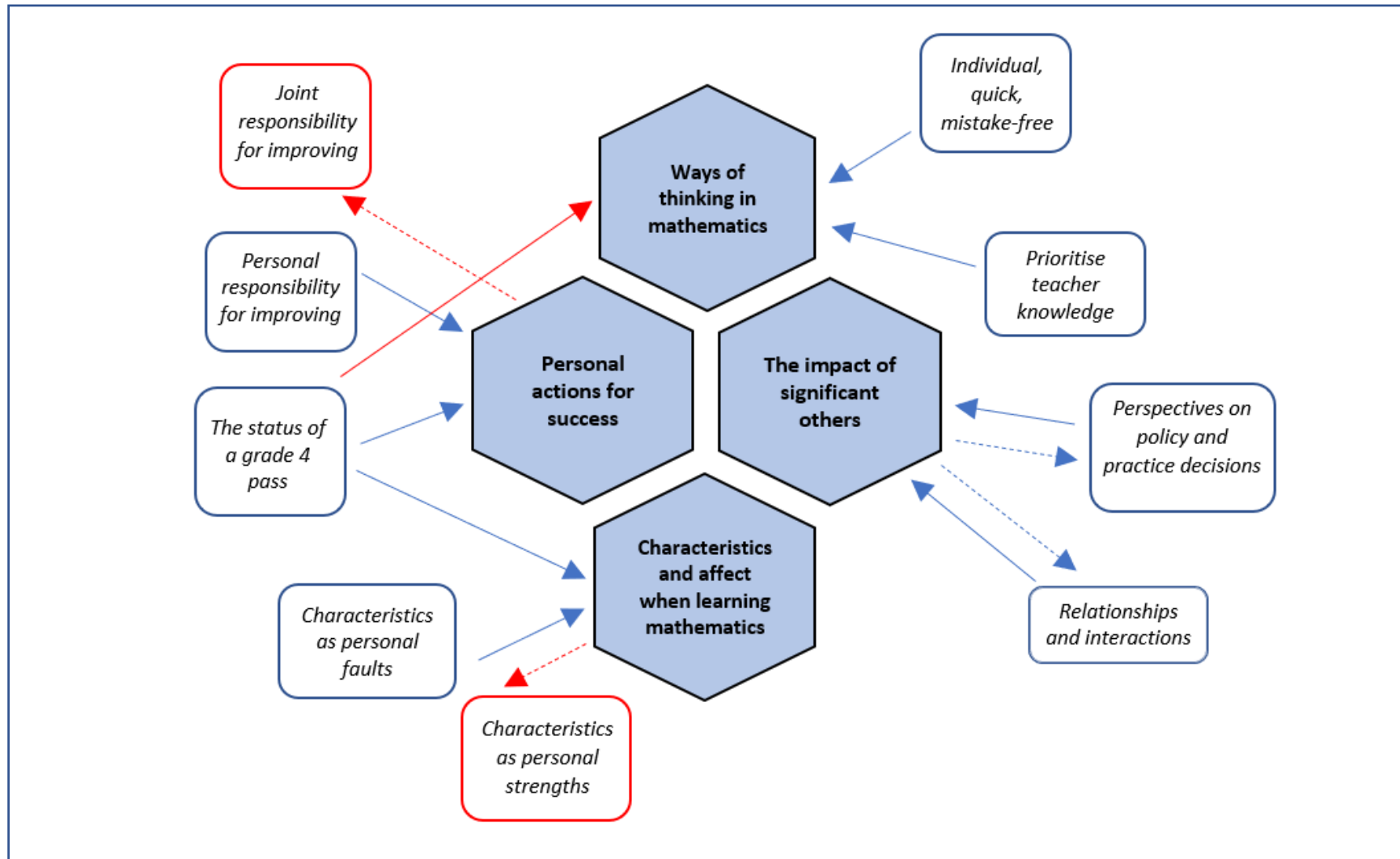


Figure 11-c: Revisited stories-as-identity-work from phase 1 and 2, with updated (in red) echoes of significant narrations (solid arrow) and narrating by students (dashed arrow).

## 11.5. Summary

In this chapter, I have re-examined the stories-as-identity-work told in phases 1 and 2 alongside the dominant discourses, which I call significant narrations, in the context of low attainment in mathematics [see section 11.2, figure 11-a]. In phase 1, although the details of the stories told were different, I was able to identify four common themes in the stories-as-identity, namely, ways of thinking in mathematics; personal actions for success; characteristics and affect when learning mathematics; and the impact of significant others. In phase 2, I revisited the themes in relation to Claire's stories-as-identity-work.

There was evidence of echoes of significant narrations within the stories-as-identity-work told by Ava, Betty, Christine, Darren and Claire, as well as by the teacher Mike. The significant narration utilised in most themes of stories-as-identity-work was around the status of the grade 4 pass in the mathematics GCSE, being found in three out of the four themes [see figure 11-c]. In phase 1, the significant narrations around relationships and interactions, and perspectives on policy and practice, were also narrated by the students, attempting to influence as well as being influenced. In phase 2, the significant narration of personal responsibility for improvement was re-narrated to include joint responsibility for improving. Claire recognised that, alongside her own essential actions, the teacher had a significant role in her progress. She re-narrated the significant narration around characteristics as personal faults to become characteristics as personal strengths. Despite being present in the literature (see, for example, Francis et al., 2017; Marks, 2014), there were no echoes of the significant narration, in phase 1 or in phase 2, that students labelled as low attaining require a restricted pedagogy. Therefore, the category does not appear in the summaries found in figure 11-b or figure 11-c.

In the final chapter 12, that follows, I conclude by presenting the contributions to knowledge from this study, both in relation to the complex identity work of students labelled as low attaining and the methodological innovations in the Listening Guide method of analysis. I reflect on the feminist methodological questions considered in subsection 5.2.1, table 5-a, before discussing the limitations of the study and potential next steps.

## 12. The concluding chapter – contributions to knowledge

### 12.1. Introduction

The purpose of chapter 12 is to reflect backwards and forwards on the study, highlighting the contributions to knowledge, limitations and potential for future work. The study contributes to knowledge in two ways: the findings in relation to identity work in the context of low attainment in mathematics; and the innovations within the Listening Guide method. In section 12.2, I begin by discussing the contribution to knowledge in relation to identity work in the context of a low attainment label. I talk about the complex picture of identity work [subsection 12.2.1]; students as active not passive [subsection 12.2.2]; disassembling and reassembling in identity work [subsection 12.2.3]; and echoes of dominant discourses [subsection 12.2.5]. Finally, in subsection 12.2.5, I discuss the implications of the findings. In section 12.3, I move to consider the contribution to knowledge in relation to innovating with methods. I talk about expanding the Listening Guide method by introducing a poetic structure called a “they poem” [subsection 12.3.1]. I explain the development of a rubric for consistency when creating various poems within one study [subsection 12.3.2]. I briefly discuss the opportunities for wider dissemination beyond mathematics education [subsection 12.3.3]. In section 2.4, I reflect on the feminist methodological considerations, previously discussed in subsection 5.2.1. I then consider the limitations of the study [section 2.5] as well as ideas about future work [section 12.6]. Finally, I share some brief reflections and a poem, as a postscript, about Claire [section 12.7].

### 12.2. Contribution to knowledge - identity work in the context of the low attainment label

I begin by discussing the contribution to knowledge of the findings of this study in relation to the identity work of students labelled as low attaining in mathematics. The findings have implications for teachers who work with students labelled as low attaining in terms of challenging assumptions and recognising the influence of dominant discourses. There were two research questions developed during the study:

**RQ1v3: What stories-as-identity-work are shared in the context of low prior attainment in mathematics?**

**RQ2v2: What patterns of stories-as-identity-work are perceived when attention is given to the (self)positioning voice through working as part of a teacher-researcher partnership?**

The study examined the stories told by students, learning to listen carefully to their perceptions of learning mathematics (RQ1v3). In addition, through RQ2v2, this study considered the patterns that

developed, through sharing the students' perspectives, in the stories-as-identity-work told by the teacher about the students. In the subsections that follow, I discuss the complex nature of identity work; students as active not passive; disassembling and reassembling in identity work; and echoes of dominant discourses.

#### 12.2.1. The picture of identity work was complex

This study has demonstrated the complex picture of identity work in the context of low attainment in mathematics. Aligning with much of the literature on low attainment in mathematics, reviewed in chapter 3, the findings have shown that some students talk about their struggles when learning mathematics, feeling discouraged and frustrated, doubting and forgetting, with some evidence of students talking about inherent characteristics (see, for example, Boaler et al., 2000; Boylan & Povey, 2020; Mkhize, 2017; Zavala & Hand, 2019). However, there was also evidence of an alternative story, a counternarrative to deficient discourses. The findings show that students talk about moving from struggling to understanding when learning mathematics, using their own actions to develop and recognising the significance of achieving a grade 4 pass [[see glossary](#)] in their mathematics General Certificate of Secondary Education (GCSE) [[see glossary](#)]. The stories told by students in both phases of the study, although seeming to have the same overall theme, were different in their detail. Students who talked about struggle, referred to various issues, such as lack of confidence when explaining their mathematical thinking, differences in methods used in the classroom and not receiving help from a teacher. In the move, or attempt to move, towards understanding when learning mathematics, students talked, in general terms, about working harder and getting into good habits, and, specifically, about revision outside of lessons, showing workings out and having a supportive teacher. Stories about the significance of achieving a grade 4 pass in the mathematics GCSE were a consistent feature of the study. Some students talked about repeated failure, equated to having achieved, a number of times, a grade 3 [[see glossary](#)] in their mathematics GCSE. They shared stories about when their actions had been ineffective as well as the impact of characteristics that they saw as inherent. In contrast, other students talked about seeing the possibility of achieving a grade 4 outcome, an outcome that they saw as impacting their stories about future aspirations. They shared stories about their successes, which they measured in terms of correct answers and GCSE grades. These findings are consistent with the dominant discourses around the grade that students achieve in the mathematics GCSE. A grade 3 or less is devalued compared to a grade 4 and above, which is seen as a ticket to future aspirations (Norris, 2022).

### 12.2.2. Students labelled as low attaining were active not passive

In contrast to deficient discourses in some literature [see chapter 3], the findings of this study show that the students labelled as low attaining in mathematics did not talk passively about themselves and their mathematics learning. Most students in the study talked about the actions they are taking, or need to take, to improve their learning in mathematics. Only one student talked about the impact of characteristics that she saw as inherent. Mkhize (2017) argues that adolescents, given the opportunity in relation to learning mathematics, will define themselves in positive terms. Those students who were taking positive actions were also the students who highlighted their successes, suggesting that taking action and experiencing success were interconnected. It could well be that there was a cyclic effect, actions that lead to success lead to further actions. The findings show that students were not only active in regard to their own learning, they were also active in influencing, or attempting to influence, the teacher. Most students in the study talked about the significance of teachers. They reflected on teachers as either making learning fun, being supportive or, mostly in relation to previous teachers, exhibiting poor practice. In phase 1, there was evidence of students attempting to influence by sharing their perspectives on the timings of lessons. Dunne et al. (2011) found evidence of strong interpersonal relationships in school working successfully with students labelled as low attaining. In phase 2, the findings show the actions of the student were influencing the developing stories told by the teacher. The initial assumptions of the teacher were challenged as the teacher-student relationship developed. However, not all students were able to take positive actions, although they were aware that some type of action was needed. In line with Hargreaves et al. (2019), the students felt discouraged by not having the means to overcome their difficulties in learning mathematics. The students talked about what they needed to start doing, rather than what they were already implementing. They talked in general terms about, for example, needing to get into good habits and to start revising, but not the specifics of how these new actions might begin to happen. Students who are labelled as low attaining may be seen as deficient or passive, but a potential counter narrative could be that, rather than choosing not to act, students do not know what actions are necessary. In this case, passivity becomes an issue of support rather than non-cooperation. However motivated a student might be, barriers to success might go beyond lack of personal effort (Zavala & Hand, 2019).

### 12.2.3. Patterns of identity work involved disassembling and reassembling

Having considered the findings around the complex nature of identity and students as active not passive, I now consider disassembling and reassembling within identity work. Where different patterns of identity work developed, during phase 2 of the study, the findings show evidence of disassembling and reassembling in the stories being told. There was a move from talking in global



terms towards the specific, disassembling the previous story, before returning to the global, reassembling a new story. Both the student, and the teacher, talked about the struggle of learning mathematics, before sharing stories of some struggles but also successes. Finally, any errors were mitigated, with the student describing herself, and being described, as successful in terms of the potential for a grade 4 in her mathematics GCSE. In some sense, the process of disassembling and reassembling reflected the notion of reification in identity work, where a person begins to use verbs about “being” rather than verbs about “doing” (Sfard & Prusak, 2005). The student, being successful in, for example, an assessment, began to see herself as potentially globally successful in mathematics. The findings of this study suggest that for reification to take place, a reassembling, there was also a process of de-reification, a disassembling of the student’s previous “being” of someone who struggled. However, the findings show that issues with disassembling and reassembling occur when there is a misalignment between the assumptions of the teacher and the needs of a student. For one student in phase 1, disassembling the story of defiance was a challenge because the idea that he was choosing not to show his working out was incorrect. He could not begin to be successful, to start getting into the habit of recording his thinking, because the story that needed to be disassembled was one of struggle rather than non-compliance. Despite the need for support, both the student, and the teacher, continued to talk about action, an active decision on the part of the student to act differently, reinforcing an incorrect narrative.

#### 12.2.4. There were echoes of dominant discourses in students’ stories

In section 3.3, as one of the contributions of this study, I developed, from literature, a model of the web of meanings that support dominant discourses in the context of low attainment in mathematics. As shown in subsection 11.4.4, figure 11-c, there were echoes of the dominant discourses, which I called significant narrations, in the identity work of the students. The significant narration utilised in most of the different themes of stories, told by students, was the status of the grade 4 pass in their mathematics GCSE. As a result of government policy in England, the outcome of a grade 4 pass has become a holy grail, both in terms of having to study mathematics, and in relation to future aspirations. It is not surprising that the status of the outcome was present in the identity work of the students in this study. They were forced to continue studying mathematics, equating success, or failure, to achieving a grade 4 pass in their mathematics GCSE. When it came to the significant narrations about others, namely, perspectives on policy and practice decisions, and relationships and interactions, there was some sense of students narrating, as well as being narrated. Students challenged, for example, the timings of the lessons, within their current student-teacher relationships. It could well be that the students felt that this aspect of the dominant discourses, in relation to others,

was something they could influence, that they may have the means to be able to overcome the difficulties. For one student, the significant narration that her characteristics were personal faults was re-narrated as personal strengths, her successes came from perseverance and hard work. The same student re-narrated her personal responsibility for improving, her perseverance and hard work, to include the joint responsibility between the teacher and the student. The re-narration was an interesting contrast to most students in the study, who talked primarily about their own actions and responsibility. The findings show the importance of recognising the dominant discourses that are perpetuated in the context of low attainment in mathematics, which have implications for the identity work of students. As mentioned in subsection 3.2.1, Thompson (2014) states “that we see ourselves as others see us” (p. 459). Dominant discourses can be the lenses through which a teacher sees their students who are labelled as low attaining, becoming the lenses through which the students see themselves.

#### 12.2.5. Implications

The findings of this study, which I now discuss in this subsection, have implications for educators who work with students who are labelled as low attaining. The findings show the importance of recognising the individuality of each student, avoiding a one-size-fits-all view when considering students who are labelled as low attaining in mathematics. Although some students might be disaffected, it is not the case for all students labelled as low attaining in mathematics. The important matter for teachers is the source of a student’s disaffection, attending to the detail of their stories. To understand, for example, the potential struggles of learning mathematics, teachers need to consider the nature of each student’s struggle. The assumption that all students labelled as low attaining struggle in the same way can lead to inappropriate support being offered that does not match their individual needs. I acknowledge that listening carefully to each student can be a challenge, due to the number of students in a class, however, understanding, as educators, the impact of our assumptions is essential. The counternarrative around passivity, viewed as matter of support not defiance, suggests educators need to consider carefully the solutions they offer to their students. A misalignment between a teacher’s assumption and the needs of a student, can lead to an incorrect narrative being developed about, and by, a student. For teacher’s knowledge, the contribution of this study is the message that learning to listen carefully to the students themselves, as experts in their own context, can expose counternarratives to dominant discourses. Teachers need to reflect on the impact of their assumptions and the dominant discourses that influence the lenses through which they view students labelled as low attaining. The process of reflection can, as shown in the use of a teacher-researcher

partnership in this study [see subsections 6.4.4 and 8.2.4], be enhanced through discussions with a peer, examining together the work of students.

### 12.3. Contribution to knowledge - innovating with methods

Having highlighted the contribution to knowledge of the findings of this study, I now move to the second way that this study contributes to knowledge, the innovation of methods. In this thesis, I have developed two innovations in the Listening Guide method. I have shown the value of the development process as well as the final product. In the first innovation, I introduced a poetic structure called a “they poem” to consider the stories told, about students, by their teacher. As a new step 5 in the method, I re-examined the first-person voice of the student, using the analysis of the they poems as a contextual foil. In the second innovation, to ensure consistency when creating a number of poetic structures within one study, I developed a creative rubric, including general and idiosyncratic guidance, to support retention and removal decisions when constructing a pronoun poem [[see appendix C](#)].

#### 12.3.1. Introducing the poetic structure of a they poem

The first innovation in this study is the introduction of a poetic structure called a they poem, extending the Listening Guide method of analysis. Gilligan et al. (2006) describe the Listening Guide method as acknowledging the cultural contexts in which a person expresses their experiences, replacing judgement with curiosity. Poetic structures, such as I poems in the Listening Guide, are said to introduce emotion into academic research, giving attention to the form, as well as the content, of narrative data (Fitzpatrick & Fitzpatrick, 2020). As discussed in subsection 5.3.1, the listening Guide, as a method of analysis, is underutilised in research on mathematics education, as is the use of poetic inquiry in general. In the context of low attainment in mathematics, outside of this current work, the Listening Guide has not been used in literature to examine students’ mathematical identity work. By using the Listening Guide, I have shown a commitment to bringing together the fields of the creative methodology of poetic inquiry and mathematics education in the context of low attainment. Innovating further, I have extended the Listening Guide, employing the concepts around I poems from the original work, to develop poetic structures called they poems. Working in conjunction with an I poem, which focuses on the first-person voice of a participant, a they poem considers the third-person voice of another significant person, as they talk about the participant.

As well as the product, the innovation of a they poem, in this thesis I have also been transparent about the development process. I presented, in section 7.5, my early attempt at using the extended method, including my ongoing reflections [see section 7.6]. In chapters 9 and 10, I have demonstrated the steps

involved in using the extended Listening Guide, focusing first on the first-person voice of the student [see chapter 9], before considering the third-person voice of the teacher [see chapter 10]. In section 10.7, I brought together the previous listenings, showing that, by grouping the I poems alongside the they poems, I accessed a textured understanding of the context of low attainment in mathematics that would not have been apparent in a single poem (Butler-Kisber, 2020; Ohito & Nyachae, 2019). The extended Listening Guide method, shown in this thesis, provides researchers with a means to examine the complex nature of concepts such as identity work. Using a they poem, as a contextual foil for a person's first-person voice, offers a way for researchers to lean in to listen to the first-person voice of participants in a way that acknowledges the impact of their context, the voices of significant others. I can imagine, by engaging with the process of extending the Listening Guide, researchers might be encouraged to consider their own adaptations of the method, the potential to include, for example, other types of pronoun poems or different formats of poem. I certainly see the extended version in this study as a part of the process, not a final product but a temporary stopping point.

### 12.3.2. Developing a rubric for consistency

The second of the two innovations with methods is the development of a creative rubric [see section 8.5, final rubric is found in [appendix C](#)]. The original Listening Guide method is presented as a set of guidelines rather than rigid rules (Gilligan et al., 2006). The instruction to extract the pronoun-verb phrase, plus any additional words that seem important, whilst allowing for flexibility, can be problematic when creating a number of poems within one study. Using a rubric, such as the one developed in this study, offers a way to ensure consistency when creating various pronoun poems within one study. As mentioned previously, the contribution of this thesis is demonstrating both the utility of the final product for researchers and the practical process of development. Acknowledging the messy realities of research, I developed a creative rubric after my reflections at the end of phase 1 of the study [see section 7.6]. I recognised that, for each poem in phase 1, I was making separate decisions about choices of pronoun-verb phrase, the additional words to retain or remove and the structure of the final poems. As part of developing as a researcher, the benefits of developing a rubric were twofold. Firstly, by studying syntax, beginning to understand, for example, the use of auxiliary verbs or verbal particles, I gained a greater knowledge of English language. The extraction of pronoun-verb phrases for the pronoun poems, I poems and they poems, became a considered choice. Secondly, by focusing on my subjective decision making, the poetic structures were more consistent in phase 2 compared to phase 1. The development process forced me to closely examine the narrative data, thinking carefully about the justifications around the choices that I made when creating the pronoun poems. By demonstrating the process of development, this study will be useful for researchers who

wish to create a rubric particular to their own study. Engaging with the development process shown will be a particularly useful activity for beginning researchers as well as those researchers first engaging with the Listening Guide as a method of analysis. There is also the sense, like the introduction of the they poems, that the creative rubric is a temporary stopping point, rather than being a final product. The rubric could be generalised in some ways but, in other ways, can be seen as specific to this study. I encourage the extension, modification and even the dismantling of the rubric as part of the research endeavour.

### 12.3.3. Wider dissemination outside of mathematics education

The two innovations that I have discussed in this section, introducing a they poem and developing a rubric, have been examined in relation to narrative data within mathematics education research. The contribution of this thesis, in demonstrating process as well as product, moves beyond the field of mathematics towards extending the wider field of poetic inquiry and linguistics. There is the opportunity to challenge, for example, a perceived dichotomy between mathematics and English, being the subject in which poetics could be seen to be naturally situated. Poeticity, drawn out through pronoun poems within the Listening Guide method of analysis, supported by a creative rubric, can be found wherever discourse is examined. Voices, from within various contexts, that have been marginalised, silenced and unheard, both spoken and written, can be foregrounded, with any listener learning to lean in and listen to the stories of others. I can imagine those listeners in a multiplicity of research sites, for example classroom teachers and those in the medical profession, engaging with and adapting the innovations to work within their own context.

### 12.4. Reflecting on the feminist methodological considerations

Up to this point in the chapter, I have highlighted the contributions to knowledge of this study, including the findings in relation to the low attainment label and the innovating of methods. However, in this thesis, I have also shared my development as a researcher. Being explicitly open about, for example, my missteps and changes in thinking has the potential to be useful to other beginning researchers, as well as those who support them, for example PhD supervisors. I have talked about the processes of research as well as the product of research, a journey and a destination. I now revisit the questions in table 5-a, found in subsection 5.2.1, to reflect on the five feminist considerations in relation to researching students labelled as low attaining.

The first feminist methodological consideration considers the politics of asking questions. In the context of this study, I asked the following questions: How are the interests of students labelled as low attaining served by studying students' voices? How can I produce a study that confronts the

dominant discourses that exist around students labelled as low attaining? What assumptions are inherent about the mathematical identity work of students labelled as low attaining? In this study, I used the Listening Guide method to learn to lean in and listen, examining the possibility for a counternarrative to the dominant discourses in the context of low attainment in mathematics. I acted as a conduit, ensuring the perspectives of the students were shared with their classroom teacher. I moved away from the assumption, from phase 1, that I could observe identity work, developing a framework that focused on stories-as-identity-work, prioritising the voice of the participants. However, to what extent the students' own interests were served is not clear. As a researcher, I chose the focus and the methods of the study. Going forward, I need to consider how to recognise the areas that are of interest to the students themselves, to allow them to co-research. Despite the researcher-focused aim of the study, I believe the findings around the complexity of identity work will have positive implications for those students labelled as low attaining in mathematics.

The second of the feminist methodological considerations talks about giving attention to language and discourse. For this study, I asked the following questions: How could the terms that I use in the study, for example low attainment and mathematical identity, act as barriers for participants? Do the data collection methods position students as experts in their own stories-as-identity-work? The term low attainment is found in the vernacular of teachers and educators rather than students. As students may not be aware that this label is applied to them, I believed using the term could be a barrier to some students. I chose to use the term "resit students" [[see glossary](#)] as an alternative in any documentation, such as information sheets and consent forms. In Phase 1, I used the language of identity work with the teacher but not with students. However, centre staging the voices of students, seeing them as experts in their context, meant that the decision to exclude students was not appropriate, infantilising the student participants. After reflection, for phase 2, I explicitly referred to my definition of identity work when recruiting student participants, explaining my focus on the stories they told. In phase 1, I used my observations from the classroom as objects to elicit stories in the interviews with students. Although the students were positioned as experts in the interpretation of the observations, I was the one who chose which observations to bring to the interview process. In phase 2, the objects to elicit stories when talking to the student participant were images that she had chosen, apart from one portion of assessment data provided by the teacher. The student was the expert, providing an explanation for her choice of image.

The third, out of the five feminist methodological considerations, focuses on reflexivity. I asked the following questions: What impact do my personal experiences of being labelled have on the study? How can I address the potential for hierarchy in my participant-researcher relationships? In what ways can I be open to negotiate, rather than control, the realities of the project? A key element of this study

was my explicit attention to reflexivity with the use of a social identity map [see section 8.4]. Through two iterations of the social identity map, I acknowledged some of my own issues around being labelled. From the point of view of impact, in a sense my experiences with being labelled had led me to this research project, the need to challenge the assumption of others. Using the social identity map, I confront my normative thinking, becoming aware of my implicit privilege as a white, middle class and British researcher. I considered my former role as a mathematics teacher, giving attention to the potential for hierarchy between a teacher and a student, as well as a teacher and a researcher. I cannot claim to have mitigated all issues with hierarchy in the study, but it was at the forefront of my mind as I interacted with the participants. Being open to negotiate, rather than control, within the study was somewhat of a chicken and egg situation. I was forced to negotiate elements of the study that were out of my control, for example abandoning face-to-face data collection because of the global pandemic, which meant that I learnt, to some extent, to relinquish control. However, the process was, and still is, ongoing.

The fourth feminist methodological consideration reflects on representation and intersectionality. In relation to this study, I asked the following questions: How will I address the differences between myself, as a previous mathematics teacher, and the participants, as students resitting their mathematics GCSE? How will I represent the voices of students in a way that does not perpetuate dominant discourses? The aim of this study was to centre stage the voices of students labelled as low attaining in mathematics. It was an explicit choice to use the language of labelling, moving away from the discourse that students are low attaining as an inherent characteristic. Connected to the discussion of hierarchy when talking about reflexivity, the issue for this study is understanding the impact of being a former mathematics teacher, being explicit about difference when representing the voices of students. I am a former teacher and, as such, I have not experienced low attainment in mathematics. However, in this study, I have explicitly considered the impact of my social identities using a social identity map. As I developed as a researcher, I acknowledged instances where I had made a judgement in, for example, my observations, rather than just recording what had happened. I used an online diary, to make a note of my thoughts, reflecting as an ongoing process during the field work.

The fifth and final feminist methodological consideration focuses on mobilising research for social change. I asked the following questions: How do I conduct myself within the teacher-researcher partnership to allow students' voices to be listened to by their teacher? In what ways will I amplify the need to centre stage the voices of students, beyond this particular project? The use of a teacher-researcher partnership was a key aspect of this study. The purpose was to act as a conduit for the voices of students to be heard by their teacher. Ensuring I reported the words of the students,

alongside any analysis, in the teacher-researcher discussion offered the teacher the opportunity to listen, to hear the students' perspectives. I worked hard to present myself as a peer, rather than any hierarchical notion of a researcher, in the discussions. I have disseminated some of the findings from this study as well as the innovative methods used. Beyond this project, I continue to share my thinking around the importance of centre staging students' voices as part of my work with the local Maths Hub [[see glossary](#)]. The findings of this study have implications for teachers working with students labelled as low attaining [see subsection 12.2.5]. I intend to publish in professional journals, alongside presenting at teacher conferences, to add to the conversations around the teaching and learning of students labelled as low attaining in mathematics.

### 12.5. Limitations of this study

Having reflected on the questions posed as part of the five feminist methodological considerations, I now continue to reflect, focusing on three limitations of the study. The first limitation relates to the small sample size of four students in phase 1 and one student in phase 2, as well as the same teacher in both phases. This study cannot be seen as having something definitive to say about the general population of students who are labelled as low attaining in mathematics. In that sense, the findings are not generalisable. The findings talk about these particular students, during a certain time, within a specific context. The experiences of the students, attending a post-16 college [[see glossary](#)], might not speak, for example, to the experiences of younger students. At no point in the study did I claim that the findings could be generalised. What this study does achieve is to provide a starting point, continuing to open up the conversation around the labelling of students, challenging assumptions and dominant discourses.

The second limitation relates to the nature of the participants that chose to take part. It could be argued that, for example, the move to positivity in phase 2 was an unusual case, that the student was already confident, evidenced by the fact that she had opted into the study. As discussed previously, at no point did the study claim that the participants were representative of the general population of students labelled as low attaining. The purpose was to listen carefully to a group of students, to examine the possibility of a counternarrative to dominant discourses. I acknowledge that another group of students might, and most likely would, have told alternative stories, leading to a different set of findings. The purpose of the study was to examine what stories it is possible to hear when listening carefully to the stories of students, considering the impact, on teacher and researchers, of learning to listen.

The third limitation relates to me as a developing researcher. As part of the analysis process, I explicitly examined the impact of my subjectivities, using a tool called a social identity map (Jacobson &



Mustafa, 2019). However, I was developing not developed. Examining my subjectivities is not the same as mitigating my subjectivities, although a step in the right direction. In a similar way, the methods in the study were developing and not developed. I acknowledge that it could be argued that the findings would have been impacted by these processes of developing. The aim was not to produce something, a study or a researcher, described as perfect, far from it. Nor was the aim to be purposely messy. However, this thesis should be seen as a journey alongside a destination, the messy realities that already exist when carrying out research alongside the presentation of research findings.

## 12.6. Future work

In this penultimate section of the chapter, I talk about the future work, the next steps in my journey. This study has given me the opportunity, as a researcher, to learn to listen carefully to students labelled as low attaining, but this is an ongoing process. I am learning, I have not learnt. With the use of poetic inquiry underutilised in mathematics education research, I would like to continue to actively bring together the field of poetic inquiry with the field of mathematics education research, developing collaborations with other scholars who are working in this area. In the more general field of qualitative research, I would like to continue to develop the approaches that I used in this study, investigating ways to expand the Listening Guide method of analysis. I am particularly interested in languages that do not use pronouns in the same way as the English language, thinking about how to develop the method to take account of the different ways people employ the syntax of their mother tongue to talk about themselves and others.

In relation to research alongside students labelled as low attaining in mathematics, I would like to expand the study, examining the parallels between the findings in this study and the stories told by students in other educational institutions, such as secondary schools [[see glossary](#)]. I am interested in investigating the development of students' stories-as-identity-work, mapping the course of dominant discourses, over time, within the stories told by students. As the findings have implications for educators, I want to collaborate with teachers to think carefully about the impact of listening to students, working to progress the teaching and learning experiences of students labelled as low attaining. A research question that I would like to examine is:

**RQ: What patterns of stories-as-identity-work develop when a teacher engages with the (self)positioning voices of students?**

The question goes beyond listening carefully to students to examining the patterns of stories that may develop as teachers engage, for example by developing teaching practice, with the stories being told.

## 12.7. A brief reflection and a postscript poem about Claire

In chapter 1, I began with my story, who I was in relation to this study. I now return to my story, who I have become (or do I mean, am becoming?). Who am I after the study? There is a sense that through learning to listening to the voices of participants, I had also begun to learn to listen to myself. I am certainly not the same person who I was at the start of my doctoral studies. What I have learnt most is that research needs to be about the people being researched, the experts are the participants. Foregrounding voice, centre staging the stories being told, involves relinquishing control, de-centring my own voice as a researcher. As such, the final story in this thesis, quite correctly, is about Claire.

### A postscript poem

*In the summer of 2021*

*Claire*

*was allocated a*

*grade 4*

*in her mathematics GCSE*

## References

- Adams, G., Converse, B., Hales, A., & Klotz, L. E. (2021). People systematically overlook subtractive changes. *Nature*, *592*, 258–261. <https://doi.org/10.1038/s41586-021-03380-y>
- Adiredja, A., & Louie, N. (2020). Untangling the web of deficit discourses in mathematics education. *For the Learning of Mathematics*, *40*(1), 42-43.
- Alderton, J., & Gifford, S. (2018). Teaching mathematics to lower attainers: Dilemmas and discourses. *Research in Mathematics Education*, *20*(1), 53-69. <https://doi.org/10.1080/14794802.2017.1422010>
- Allan, A. (2020). Feminist perspectives on qualitative educational research. In M. Ward, & S. Delamont (Eds.), *Handbook of qualitative research in education* (2nd ed., pp. 36-48). Edward Elgar Publishing Limited. <https://doi.org/10.4337/9781788977159.00013>
- Andersson, A. (2011). A “Curling teacher” in mathematics education: Teacher identities and pedagogy development. *Mathematics Education Research Journal*, *23*, 437–454. <https://doi.org/10.1007/s13394-011-0025-0>
- Andersson, A., Valero, P., & Meaney, T. (2015). “I am [not always] a maths hater”: Shifting students’ identity narratives in context. *Educational Studies in Mathematics*, *90*(2), 134-161. <https://doi.org/10.1007/s10649-015-9617-z>
- Andersson, A., & Wagner, D. (2019). Identities available in intertwined discourses: Mathematics student interaction. *ZDM*, *51*(3), 529-540. <https://doi.org/10.1007/s11858-019-01036-w>
- Arcavi, A., & Isoda, M. (2007). Learning to listen: From historical sources to classroom practice. *Educational Studies in Mathematics*, *66*(2), 111-129. <https://doi.org/10.1007/s10649-006-9075-8>
- Armstrong, A. (2020). Beginner's mind and the middle years mathematics student. *Research in Mathematics Education*, *22*(1), 48-66. <https://doi.org/10.1080/14794802.2019.164277>
- Axelsson, G. B. (2009). Mathematical identity in women: The concept, its components and relationship to educative ability, achievement and family support. *International Journal of Lifelong Education*, *28*(3), 383-406. <https://doi.org/10.1080/02601370902799218>
- Bartholomew, H., Darragh, L., Ell, F., & Saunders, J. (2011). "I'm a natural and i do it for love!": Exploring students' accounts of studying mathematics. *International Journal of Mathematical Education in Science and Technology*, *42*(7), pp. 915–924. <https://doi.org/10.1080/0020739X.2011.60886>
- Beeser, S., & Chik, A. (2014). Narratives of second language identity amongst young English learners in Hong Kong. *ELT Journal*, *68*(3), pp. 299-309. <https://doi.org/10.1093/elt/ccu026>
- Belenky, M. F., Clinchy, B. M., & Tarule, J. M. (1986). *Women's ways of knowing: The development of self, voice, and mind* (10th anniversary ed.). Basic Books.
- Bellamy, A. (2017). Forced GCSE mathematics resits: Students’ voice. In F. Curtis (Ed.), *Proceedings of the British Society for Research into Learning Mathematics*, *37*, pp. 1-6. <https://bsrlm.org.uk/wp-content/uploads/2017/06/BSRLM-CP-37-1-03.pdf>

- Bergmark, U. (2020). Rethinking researcher-teacher roles and relationships in educational action research through the use of Nel Noddings' ethics of care. *Educational Action Research*, 28(3), 331-344. <https://doi.org/10.1080/09650792.2019.1567367>
- Bibby, T. (2009). How do pedagogic practices impact on learner identities in mathematics? A psychoanalytically framed response. In L. Black, H. Mendick, & Y. Solomon (Eds.), *Mathematical relationships in education: Identity and participation* (pp. 123-135). Routledge. <https://doi.org/10.4324/9780203876114>
- Bishop, J. P. (2012). "She's always been the smart one. I've always been the dumb one": Identities in the mathematics classroom. *Journal for Research in Mathematics Education*, 43(1), 34-74. <https://doi.org/10.5951/jresmetheduc.43.1.0034>
- Black, L., Williams, J., Hernandez-Martinez, P., Davis, P., Pampaka, M., & Wake, G. (2010). Developing a "leading identity": The relationship between students' mathematical identities and their career and higher education aspirations. *Educ Stud Math*, 73(1), 55-72. <https://doi.org/10.1007/s10649-009-9217-x>
- Bloemert, J., Paran, A., & Jansen, E. (2020). Connecting students and researchers: The secondary school student's voice in foreign language education research. *Cambridge Journal of Education*, 50(4), 429-449. <https://doi.org/10.1080/0305764X.2020.1720603>
- Boaler, J., & Greeno, J. G. (2000). Identity, agency, and knowing in mathematics worlds. In J. Boaler (Ed.), *Multiple perspectives on mathematics teaching and learning* (pp. 171-189). Greenwood press.
- Boaler, J., Wiliam, D., & Brown, M. (2000). Students' experiences of Ability Grouping-disaffection, polarisation and the construct of failure. *British Educational Research Journal*, 26(5), 631-648. <https://doi.org/10.1080/0141192002000783>
- Boli, D. (2020). GCSE mathematics resit students' narratives of their relationship with mathematics. In R. Marks (Ed.), *Proceedings of the British Society for Research into Learning Mathematics*, 40(2). <https://bsrlm.org.uk/wp-content/uploads/2020/10/BSRLM-CP-40-2-03.pdf>
- Boylan, M., & Povey, H. (2020). Ability thinking. In G. Ineson, & H. Povey (Eds.), *Debates in mathematics education* (2nd ed., pp. 55-65). Routledge. <https://doi.org/10.4324/9780429021015-5>
- Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. 11(4), 589-597. <https://doi.org/10.1080/2159676X.2019.1628806>
- Bronner, S. (2017). *Critical theory: A very short introduction* (2nd ed.). Oxford University Press. <https://doi.org/10.1093/actrade/9780190692674.003.0001>
- Brubaker, R., & Cooper, F. (2000). Beyond "identity". *Theory and society*, 29(1), 1-47. <https://doi.org/10.1023/A:1007068714468>
- Brubaker, R., & Fernández, M. (2019). Cross-domain comparison and the politics of difference. *The British Journal of Sociology*, 70(4), 1135-1158. <https://doi.org/10.1111/1468-4446.12490>
- Burleson, B. R. (2011). A constructivist approach to listening. *International Journal of Listening*, 25(1-2), 27-46. <https://doi.org/10.1080/10904018.2011.536470>

- Burns, D., & Chantler, K. (2011). Feminist methodologies. In B. Somekh, & C. Lewin (Eds.), *Theory and methods in social research* (2nd ed., pp. 70-77). SAGE Publications Ltd.
- Butler-Kisber, L. (2020). Poetic inquiry. In E. Fitzpatrick, & K. Fitzpatrick (Eds.), *Poetry, method and education research: Doing critical, decolonising and political inquiry* (pp. 21-40). Routledge. <https://doi.org/10.4324/9780429202117-2>
- Calder, G. (2019). Ethics and qualitative research. In M. Ward, & S. Delamont (Eds.), *Handbook of qualitative research in education* (2nd ed., pp. 93-101). Elgar Edward Publishing Limited. <https://doi.org/10.4337/9781788977159.00017>
- Carspecken, P. F. (1996). *Critical ethnography in educational research: A theoretical and practical guide*. Routledge.
- Chronaki, A., & Kollosche, D. (2019). Refusing mathematics: A discourse theory approach on the politics of identity work. *ZDM*, 51(3), 457-468. <https://doi.org/10.1007/s11858-019-01028-w>
- Clandinin, D. J. (2013). *Engaging in narrative inquiry*. Routledge. <https://doi.org/10.4324/9781315429618>
- Cobb, P., Gresalfi, M., & Hodge, L. (2009). An interpretive scheme for analyzing the identities that students develop in mathematics classrooms. *Journal for Research in Mathematics Education*, 40(1), 40-68. <https://doi.org/10.5951/jresmetheduc.40.1.0040>
- Cohen, L., Manion, L., & Morrison, K. (2018). *Research methods in education* (8th ed.). Routledge. <https://doi.org/10.4324/9780203224342>
- Coleman, L. J., Micko, K. J., & Cross, T. L. (2015). Twenty-five years of research on the lived experience of being gifted in school: Capturing the students' voices. *Journal for the Education of the Gifted*, 38(4), 358-376. <https://doi.org/10.1177/0162353215607322>
- Coles, A., & Brown, L. (2021). Differentiation from an advanced standpoint: Outcomes of mathematics teachers' action research studies aimed at raising attainment. *Mathematics Teacher Education and Development*, 23(3), 166-181.
- Cook-Sather, A. (2012). Translating learners, researchers, and qualitative approaches through investigations of students' experiences in school. *Qualitative Research*, 13(3), 352-367. <https://doi.org/10.1177/1468794112451022>
- Cook-Sather, A. (2020). Student voice across contexts: Fostering student agency in today's schools. *Theory into Practice*, 59(2), 182-191. <https://doi.org/10.1080/00405841.2019.1705091>
- Cooper, V. L. (2017). Lost in translation: Exploring childhood identity using photo-elicitation. *Children's Geographies*, 15(6), 625-637. <https://doi.org/10.1080/14733285.2017.1284306>
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed method approaches* (5th ed.). SAGE Publications, Inc.
- Croghan, R., Griffin, C., Hunter, J., & Phoenix, A. (2008). Young people's constructions of self: Notes on the use and analysis of the photo-elicitation methods. *International Journal of Social Research Methodology*, 11(4), 345-356. <https://doi.org/10.1080/13645570701605707>

- Dalby, D., & Noyes, A. (2015). Locating mathematics within post-16 vocational education in England. *Journal of Vocational Education & Training*, 68(1), 70-86. <https://doi.org/10.1080/13636820.2015.1110828>
- Darragh, L. (2016). Identity research in mathematics education. *Educ Stud Math*, 93(19), 19-33. <https://doi.org/10.1007/s10649-016-9696-5>
- Davies, B., & Gannon, S. (2011). Feminism/Post-structuralism. In B. Somekh, & C. Lewin (Eds.), *Theory and methods in social research* (2nd ed., pp. 312-319). SAGE Publications Ltd.
- Davis, B. (1997). Listening for differences: An evolving conception of mathematics teaching. *Journal for Research in Mathematics Education*, 28(3), 355-376. <https://doi.org/10.2307/749785>
- Davis, P., & Williams, J. (2009). Hybridity of maths and peer talk: Crazy maths. In L. Black, H. Mendick, & Y. Solomon (Eds.), *Mathematical relationships in education: Identities and participation* (pp. 150-160). Routledge. <https://doi.org/10.4324/9780203876114>
- Day, S. (2012). A reflexive lens: Exploring dilemmas of qualitative methodology through the concept of reflexivity. *Qualitative Sociology Review*, 8, 60-85. <https://doi.org/10.18778/1733-8077.8.1.04>
- Dempsey, N. (2010). Stimulated recall interviews in ethnography. *Qualitative Sociology*, 33(3), 349-367. <https://doi.org/10.1007/s11133-010-9157-x>
- Department for Education. (2020, february 6). *Secondary accountability measures. Guide for maintained secondary schools, academies and free schools* [Guidance document]. [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/872997/Secondary\\_accountability\\_measures\\_guidance\\_February\\_2020\\_3.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/872997/Secondary_accountability_measures_guidance_February_2020_3.pdf)
- Department for Education. (2021, June 9). *16 to 19 funding: Maths and English condition of funding* [guidance document]. <https://www.gov.uk/guidance/16-to-19-funding-maths-and-english-condition-of-funding>
- Devine, J. R., Quinn, T., & Aguilar, P. (2014). Teaching and transforming through stories: An exploration of macro- and micro-narratives as teaching tools. 55(4), 273-288. <https://doi.org/10.1080/02763877.2014.939537>
- Dobson, A. (2014). *Listening for democracy: Recognition, representation, reconciliation*. Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780199682447.001.0001>
- Dunne, M., Humphreys, S., Dyson, A., Sebba, J., Gallannaugh, F., & Muijs, D. (2011). The teaching and learning of pupils in low-attainment sets. *The Curriculum Journal*, 22(4), 485-513. <https://doi.org/10.1080/09585176.2011.627206>
- Edmondson, S., & Howe, J. (2019). Exploring the social inclusion of deaf young people in mainstream schools, using their lived experience. *Educational Psychology in Practice*, 35(2), 216-228. <https://doi.org/10.1080/02667363.2018.1557113>
- Eynon, R., Fry, J., & Schroeder, R. (2017). The ethics of online research. In N. G. Fielding, R. M. Lee, & G. Blank (Eds.), *The SAGE handbook of online research methods* (pp. 19-37). SAGE Publications Ltd. <https://doi.org/10.4135/9781473957992.n2>

- Farrell, E. (2020). Researching lived experience in education: Misunderstood or missed opportunity? *International Journal of Qualitative Methods.*, 19, 1-8.  
<https://doi.org/10.1177/1609406920942066>
- Faulkner, S. L. (2019). *Poetic inquiry: Craft, method and practice* (2nd ed.). Routledge.  
<https://doi.org/10.4324/9781351044233>
- Fetterman, D. (1998). *Ethnography: Step by step* (2nd ed.). SAGE Publications, Inc.
- Fielding, M. (2004). Transformative approaches to student voice: Theoretical underpinnings, recalcitrant realities. *British Educational Research Journal*, 30(2), 295-311.  
<https://doi.org/10.1080/0141192042000195236>
- Fielding, M. (2011). Patterns of partnership: Student voice, intergenerational learning and democratic fellowship. In N. Mockler, & J. Sachs (Eds.), *Rethinking educational practice through reflexive inquiry* (Vol. 7, pp. 61-75). Springer. [https://doi.org/10.1007/978-94-007-0805-1\\_5](https://doi.org/10.1007/978-94-007-0805-1_5)
- Finesilver, C. (2017). Low-attaining students' representational strategies: Tasks, time, efficiency, and economy. *Oxford Review of Education*, 43(4), 482-501.  
<https://doi.org/10.1080/03054985.2017.1329720>
- Finneran, R., Mayes, E., & Roselyn, B. (2021). Pride and privilege: The affective dissonance of student voice. *Pedagogy, Culture & Society*, 1-16. <https://doi.org/10.1080/14681366.2021.1876158>
- Fitzpatrick, E., & Fitzpatrick, K. (2020). *Poetry, method and education research: Doing critical, decolonising and political inquiry*. Routledge. <https://doi.org/10.4324/9780429202117>
- Foote, M., & Gau Bartell, T. (2011). Pathways to equity in mathematics education: How life experiences impact researcher positionality. *Educational Studies in Mathematics*, 78(1), 45-68. <https://doi.org/10.1007/s10649-011-9309-2>
- Foyn, T., Solomon, Y., & Braathe, H. (2018). Clever girls' stories: The girl they call a nerd. *Educational Studies in Mathematics*, 98(1), 77-93. <https://doi.org/10.1007/s10649-017-9801->
- Francis, B., Connolly, P., Archer, L., Hodgen, J., Mazenod, A., Pepper, D., . . . Travers, M.-C. (2017). Attainment grouping as a self-fulfilling prophecy? A mixed methods exploration of self confidence and set level among year 7 students. *International Journal of Educational Research*, 86, 96-108. <https://doi.org/10.1016/j.ijer.2017.09.001>
- Francome, T., & Hewitt, D. (2020). "My math lessons are all about learning from your mistakes": How mixed-attainment mathematics grouping affects the way students experience mathematics. *Educational Review*, 72(4), 475-494.  
<https://doi.org/10.1080/00131911.2018.1513908>
- Gallagher, M., Prior, J., Needham, M., & Holmes, R. (2017). Listening differently: A pedagogy for expanded listening. *British Educational Research Journal*, 43(6), 1246-1265.  
<https://doi.org/10.1002/berj.3306>
- Gee, J. P. (2000). Identity as an analytic lens for research in education. *Review of Research in Education*, 25(1), 99-125. <https://doi.org/10.3102/0091732X025001099>

- Gewirtz, S., Maguire, M., Neumann, E., & Towers, E. (2021). What's wrong with "deliverology"? Performance measurement, accountability and quality improvement in English secondary education. *Journal of Education Policy*, 36(4), 504-529. <https://doi.org/10.1080/02680939.2019.1706103>
- Gilligan, C. (1993). *In a different voice: Psychological theory and women's development*. Harvard University Press.
- Gilligan, C., & Eddy, J. (2021). The Listening Guide: Replacing judgment with curiosity. *Qualitative Psychology*, 8(2), 141–151. <https://doi.org/10.1037/qap0000213>
- Gilligan, C., Spencer, R., Weinberg, M. K., & Bertsch, T. (2006). In the Listening Guide: A voice-centered relational method. In S. N. Hesse-Biber, & P. Leavy (Eds.), *Emergent Methods in Social Research* (pp. 253-271). SAGE Publications, Inc. <https://doi.org/10.4135/9781412984034.n12>
- Görlich, A. (2016). Poetic inquiry: Understanding youth on the margins of education. *International Journal of Qualitative Studies in Education*, 29(4), 520-535. <https://doi.org/10.1080/09518398.2015.1063734>
- Graven, M., & Heyd-Metzuyanin, E. (2019). Mathematics identity research: The state of the art and future directions. *ZDM*, 51(3), 361-377. <https://doi.org/10.1007/s11858-019-01050-y>
- Green, E., Solomon, M., & Spence, D. (2021). Poem as/and palimpsest: Hermeneutic phenomenology and/as poetic inquiry. *International Journal of Qualitative Methods*, 20. <https://doi.org/10.1177%2F16094069211053094>
- Gresalfi, M., Martin, T., Hand, V., & Greeno, J. (2009). Constructing competence: An analysis of student participation in the activity systems of mathematics classrooms. *Educational Studies in Mathematics*, 70, 49-79. <https://doi.org/10.1007/s10649-008-9141-5>
- Grootenboer, P., & Edwards-Groves, C. (2019). Learning mathematics as being stirred into mathematical practices: An alternative perspective on identity formation. *ZDM*, 51(3), 433-444. <https://doi.org/10.1007/s11858-018-01017-5>
- Gutiérrez, R. (2013). The sociopolitical turn in mathematics education. *Journal for Research in Mathematics Education*, 44(1), 37-68. <https://doi.org/10.5951/jresmetheduc.44.1.0037>
- Hall, J., Towers, J., & Martin, L. C. (2018). Using I poems to illuminate the complexity of students' mathematical identities. *Educational Studies in Mathematics*, 99(2), 181-196. <https://doi.org/10.1007/s10649-018-9839-y>
- Hall, V. (2020). Reclaiming student voice(s): Constituted through process or embedded in practice. *Cambridge Journal of Education*, 125-144. <https://doi.org/10.1080/0305764X.2019.1652247>
- Halliday, A., Kern, M., Garrett, D., & Turnbull, D. (2019). The student voice in well-being: A case study of participatory action research in positive education. *Educational Action Research*, 27(2), 173-196. <https://doi.org/10.1080/09650792.2018.1436079>
- Hammersley, M., & Atkinson, P. (2019). *Ethnography: Principles in practice* (4th ed.). Routledge.
- Hand, V., & Gresalfi, M. (2015). The joint accomplishment of identity. *Educational Psychologist*, 50(3), pp.190-203. <https://doi.org/10.1080/00461520.2015.1075401>



- Handal, B. (2003). Teachers' mathematical beliefs: A review. *The Mathematics Educator*, 13(2), 47-57.
- Hardman, J. (2019). Analysing student talk moves in whole-class teaching. In N. Mercer, R. Wegerif, & L. Major (Eds.), *The Routledge International Handbook of Research on Dialogic Education* (pp. 152-166). Routledge. <https://doi.org/10.4324/9780429441677>
- Hargreaves, E., Quick, L., & Buchanan, D. (2019). "I got rejected": Investigating the status of 'low-attaining' children in primary-schooling. *Pedagogy, Culture & Society*, 29(1), 79-97. <https://doi.org/10.1080/14681366.2019.1689408>
- Harkness, S. S., & Stallworth, J. (2013). Photovoice: Understanding high school females' conceptions of mathematics and learning mathematics. *Educational Studies in Mathematics*, 84(3), 329-347. <https://doi.org/10.1007/s10649-013-9485-3>
- Harper, D. (2002). Talking about pictures: A case for photo elicitation. *Visual Studies*, 17(1), 13-26. <https://doi.org/10.1080/14725860220137345>
- Helme, R. (2019). What are the implications for identity positioning of foregrounding the low prior attaining students' own narrative data? In R. Marks (Ed.), *Proceedings of the British Society for Research into Learning Mathematics*, 39 (3), (pp. 1-6). <https://bsrlm.org.uk/wp-content/uploads/2020/01/BSRLM-CP-39-3-02.pdf>
- Helme, R. (2020). "I do it in my head and it is hard to explain": Issues around showing workings for one low attaining student in a GCSE resit classroom. In R. Marks (Ed.), *Proceedings of the British Society for Research into Learning Mathematics*, 40 (1) (pp. 1-6). <https://bsrlm.org.uk/wp-content/uploads/2020/05/BSRLM-CP-40-1-05.pdf>
- Helme, R. (2021a). I and THEY poetic voices in learning to listen to a student labelled as low attaining in mathematics. *For the Learning of Mathematics*, 41(1), 2-7.
- Helme, R. (2021b). Learning to listen in new ways: Using a social identity map to examine the impact of my own positionality when working with the narrative of a student from a mathematics resit classroom. In R. Marks (Ed.), *Proceedings of the British Society for Research into Learning Mathematics*, 41(1), (pp. 1-6). <https://bsrlm.org.uk/wp-content/uploads/2021/05/BSRLM-CP-41-1-08.pdf>
- Helme, R. (2022). Challenging discourses of low attainment: Using they poems to reveal positioning stories and shifting identities. In C. Fernández, S. Llinares, Á. Gutiérrez, & N. Planas (Ed.), *Proceeding of the 45th Conference of the International Group for the Psychology of Mathematics Education*, 2, (pp. 371-378). <https://hdl.handle.net/10045/126590>
- Hennink, M., Hutter, I., & Bailey, A. (2011). *Qualitative research methods*. SAGE Publications Ltd.
- Hesse-Biber, S. N., & Leavy, P. (2006). *The practice of qualitative research*. SAGE Publications Ltd.
- Hesse-Biber, S. N., & Leavy, P. (2007). *Feminist research practice: A primer*. SAGE Publications Ltd. <https://doi.org/10.4135/9781412984270>
- Heyd-Metzuyanim, E. (2013). The co-construction of learning difficulties in mathematics: Teacher–student interactions and their role in the development of a disabled mathematical identity. *Educational Studies in Mathematics*, 83, 341–368. <https://doi.org/10.1007/s10649-012-9457-z>

- Heyd-Metzuyanim, E. (2015). Vicious cycles of identifying and mathematizing: A case study of the development of mathematical failure. *Journal of the Learning Sciences*, 24(4), 504-549. <https://doi.org/10.1080/10508406.2014.999270>
- Heyd-Metzuyanim, E. (2017). Identity as a nexus of affect and discourse in mathematical learning. *For the Learning of Mathematics*, 37(3), 33-38.
- Hodge, L., & Harris, R. (2015). Voice, identity, and mathematics: Narratives of working class students. *Journal of Educational Issues*, 1(2), 129-148. <https://doi.org/10.5296/jei.vli2.8314>
- Hodgen, J., & Marks, R. (2009). Mathematical "ability" and identity: A sociocultural perspective on assessment and selection. In L. Black, H. Mendick, & Y. Solomon (Eds.), *Mathematical relationships in education: Identities and participation* (pp. 31-42). Routledge. <https://doi.org/10.4324/9780203876114>
- Hodgen, J., Coe, R., Foster, C., Brown, M. H., & Küchemann, D. (2020). *Low attainment in mathematics: An investigation focusing on Year 9 pupils in England. Final report.* [https://www.nuffieldfoundation.org/wp-content/uploads/2019/11/Hodgen\\_LowAttainersMaths-42015-FinalReport-May2020.pdf](https://www.nuffieldfoundation.org/wp-content/uploads/2019/11/Hodgen_LowAttainersMaths-42015-FinalReport-May2020.pdf)
- Hodgen, J., Foster, C., & Brown, M. (2021). Low attainment in mathematics: An analysis of 60 years of policy discourse in England. *The curriculum journal*, 1-20. <https://doi.org/10.1002/curj.128>
- Holland, D., Lachicotte Jr, W., Skinner, D., & Cain, C. (1998). *Identity and agency in cultural worlds.* Harvard University Press.
- Holmes, W., & Dowker, A. (2013). Catch Up Numeracy: A targeted intervention for children who are low-attaining in mathematics. *Research in Mathematics Education*, 15(3), 249-265. <https://doi.org/1080/14794802.2013.803779>
- Horgan, D., Forde, C., Martin, S., & Parkes, A. (2017). Children's participation: Moving from the performative to the social. *Children's Geographies*, 15(3), 274-288. <https://doi.org/10.1080/14733285.2016.1219022>
- Hoskins, K. (2015). Researching female professors: The difficulties of representation, positionality and power in feminist research. *Gender and Education*, 27(4), 393-411. <https://doi.org/10.1080/09540253.2015.1021301>
- Huisman, K. (2008). "Does this mean you're not going to come visit me anymore?": An inquiry into an ethics of reciprocity and positionality in feminist ethnographic research. *Sociological Inquiry*, 78(3), 372-396. <https://doi.org/10.1111/j.1475-682X.2008.00244.x>
- Ingram, N., & Meaney, T. (2022). "My parents are pretty pleased with my maths": Students' navigation of identity stories about mathematics. *Research in Mathematics Education*, 24(1), 51-68. <https://doi.org/10.1080/14794802.2021.1938190>
- Jackson, C. (2022). Class, "ability" groups and mathematics in English secondary schools. In *All-Attainment Teaching in Secondary Mathematics* (pp. 37-57). Springer. [https://doi.org/10.1007/978-3-030-92361-7\\_4](https://doi.org/10.1007/978-3-030-92361-7_4)
- Jacobson, D., & Mustafa, N. (2019). Social identity map: A reflexivity tool for practicing explicit positionality in critical qualitative research. *International Journal of Qualitative Methods*, 18, 1-12. <https://doi.org/10.1177/1609406919870075>

- Jakobson (1960). Closing statement. Linguistics and poetics. In T. Sebeok (Ed.), *Style in language* (pp. 350-377). MIT Press.
- James, N., & Busher, H. (2009). *Online Interviewing*. SAGE Publications Ltd.  
<https://doi.org/10.4135/9780857024503>
- Johnston-Wilder, S., Lee, C., Brindley, J., & Garton, E. (2015). Developing mathematical resilience in school-students who experience repeated failure. *8th annual International Conference of Education, Research and Innovation (ICERNI2015)*, (pp. 6358-6367).  
<https://library.iated.org/view/JOHNSTONWILDER2015DEV2>
- Jussim, L. (2013). Teachers' expectations. In E. M. Anderman, & J. Hattie (Eds.), *International guide to student achievement* (pp. 243-246). Routledge.
- Kaplan, A., & Flum, H. (2012). Identity formation in educational settings: A critical focus for education in the 21st century. *Contemporary Educational Psychology*, 37(3), 171-175.  
<https://doi.org/10.1016/j.cedpsych.2012.01.005>
- Kaspersen, E., Pepin, B., & Sikko, S. A. (2017). Measuring STEM students' mathematical identities. *Educational Studies in Mathematics*, 95(2), 163-179. <https://doi.org/10.1007/s10649-016-9742-3>
- Khong, T. D., Saito, E., & Gillies, R. M. (2019). Key issues in productive classroom talk and interventions. *Educational Review*, 71(3), 334-349.  
<https://doi.org/10.1080/00131911.2017.1410105>
- Kincheloe, J., & McLaren, P. (2005). Rethinking critical theory and qualitative research. In N. Denzin, & Y. Lincoln (Eds.), *The SAGE handbook of qualitative research* (3rd ed., pp. 303-342). SAGE Publications Ltd.
- Knigge, M., & Hannover, B. (2011). Collective school-type identity: Predicting students' motivation beyond academic self-concept. *International Journal of Psychology*, 46(3), 191-205.  
<https://doi.org/10.1080/00207594.2010.529907>
- Kranendonk, M., Vermeulen, F., & van Heelsum, A. (2018). "Unpacking" the identity-to-politics link: The effects of social identification on voting among muslim immigrants in western europe. *Political Psychology*, 39, 43-67. <https://doi.org/10.1111/pops.12397>
- Lafrance, M. N., & Wigginton, B. (2019). Doing critical feminist research: A feminism & psychology reader. *Feminism & Psychology*, 29(4), 534-552.  
<https://doi.org/10.1177/0959353519863075>
- Lave, J., & Wenger, E. (1991). *Situated learning. Legitimate peripheral participation*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511803932>
- Leavy, P., & Harris, A. (2019). *Contemporary feminist research from theory to practice*. The Guildford Press.
- Leckie, G., & Goldstein, H. (2017). The evolution of school league tables in England 1992–2016: "Contextual value-added", "expected progress" and "progress 8". *British Educational Research Journal*, 43, 193-212. <https://doi.org/10.1002/berj.3264>
- Lewis, N. (2017). Linked life courses in fieldwork: Researcher, participant and field. *Area*, 49(4), 394-401. <https://doi.org/10.1111/area.12334>

- Lindemann, H. (2019). *An invitation to feminist ethics* (2nd ed.). Oxford University Press.  
<https://doi.org/10.1093/oso/9780190059316.001.0001>
- Louie, N. (2020). Agency discourse and the reproduction of hierarchy in mathematics instruction. *Cognition and Instruction*, 38(1), 1-26. <https://doi.org/10.1080/07370008.2019.1677664>
- Lundy, L. (2018). In defence of tokenism? Implementing children's right to participate in collective decision-making. *Childhood*, 25(3), 340-354. <https://doi.org/10.1177/0907568218777292>
- Mapolelo, D. (2009). Students' experiences with mathematics teaching and learning: Listening to unheard voices. *International Journal of Mathematical Education in Science and Technology*, 40(3), 309-322. <https://doi.org/10.1080/00207390802642229>
- Marks, R. (2014). Educational triage and ability-grouping in primary mathematics: A case-study of the impacts on low-attaining pupils. *Research in Mathematics Education*, 16(1), 38-53. <https://doi.org/10.1080/14794802.2013.874095>
- Marvasti, A., & Tanner, S. (2020). Interviews with individuals. In M. Ward, & S. Delamont (Eds.), *Handbook of qualitative research in education* (pp. 329–337). Edward Elgar Publishing. <https://doi.org/10.4337/9781788977159.00035>
- Mason, J., & Houssart, J. (2009). *Listening figures. Listening to learners of mathematics at secondary school and above*. Trentham books Ltd.
- Mayes, E., Black, R., & Finneran, R. (2021). The possibilities and problematics of student voice for teacher professional learning: Lessons from an evaluation study. *Cambridge Journal of Education*, 5(21), 195-212. <https://doi.org/10.1080/0305764X.2020.1806988>
- Maynard, K., & Cahnmann-Taylor, M. (2010). Anthropology at the edge of words: Where poetry and ethnography meet. *Anthropology and Humanism*, 35(1), 2-19. <https://doi.org/10.1111/j.1548-1409.2010.01049.x>
- Mazenod, A., Francis, B., Archer, L., Hodgen, J., Taylor, B., Tereshchenko, A., & Pepper, D. (2019). Nurturing learning or encouraging dependency? Teacher constructions of students in lower attainment groups in English secondary schools. *Cambridge Journal of Education*, 49(1), 53-68. <https://doi.org/10.1080/0305764X.2018.1441372>
- McFeetors, J., & Mason, R. (2005). Voice and success in non-academic mathematics courses: (Re)forming identity. *For the Learning of Mathematics*, 25(3), 16-23.
- McIntyre, D., Pedder, D., & Rudduck, J. (2005). Pupil voice: Comfortable and uncomfortable learnings for teachers. *Research papers in education*, 20(2), 149-168. <https://doi.org/10.1080/02671520500077970>
- McLeod, A. (2008). *Listening to Children: A Practitioner's Guide*. Jessica Kingsley Publishers.
- McNaughton Nicholls, C., Mills, L., & Kotecha, M. (2014). Observation. In J. Ritchie, J. Lewis, C. McNaughton Nicholls, & R. Ormston (Eds.), *Qualitative research practice: A guide for social science students and researchers* (2nd ed., pp. 243-268). SAGE Publications Ltd.
- Mendick, H., & Moreau, M.-P. (2014). Using popular culture. In D. Leslie, & H. Mendick (Eds.), *Debates in mathematics education* (pp. 17-26). Routledge.
- Merrill, B., & West, L. (2009). *Using biographical methods in social research*. SAGE Publications Ltd.

- Metcalfe, A. S. (2016). Educational research and the sight of inquiry: Visual methodologies before visual methods. *Research in Education*, 96(1), 78-86.  
<https://doi.org/10.1177/0034523716664577>
- Miller, E., Ziaian, T., & Esterman, A. (2018). Australian school practices and the education experiences of students with a refugee background: A review of the literature. *International Journal of Inclusive Education*, 22(4), 339-359.  
<https://doi.org/10.1080/13603116.2017.1365955>
- Mkhize, D. R. (2017). Forming positive identities to enhance mathematics learning among adolescents. *Universal Journal of Educational Research*, 5(2), 175-180.  
<https://doi.org/10.13189/ujer.2017.050201>
- Moensted, M. L. (2022). Shame, anger and the lived experience of school disengagement for marginalised students: A recognition theory approach. *YOUNG*, 1-18.  
<https://doi.org/10.1177/11033088221094459>
- Moreira, D., & Latas, J. (2014). Mathematics education, cultural practices and communication. In M. J. Curry, & D. I. Hanauer (Eds.), *Languages, literacy and learning in STEM education. Research methods and perspectives from applied linguistics* (pp. 109-122). John Benjamins Publishing Company.
- Ng, J., & Choi, I. (2009). Culture and First-Person Pronouns. *Personality and Social Psychology Bulletin*, 35(11), 1492-1499. <https://doi.org/10.1177/0146167209343810>
- Norris, J. (2022). The positioning of GCSE and Functional Skills in Further Education: How do vocational students make sense of post-16 mathematics pathways? *Research in Mathematics Education*, 24(2), 1-19. <https://doi.org/10.1080/14794802.2021.2010239>
- Noyes, A. (2012). It matters which class you are in: Student-centred teaching and the enjoyment of learning mathematics. *Research in Mathematics Education*, 14(3), 273-290.  
<https://doi.org/10.1080/14794802.2012.734974>
- Noyes, A., & Dalby, D. (2020). *Students' perspectives on mathematics in Further Education colleges. The mathematics in Further Education colleges project: Interim report 3*.  
<https://www.nottingham.ac.uk/research/groups/crme/documents/mifec/interim-report-3.pdf>
- O'Connor, C., Michaels, S., Chaplin, S., & Harbaugh, A. G. (2017). The silent and the vocal: Participation and learning in whole-class. *Learning and Instruction*, 48, 5-13.  
<https://doi.org/10.1016/j.learninstruc.2016.11.003>
- Ohito, E. O., & Nyachae, T. M. (2019). Poetically poking at language and power: Using black feminist poetry to conduct rigorous feminist critical discourse analysis. *Qualitative Inquiry*, 25(9-10), 839-850. <https://doi.org/10.1177/1077800418786303>
- Olofsson, A., Lindberg, O., & Fransson, G. (2018). Students' voices about information and communication technology in upper secondary schools. *International Journal of Information and Learning Technology*, 35(2), 82-92. <https://doi.org/10.1108/IJILT-09-2017-0088>
- O'Neill, J. (2018). Voice and ethics of children's agency in educational research. In R. Bourke, & J. Loveridge (Eds.), *Radical collegiality through student voice: Educational experience, policy and practice* (pp. 39-54). Springer. [https://doi.org/10.1007/978-981-13-1858-0\\_3](https://doi.org/10.1007/978-981-13-1858-0_3)

- Op 't Eynde, P., De Corte, E., & Verschaffel, L. (2006). "Accepting emotional complexity": A socio-constructivist perspective on the role of emotions in the mathematics classroom. *Educational Studies in Mathematics*, 63, 193-207. <https://doi.org/10.1007/s10649-006-9034-4>
- O'Reilly, M., & Dogra, N. (2017). *Interviewing children and young people for research*. SAGE Publications Ltd.
- Oxford University Press. (n.d.). Listen. In *Oxford English Dictionary*. Retrieved March 2, 2023, from <https://www-oed-com>
- Padilla, A., & Paulo, T. (2019). Toward inclusive mathematics education: A metatheoretical reflection about countering ableism in mathematics standards and curriculum. *International Journal of Qualitative Studies in Education*, 32(3), 299-322. <https://doi.org/10.1080/09518398.2019.1576941>
- Pearce, T. C., & Wood, B. E. (2019). Education for transformation: An evaluative framework to guide student voice work in schools. *Critical Studies in Education*, 60(1), 113-130. <https://doi.org/10.1080/17508487.2016.1219959>
- Pink, S., Postill, J., Leder Mackley, K., & Astari, N. (2017). Digital-visual stakeholder ethnography. *Sociological Research Online*, 22(4), 174-192. <https://doi.org/10.1177/1360780417726736>
- Piper, h., & Simons, H. (2011). Ethical issues in generating public knowledge. In B. Somekh, & C. Lewin (Eds.), *Theory and methods in social research* (2nd ed., pp. 25-32). SAGE Publications.
- Pole, C., & Morrison, M. (2003). *Ethnography for education*. Open University Press.
- Postill, J. (2017). Remote ethnography: Studying culture from afar. In L. Hjorth, H. Horst, A. Galloway, & G. Bell (Eds.), *The Routledge Companion to Digital Ethnography* (pp. 61-69). Routledge. <https://doi.org/10.4324/9781315673974>
- Povey, H. (2020). A pedagogy for all. In G. Ineson, & H. Povey (Eds.), *Debates in mathematics education* (2nd ed., pp. 66-77). Routledge. <https://doi.org/10.4324/9780429021015-6>
- Prendergast, M. (2009). Poem is what? Poetic inquiry in qualitative social science research. *International Review of Qualitative Research*, 1(4), 541-568. <https://doi.org/10.1525/irqr.2009.1.4.541>
- Prendergast, M. (2015). Poetic inquiry, 2007-2012: A surrender and catch found poem. *Qualitative Inquiry*, 21(8), 678-685. <https://doi.org/10.1177/1077800414563806>
- Punch, S. (2002). Interviewing strategies with young people: the "secret box", stimulus material and task-based activity. *Children and Society*, 16, 45-56. <https://doi.org/10.1002.CHI.685>
- Radovic, D., Black, L., Williams, J., & Salas, C. E. (2018). Towards conceptual coherence in the research on mathematics learner identity: A systematic review of the literature. *Educational Studies in Mathematics*, 99(1), 21-42. <https://doi.org/10.1007/s10649-018-9819-2>
- Robertson, S.-A., & Graven, M. (2019). Exploratory mathematics talk in a second language: A sociolinguistic perspective. *Educ Stud Math*, 101, 215-232. <https://doi.org/10.1007/s10649-018-9840-5>

- Roegman, R., Knight, M., Taylor, A., & Watson, V. (2016). From microscope to mirror: Doctoral students' evolving positionalities through engagement with culturally sensitive research. *International Journal of Qualitative Studies in Education*, 29(1), 44-65. <https://doi.org/10.1080/09518398.2014.974717>
- Rose, G. (2016). *Visual methodologies: An introduction to researching with visual materials*. (4th ed.). SAGE Publications Ltd.
- Roulston, K., deMarrais, K., & Lewis, J. B. (2003). Learning to interview. *Qualitative Inquiry*, 9(4), 643-668. <https://doi.org/10.1177/1077800403252736>
- Ruglis, J., & Vallee, D. (2016). Student disengagement as/and unfairness: Re-reading schools through photos. *Journal of Critical Education Policy studies*, 14(2), 186-216.
- Sarti, A., Schalkers, I., & Dedding, C. (2015). "I am not poor. Poor children live in Africa": Social identity and children's perspectives on growing up in contexts of poverty and deprivation in the Netherlands. *Children and Society*, 29(6), 535-545. <https://doi.org/10.1111/chso.12093>
- Scherer, P., Beswick, K., DeBlois, L., Healy, L., & Moser Opitz, E. (2016). Assistance of students with mathematical learning difficulties: How can research support practice? *ZDM Mathematics Education*, 48, 633-649. <https://doi.org/10.1007/s11858-016-0800-1>
- Sedova, K., Sedlace, M., Svarice, R., Majcik, M., Navratilova, J., Drexlerova, A., . . . Salamounova, Z. (2019). Do those who talk more learn more? The relationship between student classroom talk and student achievement. *Learning and Instruction*, 63. <https://doi.org/10.1016/j.learninstruc.2019.101217>
- Sfard, A. (2008). *Thinking as communicating: Human development, the growth of discourses, and mathematizing*. Cambridge University Press.
- Sfard, A., & Prusak, A. (2005). Telling identities: In search of an analytic tool for investigating learning as a culturally shaped activity. *Educational Researcher*, 34(4), 14-22. <https://doi.org/10.3102/0013189X034004014>
- Shier, H. (2010). Children as public actors: Navigating the tensions. *Children & Society*, 24(1), 24-37. <https://doi.org/10.1111/j.1099-0860.2008.00208.x>
- Shohel, M. M. (2012). Nostalgia, transition and the school: An innovative approach of using photographic images as a visual method in educational research. *International Journal of Research and Method in Education*, 35(3), 269-292. <https://doi.org/10.1080/1743727X.2012.173253>
- Simonsmeier, B. A., Flaig, M., Deiglmayr, A., Schalk, L., & Schneider, M. (2022). Domain-specific prior knowledge and learning: A meta-analysis. *Educational Psychologist*, 57(1), 31 - 54. <https://doi.org/10.1080/00461520.2021.1939700>
- Simpson, A., & Quigley, C. (2016). Member checking process with adolescent students: Not just reading a transcript. *The Qualitative Report*, 21(2), 377-392. <https://nsuworks.nova.edu/tqr/vol21/iss2/12>
- Solomon, Y. (2007). Experiencing mathematics classes: Ability grouping, gender and the selective development of participative identities. *International Journal of Educational Research*, 46(1), 8-19. <https://doi.org/10.1016/j.ijer.2007.07.002>

- Solomon, Y. (2012). Finding a voice? Narrating the female self in mathematics. *Educational Studies in Mathematics*, 80(1-2), 171-183. <https://doi.org/10.1007/s10649-012-9384-z>
- Staats, S. (2008). Poetic lines in mathematics discourse: A method from linguistic anthropology. *For the Learning of Mathematics*, 28(2), 26-32.
- Staats, S. (2017). The poetics of argumentation: The relevance of conversational repetition for two theories of emergent mathematical reasoning. *Research in Mathematics Education*, 19(3), 276-292. <https://doi.org/10.1080/14794802.2017.1375969>
- Staats, S. (2021). Mathematical poetic structures: The sound shape of collaboration. *Journal of Mathematical Behavior*, 62. <https://doi.org/10.1016/j.jmathb.2021.100846>.
- Sultana, F. (2007). Reflexivity, positionality and participatory ethics: Negotiating field work dilemmas in international research. *ACME Editorial Collective*, 374-385. <https://acme-journal.org/index.php/acme/article/view/786>
- Tallerman, M. (2015). *Understanding syntax* (4th ed.). Routledge.
- Tan, C. Y., & Dimmock, C. (2022). The relationships among between-class ability grouping, teaching practices, and mathematics achievement: A large-scale empirical analysis. *Educational Studies*, 48(4), 471-489. <https://doi.org/10.1080/03055698.2020.1780416>
- Taylor, B., Hodgen, J., Tereshchenko, A., & Gutiérrez, G. (2022). Attainment grouping in English secondary schools: A national survey of current practices. *Research Papers in Education*, 37(2), 199-220. <https://doi.org/10.1080/02671522.2020.1836517>
- Tereshchenko, A., Francis, B., Archer, L., Hodgen, J., Mazonod, A., Taylor, B., . . . Pepper, D. (2019). Learners' attitudes to mixed-attainment grouping: Examining the views of students of high, middle and low attainment. *Research Papers in Education*, 34(4), 425-444. <https://doi.org/10.1080/02671522.2018.1452962>
- Thompson, G. (2014). Labeling in interactional practice: Applying labeling theory to interactions and interactional analysis to labeling. *Symbolic Interaction*, 37(4), 458-482. <https://doi.org/10.1002/symb.127>
- Turner, E., Dominguez, H., Maldonado, L., & Empson, S. (2013). English learners' participation in mathematical discussion: Shifting positionings and dynamic identities. *Journal for Research in Mathematics Education*, 44(1), 199-234. <https://doi.org/10.5951/jresmetheduc.44.1.0199>
- Vecchio, L., Dhillon, K., & Ulmer, j. (2017). Visual methodologies for research with refugee youth. *Intercultural Education*, 28(2), pp. 131-142. <https://doi.org/10.1080/14675986.2017.1294852>
- Verhoeven, M., Poorthuis, A. M., & Volman, M. (2019). The role of school in adolescents' identity development. A literature review. *Educational Psychology Review*, 31(1), pp. 35-63. <https://doi.org/10.1007/s10648-018-9457-3>
- Walters, T., Simkiss, N., Snowden, R., & Gray, N. (2022). Secondary school students' perception of the online teaching experience during COVID-19: The impact on mental wellbeing and specific learning difficulties. *British Journal of Educational Psychology*, 92, 843-860. <https://doi.org/10.1111/bjep.12475>



- Ward, A. (2011). "Bringing the message forward": Using poetic re-presentation to solve research dilemmas. *Qualitative Inquiry*, 17(4), 355-363. <https://doi.org/10.1177/1077800411401198>
- Warwick, P., Vrikki, M., Karlsen, A. M., Dudley, P., & Vermunt, J. D. (2019). The role of pupil voice as a trigger for teacher learning in Lesson Study professional groups. 49(4). <https://doi.org/10.1080/0305764X.2018.1556606>
- Watson, A., & De Geest, E. (2005). Principled teaching for deep progress: Improving mathematical learning beyond methods and materials. *Educational Studies in Mathematics* 58, 209-234. <https://doi.org/10.1007/s10649-005-2756-x>
- Wellington, J. (2015). *Educational research: Contemporary issues and practical approaches* (2nd ed.). Bloomsbury Academic.
- Wenger, E. (1998). *Communities of practice: Learning, meaning and identity*. Cambridge University Press.
- Wigginton, B., & Lafrance, M. N. (2019). Learning critical feminist research: A brief introduction to feminist epistemologies and methodologies. *Feminism & Psychology*, 1-17. <https://doi.org/10.1177/0959353519866058>
- Williams, N. (2019). Listening. *Transactions of the Institute of British Geographers*, 44(4), 647-649. <https://doi.org/10.1111/tran.12324>
- Wilson, A., Reay, D., Morrin, K., & Abrahams, J. (2020). "The still-moving position" of the 'working class' feminist academic: Dealing with disloyalty, dislocation and discomfort. *Discourse: Studies in the Cultural Politics of Education*, 1-15. <https://doi.org/10.1080/01596306.2020.1767936>
- Wood, M. B. (2013). Mathematical micro-identities: Moment-to-moment positioning and learning in a fourth-grade classroom. *Journal for Research in Mathematics Education*, 44(5), 775-808. <https://doi.org/10.5951/jresmetheduc.44.5.0775>
- Wood, M. B., & Kalinec, C. A. (2012). Student talk and opportunities for mathematical learning in small group interactions. *International Journal of Educational Research*, 51-52, 109-127. <https://doi.org/10.1016/j.ijer.2011.12.008>
- Woodward, S. (2020). *Material methods: Researching and thinking with things*. SAGE Publications Ltd. <https://doi.org/10.4135/9781529799699.n3>
- Wortham, S. (2001). *Narratives in Action: A Strategy for Research and Analysis*. Teachers College Press.
- Yeo, A. L., Ward, K., McNaughton Nicholls, C., & Lewis, J. (2014). In-depth interviews. In J. Ritchie, J. Lewis, C. McNaughton Nicholls, & R. Ormston (Eds.), *Qualitative research practice: A guide for social science students and researchers* (2nd ed., pp. 177 - 210). SAGE Publications Ltd.
- Young, J. (2017). All the world's a school. *Management in Education*, 31(1), 21-26. <https://doi.org/10.1177/0892020616685263>
- Zavala, M. d., & Hand, V. (2019). Conflicting narratives of success in mathematics and science education: Challenging the achievement-motivation master narrative. *Race Ethnicity and Education*, 22(6), 802-820. <https://doi.org/10.1080/13613324.2017.1417251>

## Appendix A – glossary

### **Ability grouping**

Ability grouping refers to the sorting or grouping of students based on their perceived academic “abilities”. Attainment in assessments is often used to decide “ability”, with students categorised into high (top), middle and low (bottom) groups, although this differs across educational institutions. Ability grouping does not necessarily mean that students will be in separate classes but may receive different provision within the same classroom.

### **Accountability measures**

The use of the outcomes of, for example, attainment 8 and progress 8 scores, to hold schools and colleges accountable for the progress of their students. The measures are published in league tables for comparison between schools.

### **Attainment 8**

See progress 8. Attainment 8 is a measure of academic performance in English secondary schools. It is calculated by adding together a pupil's highest scores across eight government approved school subjects, mostly examined at the end of a student's secondary education.

### **Bottom set**

Refer to ability grouping/setting. An alternative name, used by school, for the lowest group within ability grouping.

### **Centre Assessed Grade (CAG)**

In summer 2020, GCSE and A level exams were cancelled in England as part of the government's response to the covid-19 pandemic. Instead, schools and colleges (centres) were asked to allocate grades based on their best judgement regarding what grade they believed candidates would have achieved if exams had gone ahead. These were referred to as Centre Assessment Grades (CAGs).

### **College**

Colleges, also known as Further Education colleges or post-16 colleges, are attended by students of all ages, mostly from the age of sixteen and onwards. Further education refers to any study after secondary school. It is not a part of higher education, where a student goes to university to attain an undergraduate or post-graduate degree.

### **Foundation tier curriculum**

The mathematics curriculum in England is divided into two tiers, foundation and higher. The foundation tier curriculum will always have less content than higher tier courses, meaning that there is less to learn. Following a foundation tier curriculum means that the highest grade you could obtain in a General Certificate of Secondary Education (GCSE) is a grade 5 (**see grade 9 to 1 below**).

### **Functional Skills/level 2**

Functional skills examinations are alternative qualifications to a General Certificate of Secondary Education (GCSE). Functional skills curricula are designed to give people the practical skills they need in order to function in everyday life, whereas GCSEs provide academic knowledge and understanding.

### **Further Education/college**

Colleges, also known as Further Education colleges or post-16 colleges, are attended by students of all ages, mostly from the age of sixteen and onwards. Further education refers to any study after secondary school. It is not a part of higher education, where a student goes to university to attain an undergraduate or post-graduate degree.

### **General Certificate of Secondary Education (GCSE) paper 1, paper 2, paper 3**

The qualification taken by most fifteen- and sixteen-year-olds at the end of their secondary school education in England, Northern Ireland and Wales. The examination consists of three papers, in paper 1 a calculator is not allowed, in papers 2 and 3 a calculator is allowed.

### **Grades A\* to C**

Pre-2016 outcomes of a General Certificate of Secondary Education (GCSE) examination in England. The grades went from A\* (highest) to G (lowest). A grade C or higher is seen as a pass. The number of A\* to C grades, referring to the number of students who passed, was used as an accountability measure.

### **Grades 9 to 1**

From 2016 onwards, a new grading system was introduced for the outcomes of a General Certificate of Secondary Education (GCSE) examination in England, replacing the previous system of letters. The grades go from 9 (highest) to 1 (lowest). A grade 4 or higher is seen as a pass.

### **Grade 4 pass**

See grades 9 to 1 above. A grade 4 pass refers to the threshold outcome of a General Certificate of Secondary Education (GCSE) examination in England. A student who achieves a grade 4 or above is said to have passed.

### **Grade 3**

See grades 9 to 1 above. A grade 3 (or below) refers to the outcome of a General Certificate of Secondary Education (GCSE) examination in England. A student who achieves a grade 3 or below is said to have failed.

### **Higher tier curriculum**

The mathematics curriculum in England is divided into two tiers, foundation and higher. The higher tier curriculum will have more difficult content than foundation tier courses. Following a higher tier curriculum means that the highest grade you could obtain in a General Certificate of Secondary Education (GCSE) is a grade 9 (**see grade 9 to 1 above**).

### **Mainstream school**

Mainstream refers to schools or colleges which are not special schools. A special school provides provision for students who have additional needs.

### **Maths Hub**

The Maths Hub programme is a nationally coordinated network bring together mathematics education professionals, in collaboration, to develop and spread excellent practice, benefiting all students. There is currently a national network of 40 hub.

**Mixed-attainment teaching**

See ability grouping/setting. Mixed-attainment teaching refers to a system of not grouping students into classes based on their perceived academic “abilities”. Students in the class will have a range of attainment levels and mixed-attainment teaching refers to the pedagogy required to enable all to access the learning.

**Mock examination**

A mock examination is a practice examination taken by a student, administered by their school or college. Often mimicking the format of, for example, a General Certificate of Secondary Education (GCSE), a mock examination is seen as preparation for the final examination.

**National Centre for Excellence in the Teaching of Mathematics (NCETM)**

An organisation, funded by the Department for Education, the aim of which is to support schools in England to collaborate, in order to raise levels of achievement in mathematics. The NCETM coordinate the Maths Hub program.

**Post-16 college/education**

Colleges, also known as Further Education colleges or post-16 colleges, are attended by students of all ages, mostly from the age of sixteen and onwards. Further education refers to any study after secondary school. It is not a part of higher education, where a student goes to university to attain an undergraduate or post-graduate degree.

**Primary school**

A school in England for students between the ages of about five and eleven.

**Progress 8**

See attainment 8. Progress 8 is a measure that indicates how much a secondary school in England has helped pupils improve (or progress) over a five-year period when compared to a government-calculated expected level of improvement.

**Resit/resit class**

Students who achieve grade 3 or below in their mathematics or English General Certificate of Secondary Education (GCSE), taken at the end of their secondary education, are required, when they attend post-16 provision, to continue studying mathematics to improve their grade. Students need to retake or “resit” the examination.

**Secondary school**

A school in England for students between the ages of eleven to sixteen. Secondary schools can also have provision for students aged sixteen to eighteen.

**Setting/setted**

See ability grouping. Setting refers to the sorting or grouping of students based on their perceived academic “abilities”. Attainment scores in assessments are often used to decide “ability”, with students categorised into high (top), middle and low (bottom) sets. Setting usually means that students will be in separate classrooms.

**Teacher Assessed Grade (TAG)**

In summer 2021, GCSE and A level exams were cancelled in England as part of the government's response to the covid-19 pandemic. The system of CAGs used in 2020 was replaced by Teacher Assessed Grades. Teachers will be able to draw on a range of evidence when determining grades, including the optional use of questions provided by exam boards, as well as mock exams, coursework, or other work completed.

**Teaching/classroom assistant**

A Teaching or classroom assistant is a member of staff who provides support to teachers at a school. Their duties can include, for example, working individually with students and supporting students with additional needs.

**Top set**

Refer to ability grouping/setting. An alternative name, used by schools, for the highest group within ability grouping.

**Value-added scores**

Value-added scores are a measure of a school's performance. Attainment 8 and progress 8 are both used to measure the value added to students' outcomes by a school.

**Work Group**

A Work Group is a collaborative group within the Maths Hub programme, comprised of participant teachers from a number of schools. The participant teachers, or other educators, work together around a common theme, normally over the large part of a school year.

**Year 11**

An educational year group in schools in England. This is the last year of secondary education and students are usually, but not always, aged fifteen to sixteen years old.

## Appendix B - ethics documentation

### Phase 1

#### Ethics application

Name(s): Rachel Helme

Proposed research project: What are the enactments of mathematical in the context of low prior attainment in mathematics? A pilot study.

Proposed funder(s): None

Discussant for the ethics meeting: **Julian Brown**

Name of supervisor: Alf Coles; Laurinda Brown

Has your supervisor seen this submitted draft of your ethics application? Y

#### **Please include an outline of the project or append a short (1 page) summary:**

This is a methodology-based case study that will act as a pilot to my main PhD project. The aims of this project are:

- *To understand the current enactments of identity in the LPA context*
- *To test the validity of the research methods (measuring what it should be)*
- *To understand the impact of the research methods (teacher's workload and other context specific practicalities)*

The context of the study will be post 16 students who did not achieve grade 4 or above in their GCSE maths exam in year 11, and the teachers and departments who teach these students in maths resit classes.

There will be two phases with differing levels of researcher engagement, namely whole department interviews and classroom-based involvement:

- The whole department phase will involve listening to the stories of teachers in the department who are currently timetabled to teach Maths resit classes.
  - Anticipated time commitment:  
Staff presentation with Q and A (30 minutes); 1 x 1-1 interview (1 hour).
- The class-based involvement phase involves the researcher working with an ethnographical sensibility, as a teaching assistant in the classroom, in order to observe and discuss with the student and teacher participants how identity is enacted when doing maths. It is envisaged that this phase will be over a four-month period in line with the term dates of the establishment. There is one three-hour lesson every week.
  - Anticipated participants time commitment:
    1. Teachers: Staff presentation with Q and A (30 minutes); 1 x 1-1 interview (1 hour); 1 x contextual data gathering (this will be assisting the teachers in context); 1 x teaching and activity observation; 1 x reflective interview (1 hour); 1 x member checking session (30-60 minutes)
    2. Students: Student presentation with Q and A (20 minutes); 1 x 1-1 interview (30–60 minutes); 1 x contextual data gathering; 1 x teaching and learning observation; 1 x reflective focus group (30-60 minutes); 1 x member checking session (30-60 minutes)

**Ethical issues discussed and decisions taken (see list of prompts overleaf):**

**Updates after ethical conversation shown in red (18/7/19)**

**Updates after supervisor feedback shown in green (26/7/19)**

### **Researcher access/exit**

The participants are students who have low prior attainment in mathematics and the teachers that teach these students in resit classes. This study uses the DfE definition of low attainment as students who did not achieve a grade 4 or above in their maths GCSE. I have chosen post 16 students as they will be aware of their GCSE grade and therefore there is less issues of highlighting a fact that they may not be aware of, however the potentially sensitive term 'low attainment' will not be used in discussions with students. **In addition, the term 'low attainment' will be replaced by 'resit students' in teachers information sheets and consent form in case this is inadvertently seen by students. (Students who achieved less than a grade 4 in their maths GCSE have to resit the exam post 16, in order to attempt to improve their grade, sometimes on multiple occasions).**

The context of study is a post 16 college who are currently working with the DfE on a national incentive. This characteristic is important in the choice of site but would identify the college and therefore will not be used in any write up either during or after the project. The aims of the study will be clarified with the gatekeepers in pre study discussions and information sheet, describing the benefits to both myself as a researcher and the potential additional knowledge useful for the college.

**Within the writeup process, the college will be described as an establishment which is interested in improving the outcomes and experiences of low attaining students in mathematics.**

The sample frame will be the teachers in the maths department, and the students that are in their resit classes. The student participants will only be approached to take part if their teacher has agreed to participant in the classroom-based phase of the study.

**This study will focus on the students who achieved a grade 3 and will therefore initially resit their GCSE in November. These could be described as the 'almost attaining' students, who could at various times in their schooling have been described as both 'attaining' and 'low attaining'. This choice of student is feasible because the college organises these students into different classes (called the delta classes) to students who achieved a grade 2 or below (called the Echo, and Foxtrot classes). It is possible that teachers of these 'delta' classes will not volunteer to participate, in which case the Echo, and Fox (grade 2 or 1) teachers will be approached. The rationale for choosing this class will be shared with the teacher participants in the presentation**

I will use the natural rhythm of education, that is starts and ends of terms, where possible to enter and exit the research as a way of managing relationships with teachers and student, this is a natural time for adults to enter or leave educational contexts.

My movement around the college will have to be negotiated with the gatekeepers, and 'go' and 'no go' areas clarified. I hold a current DBS certificate which will hopefully aid with this.

### **Power and participant relations**

The teacher participants will need to be made aware that I have a previous working relationship with the head of faculty at the college. This transparency is important to prevent any issues around trust that may occur if they found out at a later date. Any concerns around confidentiality will be addressed in the whole staff presentation and/or during the question-and-answer sessions. The college gatekeepers will not have access to any raw data from interviews or observed activities, but a final report will be created

for their use internally, for example in governors' meetings etc. This will be made explicit on their own information sheet and consent form.

A copy of the final report will be made available to teachers' participants on request; however, this will be adapted for student participants as some responses may not be appropriate to share with this audience. It is important to protect the relationship between teachers and student, which will be ongoing after the study has finished.

Staff may believe that this project is part of the DfE initiative and that they must take part and will be reminded in the presentation and information sheet that their participation in this study is voluntary.

The student participants may think that they must take part in the study as they are in a sense a captive audience (**Coercion**). They will be made aware of my dual role of researcher and teaching assistant and I will always wear my University of Bristol pink lanyard to make them aware of this. (This is in contrast to the green/blue of the college). They will be informed of my role as a researcher in the first lesson (or as soon as possible) for transparency. There will be students in the classroom who choose not to participate, and they will still receive help in class in the teaching assistant role, but no data will be collected from them. **This will avoid drawing attention to the students who have chosen to participate by singling them out for help.**

This information will be provided during a student presentation in the classroom and on the information sheet.

The only caveat is if any safeguarding issues arise where the college guidelines will be adhered to. This information will be provided in the staff and student presentations and on the information sheet.

Teachers and students may talk, providing additional data, outside of the 'official' data collection times, for example during lunch breaks. I will continue to wear my university of Bristol pink lanyard to remind them of my dual role ~~and additional consent will be sought if this data is considered useful~~. Where practical I will only be present in the college during approved classroom lessons times, and for pre-arranged presentations and interviews.

**UPDATE: This unofficial data will not be used, unless participants are happy to restate it during more 'official' collection times (interviews etc) as covered on the consent form. (This will allow me to reflect on the impact)**

### **Information given to the participants**

There will be four versions of the information/consent sheet:

- Gate keepers
- Whole department interview teachers
- Class-based phase teachers
- Class-based phase student

### **~~DO I NEED A POSTER IN THE ROOM? (NO)~~**

**Although useful as a reminder, after a few lessons they will not remember the poster either.**

### **Right to withdraw and informed consent**

The presentations, information sheet and consent form will state that involvement is voluntary and that they have the right to withdraw. This will also be reiterated before all the 1-1 interviews and the student focus group.

The students are post-16 and therefore consent is not required from their parents.

Teachers will be made aware that this project is not part of the DfE initiative, and they do not have to take part.



## Complaints procedure

Supervisors contact details will be provided on information sheets

## Safety and well-being of participants and researcher

The topic of 'low attainment' is potentially a sensitive topic for students, as could recalling memories of past learning experiences. In this case I will stop any interviews on the request of the student or if I believe this is an issue.

This should be the participants decision. If I feel uncomfortable or the student requests it, I will stop the interview, however the student will be given the option to continue if they are happy to. This will be part of the interview preamble.

In addition, as previously mentioned, the term 'low attainment' will be replaced by 'resit students' in ALL information sheets, consent forms and in discussions with teachers.

As I have a role in mathematics education, I hold a current DBS certificate which I will present to the college for inspection. That being said, sensible measures will be taken to ensure that any 1-1 interviews take place in private but publicly viewed areas, such as classrooms with windows or library facilities. No interview/focus group meeting will take place outside of the college environment.

Access to the classroom will be in constant negotiation with the teacher to avoid any sense of being 'observed' as the term is understood in educational circles. The relationship with the teacher will be transparent and handled sensitively. This transparency is also key with the student participants with my dual role explicitly discussed.

Because of the insider nature of this research, it will be important for me to consider where my role of teaching assistant ends, and that of researcher begins. Within the three-hour lesson time, I will have responsibilities in my dual role, to the teacher and the college, to conduct myself appropriately, understanding the college behaviour for learning policies for example. However, direction will always be sought from the teacher unless negotiated beforehand.

Outside of this time when still on the college site I will conduct myself solely as a researcher, for example not providing any further assistance to students. I will signpost any requests back to the teacher or other appropriate adult.

Due to my previous roles in education, it may be that the teacher asks for advice or support on their teaching and learning. As I am presenting the teacher as 'expert' this would not be appropriate for me to engage in, and signposting would have to be made to another member of staff. This would be negotiated with the head of faculty before the class-based phase begins. Initially sharing my working history may add credibility to my presence and transparency to my previous working relationship with the head of faculty, however it will be sensible to avoid too much detail after the first presentation. This will have to be balanced with not being 'covert'.

It will be important that I continuously 'check' myself, reflecting on my actions and this will be part of the ongoing ethical decisions to be made in the field with the support of my supervisor.

Due to the ethnographic sensibility of this study, the developing working relationships between myself and the participants will have to be carefully managed, and contact outside of the study will be avoided, for example social media or other social events. As previously discussed, the natural rhythm of the college will be used to enter and exit the context.

There is a possible scenario that I am previously known to some of the teachers and students which could negate the above, however this college is outside of the local authority area of my previous employment.

## Anonymity/confidentiality

All participants and the college will be given pseudonyms and the DfE characteristic that led to the choice of context will not be discussed in any write up.

However, with regard to anonymity within the college, this will be more difficult to maintain when balanced with safety issues around interviewing as well as my visible role in the classroom. The presentations and information sheets will inform the participants of this issue and further discussion will be encouraged. Non traceability to an individual participant is possible for the student and whole department group participants, however this is not the case for the class-based phase teacher and will need to be discussed fully and consent given.

With regard to confidentiality, all data will be confidential, except for the student focus group where the discussion will be summarised and shared with the teachers in the stimulated reflective interview. However, this summary will be presented as ‘the focus group said...’ and comments from individual students (non-traceability) will not be shared with the teacher. Students will be informed of this on the information sheet, and again before the focus group activity. They will be reminded of their right to withdraw at this point.

All participants will be informed that confidentiality will not be maintained if any safeguarding issue becomes apparent during interviews, focus group discussions, observed activities or at any other time. In this case, the college guidelines will be strictly adhered to.

Although I can control my own action, I am not able to guarantee the actions of others.

### **Data collection**

There will be a range of data collection methods:

Whole department phase

- 1-1 semi structured interviews with teachers (approx. 12 participants)
- Copies of artefacts collected as a response to the analysis of transcript, for example worksheets or schemes of learning
- Analysis of documents as a response to the above

Class-based phase

- 1-1 semi structured interviews (teachers and students) (max 1 hour)
- Observation of mutually agreed activity, field notes
- Semi structured focus group discussion with students, 6/8 participants in each group. (If there are more than 6 participants, then an extra group will be formed) (max 1 hour)
- Stimulated reflective discussion with teacher (1 hour)
- Reflective diary during time as teaching assistant
- Copies of artefacts collected as a response to ongoing analysis, for example worksheets
- Analysis of documents as a response to the above
- Comments from member checking process

The use of a focus group presents issues around dominant voice and power relations between participants. As part of the preamble before the activity, instructions will be given on how the participants should conduct themselves to allow every voice to be heard, and to avoid the inclusion of non-participant data in conversation. A structure will be provided by myself to facilitate this.

The narrative and observed data, will be aligned with the collected artefacts to produce, **in collaboration with each participant**, a ‘digit’ story book of the participants, both as an individual and as a summary of the participant ‘type’, that is ‘teacher’ and ‘student’.

All artefacts will be checked for any information that could identify the participant or college and redacted where necessary.

The narrative data will be voiced recorded and translated verbatim later, so that full attention can be given to the participant.

The reflective diary will only be updated outside of the lesson time to avoid a sense of the teacher **and the student** being ‘observed’. **Due to the ethnographical nature of this case study, it will not be possible to state in advance what might be of interest in the lesson and this should be clearly discussed in the teacher and student presentations, as well as the information sheet.**

The only exception to the above will be **taking notes during** the observation of the mutually agreed activity, in which a different notebook will be used to avoid the possibility of information being inadvertently seen during the reflection sessions.

The artefact collection process will be at a separate time for the interviews/focus group so as not to identify which participant may have mentioned which artefact. Where the artefact is not made available by the college, alternatives will be used to represent them, and this will be clearly labelled. **The use of alternatives could introduce researcher bias into the process and therefore this will be reviewed and updated as part of the member checking process.**

### **Data analysis**

The Listening Guide will be used to analyse the narrative data produced, which will be aligned with any observed enactments from the field notes as well as any artefacts collected as a response to the narrative. This form of analysis is chosen as it is said to bring the researcher into a relationship with the person behind the data, viewing the data holistically and in this case also visually. At this time, the Listening Guide has not previously been aligned with visual data to create this ‘story book’, and hence this is a test of the validity and the practicality of this methodology.

The ‘digit’ storybook will be created and stored electronically on the university of Bristol system and only temporarily stored on a password protected USB for demonstration to the participant in the college environment.

The participants of the class-based phase will be able to member-check their personal ‘digit’ storybook and refine as necessary.

### **Data Storage and protection**

All narrative data will be recorded on a password protected recording device and the transcript will be stored on the university system. Field notebooks will be marked private and held only by myself, **with all participants and the college being anonymised**. Copies of any collected artefacts will be scanned on to the university system at the earliest convenience and the **original returned/destroyed (confidential shredding) as appropriate**. Some photographs may be taken of artefacts and the photos will be transferred on to the university system at the earliest convenience and then deleted of the camera used. Consent will be obtained from participants for the anonymised data to be used in further articles and conference sessions.

This data will be protected as per the guidance <http://www.bristol.ac.uk/secretary/data-protection/>

### **Feedback**

Participants of the class-based phase will have the opportunity to member check and refine the ‘digit’ story book that has been created

The college will be provided with a final report of the findings of this project that they can use for internal purposes only, for example governors’ meetings etc.

## Responsibilities to colleagues/academic community

I will always ensure that I conducted myself to a high standard, respecting the workload and day to day life of the teacher. I will ensure that I discuss any issues or questions that arise during the study with my supervisor, **I will use my supervisor meetings as ethical check ins during the study.**

The college is currently involved in a DfE initiative which engages with other partners including a University. It will be imperative that this research does not impact the work being undertaken. Permission will be sought from and negotiated with the partnership University, and any other relevant organisation to run this project alongside. The observed activity, interviews and focus group work will be, **as far as practical**, planned at such a time as to avoid any activities from this initiative. Staff will be informed in the presentation and information sheet that any activities that relate to this initiative take precedence over this pilot study.

**This study will not take a deficient perspective on the teaching and learning of mathematics, and the actors (students, teachers, college) therein. This study is to investigate but not make a judgement on the context of low attainment in mathematics.**

## Reporting the research

The finding of this study will be using to support my progression and guide the methodology of my main PhD project.

An article regarding the findings will be submitted for publication and used in a conference setting.

The data will be stored in an anonymised form and consent will be obtained from participants for the above use of their data.

If you feel you need to discuss any issue further, or to highlight difficulties, please contact the GSoE's ethics co-ordinators who will suggest possible ways forward.

If you feel you need to discuss any issue further, or to highlight difficulties, please contact the GSoE's ethics co-ordinators who will suggest possible ways forward.

Signed:	(Researcher)	Signed:	(Discussant)
Date:	[Redacted]	[Redacted]	Julian Brown
	Rachel Helme		18 <sup>th</sup> July 2019.

Signatures scan from original

## Investigating mathematical identity in maths resit classrooms.

### College information sheet

**PLEASE NOTE: This project will not involve any teachers and students working on the Centre of Excellence project to avoid any cross contamination.**

#### What is this study?

I am investigating the experiences of both teaching and learning maths in the context of students who did not achieve a grade 4 or higher in their GCSE. These students are described by the DfE as 'low attaining'. I am interested in hearing stories about past and present experiences of both teachers and students. I am also interested in the 'act' of both teaching and learning maths from their point of view. These stories and actions together form a 'mathematical identity'.

This data will help both the college and others interested in maths education begin to understand resitting maths from the point of view of those involved.

#### What will happen?

This study will take place **from September to December** in line with the college term dates and there will be two phases, a whole department phase and an extended classroom phase.

There will be a number of different ways of collecting data

1. The **whole department phase** involves one off interviews with as many teachers in the department as possible. Copies of anything discussed with me will be collected, for example, schemes of learning or worksheets. These interviews could take place at any time during the project.
2. The **extended classroom phase** focuses on one particular teacher, and the students in their lesson. This will involve me being a researcher in classroom, taking on the role of a teaching assistant in order to both support the teachers and get to know the participants.

In phase 2, data will be collected in a number of different ways:

- A student interview at the beginning of the project, in September or October
- A teacher interview at the beginning of the project, in September or October
- Researchers own field notes after lessons, recording interesting things that may have happened

- The notes taken during the agreed observation
- A one-off reflective student focus group session
- A one-off reflective conversation with the teacher, stimulated by my own notes of the activity and the student's own reflections.
- Copies and photographs of anything discussed with me.

Within an agreed timescale after the end of the project, I will provide you with a final anonymised report for you to use **internally** in the college. I will also share the anonymised findings with others both within, and beyond the University of Bristol, for example through academic journals and conferences, in order to help a wider audience understand the experiences of resitting maths.

### **Your rights and consent**

The college does not have to take part in this project, the process is entirely voluntary, and you can withdraw from it at any point without explanation. In the final report and any writing that may follow, all participants and the college will be given a pseudonym so that they are anonymous. **However, it is important to realise that within the college itself anonymity is more difficult to maintain**

In line with data protection and GDPR, this research adheres to the university guidelines found here: <http://www.bristol.ac.uk/secretary/data-protection/>

### **Questions?**

If you have any further question or complaints, just ask me or you can email:

████████████████████

Here is my supervisors email address

████████████████████

### **Consent**

1. I have had an opportunity to read the information sheet and understand the planned study.
2. I recognise that the data provided by the participants will be confidential, except for safeguarding issues where the guidelines provided by the college will be adhered to.
3. I understand the final anonymised report provided will be for internal use only.

Signed

Name

# Investigating mathematical identity in maths resit classrooms.

## Teacher Participant Information Sheet 1

### Department interviews

#### What is this study?

I am investigating the experiences of both teaching and learning maths in the context of students who did not achieve a grade 4 or higher in their GCSE. I am interested in hearing stories about your past and present experiences as a teacher as well as the stories told by students in your classrooms. I am also interested in the 'act' of both teaching and learning maths both from your point of view and from that of your students. These stories and actions together form a 'mathematical identity'.

These stories and experiences will help those interested in maths education begin to understand resitting maths from the point of view of both you and your students.

#### What will happen?

There will be two phases, a whole department phase and an extended classroom involvement phase.

#### **This information sheet is about the whole department interview phase only.**

I would like to hear and collate the experiences of the department as a whole unit. I will ask you to share your stories in a one-off interview. The stories from all the teachers who participate will be then analysed to see if there are any common or non-common themes and ideas. In addition, I will collect copies and photographs of anything you talk about, for example worksheets and schemes of learning.

We can spend as long as you like in the interview type conversation, but I envisage this will not be more than a one-hour session. The interviews will take place at a mutually agreed time between September and December in line with the term dates of the college. The interview will be recorded on a voice recorder and transcribed later so that I can concentrate on what you are saying.

#### Your rights and consent

You do not have to take part in this project, the process is entirely voluntary, and you can withdraw from it at any point without explanation. When your experiences are shared all participants and the college will be given a pseudonym so that you are anonymous.

**However, it is important to realise that others within the college itself may see that you are involved in the project and therefore may know your contribution to the findings.**

In line with data protection and GDPR, this research adheres to the university guidelines found here: <http://www.bristol.ac.uk/secretary/data-protection/>

Questions?

If you have any further question or complaints, just ask me in person or you can email:

████████████████████

Here is my supervisors email address

████████████████████



# Investigating mathematical identity in maths resit classrooms.

## Teacher Participant Information Sheet 2

### Classroom involvement phase

#### What is this study?

I am investigating the experiences of both teaching and learning maths in the context of students who did not achieve a grade 4 or higher in their GCSE. I am interested in hearing stories about your past and present experiences as a teacher as well as the stories told by students in your classrooms. I am also interested in the 'act' of both teaching and learning maths both from your point of view and from that of your students. These stories and actions together form a 'mathematical identity'.

These stories and experiences will help those interested in maths education begin to understand resitting maths from the point of view of both you and your students.

#### What will happen?

There will be two phases, a whole department phase and an extended classroom phase.

**This information sheet is about the extended classroom involvement phase only, please read carefully and ask questions to clarify anything.**

This will focus on one teacher and one class and will involve me being part of the classroom for an extended period of time, this will be from September to December in line with the term dates of the college. I wish to help in the classroom taking the role of a teaching assistant in lessons, this will allow me to get to know you and your students well. At a mutually agreed time, I will observe and take extensive notes about one lesson and then ask you and your students to separately reflect on the 'act' of doing this observed maths. This will be explained to the students in at the start of the project in September or October, and they will be asked to give consent to this process.

Data will be collected in a number of different ways:

- A student interview, at the beginning of the project in September or October.
- A teacher interview, at the beginning of the project in September or October.
- Researchers own field notes after lessons, recording interesting things that may have happened.
- The notes taken during the agreed observation

- A reflective student focus group
- A reflective conversation with the teacher, stimulated by my own notes of the activity and your student's reflections.
- Copies and photographs of anything you have discussed with me, for example worksheet, schemes of learning etc.

At the end of the project in December, I will ask you to discuss all the information I have put together to make sure I have understood everything correctly.

We can spend as long as you like in the interview and the reflective conversations, but I envisage these will be not more than one-hour sessions.

### Your rights and consent

You do not have to take part in this project, the process is entirely voluntary, and you can withdraw from it at any point without explanation. When your experiences are shared, all participants and the college will be given a pseudonym so that you are anonymous.

**However, it is important to realise that others within the college itself may see that you are involved in the project and therefore will know your contribution to the findings.**

In line with data protection and GDPR, this research adheres to the university guidelines found here: <http://www.bristol.ac.uk/secretary/data-protection/>

### Questions?

If you have any further question or complaints, just ask me in person or you can email:

████████████████████

Here is my supervisors email address:

████████████████████

**CONSENT FORM**

**Investigating mathematical identity in maths resit  
classrooms. (TEACHER)**

**Please answer the following questions by circling the response that applies:**

1. I confirm that I have read information sheet and have had details of the study explained to me  
**Yes/No**
2. My questions about the study have been answered to my satisfaction and I understand that I may ask further questions at any point  
**Yes/No**
3. I understand that I can change my mind at any time, without giving my reason  
**Yes/No**
4. I understand about any issues with anonymity and confidentiality within the college as discussed in the information sheet  
**Yes/No**
5. I wish to participate in the study as described in the information sheet  
**Yes/No**

**Name** \_\_\_\_\_

**Signature** \_\_\_\_\_

**Date** \_\_/\_\_/\_\_\_\_

**Researcher Name** \_\_\_\_\_

**Researcher Signature** \_\_\_\_\_

# Investigating the experiences of learning maths

## Student Participant Information

### What is this study?

I am interested in the experiences of students who did not achieve a grade 4 or higher in their maths GCSE in year 11. I am interested in hearing stories about learning maths as well as seeing what it like to do maths in a lesson. I want to hear and see this in order to help myself and others, both inside and outside the college, to understand what it is like to learn maths for your point of view. I will also be talking to teachers to get their point of view as well.

### What will happen?

I will be spending time in your lessons, from September to December, in order to help your teacher and to get to know you properly. This will be part of seeing maths from your point of view.

I will keep a journal called field notes, where I will write down interesting things that happen in lessons. It is not possible to say in advance what might be interesting, but examples could be fascinating calculations you have used, or whether you worked alone or in a group. This will happen after the lesson so that you can carry on learning maths as normal.

As well as the field notes, I will ask you to be involved in three different types of discussion:

1) September or October:

At the beginning of the project, we will have a 1-1 conversation about your past stories about learning maths before you came to college.

**This conversation will be confidential unless you share something that would be a as 'safeguarding issue'. In this case I will have to share the information with the college.**

2) Between October and December:

On **one** occasion, at a time convenient to your teacher, I will carefully watch a particular activity and then afterwards ask you to discuss it in the focus group.

**On this occasion I will discuss and share this information as a group response with your teacher, however I will remind you of this before the discussion starts.**

3) December:

At the end of the project, I will ask you to look at the information I have gathered about you to make sure I have understood everything correctly.

These conversations will take between 30mins and 1 hour each.

I will collect copies and photographs of anything you talk about, for example lesson worksheets or copies of your work. **I will only collect these if you have talked about them with me.**

The 1-1 conversation and focus group discussion will be recorded on a voice recorder so that I can concentrate on what you are saying.

### Your rights and consent

You do not have to take part in this project, the process is entirely voluntary, and you can change your mind at any point without giving a reason. **If you do not want to take part, I will still help you in class but will not collect information from/about you.**

When your experiences are shared with others inside and outside of the college, all students, teachers and the college will be given pseudonyms so that you are anonymous. **However, it is important to realise that others in the college itself may see that you are involved in the project.**

In line with data protection and GDPR, this research adheres to the university guidelines found here: <http://www.bristol.ac.uk/secretary/data-protection/>

### Questions?

If you have any further question or complaints, just ask me in person or you can email:

████████████████████

Here is my supervisors email address

████████████████████

**CONSENT FORM****Investigating the experiences of learning maths (STUDENT)**

Please answer the following questions by circling the response that applies:

7. I confirm that I have read information sheet and have had details of the study explained to me  
**Yes/No**
  
8. My questions about the study have been answered to my satisfaction and I understand that I may ask further questions at any point  
**Yes/No**
  
9. I understand that I can change my mind at any time, without giving my reason  
**Yes/No**
  
10. I understand about any issues with anonymity and confidentiality within the college as discussed in the information sheet  
**Yes/No**
  
11. I wish to participate in the study as described in the information sheet  
**Yes/No**

Name \_\_\_\_\_

Signature \_\_\_\_\_

Date \_\_/\_\_/\_\_\_\_

Researcher Name \_\_\_\_\_

Researcher Signature \_\_\_\_\_

Ethic approval

From: **Research Governance and Ethics Officer** [REDACTED] >

Date: Tuesday, July 30, 2019

Subject: Ethics Online Tool: application signed off

To: [REDACTED]

Your online ethics application for your research project "What are the enactments of identity in the context of low prior attainment in mathematics? " has been granted ethical approval. Please ensure that any additional required approvals are in place before you undertake data collection, for example NHS R&D Trust approval, Research Governance Registration or Site Approval.

For your reference, details of your online ethics application can be found online here:

<http://www.bristol.ac.uk/red/ethics-online-tool/applications/92642>

## Phase 2

### Ethics application

Name(s): Rachel Helme

Proposed research project: What are the enactments of mathematical identity in the context of low prior attainment in mathematics?

Proposed funder(s): None

Discussant for the ethics meeting: Julian Brown (original version 5.3.20)

Name of supervisor: Alf Coles; Laurinda Brown

Has your supervisor seen this submitted draft of your ethics application? Y

### **Please include an outline of the project or append a short (1 page) summary:**

The research themes of this PhD project are:

- *What are the enactments of identity in the context of low attainment in mathematics?*
- *What patterns of identity emerge when attention is given to the (self)positioning of students, though the work of a teacher-researcher partnership?*

The context of the study will be post 16 students who did not achieve grade 4 or above in their GCSE maths exam in year 11, and the teacher who teaches these students in a maths resit class.

The researcher will work in collaboration with the teacher using the field site's digital platform to review student assessment and other work as a stimulus for teacher voice, including the enactments observed by the teacher during teaching and learning. Following on from this online meeting, the researcher will be involved in the target setting and review meetings between the teacher and student in order to gather student voice about the audienced work and observations. **The student's data will be shared with the classroom teacher during the project in order to enable them to consider their teaching and learning activities with these students and if different patterns may emerge.**

It is envisaged that this phase will run during the academic year 2020/2021 in line with the term dates of the establishment. There are two one and a half hour lessons every week and the term assessment cycle involves 1x initial assessment, 2x target setting and review meetings, and 1x final assessment. It is anticipated that three termly cycles will be carried out. All online meetings will be recorded using Teams software.

- Anticipated participants time commitment:
  1. Teacher: 1 x initial reflection of the student participants and the project; 1 x final reflection of stories that emerge; A termly cycle of 1 x stimulated discussion using work loaded on digital platform; 2 x target setting/review meetings with students and researcher online (part of current practice) (30 minutes total); Asynchronous dissemination and reflection discussion around final assessment and student/teacher narrative.



2. Students: Student presentation with Q and A (20 minutes); 1 x 1-1 asynchronous primary image-based task (30–60 minutes); 1 x final asynchronous image/narrative based task and member checking session (30-60 minutes); A termly cycle of 2 x target setting/review meetings with teacher and researcher online (part of current practice) (30 minutes total); Asynchronous dissemination and member checking of narrative.

### **Ethical issues discussed and decisions taken (see list of prompts overleaf):**

#### **Researcher access/exit**

The teacher participant has already been involved in the pilot stage of this project and is known to myself, as researcher, through local professional networks. It will be important to re-negotiate access to the classroom participants and online versions of the student work to avoid any assumptions that may arise from this previous working relationship and consider carefully any contact outside of the college during the project timescale. The need for anonymity of the college and the participants will be reiterated, with any conversations regarding the project outside of the context of student (for example possible networking events) discouraged. I can of course only control my own actions.

The participants are students who have low prior attainment in mathematics and the teacher that teach these students in their resit class. This study uses the DfE definition of low attainment as students who did not achieve a grade 4 or above in their maths GCSE. I have chosen post 16 students as they will be aware of their GCSE grade and therefore there is less issues of highlighting a fact that they may not be aware of, however the potentially sensitive term ‘low attainment’ will not be used in discussions with students. In addition, the term ‘low attainment’ will be replaced by ‘resit students’ in teachers information sheets and consent form in case this is inadvertently seen by students. (Students who achieved less than a grade 4 in their maths GCSE have to resit the exam post 16, in order to attempt to improve their grade, sometimes on multiple occasions).

The context of study is a post 16 college who are currently working with the DfE on a national incentive. This characteristic is important in the choice of site but would identify the college and therefore will not be used in any write up either during or after the project. The aims of the study will be clarified with the gatekeepers in pre study discussions and information sheet, describing the benefits to both myself as a researcher and the potential additional knowledge useful for the college.

Within the writeup process, the college will be described as an establishment which is interested in improving the outcomes and experiences of low attaining students in mathematics.

The sample frame will be a teacher in the maths department, and the students that are in their resit classes. The student participants will only be approached to take part if their teacher has agreed to participant in the study.

This study will focus on the students who achieved a grade 3 or are allocated to a ‘grade 3’ class by the college and will therefore most likely initially resit their GCSE in November. These could be described as the ‘almost attaining’ students, who could at various times in their

schooling have been described as both ‘attaining’ and ‘low attaining’. This choice of student is feasible because the college organises these students into different classes (called the delta classes) to students who achieved a grade 2 or below (called the Echo, and Foxtrot classes). It is possible that students within the ‘delta’ classes of the teacher will not volunteer to participate, in which case the Echo, and Fox (grade 2 or 1) classes will be approached. The revised project has been co created with the teacher and therefore the Delta class will be used as per their request.

I will use the natural rhythm of education, that is starts and ends of terms, where possible to enter and exit the research as a way of managing relationships with teachers and student, this is a natural time for adults to enter or leave educational contexts.

My access to the online platform, including student work and assessment results, and involvement in the target setting meeting, will be negotiated with the college, teacher and student participants. The information sheet, consent form, and student presentation will be used to make it transparent to student participants that their work uploaded to the digit platform, assessment results, and observed actions will be discussed. Previous relationship building during the pilot study and positive response to the findings will aid with this for the teacher and the college, and the student/teacher relationship will be a gatekeeper to the student/researcher relationship (see issues of power relations below). I will sign a non-disclosure agreement if required by the college.

### **Power and participant relations**

A copy of the final report will be made available to the teachers’ participant on request; however, this will be adapted for student participants as some responses may not be appropriate to share with this audience. It is important to protect the relationship between teachers and student, which will be ongoing after the study has finished. The college gatekeepers will not have access to any raw data from interviews or observed activities, but a final report will be created for their use internally, for example in governors’ meetings etc. This will be made explicit on their own information sheet and consent form.

The student participants may think that they must take part in the study as they are in a sense a captive audience (Coercion). All participants will be made aware of their right to decline to be involved as well as to withdraw consent at any time on the information sheet and the online classroom presentation.

The relationship between student participants and researcher will be online, either asynchronously or via Teams, and this could affect the relationship building process. The project has been co-created with the teacher and therefore my role as researcher will be given credence by the teacher. In addition, I will hold a student presentation and Q and A session via Teams to introduce myself and the project. The presence of the teacher could be an issue in influencing the responses of the students during the asynchronous image-based task and synchronous online discussion during the target setting meetings. This is unavoidable as the teacher is the gatekeeper to the students, however this will be taken into account when analysing the narrative data. This is a co-created project with narrative data being available to the teacher, however this will be highlighted on the student information sheet and presentation. Regarding the researcher involvement in the target setting meeting via Teams, it will be important to ‘announce’ my presence, and that I am recording, making sure that I am visible to the student via the teacher laptop to ensure there is not element of ‘convert’ listening.

The only caveat is if any safeguarding issues arise where the college guidelines will be adhered to. This information will be provided in the staff and student presentations and on the information sheet.

### **Information given to the participants**

There will be three versions of the information/consent sheet:

- Gate keepers
- Termly cycle phase teacher
- Termly cycle phase students

### **Right to withdraw and informed consent**

The presentations, information sheet and consent form will state that involvement is voluntary and that they have the right to withdraw. This will also be reiterated before all the 1-1 interviews.

The students are post-16 and therefore consent is not required from their parents.

### **Complaints procedure**

Supervisors' contact details will be provided on information sheets

### **Safety and well-being of participants and researcher**

The topic of 'low attainment' is potentially a sensitive topic for students, as could recalling memories of past learning experiences. Before the initial and final image-based tasks students will be reminded of sources of support that are available at the college.

In addition, as previously mentioned, the term 'low attainment' will be replaced by 'resit students' in ALL information sheets, consent forms and in discussions with teachers.

As I have a role in mathematics education, I hold a current DBS certificate which I will present to the college for inspection. All online discussions within the termly cycle will take place with the teacher present, and the initial and final image-based interview task will be carried out asynchronously via the college's digital platform. All uploads to the digital platform will be visible to the teacher as co-creator of the study. Access to the digital platform outside of the teacher discussions will not be key to this project but may be negotiated with the college if the teacher participant considers this necessary due to their own workload issues. A 'read only' access will be requested so as not to inadvertently corrupted any college data.

It will be important that I continuously 'check' myself, reflecting on my actions and this will be part of the ongoing ethical decisions to be made in the field with the support of my supervisor.

### **Anonymity/confidentiality**

All participants and the college will be given pseudonyms and the DfE characteristic that led to the choice of context will not be discussed in any write up.

However, with regard to anonymity within the college, this will be more difficult to maintain when balanced with safety issues around interviewing as well as my visible role in the classroom. The presentations and information sheets will inform the participants of this issue and further discussion will be encouraged. Non traceability to an individual participant is possible for the student participants, however this is not the case for the class-based teacher and will need to be discussed fully and consent given.

With regard to confidentiality, all data will be confidential, except for the student participants where the data will be shared with the teacher. Students will be informed of this on the information sheet. They will be reminded of their right to withdraw at this point.

All participants will be informed that confidentiality will not be maintained if any safeguarding issue becomes apparent during interviews, observed activities or at any other time. In this case, the college guidelines will be strictly adhered to.

Although I can control my own action, I am not able to guarantee the actions of others.

### **Data collection**

There will be a range of data collection methods:

- 1) Student asynchronous image based/narrative task at the beginning and end of the study uploaded onto digital platform
- 2) Reflections from teacher participant regarding the consented student participants and the project, via Teams or email, both at the beginning and end of the study
- 3) Researchers own reflexive diary

Termly cycle of:

- 4) Synchronous teacher discussions recorded via Teams software stimulated by work uploaded on to the digital platform and teacher's teaching and learning observations
- 5) Copies of student work highlighted during the above discussions
- 6) Synchronous researcher involvement virtually, recorded via Teams, during teacher/student face to face target setting meetings, stimulated by previous teacher and student /teacher meetings
- 7) Asynchronous student member checking and reflection via digital platform
- 8) Asynchronous teacher dissemination discussions and reflection on reassessment results via email

All artefacts will be checked for any information that could identify the participant or college and redacted where necessary.

The data including any interesting artefacts highlighted (such as classwork and assessment results) will be - recorded via Teams software and the narrative transcribed verbatim later, so that full attention can be given to the participant.

The reflective diary will only be updated outside of the lesson time to avoid a sense of the teacher and the student being ‘observed’. Due to the ethnographical nature of this case study, it will not be possible to state in advance what might be of interest in the lesson and this should be clearly discussed in the teacher and student presentations, as well as the information sheet.

### **Data analysis**

The Listening Guide will be used to analyse the narrative data produced, which will be aligned with any teacher observed enactments, from the field notes, as well as any artefacts collected as a response to the narrative. This form of analysis is chosen as it is said to bring the researcher into a relationship with the person behind the data, viewing the data holistically and in this case also visually. At this time, the Listening Guide has not previously been aligned with visual data to create this ‘story book’, and hence this is a test of the validity and the practicality of this methodology. The use of I poems within this process will be used to highlight similarities and differences between the various voices of all participants within the project and consider any different voices that may emerge. The use of a reflexive diary will enable the voice of researcher to be present.

### **Data Storage and protection**

All narrative data, transcripts, and work artifacts that are collected during the Teams recorded discussions will be storage on the university system. Field notebooks will be marked private and held only by myself, with all participants and the college being anonymised.

Consent will be obtained from participants for the anonymised data to be used in further articles and conference sessions.

This data will be protected as per the guidance <http://www.bristol.ac.uk/secretary/data-protection/>

### **Feedback**

All participants will have the opportunity to member check the ‘meaning making’ as priority is given to the participant voice. This dissemination will happen during the project as an ongoing dialogue using the digital platform (students) and email/Teams (teacher)

The benefit for the student is to have the opportunity to give feedback, from their own point of view to the people who influence their education (in this case the college) in order to help them understand the students’ mathematical experiences.

The college will be provided with a final report of the findings of this project that they can use for internal purposes only, for example governors’ meetings etc.

### **Responsibilities to colleagues/academic community**

I will always ensure that I conducted myself to a high standard, respecting the workload and day to day life of the teacher. I will ensure that I discuss any issues or questions that arise during the study with my supervisor, I will use my supervisor meetings as ethical check ins during the study.

The college is currently involved in a DfE initiative which engages with other partners including a University. It will be imperative that this research does not impact the work being undertaken. Permission will be sought from and negotiated with the partnership University, and any other relevant organisation to run this project alongside. The observed activities and interviews will be, as far as practical, planned at such a time as to avoid any activities from this initiative. Staff will be informed in the presentation and information sheet that any activities that relate to this initiative take precedence over this pilot study.

This study will not take a deficient perspective on the teaching and learning of mathematics, and the actors (students, teachers, college) therein. This study is to investigate but not make a judgement on the context of low attainment in mathematics.

### **Reporting the research**

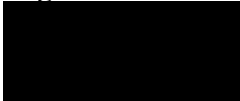
The finding of this study will be used in the final thesis for my PhD

Articles regarding the findings may be submitted for publication and used in a conference setting.

The data will be stored in an anonymised form and consent will be obtained from participants for the above use of their data.

If you feel you need to discuss any issue further, or to highlight difficulties, please contact the GSoE's ethics co-ordinators who will suggest possible ways forward.

Signed Discussant



5<sup>th</sup> March 2020

Signed Researcher



5<sup>th</sup> March 2020

## Notification of Amendments(s) to Faculty Research Ethics Committee (FREC) reviewed studies

This template **should** be used to notify the Faculty Research Ethics Committee (FREC) Chair of proposed amendments to a study which has already received a favourable ethical opinion.

### Instructions for using this template

- This template should be completed by the CI and optionally authorised by the supervisor for student applications.
- This form should be submitted to the [Research Governance and Ethics Officer](#) who will facilitate a review with the FREC chair in the first instance.
- All revised supporting documentation with the changes (including version number and dates) highlighted should be provided for review with this document.

### 1. Study Information

Full title of study:	What are the enactments of identity in the context of low prior attainment in mathematics?
Online Ethics Tool Unique Project ID:	102142
Amendment Notification number:	
Amendment Notification date:	
<b>Details of Chief Investigator:</b>	
Name [first name and surname]	Rachel Helme
Contact telephone number:	██████████
Email address:	████████████████████
<b>Details of Supervisor (Student Project Only):</b>	
Name:	Alf Coles
Contact email address:	████████████████████

## 2. Summary of amendment(s)

This template be used to notify the Faculty Research Ethics Committee Chair (FREC) of amendments to a study which has already received a favourable ethical opinion.

No.	Brief description of amendment <i>(please enter each separate amendment in a new row)</i>	List relevant supporting document(s), including version numbers <i>(please ensure all referenced supporting documents are submitted with this form)</i>	
		Document	Version
1	<b>Remove</b> face to face classroom involvement and observation and <b>replace</b> with discussing student work with the teacher via the field site's own digital platform. This will be recorded using Teams.	Amended ethics form Student, teacher (v2.0) and gate keeper participants information	2.1
2	<b>Remove</b> 1-1 interviews with students and <b>replace</b> with asynchronous initial image-based task and final reflection task via field site's digital platform	Amended ethics form Student participants information	2.1
3	<b>Remove</b> 1-1 interviews with teacher and <b>replace</b> with synchronous and asynchronous reflections via teams and email	Amended ethics form Teacher participants information	2.1 2.0
4	<b>Remove</b> informal narrative collected during face-to-face lessons and <b>replace</b> with virtual involvement, via Teams, of students termly target setting and review meetings and asynchronous student reflections, via field site's digital platform, of emerging stories	Amended ethics form Student participants information	2.1
5	<b>Remove</b> voice recording and photographing work and <b>replace</b> with video recording via Teams including any artefacts highlighted during conversations stimulated from the field site's digital platform (for example student work or assessments)	Amended ethics form Gatekeepers' participation sheet	2.1
6			

[Add further rows as required]



## Investigating mathematical identity in maths resit classrooms.

### College information sheet

**PLEASE NOTE: This project will not involve any teachers and students working on the Centre of Excellence project to avoid any cross contamination.**

#### What is this study?

I am investigating the mathematical identities and experiences of both teaching and learning maths in the context of students who did not achieve a grade 4 or higher in their GCSE. These students are described by the DfE as 'low attaining'. Mathematical identity is the way someone talks, acts and the ideas they have about themselves in relation to maths as well as how others see them, and I am interested in hearing stories about learning experiences and the 'act' of teaching and learning maths from their point of view.

This data will help both the college and others interested in maths education begin to understand resitting maths from the point of view of those involved.

#### What will happen?

This jointly created study will take place between December 2020 and July 2021 and focuses on one teacher and students in their Delta class. This project involves the researcher working remotely alongside the teacher to view students work (including assessment results) that are uploaded onto the OneNote platform in Teams and to hear the student's stories as part of the target setting and review meetings.

There are a number of different ways that data will be collected:

- 1) Student asynchronous image-based task at the start of the study
- 2) Student asynchronous reflections on the stories that emerge, both during and at the end of the study
- 3) Teacher reflections regarding the student participants and the project at the start of the study, via Teams
- 4) Teachers' reflections on the stories that emerge, both during and at the end of the study, via Teams or email
- 5) A termly cycle of:

Both synchronous (via Teams) and asynchronous (via email) reviews of students work, assessment results and teacher's observations, recorded using Teams or email

Involvement virtually in the student target setting and review meeting, recorded via Teams

Artifacts that are highlighted during discussions using [the digital platform] including for example student work, video recorded via Teams

It is anticipated that this cycle will be repeated three times.

All data including synchronous videos, artefacts, transcriptions and asynchronous reflections will be stored securely on the University of Bristol servers.

In an agreed timescale after the end of the project, I will provide you with a final anonymised report for you to use **internally** in the college. I will also share the anonymised findings with others both within, and beyond the University of Bristol, for example through academic journals and conferences, in order to help a wider audience understand the experiences of resitting maths.

### **Your rights and consent**

The college does not have to take part in this project, the process is entirely voluntary, and you can withdraw from it at any point without explanation. In the final report and any writing that may follow, all participants and the college will be given a pseudonym so that they are anonymous. **However, it is important to realise that within the college itself anonymity is more difficult to maintain**

In line with data protection and GDPR, this research adheres to the university guidelines found here: <http://www.bristol.ac.uk/secretary/data-protection/>

### **Questions?**

If you have any further question or complaints, just ask me or you can email:

[REDACTED]

Here is my supervisor's email address

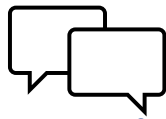
[REDACTED]

### **Consent**

1. I have had an opportunity to read the information sheet and understand the planned study.
2. I recognise that the data provided within this study will be confidential, except for safeguarding issues where the guidelines provided by the college will be adhered to.
3. I understand the final anonymised report provided will be for internal use only.

Signed

Name



## Your maths stories project

### Investigating mathematical identity in maths resit classrooms.

#### Teacher Participant Information Sheet

##### What is this study?

I am investigating the mathematical identities and experiences of both teaching and learning maths in the context of students who did not achieve a grade 4 or higher in their GCSE. Mathematical identity is the way someone talks, acts and the ideas they have about themselves in relation to maths as well as how others see them.

I am interested in hearing stories about your past and present experiences as a teacher as well as the stories told by students in your classrooms. I am also interested in the 'act' of both teaching and learning maths both from your point of view and from that of your students.

These stories and experiences will help those interested in maths education begin to understand resitting maths from the point of view of both you and your students.

##### What will happen?

The project will take place from December 2020 to June 2021. At the start of the project, I will ask for your reflections of the student participants and the project. At the end of the study, I will ask you will look again at what has been produced as well as reflect on the findings that have emerged during the project.

In addition, the following will happen every new term:

- 1) Using the information uploaded on to the OneNote platform, we will discuss via Teams the work the student participants have completed including the results of any initial assessments as well as anything interesting that you have observed in lessons.
- 2) Using Teams, I will attend virtually both the target setting and review meetings that you have with your students to ask about and hear their stories.
- 3) We will discuss the results of the re-assessment at the end of the term.
- 4) I will share with you the stories that I see emerging for you to reflect and comment on if you wish to.

Conversations will be recorded using Teams and via email discussions and stored safely using password protected files on the University of Bristol site. This includes any classwork

and assessment results that are highlighted during conversations. I anticipate this process repeating for three terms.

All videos and conversations will be recorded using Teams and stored safely using password protected files on the University of Bristol servers. This includes any classwork and assessment results that are highlighted during conversations.

## Your rights and consent

You do not have to take part in this project, the process is entirely voluntary, and you can withdraw from it at any point without explanation. When your experiences are shared, all participants and the college will be given a pseudonym so that you are anonymous.

**However, it is important to realise that others within the college itself may see that you are involved in the project and therefore will know your contribution to the findings.**

In line with data protection and GDPR, this research adheres to the university guidelines found here: <http://www.bristol.ac.uk/secretary/data-protection/>

## Questions?

If you have any further question or complaints, just ask me in person or you can email:

████████████████████

Here is my supervisor's email address:

████████████████████

## CONSENT FORM

### Investigating mathematical identity in maths resit classrooms. (TEACHER)

Please answer the following questions by circling the response that applies:

13. I confirm that I have read information sheet and have had details of the study explained to me  
**Yes/No**

14. My questions about the study have been answered to my satisfaction and I understand that I may ask further questions at any point  
**Yes/No**

15. I understand that I can change my mind at any time, without giving my reason  
**Yes/No**

16. I understand about any issues with anonymity and confidentiality within the college as discussed in the information sheet  
**Yes/No**

17. I wish to participate in the study as described in the information sheet  
**Yes/No**

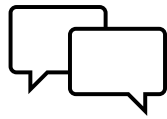
Name \_\_\_\_\_

Signature \_\_\_\_\_

Date \_\_/\_\_/\_\_\_\_

Researcher Name \_\_\_\_\_

Researcher Signature \_\_\_\_\_



## Your maths stories project

### Mathematical identity: Investigating the experiences of learning maths

#### Student Participant Information

##### What is this study?

I am interested in stories about the mathematical identities and experiences of students who did not achieve a grade 4 or higher in their maths GCSE in year 11. Mathematical identity is *the way someone talks, acts and the ideas they have about themselves in relation to maths, as well as how others see them.*

I am interested in hearing your stories about learning maths as well as what it is like to do maths in a lesson. I want to hear this in order to help myself and others, both inside and outside the college, to understand what it is like to learn maths for your point of view. I will also be talking to your teacher to get their point of view as well.

##### What will happen?

The project will take place from December 2020 to June 2021. At the **start** of the project, I will ask you to complete an image-based task that represents the experiences you have had learning maths. At the **end** of the project, I will ask you will look again at what you produced as well as reflect on what you have said during the project.

##### **In addition, the following will happen every new term:**

- 1) Using Teams, I will attend virtually both the target setting and review meetings that you have with your teacher to ask about and hear your stories about learning maths.
- 2) Your teacher and I will discuss the information uploaded onto the OneNote platform in Teams including the work you have completed, the results of any initial assessments as well as anything interesting that they have observed in lessons. At the end of each term, your teacher and I will discuss the results of your re-assessment.
- 3) I will share with you via email the stories that I see emerging for you to reflect and comment on if you wish to.

**I anticipate this process repeating for three terms.**

##### **Other important information**

All videos and conversations will be recorded using Teams and stored safely using password protected files on the University of Bristol servers. This includes any classwork and assessment results that are highlighted during conversations.

**AS THIS IS A JOINT PROJECT, IT IS IMPORTANT THAT YOU KNOW THAT ALL THIS INFORMATION WILL BE SHARED WITH YOUR CLASSROOM TEACHER.**

### **Your rights and consent**

You do not have to take part in this project, the process is entirely voluntary, and you can change your mind at any point without giving a reason.

When your experiences are shared with others inside and outside of the college, all students, teachers and the college will be given pseudonyms so that you are anonymous. **However, it is important to realise that others in the college itself may see that you are involved in the project.**

In line with data protection and GDPR, this research adheres to the university guidelines found here: <http://www.bristol.ac.uk/secretary/data-protection/>

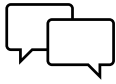
### **Questions?**

If you have any further question or complaints, just ask me in person or you can email:

████████████████████

Here is my supervisor's email address

████████████████████



## YOUR MATHS STORIES PROJECT CONSENT FORM

### Mathematical identity: Investigating the experiences of learning maths (STUDENT)

Please answer the following questions by circling the response that applies:

19. I confirm that I have read information sheet and have had details of the study explained to me  
**Yes/No**

20. I understand that I can change my mind at any time, without giving my reason  
**Yes/No**

21. I understand about any issues with anonymity and confidentiality within the college as discussed in the information sheet  
**Yes/No**

22. I understand that my classwork including assessment results uploaded onto the OneNote platform in Teams will be viewed by the researcher and the data collected will be shared with my teacher during the project  
**Yes/No**

23. I wish to participate in the study as described in the information sheet  
**Yes/No**

24. I consent to my data being used anonymously for:

- A final report to the college
- Assignments for the University of Bristol
- Published articles in magazines and journals
- Discussion at conferences

**Yes/No**

Name \_\_\_\_\_

Signature \_\_\_\_\_

Date \_\_/\_\_/\_\_\_\_

Researcher Name \_\_\_\_\_

Researcher Signature \_\_\_\_\_



Ethic approval

From: **Research Governance and Ethics Officer** [REDACTED] >

Date: Thursday, March 12, 2020

Subject: Ethics Online Tool: application signed off

To: [REDACTED]

Your online ethics application for your research project "What are the enactments of mathematical identity in the context of low prior attainment in mathematics? " has been granted ethical approval. Please ensure that any additional required approvals are in place before you undertake data collection, for example NHS R&D Trust approval, Research Governance Registration or Site Approval.

For your reference, details of your online ethics application can be found online here:

<http://www.bristol.ac.uk/red/ethics-online-tool/applications/102142>

The amendments did not require separate approval, please see email chain below.

Hi Rachel

I see that you have requested amendment approval.

If you are proposing to move f2f data collection online (i.e., from f2f interviews to interviews over teams) there is no need to submit a request.

If you are proposing to make a substantive change to your project, any changes will need to be submitted to the RED system and approved by Alf in the usual way. I'd only need the changes included in the uploaded documents. Anything that remains the same will be in your original submission. I'd just need the original application number referenced in the comment section of your new application.

Alf would be best placed on whether proposed changes are considered substantive, but I think things like moving from interviews to questionnaires, changing sampling frame etc need re-approval.

Hope this helps  
Amanda

Thank you Amanda.

The changes are essentially moves from f2f to online (as detailed in the form). So, if we have understood correctly, this does not need an official amendment. Rachel has updated the information and participation sheets to reflect the changes and I have checked over each of these.

So, just to double check, she can include all the updated information in the thesis, but can continue with data collection on the basis of the existing ethics approval – have we got that right?

With thanks again

Alf

That is correct Alf, this is a minor change so no need for an amendment.

Thanks  
Amanda

## Appendix C - the creative rubric for pronoun poems

### Final rubric

#### Creative rubric

##### **Step 1: Prepare the data**

- Remove the researcher's own voice if present in the transcript but keep responses in separate paragraphs to retain rhythm
- For transcribed data, remove any punctuation or capitalisation that may have appeared in transcription, except in reference to elisions
- For written data, retain punctuation, spellings and word choice of the author
- Change all proper names used for the protagonist to the pronoun used in the dialogue
- Identify and underline sections of narrative that use the first-person pronoun (I poem) or third person pronoun and name (they poem)
- Exclude word strings where the speaker uses pronouns for another context, e.g., telling stories about someone else using the same pronoun as the protagonist

##### **Step 2: Create the long phrase form**

- Extract longer word strings that seem to have meaning and arrange in list order
- Convert all words in the poem to lower case, including when using written data
- Highlight the pronoun-verb phrase (you may include additional words at this stage)

##### **Step 3: Identify the pronoun-verb phrases, retain or remove**

- For each highlighted example, identify the pronoun and main verb
- Retain or remove additional words using the general and idiosyncratic guidance
- Record any new decisions to the idiosyncratic guide, if applicable
- Extract the pronoun-verb-additional words phrase and arrange in order

##### **Step 4: Create the final aligned form**

- Make a line-by-line comparison with the long phrase form to ensure no change of meaning has been created or could be implied
- Create three columns, parsing sections of each line by aligning the pronoun

## General guidance

General guidance		
	Issue	Action
1	<p><b>Auxiliary verbs</b></p> <p>Auxiliary verbs include, for example, be; have; will; do; and should. Coexisting with a main verb and sometimes called a helping verb; makes reference to past, present, and future. Can be directly negated by “not”.</p>	<p>Retain alongside the main verb when used as auxiliary.</p> <p>Retain “not” if used separately to negate a verb or auxiliary, for example, “I am” and “I am not”</p> <p>NOTE: the verbs “have” and “be” are main verbs in their own right and can be negated.</p>
2	<p><b>Elisions</b></p> <p>In linguistics, an elision or deletion is broadly defined as <b>the omission of one or more sounds (such as a vowel, a consonant or a whole syllable) in a word or phrase.</b></p> <p>For example, “don’t” instead of “do not”</p>	<p>Retain as the speaker uses them; refer back to original recording if necessary.</p>
3	<p><b>Verbal particles</b></p> <p>Small words that go together with verbs to create a verbal phrase, for example, shut “up”.</p>	<p>Retain as verbal phrase.</p>
4	<p><b>Adverb</b></p> <p><b>Adverbial phrase</b></p> <p>A word or phrase that modifies or qualifies an adjective, verb, or other adverb or a word group, expressing a relation of place, time, circumstance, manner, cause, degree, etc. (often ends in <i>-ly</i>), for example, quickly; firmly; lightly; and noisily.</p>	<p>Retain where it is modifying the verb and is positioned between the pronoun and verb or directly before the pronoun.</p> <p>This will retain the pronoun verb phrase.</p>
5	<p><b>Conjunctions</b> before pronoun.</p> <p>Conjunctions include, for example, once; when; if; and but. A word used to connect clauses or sentences or to coordinate words in the same clause.</p>	<p>Retain if the removal of this word would change the meaning of the word string.</p> <p>It may be appropriate to remove the conjunction “and”.</p>
6	<p><b>Multiple examples</b></p> <p>More than one example in a string of words, for example, she was convinced she was right.</p>	<p>Place on separate, subsequent lines with the additional words to retain meaning. The TWO lines read together should have the meaning of the original single line.</p>

## Idiosyncratic guidance

Idiosyncratic guidance		
	Issue	Action
7	<p><u>Speaker</u></p> <p><b>Repeated phrases</b></p> <p>The speaker repeats a word or phrase <u>exactly</u> in succession, similar to a stutter.</p>	<p>The repeated phrase is only used once; refer to original recording if necessary.</p> <p>Where the speaker used a similar phrase, both are retained, including:</p> <ul style="list-style-type: none"> <li>• where an additional word is added</li> <li>• elisions in the repeat</li> </ul>
8	<p><u>Speaker</u></p> <p><b>Truncations</b></p> <p>The speaker does not seem to complete a word string in their speech.</p>	<p>Use the phrase in the same way as the speaker. This will not be an omission in the poem, although it may look like one.</p>
9	<p><u>Speaker</u></p> <p><b>Recounting spoken and thought elements without using the verbs say or think</b></p> <p>Indications by the speaker that they are stating what they said or thought by quoting, for example “I’d be like she can do this work now”.</p>	<p>The phrase and the start of the stated speech with speech marks is used to avoid any confusion with the word like meaning having the same characteristics as.</p>
10	<p><u>Study</u></p> <p><b>Additional words to retain meaning</b></p> <p>Additional words before and after the verb phrase that do not appear in the general rubric that relate to and convey an alternative meaning to the pronoun-verb phrase.</p>	<p>If the removal of the additional words changes the meaning or sense of the original word string, then they should be retained.</p> <p>This should be acknowledged as a subjective decision by the listener.</p>
11	<p><u>Speaker/writer</u></p> <p><b>Other voices before the pronoun</b></p> <p>References to the narrator’s own voice in a word string in addition to that of the protagonist, suggesting an opinion or perception, for example, “I <u>just wasn’t sure</u> how much she knew”.</p>	<p>The removal of the other voice in the word string has the potential to change the meaning from opinion to fact.</p> <p>The decision whether to include is subject to the purpose of the analysis. For this study, the interplay between positioning and being positioned is important and therefore the additional voices are retained.</p>
12	<p><u>Writer</u></p> <p><b>Incorrect word or spelling used</b></p> <p>The writer seems to have chosen the incorrect word for the context or has used an incorrect spelling.</p>	<p>Retain the word in the same way as written to avoid subjective changes.</p>

## Notes from early iterations of the rubric and guidance

### Creating a poem

Step 1: Identify sections of dialogue that use the 1<sup>st</sup> person pronoun (I poem) or the third person pronoun (they poem).

Step 2: Extract longer word strings that seem to have meaning to create the 1st iteration.

Step 3: If applicable, change all names to the pronoun used in the rest of the dialogue.

Step 4: Retain and remove process, phase 1. Reduce the statements applying the general and idiosyncratic guidance to create the second iteration.

Step 5: Retain and removal process, phase 2. Make a line-by-line comparison of the 1<sup>st</sup> iteration and 2<sup>nd</sup> iteration to ensure no change of meaning is implied or created.

### Extract from Attempt #2 - creating the teacher's chapter 1 they poem

For those verbs that make reference to other actions, states, behaviours etc both the verb and that which is referenced will be included.

For example, "she would disrupt the take up time" becomes "she would disrupt" rather than just "she would". The verb "would", as the past tense of "will", makes reference in definition to expressing behaviours/facts about capacities and abilities. The verb phrase has meaning with BOTH "would" and "disrupt".

Other verbs:

BE (is/am/was): having the **state**, quality, identity, nature, role, etc., specified

HAVE\* (has/had): perform the **action** indicated by the noun specified (used especially in spoken English as an alternative to a more specific verb)

WILL (would): expressing habitual **behaviour**; expressing facts about ability or capacity.

DO\*\* (does/doesn't): perform (an **action**, the precise nature of which is often unspecified); **act** or **behave** in a specified way; achieve or complete; used to give emphasis to a positive verb.

Where the speaker uses the above verbs but does not specify a state, action etc the statement will be written as is, and as such there may be some poetic lines that are written as 'she is'. This is not an omission. **Hanging phrase?**

\*In reference to the verb HAVE, where this is used as a possession (she has a copy of) rather than an action (she has interrupted), only the phrase 'she has' is retained.

\*\*In reference to the verb DO, where this is used as a performed action (all she has to do) rather than referencing to another positive/negative verb (she does/doesn't understand) then only the phrase 'she does' is retained.

## Appendix D – pronoun poems (I poems and they poems)

### Phase 1

#### [Ava's](#) I poem

College I find really interesting	1
I prefer	2
I came here	3
I find	4
I don't think so	5
I already know some things	6
but I forgot them	7
I was ok	8
I think about it	9
I think differently	<b>10</b>
I don't know	11
I am thinking	12
I am thinking	13
I am trying	14
I was struggling	15
I tried	16
When I use it, I got some of them wrong	17
I am ok with those	18
I did do	19
I always leave my book	<b>20</b>
So, when I have time at home	21
I am looking at it	22
I don't know	23
When I first come here	24
I find it really fun	25
I am not sure I am going to pass	26
I try	27
I came last year	28
I started	29
I did really well	<b>30</b>
I got	31
I was	32
I did not revise back then	33
I wasn't confident	34
I thought I want to have this year to be confident in everything	35
I thought there is no point to start and learn things that I haven't learnt	36

[Betty's](#) I poem

I am just trying to get through college	1
I might rep or something	2
I hate it	3
I absolutely hate it	4
I have the attention span of a carrot	5
I can't	6
I think it was like better at school	7
I think Mike was the only decent teacher	8
I had	9
I had loads of different teachers	<b>10</b>
I was put ... I don't know why	11
I had to drop	12
I literally just got into the exam	13
I went into foundation again	14
I was 7 marks off	15
I was 34 again	16
as soon as I leave the classroom it just leaves	17
I forget	18
I can't remember	19
I can't remember what I had	<b>20</b>
I don't but pretend I do	21
I prefer Mike over who I had last year	22
I just want to fall asleep	23
I could	24
I could literally	25
I can't concentrate	26
I would rather	27
I just can't concentrate	28
I could compare	29
I timesed [sic]	<b>30</b>
I don't mind either they are alright	31
I can't sit	32
I can't	33
Or I will start just chatting	34
I didn't even know they were handed out	35
I put green	36
I just want to be in bed than be here	37
I would rather	38
I prefer my other lessons	39
Yea I would do it every now and again	<b>40</b>



## Christine's I poem

I don't like it hate it	1
but I don't enjoy it	2
I chose it	3
nothing else I really wanted	4
I wanted to do	5
was it worse in school	6
I don't know	7
I don't have any motivation	8
I obviously went	9
because I wanted	<b>10</b>
I don't {sigh} I don't know	11
I have failed four times	12
I literally can't be assed	13
I need to get maths	14
but I just can't be bothered	15
I failed	16
I just like {pause} I can't be bothered	17
I just	18
I can't concentrate	19
I have gotten worse	<b>20</b>
I don't have	21
I only have	22
I don't mind	23
I like	24
I had	25
I prefer	26
I don't know if I am allowed to say	27
I do prefer	28
I get in the morning	29
I'll {pause} it will be	<b>30</b>
I will be	31
I will be	32
I just can't concentrate	33
I would rather	34
I understood	35
I just	36
I wrote	37
I can't remember	38
I did	34
I just saw	<b>40</b>
I don't know	41
I just did that	42
I don't know why	43
I think	44
I can't remember how I was taught	45
I think I was always taught	46
that is what I did	47
I prefer those	48
I just felt	<b>49</b>
to be fair I did not really try	50
I got to	51
I just can't be bothered	52
I think I wrote	53
I can't be bothered	54

I will start going on my phone	55
I will start scribbling	56
I put green	47
red because I didn't try it	48
I think I did more	49
I am just	<b>60</b>
I don't like maths	61
it wasn't frustrating because I didn't understand	62
I knew how	63
I am fine with my other lessons	64
I would probably attend	65
I wouldn't come	66
I know it is important	67
I know I need	68
but I just don't have any motivation	69
If I fail this one we have just done I will actually start revising	<b>70</b>
I need	71
before I leave	72
I decided to go uni	73
when I was in maths	74
I didn't know what I wanted	75

## Darren's I poem

(Stanza 1)	
I done	1
then I did	2
so I went on	3
but I did not do	4
I left it until	5
I could have got better	6
I am trying	7
whatever I can get	8
I want	9
but I am not just	<b>10</b>
(Stanza 2)	
I hated it	11
I wasn't that good	12
I didn't really try	13
I probably prefer it now	14
I just feel like I can	15
I just couldn't	16
I think	17
I knew	18
now I feel	19
I don't know I matured	<b>20</b>
(Stanza 3)	
in the exams I don't	21
in class I am good	22
in exams I am not	23
I don't know I prefer	24
I can just see	25
I can just do	26
I can see	27
I have to write it all down	28
I get confused	29
I prefer	<b>30</b>
I don't really	31
if I was to	32
I would	33
I can	34
I think I do well	35
I can like see how well I am doing	36
I feel like all my knowledge goes out the window	37
I don't know...	38
I can double check	34
I have got	<b>40</b>
I have to	41
I will be	42
I will be	43
I need to do more	44
I have to	45
I start questioning	46
I will leave it	47
I will see	48
I know but I don't know fully	<b>49</b>
I will leave it	50
I get to	51

if I have got it wrong	52
I can correct myself	53
I think	54
I can like look	55
I can see	56
I have done	57
I don't know	58
(Stanza 4)	
I need I think	59
I just need to	<b>60</b>
I don't really revise	61
I have got to	62
I have got	63
(Stanzas 5)	
I get loads	64
I have got	65
I got to	66
I have got to	67
(Stanza 6)	
I do it in my head	68
I know how to	69
if I have to explain	<b>70</b>
I know how I am	71
I just leave it	72
I know how to	73
I need to	74
I need to	75
I know how I am doing it	76
if I have to	77
I can't really explain	78
I knew	79
I just leave it	<b>80</b>
I know how I got	81
(Stanza 7)	
so I just	82
I think	83
I think I need to	84
if I get into the habit	85
I will	86
I just need to	87
I just to	88
I will get into the habit	89

[Mike's](#) they poem about Darren

(Stanza 1)	
He is in	1
He is	2
He told me	3
He knows he has	4
He wants this year	5
(Stanza 2)	
He is not building my ego	6
The one he is	7
He is someone who I think	8
(Stanza 3)	
He can see	9
He has decided	<b>10</b>
(Stanza 3, sub poem)	
Some people will	11
They have	12
They are	13
They drop off	14
They might be	15
They might drop off	16
They reached	17
When they come	18
They feel more inclined	19
The best they can	<b>20</b>
Some people cope	21
Some people don't	22
They are not	23
They will come back	24
They think they are	25
They have all	26
They have got all	27
They will come back	28
Some people will never	29
Some people haven't	<b>30</b>
They might	31
They might	32
(Stanza 3, continued)	
He has now realised	33
He is	34
He has got	35
He is doing	36
He wants	37
He now understands	38
He had to do	34
He had to do	<b>40</b>
He has	41
He had	42
(Stanza 4)	43
When he came in	
He thought	44
He is now	45
He is doing	46
He is turning up	47
He is turning up	48

(Stanza 5)	
He was 'I can...'	49
He went 'well I will...'	<b>50</b>
He is like 'well why should I...'	51
(Stanza 6)	
He smokes	52
I think he smokes	53
He is	54
He likes	55
(Stanza 7)	
He said	56
He kind of looked at me	57
He is	58
He will	59
He doesn't realise	<b>60</b>
He has taught me	61

## Phase 2

### Claire's I poems

#### *Cycle 1: I poem<sub>c1</sub>*

	i	have chosen	1.1
	i	had to go to achieve	1.2
as	i	struggled	1.3
how	i	felt about	1.4
that	i	am in	1.5
	i	am finally understanding	1.6
like	i	couldn't understand	1.7
as	i	kept trying	1.8
	i	felt like	1.9
	i	could finally answer	<b>1.10</b>
	i	didn't get much help	1.11
therefore	i	struggled	1.12
	i	asked	1.13
	i	wouldn't get	1.14
that	i	had to face	1.15
now	i	get	1.16
in a way	i	understand	1.17
	i	benefit more	1.18
which	i	understand	1.19
	i	keep trying	<b>1.20</b>
	i	also used to struggle	1.21
that	i	struggle with	1.22
what	i	am struggling at	1.23
the way that	i	learn	1.24
when	i	have to understand	1.25
	i	find	1.26
	i	wouldn't know how	1.27
that's when	i	need	1.28
	i	also work	1.29

*Cycle 2: I poem<sub>c2</sub>*

	i apologise	2.1
that	i haven't been	2.2
	i see	2.3
	i do still seem to be	2.4
that	i notice	2.5
	i still struggle	2.6
so that	i will need to	2.7
	i can progress	2.8
that	i also see	2.9
	i am	<b>2.10</b>
that	i personally think	2.11
that	i am approving	2.12
that	i am pushing	2.13
	i need to get	2.14
that	i personally think	2.15
	i have been	2.16
	i used	2.17
	i have become	2.18
	i have been doing	2.19
that	i 'm really thankful	<b>2.20</b>
if	i could have	2.21
	i need to	2.22
what	i was very pleased	2.23
	i got in	2.24
	i worked really hard	2.25



*Cycle 3: I poem<sub>c3</sub>*

than what	i	said	3.1
	that	i can now see	3.2
	that	i can take now	3.3
		i couldn't	3.4
		i have	3.5
		i had	3.6
		i had	3.7
which	i	found	3.8
now	i	have	3.9
		i can do	<b>3.10</b>
		i can access	3.11
		i 'm much more confident	3.12
		i see it as	3.13
		i had	3.14
where	i	am now	3.15
		i 'm actually finding	3.16
when	i	was really stuck	3.17
		i said to	3.18
		i 'm meeting	3.19
		i have come through	<b>3.20</b>
further than	i	expected	3.21
		i am	3.22
when	i	was	3.23
		i have	3.24
		i 'm	3.25
		i 'm hoping	3.26
		i can feel	3.27
		i can actually	3.28
what	i	have to do	3.29

## [Mike's](#) they poems about Claire

### *Cycle 1: they poem<sub>c1</sub>*

#### Emails and introduction

	she is	1.1
	she 's a bit off	1.2
normally if	she doesn't understand	1.3
	she 'll say	1.4
when	she does then get it	1.5
	she 's interrupted	1.6
	she 's kinda pushed it	1.7
	she 's like "i can do..."	1.8
	she is building in confidence	1.9
	she 's also getting	<b>1.10</b>
i don't believe	she was	1.11
	she came out as	1.12
	she was always wanting	1.13
i just wasn't sure about how much	she knew	1.14
	she 's really strong	1.15
	she 's quite confident	1.16
the bits that	she struggles with	1.17
i thought does	she know	1.18
what the school of said	she knows	1.19
	she 'd be	<b>1.20</b>
i don't think	she was	1.21
	she would disrupt	1.22
slowly	she started	1.23
once	she started	1.24
i knew that if	she didn't understand	1.25
	she would	1.26
	she 'd be	1.27
	she 'd say	1.28
	she was convinced	1.29
	she was right	<b>1.30</b>
	she knows	1.31
	she doesn't understand	1.32
all	she has to do	1.33
what parts	she doesn't understand	1.34
what parts	she doesn't understand	1.35
of how	she can then work it out	1.36
	she was	1.37
i think	she was	1.38
	she now has	1.39

	she 's written	<b>1.40</b>
	she put	1.42
	she said	1.43
	she 's put	1.44
i know that	she 's got	1.45
	she knows	1.46
but	she 's confused	1.47
	she hasn't got a	1.48
	she wasn't as confident	1.49
as what	she 's showing	<b>1.50</b>
the way that	she 's represented	1.51
	she 's just represented	1.52
that	she 's lost	1.53
	she should of	1.54
	she didn't get	1.55
	she 's the only one	1.56
why	she think	1.57
that what	she was doing	1.58
why	she	1.59
why	she 's done	<b>1.60</b>
	she fell over	1.61
	she wants to be	1.62
	she would ultimately need	1.63
	she 's on	1.64
	she 's got	1.65
	she 's written down	1.66
	she 's put	1.67
then	she 's putting	1.68
	she 's written	1.69
that	she 's answered	<b>1.70</b>
	she 's answered	1.71
	she 's having a go	1.72
	she just needs to	1.73
	she is	1.74
	she put	1.75
that	she 's put in	1.76
how	she 's identified	1.77
	she has been	1.78
but	she 's referring to	1.79
that	she said	<b>1.80</b>
	she really struggled	1.81
	she 's enjoyed	1.82
i am hoping	she 's referring to	1.83
how	she learns	1.84
	she 's	1.85
where	she 's confident	1.86

	she 's	1.87
	she is	1.88
	she 's got	1.89
	she 's more likely to	<b>1.90</b>
	she 's misinterpreted	1.91
	she scored	1.92
what	she was doing	1.93
	she 's misread	1.94
	she hasn't misread	1.95
	she 's read	1.96
	she 's getting	1.97
	she	1.98
	she 's got	1.99
	she 's expanded	<b>1.100</b>
i see what	she 's done	1.101
	she 's divided	1.102
	she 's nailed that	1.103
	she 's managed to	1.104
what's	she	1.105
	she 's used	1.106
	she 's applied	1.107
	she 's	1.108
what	she 's done there	1.109
	she 's done	<b>1.110</b>
	she 's got	1.111
	she 's	1.112
	she 's managed to	1.113
	she had a go	1.114
	she 's given	1.115
	she 's worked out	1.116
	she put	1.117
	she 's referenced	1.118
so	she 's got	1.119
but	she 's had a go	<b>1.120</b>
	she 's just has	1.121
	she 's had a stab	1.122
	she	1.123
	she 's	1.124
i thought	she would have	1.125

	she 's got	1.126
	she 's got	1.127
	she may have misinterpreted	1.128
	she written	1.129
what	she should have	<b>1.130</b>
	she got	1.131
i think	she got	1.132
	she so happy	1.133
	she 's gone around	1.134
	she got	1.135
	she managed	1.136
	she 's also managed	1.137
	she 's looking	1.138
	she would do	1.139
what	she 's expected to do	<b>1.140</b>
	she 's written	1.141
	she 's got	1.142
	she 's	1.143
the bit that	she struggled with	1.144
when	she subtracted	1.145
	she forgotten	1.146
	she 's ended up with	1.147
how did	she not get	1.148
	she 's done	1.149
then	she 's done	<b>1.150</b>
so	she 's done	1.151
then	she 's done	1.152
	she 's got	1.153
	she 's put	1.154
	she put	1.155
	she 's included	1.156
	she done	1.157
	she 's done	1.158
again	she 's missed	1.159
	she 's confident	<b>1.160</b>
	she 's got	1.161
what	she 's missed	1.162
i think	she 's been	1.163
	she 's dropped	1.164
	she got	1.165
	she loves that	1.166
	she loves drawing	1.167
	she 's getting	1.168
	she 's drawing	1.169
	she 's got	<b>1.170</b>
	she 's drawn	1.171
	she drawn	1.172

	she 's gone for	1.173
so	she doesn't understand	1.174
	she 's got	1.175
	she 's gone through	1.176
oh wow	she has answered	1.177
	she 's got it right	1.178
if	she was	1.179
	she 's made	<b>1.180</b>
	she 's made	1.181
	she said	1.182
	she has then done	1.183
	she 's been identified	1.184
	she 's done	1.185
	she 's got	1.186

	she got	1.187
again	she got that	1.188
	she got	1.189
	she could work out	<b>1.190</b>
	she 's not able to explain	1.191
	she 's got	1.192
but	she 's	1.193
but then	she 's not worked out	1.194
then	she 's got	1.195
that because	she 's seeing	1.196
is where	she 's going for	1.197
	she is really good	1.198
how	she got that	1.199
oh	she 's worked out	<b>1.200</b>
no	she	1.201
	she 's got	1.202
	she 's done	1.203
ones that	she knows	1.204
then	she 's assumed	1.205
so	she 's	1.206
so	she got	1.207
	she 's just drawn	1.208
	she got	1.209
i can see	she has done	<b>1.210</b>
of how	she worked that out	1.211
	she	1.212
	she 's converted	1.213
so	she can't extrapolate	1.214
yes	she 's nailed that	1.215
	she got	1.216
	she knows	1.217
	she then knew	1.218
	she scaled up	1.219
that's lovely what	she ' done	<b>1.220</b>
i think	she struggled	1.221
i think	she struggled	1.222
	she 's just put	1.223
	she knows	1.224
	she knows	1.225
	she 's got that confused	1.226
but	she 's put	1.227
then	she 's added	1.228
recognised that	she needs	1.229

	she 's got that far	<b>1.230</b>
where	she got	1.2321
	she could have	1.232
	she 's just picked	1.233
	she can't draw	1.234
	she 's got	1.235
what	she got	1.236
	she 's got	1.237
	she got	1.238
	she 's then left at	1.239
	she 's put	<b>1.240</b>
where	she 's strong	1.241
	she 's strong apart from	1.242
what	she 's done is	1.243
	she 's divided	1.244
then	she subtracted	1.245
even though	she	1.246
	she 's divided	1.247
	she 's got	1.248
	she 's then	1.249
that	she 's done	<b>1.250</b>
that's where	she 's gone wrong	1.251
	she 's got	1.251
then	she 's got	1.252
	she	1.253
	she 's done	1.254
that's where	she 's made	1.255
	she 's just gone	1.256
	she crossed out	1.257
	she started to struggle again	1.258
cos	she said	1.259
	she overcomplicated that	<b>1.260</b>
but	she 's had a go	1.261
	she has got	1.262
but	she 's had a go	1.263
	she 's done alright overall	1.264



Final section

	she 's got	1.265
	she 's	1.266
	she is	1.267
that	she can correct	1.268
	she 's pretty much heading	1.269
	she 's	<b>1.270</b>
	she always put	1.271
	she	1.272
when	she does	1.273
if	she 's not sure	1.274
	she will question	1.275
	she 's also getting	1.276
	she 's getting	1.277
	she 's	1.278
	she	1.279
	she 's	<b>1.280</b>
	she always tries	1.281
	she 's	1.282
	she 's	1.283
	she 's	1.284
how	she 's evolved	1.285
	she now is going to be	1.286
	she conducts	1.287
	she definitely has	1.288
	she 's coming	1.289
where	she get	<b>1.290</b>
	she 's	1.291
	she 's come	1.292
	she 's really really timid	1.293
	she was not allowing	1.294
	she had to be	1.295
i think	she	1.296
but	she	1.297
	she	1.298
	she can do	1.299
	she can do	<b>1.300</b>
that	she does need to develop	1.301
that	she will use	1.302
that	she wanted to do	1.303
	she subsequently gone in	1.304
	she 's done	1.305
	she 's done	1.306
	she 's done	1.307
	she set	1.308
what	she thinks	1.309
	she needs to do	<b>1.310</b>
	she 's done	1.311
that	she 's going for	1.312

that	she 's had	1.313
whether	she 's done	1.314
whether	she 's done	1.315
that	she said	1.316
	she was going to do	1.317
	she said	1.318
	she 's gonna go in	1.319
	she 's done	<b>1.320</b>
	she 's had to	1.321
what else did	she say	1.322
	she was going to	1.323
	she also said	1.324
	she 's gonna look	1.325
	she 's done	1.326
	she 's watched	1.327
	she 's also watched	1.328
when	she set	1.329
but	she 's also gone in	<b>1.330</b>
	she 's looked at	1.331
	she 's had a go	1.332
	she did	1.333
	she had a first look	1.334
	she had another look	1.335
	she 's having	1.336
that	she 's still going in	1.337
	she 's kind of paying attention	1.338
that	she 's been	1.339
that	she 's put in	<b>1.340</b>
that	she 's got	1.341
that	she 's doing	1.342
	she 's got no	1.343
	she 's ok	1.344
i think	she can't	1.345
	she can't comprehend	1.346
	she 's gone straight in	1.347
	she is	1.348
but	she is not	1.349
	she 's one	<b>1.350</b>

Cycle 2: they poem<sub>c2</sub>

Emails and Introduction

	she has retained	2.1
	she has been ever present	2.2
if	she has mentioned	2.3
	she refers to	2.4
	she has	2.5
the progress	she is making	2.6
when	she looked at	2.7
	she 's come out as	2.8
where	she is	2.9
i don't think	she was quite there	<b>2.10</b>
see where	she is	2.11
but	she was	2.12
which	she hasn't finished yet	2.13
how much effort	she 's put into	2.14
	she 's still working	2.15
	she 's got about	2.16
which	she 's cracked on with	2.17
i thought	she could have done	2.18

	she needed to work on	2.19
which	she 's done	<b>2.20</b>
	she had got wrong	2.21
	she got these	2.22
	she put	2.23
	she put	2.24
i don't think	she fully understand	2.25
	she was like "oh right ok..."	2.26
	she went "yeah that's like ..."	2.27
so	she 's making	2.28
	she is	2.29
	she 's still	<b>2.30</b>
	she came in	2.31
	she had	2.32
	she had	2.33
	she had	2.34
	she was	2.35
	she absolutely loving	2.36
	she 's	2.37
i don't know	she told you	2.38
	she 's really really happy	2.39
i say	she 's thriving	<b>2.40</b>
i think	she 's going to be	2.41
that possibly	she was	2.42
but	she 's taken to	2.43
hard work that	she 's putting in	2.44
	she 's focused	2.45
	she knows	2.46
	she wants	2.47
	she knows	2.48
	she doesn't conform	2.49
i don't think	she	<b>2.50</b>
	she doesn't conform	2.51
	she 's just really focused	2.52
	she is	2.53
i think that	she would be	2.54
that actually	she was	2.55
	she 'd come in	2.56
	she was concerned	2.57
	she 's "oh yeah you can't ..."	2.58
	she said	2.59
	she went "yeah but ..."	<b>2.60</b>
	she went "yes i suppose..."	2.61
	she 's	2.62
	she 's doing	2.63
i don't think	she 's quite	2.64

	that she 's got	2.65
	she is	2.66
	she 's	2.67
my belief that	she would cope	2.68
	that she worked towards	2.69
like i said	she knows	<b>2.70</b>
what	she needs to do	2.71
	she 's got	2.72
where	she is there	2.73
how	she 's done	2.74
	she was absolutely adamant	2.75
then	she said	2.76
	she said	2.77
so	she got	2.78
	she thought	2.79
	she wasn't getting	<b>2.80</b>
you know what	she done	2.81
	she got	2.82
	she got	2.83
	she got	2.84
but	she didn't	2.85
	she went back to	2.86
so where	she 's got	2.87
	she 'll get	2.88
again	she 's picked on	2.89
because	she picked	<b>2.90</b>
so that's why	she got	2.91
	she got	2.92
	she 's not	2.93
	she 's not looking at	2.94
if	she 'd written	2.95
	she got	2.96
	she 's building up	2.97
that	she can do it	2.98
	she did	2.99
that	she couldn't get	<b>2.100</b>
	she can get	2.101
so	she got	2.102
	she misunderstood	2.103
	she should have	2.104
	she 's	2.105
what	she should have been	2.106
	she 's not quite understood	2.107
	she 's not understanding	2.108
i'm surprised	she didn't get	2.109
	she 's kind of looking up	<b>2.110</b>
but	she will see	2.111
then	she 'll get it	2.112
again	she 's struggling	2.113
with what	she 's done overall	2.114
	she was happy to explain	2.115

	she 'll kick herself	2.116
	she 'll probably kick herself	2.117
	she 's assumed	2.118
	she can do that	2.119
i'm just thinking	she didn't look at	<b>2.120</b>
	she 's just gone	2.121
	she 's assumed	2.122
	she know	2.123
	she lost	2.124
again	she 'll kick herself	2.125
	she 's got	2.126
	she got	2.127
	she did	2.128
	she 's now starting to write it	2.129
	she picks up	<b>2.130</b>
	she thinks	2.131
	she has to do	2.132
where	she pulled	2.133
	she fell apart	2.134
	she 's done	2.135
then	she didn't	2.136
that	she thought	2.137
where	she went	2.138
	she had to go	2.139
	she 's like	<b>2.140</b>
so	she knew	2.141
	she knew	2.142
	she 's added	2.143
then	she stopped	2.144
	she didn't then work out	2.145
	she got so far	2.146
	she 's really really confident	2.147
i don't think	she 's read	2.148
	she done	2.149
this time	she has got	<b>2.150</b>

	she still got	2.151
	she 's already	2.152
when	she answered	2.153
why has	she done	2.154
	she 's got	2.155
	she 's made	2.156
my overall impression of how	she 's doing	2.157
so	she still has	2.158
so	she 's been given	2.159
	she 's confident	<b>2.160</b>
	she should not get	2.161
that	she 's got it	2.162
what	she 's thinking	2.163
	she	2.164
	she 's not got	2.165
how	she gets on	2.166
	she 's got nothing	2.167
i'm surprised that	she didn't know	2.168
i am glad that	she recognises	2.169
where	she got that	<b>2.170</b>
	she would have recognised	2.171
	she knew	2.172
	she knew	2.173
but	she wasn't as strong	2.174
	she 's like "oh yeah..."	2.175
	she could see	2.176
	she wanted to have a go	2.177
	she 's not got	2.178
i don't know how	she got	2.179
how	she 's got	<b>2.180</b>
	she 's missed	2.181
so	she 's missed	2.182
	she 's missed	2.183
	she 's not related to	2.184
	she 's also missed	2.185
	she 's got	2.186
	she 's wrong	2.187
that is where	she falls down	2.188
	she struggles	2.189
	she 's got	<b>2.190</b>
	she hasn't got	2.191
	she 's just done	2.192
	she 's just looked at	2.193
had	she looked	2.194

	then	she would have got	2.195
		she 's missing	2.196
		she 's misunderstood	2.197
	because	she 's used	2.198
	where	she get	2.199
		she recognises	<b>2.200</b>
		she could have show	2.201
	can	she	2.202
	not quite sure how	she got	2.203
		she 's probably going to go	2.204
	what	she 's done	2.205
		she 's multiplied	2.206
	then	she multiplied	2.207
		she 's taking	2.208
		she reckons there	2.209
		she 's a little bit away	<b>2.210</b>
		she had a go	2.211
	i's rather	she had a go	2.212
	look what	she 's done	2.213
		she 's overcomplicated	2.214
		she	2.215
		she 's quite way out	2.216
		she talked about	2.217
	how much	she loved	2.218
	perhaps	she 'd been over graded	2.219
		she backed it up	<b>2.220</b>
		she has a good go	2.221
	initially	she should have got	2.222
	shouldn't	she	2.223
		she squared	2.224
		she Still got time	2.225
		she will	2.226
		she 's that studious	2.227
		she will go back	2.228
	last time	she attempted	2.229
		she will now look	<b>2.230</b>
		she will make	2.231
		she then tidy it up	2.232



Cycle 3: they poem<sub>c3</sub>

Discussion after Claire's interview

	she is	3.1
isn't	she	3.2
	she 's	3.3
	she 's confident	3.4
	she knows	3.5
i say	she knows	3.6
	she 's	3.7
	she 's been on	3.8
	she 's very shrewd	3.9
	she knows	3.10
when	she 's seen	3.11
	she 's got	3.12
	she 's really really pleased	3.13
	she says	3.14
	she self-actualised	3.15
the pictures	she 's used	3.16
how	she felt	3.17
that	she said	3.18
	she come up	3.19
	she said	3.20
i don't know whether	she said	3.21
or whether	she reflected	3.22
	she 's really really reflective	3.23
that's how	she was thinking	3.24
	she 's	3.25
i thought	she was	3.26
where	she was going	3.27
	she just	3.28
	she just flew	3.29
	she was showing	3.30
what	she could do	3.31
	she still has	3.32
	she gets	3.33
	she just crumbles	3.34
	she 's got	3.35
	she 's at	3.36
	she didn't know	3.37
	she knows	3.38
where	she 's on	3.39
but	she hasn't decided	3.40

whether	she	wants to take	3.41
	she	's now believing	3.42
whereas	she	didn't before	3.43
	she		3.44
	she	was very very vocal	3.45
	she	didn't like	3.46
	she	didn't get on	3.47
	she	's in	3.48
i say	she	's been for me	3.49
	she	's been	3.50
	she	is quite good	3.51
	she	has	3.52
	she	's been	3.53
	she	's been	3.54
	she	's tried	3.55
where	she	's come in	3.56
when	she	's made	3.57
	she	's reflected	3.58
i think	she	doesn't give herself	3.59
i think	she	believes	3.60
	she	's had	3.61
	she	can put it	3.62
	she	's made	3.63
like i say	she	couldn't connect	3.64

## Appendix E - examples of data

In this appendix, I present examples of the data collected over both phases. Full data is available on request, within ethical considerations.

### Examples of data from phase 1

#### Interview protocol (students)

##### **Interview protocol (student)**

1. Tell about your time at college,
  - When did you start studying here?
  - What are you studying at the moment and why did you choose this?
  - Can you tell me about a particular lesson/incident that you remember? Why is this memorable?
  
2. Think of your past experiences of learning maths.
  - What can you remember about learning maths at school/last year?
  - Can you tell me about 1 or 2 lessons/incidents that you can particularly remember? Why were these memorable?
  - So, what three words would you use to describe learning maths?
  - Tell me why you have chosen .... (Discuss each word)
  
3. Let's talk about maths at college, could you tell me about today's lesson.  
I noticed you.....do this, said this, acted like this. Discuss my observations (?) and ask for clarification.  
(this is a photo elicitation opportunity, pre or post, either bring photos that demonstrate my observations or take photos that highlight elements of the discussion)

##### **What will we talk about?**

I want to understand from your point of view so:

- I will ask about your time at college and what you are studying
  
- Past experiences: I will ask you to talk about your past experiences of learning maths
  
- Today's experiences: I will ask about the lesson and how you learnt maths, I may ask about some things that I have noticed from other lessons

## A student's lesson artifacts

Below are some examples of lesson artifacts, photographs of work, collected, in this case, during my observations of Darren.

Percentages Skills Check

- How would you find 5%? How would you find 25%?  
Find 10% half is 5%      Find 50% half is 25%
- What is 15% of 200? 30  
10% = 20  
5% = 10
- Increase 450 by 20%  
540
- Decrease £50 by 32% 34  
10% = 5  
30% = 15
- Find 140% of 80kg 112
- A phone shop increases the price of an iPhone from £800 to £960, by what % has the price increased  
 $800 - 960 = 160$       20%

Confidence Review	Initial	End of Lesson Confidence Review—what changed?	Exit
Percentage of amount	A		A G
Percentage increase/decrease	C		A G

Darren describes to the researcher:

- 1) Found 10% and then divided by 2, found 50% and then divided by 2
- 2) Find 10% and 5% (no elaboration for 15%)
- 3) Find 10% and double and add it on
- 4) Find 10% and 1% so 30% and 2% add 30% and 2% and take away
- 5) Find 50% and then 10%, 50% - 10% = 40% and then add it on
- 6) The difference is £160, 10% is £80 so it is 20%

Comment from Mike, "yes but that is not the recognised route".

Discuss and write down how you could calculate the given percentages of a quantity:

- 50%      ÷ 2
- 25%      ÷ 2, ÷ 2
- 10%      ÷ 10
- 5%      ÷ 10, ÷ 2
- 20%      ÷ 10, × 2
- 1%      ÷ 100

Student own version (before RED input)

50% half is  
25% Find 50% then half is  
10% divide by 10  
5% Find 10% then half is  
20% Find 10% then double it  
1% Find 10% then divide by 10

THE METHOD builds up

## A student's interview transcript

Below is an example of an interview transcript, in this case, from Ava's interview. The interview was audio recorded and transcribed by hand. In the transcript, my questions are in red, with Ava's answers in black.

### Ava's Transcribed interview (20/11/19)

Me: So, tell me about college?

Ava: College I find really interesting erm because it more like [sic] oh we are doing things we are practicing, it is not only theory I prefer my course [inaudible] English and maths that [sic] because they are trying to help us and develop what you already have, the skill you already have but they are also trying to teach us like things that help us not only in maths class but in the future as well

Me: What are you doing at college?

Ava: Cookery

Me: And you are enjoying that, that is practical isn't it. Now think about maths but not this year. If you had to describe it in three words, your experiences of learning maths, what words would you use?

Ava: {thinking} so think about

Sometimes hard

Enjoyable

Something good for the future

Me: So, tell me about 'hard' why did you chose that word?

Ava: Because there is a lot to learn and sometimes there is not enough time and erm so in the past in Romania [sic] only an hour of maths, an hour a day and we had two days a week [inaudible] we did not do maths so much and when I came here it was more it was four hours sometimes goes up to four hours and I find it is more it helps me a lot more because [sic]

Me: Is that because there is more time, so in Romania there is two hours is that in school? there is only two hours or in college, yes so that is twice a week in school and you have to get all of that learning in those time

Ava: And we have classes of thirty so [sic]

Me: So big class less time so it is difficult because you haven't got the time to practice, is that what you are thinking?

Ava: Yes

Me: Enjoyable, why enjoyable?

Ava: Err because you learn a lot of things and the maths teachers from here [sic] made really enjoyable, we don't get bored there is so much to do at the same time they're trying to make it fun.

Me: And good for the future, tell me about that?

Ava: Erm we [sic] because we don't only focus on the things, we do GCSE exams we focus on things like coins money and all that can help us [inaudible]

Me: Is there anything else you wanted to add to this?

Ava: No, I don't think so

Me: So, thank you, so today lesson how did you get on in today's lesson

Ava: Erm I already know some of things, but I forgot them and

Me: Would you mind if we looked at your book?

[opens book]

Me: Can you remember what you did? what was easier and what was ...not more difficult is not the word I am looking for how far did you get what were you ok with?

Ava: Em, I was ok with everything but when I think about it, I think differently

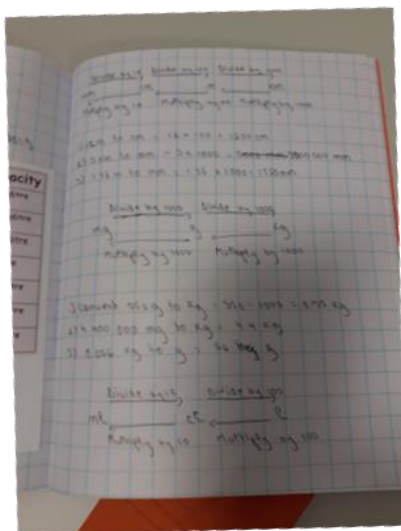
Yes I don't know it is just [sic] so for example when I am thinking about kilometres I am thinking about one thousand like one thousand metres and I am trying to convert it like that, and now it is quite hard to convert it on that [sic]

Me: So, you have your own way of thinking about it and you are trying to match the way you have been told

Ava: Yes, and so that why I was struggling

Me: And so, do you, when you did the calculations do you think you used your own method, your own thinking

Ava: No, I tried to use this one [see photo]



Me: You tried to use this

Ava: As so when I use it, I get some of them wrong

Me: And do you think that was because you were trying to fit it with this rather than the way you already know

Ava: yes

Me: Oh that is interesting that I interesting., so we did ...the measurements first length mass capacity and the time calculation where you ok with those?

Ava: Yes, I am ok with those it just the ermm the rounding that I did do on the hardest one

Me: It did not say to round so we did know to round, so do you mind me asking, I noticed you taking some photos, why do you take photos because I thought that was interesting

Ava: Yes, because I always leave my book in here so when I have time at home, I am looking on in it [sic]

Me: So, you use that for revision as well, have you don't this for all of your work in maths?

Ava: Most of it, yes

Me: Ok so can I ask you then, you talked about the teacher here made the lessons more enjoyable, can you tell me a little bit more about that, just your own opinions?

Ava: I don't know, they are just trying so [sic] when I first came here erm it was something with [sic] like they trying [sic] to put celebrities into maths and like to calculate how hot they are with temperature and that was fun, I find it really fun and I [sic].

Me: So, it is just, it is not just practicing sums, there is all of these extra things that you are practicing and you quite like that

So, do you find it useful for cookery the stuff you do in maths or is it not really connected?

Ava: It is connected because with the recipes we have to times them most of the time, so it is easier for me to do that

Me: Ok gives you a bit more confidence would you say is that what it is how do you think...did you do the resit, did you do the exam how do you think how do you think you got on?

Ava: It went alright erm I am not sure I am going to pass it I try in the middle [sic]

Me: You are not sure, have you so when did you sorry when did you come from here to Romania, have you already done a GCSE is the question I am asking?

Ava: Yes, because I came last year, and I started from entry level 2 and so I really well [sic] so they put me on GCSE maths exam in summer and then yes, I got a grade 3.

Me: I bet you were really pleased with that weren't you

Ava: I was

Me: You should be

Ava: I did not revise back then because I wasn't confident enough in the [inaudible] so I thought I want to have this year to be confident with everything because I thought there is no point to start and learn thing [sic] that I haven't learnt.

[Final conversations. Anything else]

[Photograph of 'method' work in the book etc]

## Primary record observation field notes

Below is an example of my field notes, including my own thoughts shown in red. I used codes to identify participants as follows (pseudonyms):

- TEACH 1: Mike
- T1S3: Ava
- T3S1: Betty
- T3S2: Christine
- T4S2: Darren

### **Primary record, activity descriptions/notes (20/11/19)**

Today's planned topic: Metric conversations, speed distance time, standard form

TEACH 1 shared resources and lesson ideas with me before the lesson, shows me photos and real objects that he had taken that have measures on the packaging, for use in the lesson.

In addition, TEACH 1 presented me with copies of the resit foundation paper to take home (unsolicited)

Time	
9:00	Students began to arrive and complete the starter activity, TEACH 1 said that this was created to measure prior knowledge, some revision of past (unrelated) facts and a form of RAG rating for the beginning and end of the lesson (see starter 201119)  TEACH 1 shows me the sheets from previous lessons, and describes how he is going to collect them, retrospectivity (1 lesson behind)
9:15	TL introduction and review/discussion of the start activity
9:25	TL activity, new learning 'prefixes'
9:35	Students glued prefix meanings in book (e.g., Milli => thousandth of a measure etc)
9:40	<ul style="list-style-type: none"> <li>• TL Discussion of conversion for length</li> <li>• Copy into book</li> <li>• 3 QQ in book then discussion</li> <li>• Repeat for Mass and capacity (presented separately)</li> </ul>
10:00	White board activity: mixed length, mass, capacity questions (assessment?)
10:05	Students work on questions on the sheet (see My copy in student T1S3 record)  There was evidence in the classroom of students struggling with multiplying and dividing by powers of 10, see 'incident' below)
10:30	BREAK BEGINS
	TEACH 1 shares with me the decision to not go on to SDT calculations and standard form as 'this [previous work] took longer than I thought'
10:50	BREAK ENDS
10:52	TL activity for time conversations, calculators given for changing minutes to a decimal (by using a fraction denominator 60, then using 'minutes divided by 60 = decimal')



	Students copy example into book
11:00	Students have choice of red, amber or green set of questions on the board and are told to choose their own starting point, complete in their books
11:10	TEACH 1 shows the answers on the board (already on power-point) and students mark (some answers are rounded and therefore are the students correct if they did not round?)
11:15	Students log on to surface pro and find the link to the 15-question progress check provided by the teacher. The topics are general and not necessarily related to this topic. TEACH 1 stated that this will be done regularly to review progress (TEACH 1 shows me the students results as they come in and the excel spread sheet that fed from the Microsoft form that has the progress check on).
11:35	Student T1S3 completes the progress check and we leave the room to begin her interview <b>[Important: see diary for reflection of this process]</b>
11:55	Returned to the room, the rest of the class has moved to maths watch TEACH 1 shares with me his data on completion and stated that they have not been doing their homework, he show me the data for this class and another class and compares the completion rate, we discuss that even the students he would describe a 'good' have not completed homework, I wonder out loud if there is an access problem. TEACH 1 continues to share with me the 'live' data as the students work on this homework in class.
12:10	Class is told to tidy up, then reminded to complete the RAG on the start sheet recording what they have learnt. Student T3S2 was reminded (publicly for the whole class) of an example of something new they mentioned in the lesson, as an example of what to write.
12:12	Class dismissed TEACH 1 and I put away up the resources used

**Note to self: Take more photos to help with descriptions**

#### Incident between student T3S2 and TEACH 1

The student seemed to be having issues with dividing and multiplying by powers of 10 during the whiteboard session especially when using decimal measures- eventually stating after some attempts 'is this wrong as well?'. Afterwards declared to the teacher 'this is boring!' but TEACH 1 answered with 'but sometimes things are challenging'. I noted that TEACH 1 did not address the comment directly and literally with his answer. I wondered if this was because he believed that the student was deflecting her frustration and lack of confidence and in a post lesson discussion TEACH 1 confirmed this.

**(BE CAREFUL!! Confirmation bias, in future ask TEACH 1 'why' rather than say 'do you think this').**

I also noted regarding the above incident that this was the first time that I had seen T3S2 had been rude in the manner of speech to TEACH 1.

T3S2 and T3S1 late to lesson, indicted by TEACH 1 (this was unusual compared to other observed lessons) In addition TEACH 1 also noted the presence of a 'new' student that in his opinion seemed to be trying to distract the student, although I noted this, I also saw that T3S2 seemed to be trying to continue working

#### My positioning in the room

The resources were shared with me before the lesson so I 'knew what we are doing'  
TEACH 1 in discussion regarding the meaning a 'similarity' in maths after demonstrating with A4 and A5 paper as for my opinion on how to explain it, in front of the students, in addition late asked about the pronunciation of 'deca' compared to 'dec' in front of students. These both happened during a TL whole class session.

TEACH 1 during the break but with some students present in the room began to ask my opinion on possible timing and duration of lesson for differing students, currently delta (aiming for grade 4) get 3 hours per week and echo and foxtrot) aiming for a grade 3 and 2) get 1 ½ hours per week. We discussed the financial constraints of this, and 1 student became involved in the discussion.

Noted

Student do not have tutor time before maths, it is their first lesson and that maybe why they arrive in drib and drabs.

All resources (calculators, white boards etc) were given out and put away by teacher

Starter activity (20/11/19).

**Number: Converting Measurements, Standard Form**

3

Today's Facts

1. What units of measure do you see in everyday life
2. Give an example of length
3. Give an example of capacity
4. Give an example of mass
5. Why do we use Standard Form

Converting Measurements & Standard Form Skills Check

1. Which is more, 750 ml or 0.75l
2. Which is more 75ml or 75 cl
3. Which is greater, 2500m or 25KM
4. Which is heavier, mg or g
5. Are the following in Standard Form?  
 $3.1 \times 10^1$   
 $65.3 \times 10^1$

Random Facts Test

1. What is the hypotenuse?
2. What does it mean if two shapes are similar?
3. What is the opposite of squaring a number?
4. What is a prime number?

Confidence Review	Initial	End of Lesson Confidence Review—what changed	Exit
Converting Measurements	R	A	G
Standard Form	R	A	G

3 key things I learnt today:

- 1.
- 2.
- 3.

Areas I still need to work on:

## Interview protocol (teacher)

### **Interview protocol (teacher)**

Tell me about your personal history as a teacher.

- How long?
- Where? College/secondary/adult/mixed
- What influenced your choices?
- Why are you now working at this college?

Thinking about previous years, Tell me about your experiences of teaching low attaining students.

- What 'level' of class have you previous taught?
- What can you tell me about the students?
- What can you tell me about the students as learners of maths?

Thinking back, are there any students that stand out in your memory? How would you describe them?

- Why these in particular?
- How did they act/talk generally?
- What can you remember about them as maths learners?

Adrian: Thinking about this current academic year, what can you tell me about the students in your classes?

- Refer to email

Focusing on Delta class, can you describe one or two students in your class?

- Why these in particular?
- How do they act/talk generally?
- How do they act/talk as maths learners?

Mike: Thinking about [the student who consented], how would you describe them?

- How do they act/talk?
- How do they act/talk as maths learners?

## An extract of the teacher's interview transcript

Below is an extract of data, taken from part way through the interview. The interview audio recorded and transcribed by hand. My questions are in red, with Mike's responses in black.

### **Mike's transcribed interview (06/11/19)**

Mike: Darren is in his third year bearing in mind that all these learners in this class I have got them for the first time because it is my first year of teaching [at the college] so I am seeing people in their 1<sup>st</sup> year at the college, 2<sup>nd</sup> year and 3<sup>rd</sup> year now initially erm the obvious thing to do is speak to Darren's previous teachers and find out what he is like, and I spoke to both his previous teachers and the kind of the [sic] overall impression I have got is that Darren is lazy and doesn't want to listen which couldn't be further from the truth on my initial impressions of six weeks of Darren. He has told me that he knows he has messed around the last couple of years, but this year wants to be the year that he passes his GCSE. Erm you know he is not [sic] he is not building my ego and saying you're better than the other teachers are I think it is because I am the teacher with him here and now that I am going to be the one that he is most loyal to and I think whoever taught him last year will be the same [inaudible...Mike takes a phone call!] so Darren is somebody who I think has got the ability but saying that I think everybody in the class that I have seen on a week to week basis has the ability, but Darren more so because he can see the reason behind it now erm it might just be that this is the year that that he has decided that learning is right for him

**Me: The reason behind maths or the reason behind passing maths?**

Mike: I think the reason behind passing maths erm you know I'm one of these people that [sic], some people will come to you at secondary [sic] I am going to flip between all the different levels of school again now, some people what come to you in year 7 and they have scored spectacular in their SATs in year 6 and everyone is in awe of them they are really brainy at maths and all that stuff and you see them drop off as they go through [sic]. Now they drop off because they might be overconfident, they might drop of because they reached their peak in year 6 you don't know, there are lots and lots of different reasons. And that's to say that there is so much kind of emphasise on these kinds of staged exams, SATs at year 6, GCSEs at year 11 and then subsequently when they come to the college, that there is an awful lot of pressure put onto the learners. Because that pressure is put on at year 6 they feel more inclined to want to perform and do the best they can which is [sic] and that is a nice thing to do, some people cope with that some people don't and the ones that don't, don't score as well, but that does mean that they are not able to learn, sometimes year 6 is the wrong time for them to learn, year 11 is the wrong time to assess them and sometimes you will find that even at college it is the wrong time and they will come back when they think they are ready to learn. They have all the immaturities out of the way they have got all their anxieties out of the way and they will come back as an adult learner at 21 or at 30, 40, 50 whatever it is, some people will never feel the right time for them to learn, some people haven't had that opportunity given to them at school because they might have been the quiet person, they might have been the really loud person that's the first one sent out every day, you don't know there is lots of things . But I think Darren has now realised that actually [sic] because he is one of the oldest in the class as well he has got himself a job so he is working outside of college but he is also doing something in college that for him is something that he wants to do, which is travel and tourism I think it is.

## Examples of data from phase 2

In contrast to phase 1, in phase 2, as a conscious decision, there were no interview protocols.

### Student's interview tasks

There were two specific interview tasks used with the student participant. One task was at the start of the project, with the task repeated, with slight modifications, at the end. Below is the initial task that was part of cycle 1 of the data collection.

#### Representing your experiences of learning maths

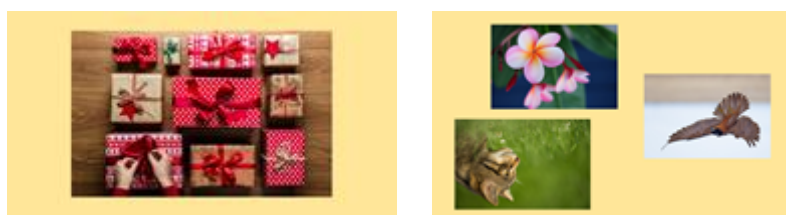
Dear Claire

I would like to invite you to complete the chapter 1 task for the *my maths stories* project, this should take about 15-25 minutes to complete.

This first creative task is to understand your experiences of learning maths up to this point, as well as the ideas you currently have about yourself and maths. **The task is in two parts and it is important that you complete both parts.**

#### Part 1: Finding a picture

I would like you to think carefully about your experiences of learning maths up to this point and then find a **picture or pictures** that **represent your experiences of learning maths**. This can include anything that **you** think is important, including your memories, feelings, and opinions. The picture(s) can be sourced from the internet or something you create yourself. You can use one or more picture, like in these examples:



#### Part 2: Describing the choice of picture

I would like you to make a **voice recording** to explain and help me understand **why** you have chosen this image and **how** it represents your experiences of learning maths. This is because when someone else looks at a picture they do not 'see' in the same way as you do. Remember to talk as naturally as possible and share anything that **you** think is important, including your memories, feelings, and opinions.

The most straight forward way to do this is to use the voice recording function on your mobile phone, which should save as an mp4 file or something equivalent. However, if you are not able to record yourself then you can write down your thoughts instead.

Please reply to this email, with both the **picture** and the **voice recording**, by **Monday 21st December 2020**.

Thank you again for agreeing to take part in this project  
Best wishes

Below is the final task, sent using email, that was part of cycle 3 of the data collection.

Good morning Claire

Please could I ask you to do one final task for me before we meet. For the very first task back in December I asked you to find an image that represented your **past** experiences of learning maths and you sent through and discussed this picture of a maze:

(The copyright owner did not agree for the image to be reproduced, but a similar image can be found in section 9.3, image 9-a)

Please could I ask you to think about how you are feeling **now** about maths, your **present** experiences, feelings and opinions and decide if you would choose a different picture now to represent your present situation, I would be grateful if you could email me this new picture. You do not need to tell me why you have chosen the picture because we can talk about this in our meeting on the 6th of May.

Thank you and best wishes

## Examples of Claire's data

Claire's interview data included mostly email conversations, over all three cycles, as well as one online interview, which was transcribed. Below is an example of the email conversations from cycle 1. My voice is in red, Claire's voice is in black.

Fri 25/12/2020 13:52

Hi Rachel

Sorry I haven't got this to you in time but here is my first activity

Merry Christmas

Claire

(The copyright owner did not agree for the image to be reproduced, but a similar image can be found in section 9.3, image 9-a).

I have chosen this image because for me my path was not straight at all there was mistakes and a very long way I had to go to achieve my grades and it wasn't always easy for me as I struggled to understand maths therefore this image is a perfect example of how I felt about my experience of maths however during the college period that I am in I am finally understanding maths and being able to recognize [sic] and interpret maths. Maths did annoy me at times and it made me feel like I couldn't understand maths but as I kept trying and trying to understand maths it got a lot clearer to me and I felt like I could finally answer questions and be able to get maths it just would of [sic] taken me longer to do so. Finally my opinion of maths is that it is a very difficult subject to get and understand and acknowledge but if you just keep trying and keep persevering you can get through the hurdles of maths and you do very well.

Thu 07/01/2021 15:37

Good afternoon Claire,

I hope everything is going as well as it can this term. Thank you very much for your excellent response to the chapter 1 task for the *my maths stories project*.

I wonder if you won't mind answering a follow up question:

I notice that you talk about two different stories, one past where you talk about struggle and a not straight journey, and a present one where you talk about keeping trying and things became clearer. I wonder if you could talk about what you think changed between the two stories.

Thank you and best wishes

Fri 08/01/2021 09:59

Hi Rachel

For me what changed between these two stories was the fact that at school in the past I didn't get much help therefore I struggled a lot and every time I asked for help and support I wouldn't get it. When my school teacher set the homework he didn't do it on a platform which benefited me and he didn't really explain the work or homework well therefore it was a daily struggle that I had to face. Whereas now I get support and help from my maths teacher and he always explains it in a way which I understand which I benefit more from and secondly he always gives us feedback which I understand and lastly he uses a platform for the class work and home work which is more suitable for me and I keep trying and things do become clearer and I also used to struggle a lot with maths but now there is still some topics that I struggle with but there is the right material for me to get better with what I am struggling at.

Below is an extract of the transcribed interview from cycle 3. The interview took place using video conferencing software, being first auto-captioned by the software, before the transcript was refined by hand. This extract of data is from the start of the interview. All grammar and capitalisation have been removed, with the exception of elisions [see section 8.5.1]. The extract is a conversation, my voice is in red, and Claire's voice is in black.

**Claire's online interview (06/05/21)**

Me: any message to say it was recording

Claire: no

Me: ok it looks like it's recording at my end

Claire: oh there we go

Me: ok perfect so like i said it's fantastic thank you ever so much for agreeing to talk to me and actually thank you for everything you've done doing this project

Claire: that's all right

Me: it has been amazing for me it's been so interesting and today what i'd like to do is just look at those images you know those two images that one you sent me the other day

Claire: yeah

me: and that one you sent right at the beginning and we'll use that just to create a conversation if that's ok

Claire: yeah that's fine.

Me: alright so i'm gonna just share my screen a minute so hopefully you'll be able to see when i share my screen can you see that image that's the image you just sent me recently wasn't it

Claire: all i can see is RH, ah there you go yeah

*(The copyright owner did not agree for the image to be reproduced, but a similar image can be found in section 9.3, image 9-a).*

Me: that's the one you send me with the two paths wasn't it

Claire: yeah

Me: so i know you talked quickly in your email but can you just tell me again why this particular picture represents how you feel at the moment

Claire: well for me at the moment maths is a lot easier than what i said in previous emails

Me: uhm

Claire: and for me it's more that i can see the routes that i can take now with maths well [sic] i couldn't last time

Me: ok lovely so what do these two paths what are they where are they going to anywhere particular

Claire: like career goals

Me: oh nice

Claire: yeah

Me: now that's nice so what do you have two career goals or was it just the idea that the path is leading somewhere



Claire: yeah i have two career goals

Me: oh can you tell me about them

Claire: then a teacher [sic]

Me: oh nice.

Claire: being a teacher assistant.

Me: oh lovely fabulous that's quite exciting isn't it

Claire: yeah

Me: ok so when you first came to college did you have those same plans

Claire: i had the same plans but the paths were bit all over the place

Me: ok tell me a bit more about that

Claire: like because in school i had a teacher who wasn't very good at [sic] well to me he was very good at maths but he was the head of maths and he just used the online tools which i found really difficult to use, but now i have Mike it seems like i can do all the work and that i can access all the online tools

Me: that's really nice isn't it so would you say you're more confident what's the change that happened

Claire: yeah i'm much more confident

Me: perfect lovely thank you so much so i'm going to just show you the second screen can you see both of them now yes ok so when i looked at these images now this was my story that i told myself they look really different so you have talked a little bit about it just a minute ago but how do you when you look at them how do you see those as different images

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Claire: i see it as on right hand side that was like all through school that i had really like mick [sic] mismatch like [sic] math lessons and yeah and on the left is like where i am now and that i'm actually finding it a lot easier to do maths

Me: lovely 'cause on the right it looks a bit lost doesn't it you could get lost there couldn't you in that maze somehow lovely so just just [sic] for a second can you think of any particular time when it felt different so what i'm saying is can you remember a moment where you thought this doesn't feel the same as school anymore

Claire: probably when i was really stuck on something and i i [sic] said to Mike Mike [sic] can you help me and he said to me yeah sure so that helped me and showed me like how do the question and then he ended what what [sic] like module to do on mathswatch

Me: ok so that was an important moment for you then was it that one

Claire: yeah

Me: so when you look at the two images this might seem like a strange question and it's not really is there anything you were surprised about so did anything happen that you didn't think was going to happen this year

Claire: a lot

## Extracts of the teacher's interview data

Below are two extracts of the teacher's interview data, including images of some of the screens shared in cycle 2. The interviews took place using video conferencing software, being first auto-captioned by the software, before being refined by hand. All grammar and capitalisation have been removed, with the exception of elisions [see section 8.5.1]. Both extracts of data are from part way through the interviews. The extracts are conversations, my voice is in red, and the teacher's voice is in black. In the second extract, where the teacher indicates something on the screen using the mouse, these are written in blue.

### **Cycle 1 interview with Mike, 04/02/21**

Mike: and then we've got the likes of claire who bless her is lovely

Me: claire is lovely

Mike: she is yes she's a bit off today though and i'm not quite sure why

Me: it wasn't me i haven't emailed her for weeks

Mike: i don't mean off like that i mean off as in normally if she doesn't understand something she'll say Mike i don't get it you know not not [sic] sure about that and i've done this or when she does then get it should [sic] say oh yeah understand where i've made the mistake now no problems at all i'm going through explanations of erm we are doing straight line graphs so we're looking at gradients we're looking at vertical lines horizontal lines etc i'm halfway through and she's interrupted the chat and said can i get on the work now and i'm like well yeah hang on a minute claire i says you know there's some there's some [sic] bits here about how you find the gradient well i know that that's the number before the the x i says yes but if you're just giving [sic] a line how are you going to find it so so [sic] and that's that's that's [sic] the first time she's kinda pushed it where it's almost like she's like i can do this now i want to move on but instead of having i'd say more manners than anything else because normally she would wait until i finish speaking but it was it was [sic] right in the middle of the of when i was speaking and i saw that the chat thing pop up and when i'm trying to keep an eye on the chat and speak to them it can't happen i stop and now hang on a minute claire you know we still need [sic] there is still a couple of bits that you need to cover and i didn't hear anything from her after that so i have sent a message afterwards and said let [sic] you know hopefully everything is ok but she is building in confidence because she's also getting some one-to-one tuition from within the college as part of this catch up funding

Me: ok yeah

Mike: and i feel really bad because i think i said to you that i don't believe she was a grade three she came out as a strong grade three in the november resit

Me: ok

Mike: but i [sic] but again i put that down to quite possibly very very eager to please more than anything else so you know it's it's [sic] about that erm the behaviour for learning so when you're in a class and you you [sic] expect a learner when you give them the expectations and then after a couple of times it's like ok yeah we're happy that you know the answer now can you let [sic] you know i'm gonna go to this person for the answer or this person for the answer because she was always wanting

to be the first person to speak and we kind of got through that and once that kind of settle down i then started to see what i saw was was [sic] ability that there is ability there i am not disputing that but i just wasn't sure about how much she knew because i haven't gone through the whole content er what i am finding is she's really strong with algebra which is really good erm and she's quite she's quite [sic] confident with geometry as well the bits that she struggles with is ratio which is where this kind of insecurity was coming from and i thought does she know as much as what the school of [sic] said she knows and then [sic] and i now feel [sic] i don't feel bad but i feel like i misjudged her at the beginning i've mistaken her eagerness for er overcompensating for potentially a lack of ability

Me: ok hold on so what you are saying that you [sic]? she was trying to answer a lot in the class to cover that up?

Mike: possibly i think yeah so yeah so [sic] she'd be like the first one to answer the question and i think hang on you haven't considered [sic] to me i don't think she was [sic] you know i would give them reasonable amount of take up time when when [sic] i pose a question but she would she would [sic] disrupt the take up time by shouting out an answer so and it was it was [sic] trying to get her to recognise you know discreetly about the behaviour for learning and everybody's got a voice etc and then slowly she started to get used to that and then i knew then [sic] once she started to get used to that i knew that if she didn't understand something i could then probe her to find out what you know about where her level of understanding was instead of worrying that every time i come up with a question she would just [sic] and sometimes it would be right you know and sometimes it would be wrong but she'd be [sic] you know she'd say in such a way that she was convinced she was right as well and then that kind of steer [sic] you off from the delivery this is when we're kind of face to face you know whilst we have been online she's more er receptive to feedback because she knows that she doesn't understand something all she has to do is drop me a message in teams and say Mike [sic] don't understand i'll get clarity on what parts she doesn't understand and as soon as i know what parts she don't understand i'm already screen grabbing it and sticking it into her onenote area to then go through and explain a process of how she can then work it out and like you know and i keep saying to them i'm not teaching this from scratch but i'm showing you a method that works for me and i'm trying to find out a method that will then work for you and and [sic] moving forward there she was i think she was 14 marks away from a grade 4

Me: oh gosh

Mike: so she now has a copy of her papers 'cause we we [sic] are allowed to have access to her scripts

Me: oh interesting

Mike: yeah well edexcel provide them free but yeah we have to do is is [sic] we have to get the students permission then we can download it and then we can use the script and we give them the option that if we use the script in a whole class environment which we're not going to anyway but if we were to use that we give them the option to anonymise themselves or they are not bothered most of them want to anonymise themselves but i i [sic] think the reason they've done that is they're not aware that we wouldn't be using it anyway but it's it's [sic] a requirement from jcq that for us to access the script we've got to say to them if it was used in class you know are you happy for your name to be shown or not shown

Cycle 2 interview with Mike (26/03/21)

Adam and three friends go on holiday together for a week.

The costs of the holiday will be shared equally between the 4 friends. These are:

- £1460 for 4 return plane tickets
- £720 for the accommodation
- £180 for the car hire for a week

How much does Adam have to pay for his share of the costs?

Note: Please give your final answer in £.

Accommodation: £720  
 $£720 \div 4 = £180$  per person  
 Car hire: £180  
 $180 \div 4 = £45$  per person  
 $£365 + £180 + £180 = £725$   
 Adam has to pay: £725

Total marks: 3

Mike: and you know what she [sic] done and it's very very hard i can't turn around and say to her you made a mistake here she got this bit right (indicates £720) she got this bit right (indicates £180 per person) and she got this bit right (indicates £45 per person)

Me: yeah

Mike: but she didn't add the 45 she went back to the 180 again

Me: oh

Mike: so where she's got one out of three there i'm giving her two out of three

Me: i was going to say from a marking marker's point of view i would say that that's you get marks for writing down there the 45 yeah so (indistinct) the final bit

Mike: and so bit of a shame there right eleven [sic]

a) Alice says that all the factors of 8 are even. Write down an example to show that Alice is wrong.  (1)

b) Alfie says that all the digits in odd numbers are odd. Which of the numbers below show that Alfie is not correct?  (1)

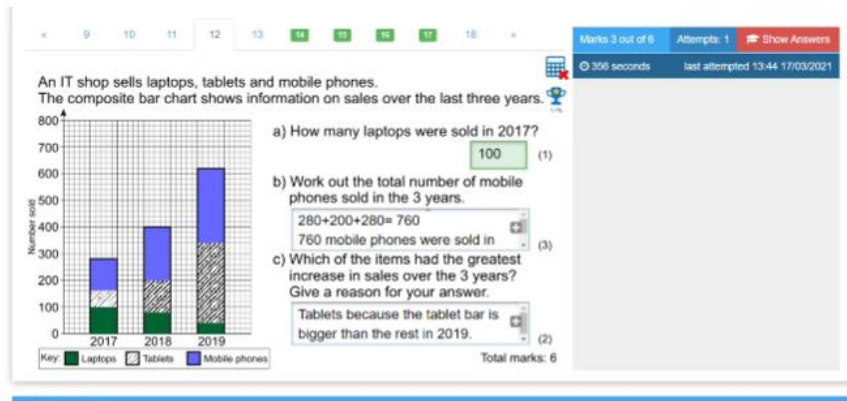
A: 5634  
 B: 7931  
 C: 2977  
 D: 3130

Total marks: 2

and there you go so she'll get a mark for that because i know that that's right and again she's picked on one here (indicates part b) because she picked the [sic] starts with an odd number so it must be odd so you know they all have that but this is this is [sic] it's almost like a little bit of problem solving interpretation isn't it

Me: yeah

Mike: yeah this one here



and again this was wording [sic] and not really zooming in on to getting these [sic] so when we looked at the the [sic] mobile phones not recognising that this actually was only 120 not 280 (indicates on 2017 bar)

Me: ok

Mike: so there is again not a huge error but it was misinterpretation of graphs

Me: yeah with that came up before that's come up before [sic] hasn't it misinterpretation or graphs with Claire

Mike: yeah yeah [sic] so you know so that's why she got specific ones on this was it specifically let me have a look on my notes 'cause i wrote some notes down before i set this work for them so Claire er no that was a collective that that [sic] wasn't just Claire that was everybody it [sic] was a little bit weak on there but i don't have any other composite bar chart questions so you know this one here what we'll probably do is we'll do that on paper

Me: yeah no fair enough

Mike: and then you know evidenced [sic] by recording it so on this one here



she got one out of three but actually it's three out of three because she's not [sic] again she's not looking at what the wording tells her in the question

Me: ok yeah

Mike: "make your answer clear by writing" there so you know it's right that it's five 40 centimetre bars but if she'd written five lengths she got three marks so there's another couple mark so when

you look at this you know she's building up more marks all the way through which which [sic] is demonstrating that security that she can do it

Me: yeah

Mike: there you go there was the ratio question

Anna, Laura and David each earn the same monthly salary.

Each month,

- Anna **saves** 19% of her salary and spends the rest of it
- Laura spends  $\frac{17}{20}$  of her salary and **saves** the rest of it
- amount of salary David **saves** : amount of salary he spends = 2 : 8

Work out who saves the most of their salary each month.  
Show how you get your answer.

Note: Please clearly label the workings for each person and write your final answer as ... **saves the most**

Anna saves 19%  
Laura:  $20 \times 5 = 100$ ,  $17 \times 5 = 85 = 85/100$  or 85% and saves: 15%  
David: 2:8 which is out of 100 therefore the 2 stands which makes

Total marks: 4

Marks: 4 out of 4 Attempts: 1 Show Answers  
339 seconds last attempted 14:12 17/03/2021

Me: yeah so she sort of did do a ratio question

Mike: yeah but [sic] yeah she did ratio but didn't didn't [sic] struggle with it is what i meant

Me: yeah no that's that's [sic] yeah that's nice and it's quite a wordy one

Mike: yeah because its fractions, fractions, decimal and percentages

Me: and that making me think making me think that originally she said she wasn't confident with those and that's quite nice to see isn't

Mike: definitely built on it yeah so working [sic] percentages you know and again but it was shock that she couldn't get percentages in the initial and exit assessments

Work out 15% of 240 grams.

10% = 24g  
5% = 12g  
24 + 12 = 36 grams

Total marks: 2

Marks: 2 out of 2 Attempts: 1 Show Answers  
134 seconds last attempted 13:55 17/03/2021

so substitution no problems

$V = 5x + 2y$   
 $x = 3$   
 $y = -4$

a) Work out the value of  $V$ .

$V = 5 \times 3 = 15 - 8 = 7$   
 $y = 7$  (2)

b) Expand  $3p(p + 5)$

$3p^2 + 15p$  (2)

c) Solve  $4(k - 6) = 20$

$4(k - 6) = 20$   
 $4k - 24 = 20$   
 $+24 \quad +24$  (2)

Total marks: 6

but like I say her algebra is so strong

Me: yeah

Mike: which is quite nice and again ratios [sic]

In a box of chocolates,  $\frac{1}{5}$  of the chocolates contain nuts.  
 The rest of the chocolates do not contain nuts.

Write down the ratio of the number of chocolates that contain nuts to the number of chocolates that do not contain nuts.  
 Give your answer in the form  $1 : n$

$1:4n$  (2)

Total marks: 2

Me: and I to n as well

Mike: there you go there you go [sic] you see

Me: i remember what [sic] i remember everything you tell me

Mike: yeah it does work they didn't [sic] they hated it to begin with and she can get it right now like i said we talked about the things here

$A = \{\text{multiples of 3 between 20 and 32}\}$   
 $B = \{\text{odd numbers between 20 and 32}\}$   
 $C = \{\text{even numbers between 20 and 32}\}$

a) List the members of  $A \cup B$

Members = 21 and 27 (2)

Note: Please clearly label your final answer with members = ...

b) List the members of  $A \cap C$

Members: 21, 27 and 30 (2)

Note: Please clearly label your final answer with members = ...

Total marks: 4

so she got this one these two she misunderstood about which way she should have been going with them so and so you know not necessary the numbers that go in there but necessarily what these two meant (indicates venn notation, intersection and union) so we've clarified that now and hopefully we can move on from that 'cause i would normally assume that learners are quite good

with venn diagrams they're quite nicely [sic] quite visual and even if it hasn't drawn there they could probably do it and get away with it erm nineteen ok

a) Work out  $4\frac{1}{7} + 1\frac{3}{2}$   
 b) Work out  $4\frac{1}{2} + \frac{3}{5}$   
 Give your answer as a mixed number in its simplest form. (2)

Total marks: 4  
 Marks 4 out of 4  
 Attempts: 1  
 191 seconds  
 last attempted 14-12-17/03/2021

a)  $5\frac{9}{11}$   
 b)  $7\frac{1}{2}$

so her fractions yeah her fractions were ok but collectively they weren't so and again ratio question again look

In a village  
 the number of houses and the number of flats are in the ratio 9 : 5  
 the number of flats and the number of bungalows are in the ratio 10 : 3  
 There are 30 bungalows in the village.  
 How many houses are there in the village?

Note: Please make your final answer clear by writing ... houses

Total marks: 3  
 Marks 3 out of 3  
 Attempts: 1  
 199 seconds  
 last attempted 14-12-17/03/2021

NOH:NOF=9:5  
 NOF:NOB= 10:3  
 NOH:NOF: 100:30  
 NOH:NOF: 180:20  
 There are 180 houses

Me: yeah nice

Mike: percentage profit here

Lucy buys 7 kg of nuts to sell.  
 She pays £10 for the nuts.  
 Lucy puts all the nuts into bags.  
 She puts 350g of nuts into each bag.  
 She then sells each bag of nuts for 75p.  
 Lucy sells all the bags of nuts.  
 Work out her percentage profit.

Total marks: 4  
 Marks 4 out of 4  
 Attempts: 2  
 308 seconds  
 last attempted 14-10-17/03/2021

7000g= 7kg=£10  
 7000÷350= 500 bags  
 0.75 x 500= 3.75  
 10 ÷ 3.75=0.375  
 37%

not quite there so but again we can work we can work [sic] through on that and that's not a problem erm she's the only one to get this question right



16 17 18 19 20 21 22 23 24

Marks 3 out of 3 Attempts: 1 Show Answers

412 seconds last attempted 14:35 17/03/2021

A cycle race in France is 2214.5 miles in length.

Miguel knows his average speed from previous races is 21.14 miles per hour. For this next race in France he is planning on cycling 9 hours per day.

Estimate how many days Miguel will take to complete the race.

T: S x D  
 $21.14 \times 9 = 190.26$   
 $190.26 \times 11$

11 days

Total marks: 3

Me: nice

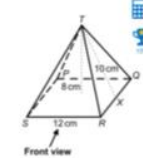
Mike: so er not quite sure with this now this is a mathswatch thing

16 17 18 19 20 21 22 23 24

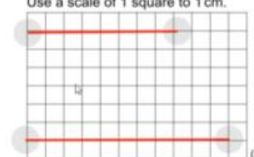
Marks 0 out of 6 Attempts: 2 Show Answers

127 seconds last attempted 14:35 17/03/2021

Here is a solid square-based pyramid.  
 The base of the pyramid is a square of side 12 cm.  
 The height of the pyramid is 8 cm.  
 X is the midpoint of QR and  $XT = 10$  cm.



a) Draw the front elevation of the pyramid from the direction of the arrow. Use a scale of 1 square to 1 cm.



b) Work out the total surface area of the pyramid.

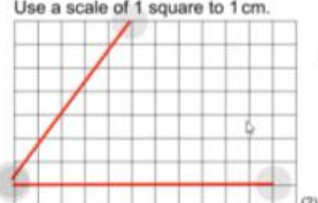
$8 \times 12 \times 10 = 960$  cm cubed

Total marks: 6

Me: yeah what's that

Mike: this is what she should have been doing (moves red lines)

a) Draw the front elevation of the pyramid from the direction of the arrow. Use a scale of 1 square to 1 cm.



b)

## Appendix F – examples of data analysis

In appendix F, I include examples of notes and jottings that supported the analysis process. The analysis of the data in this study is documented in the thesis, phase 1 in chapter 7 and phase 2 in chapters 9 and 10. The full analysis is available on request, within ethical guidelines.

### Phase 1

Trying to find common themes in the students' data

#### **Ava**

Ana has a positive attitude and she thinks that learning maths is both fun in the present and useful for the future. She works hard and independently, completing all the core work set and the extension work provided.

#### **Ava's struggles**

She has maths understanding but either states she has forgotten it or she thinks differently to the teacher. Her struggle comes from trying to apply the teacher's method when it is different from her own. She seems to choose her own methods when she is confident to.

#### **Ava's actions**

She talks about revising at home and take photos of her exercise book. She says she was not confident to revise previously.

#### **Betty**

For Betty college is a chore (not just maths but also maths!), she would rather be somewhere else. She will choose the normal level of work.

#### **Betty's struggles**

She describes herself in terms of deficiency, lack of attention span, can't concentrate, can't remember (there are issues I can't control! \_ it is not my fault)

#### **Betty's actions**

She talked about other people's actions rather than her own (does not seem to feel responsible for anything). However, she will use her own maths methods when it makes more sense to her.

#### **Christine**

She has tried in the past and not been successful and now she lacks motivations. She does need maths for her university course though. She is open in class and sometimes vocal about answers and difficulties. Her work matches the methods demonstrated by the teacher, and she will attempt the normal level of work. She does not extend or attempt to apply her own understanding or previously taught methods. She is fine with college but not maths.

#### **Christine's struggles**

She believes that she is not capable and struggles with motivation. (I did, failed and now can't be bothered). She struggles with concentration.

#### **Christine's actions**

(in line with struggles) She has tried different actions in the past but these were not successful but she is aware that she needs maths for her future plans. She says she needs to start revising

#### **Darren**

He comes across as confident in lessons and will provide answers during the teacher led session. That being said, he finds it difficult to describe his thinking verbally and in written form. Jottings are used

rather than a coherent chain of reasoning. He will use other methods that seems sensible to him rather than the teacher demonstrated method. He will choose the challenge level work.

#### Darren's struggles

He states that it is difficult to explain his thinking to someone else, especially when he can just 'see' it. He talks about maths knowledge as something that he can't keep in his head, especially in exam situations. He like to have the means to check his work with teacher etc.

#### Darren's actions

He believes that he need to take action to improve, both doing workings and starting to revise. The responsibility seems to be on him, I didn't do this so I need to start doing it.

## An iteration of the stanzas in Darren's I poem

### Darren's I-poems

#### Stage 1

Sees and uses connections in work, but can't always explain how; no maths for maths sake.

Notices/recognises/takes responsibility for the impact of his own actions

Sense of frustration about 'explaining' (workings), I need to, but I don't know how it

I know what the issue was/is, It was me, but what now?

#### Stage 2

**Maths words: Difficult (less so now), boring, tedious (refer to resitting)**

I done (Responsibility, I could have)

then I did

so I went on

but I did not do

I left it until

I could have got better

I am trying

whatever I can get

I want

but I am not just

I hated it (Responsibility, I didn't)

I wasn't that good

I didn't really try

I probably prefer it now

I just feel like I can

I just couldn't

I think

I knew

now I feel

I don't know I matured

in the exams I don't (Explanation frustration)

in class I am good

in exams I am not

I don't know I prefer

I can just see

I can just do

I can see

I have to write it all down

I get confused

I prefer

I don't really

if I was to

I would

I can

I think I do well

I can like see how well I am doing

I feel like all my knowledge goes out the window

I don't know...

I can double check

I have got

I have to

I will be

I will be

I need to do more

I have to  
I start questioning  
I will leave it  
I will see  
I know but I don't know fully  
I will leave it

I get to  
if I have got it wrong  
I can correct myself  
I think  
I can like look  
I can see  
I have done  
I don't know

I need I think (I need to)  
I just need to  
I don't really revise  
I have got to  
I have got

I get loads (Pressures)  
I have got  
I got to  
I have got to

I do it in my head (Explaining revisited)  
I know how to  
if I have to explain  
I know how I am  
I just leave it  
I know how to  
I need to  
I need to  
I know how I am doing it  
if I have to  
I can't really explain  
I knew  
I just leave it  
I know how I got

so I just (I just need to)  
I think  
I think I need to  
if I get into the habit  
I will  
I just need to  
I just to  
I will get into the habit

An iteration of teacher's they poem about Darren

### Positioning [they] poem

#### General statements

Business students

those that are in business are more driven to get their maths because they know it is an important part of what they then want to go on and do

they have already given me half of their motivation and engagement

business ones are doing it because they have but they want so there are two different mindsets

Boy

it is a boy girl split

the boys erm I think on an effort I think on a laziness on a bravado on a kudos whatever you want to less likely to write stuff down because they think that they are clever enough to remember it

#### Personal statements

T4S2 is in his third year

the overall impression I have got is that [student] is lazy and doesn't want to listen

He has told me that he knows he has messed around

wants to be the year that he passes his GCSE

I think he has got the ability

he can see the reason behind it now

he has decided that learning is right for him

I think [student] has now realised

he is one of the oldest in the class as well he has got himself a job

he is working outside of college

he is also doing something in college that for him is something that he wants to do

he now understands

something that he had to do

he has to do because it will benefit him

whether he has switched into that this year I don't know

his marks erm were reducing

his proximity to a grade 4 was getting further away

in a way that he didn't kind of connect with

he is now starting to enjoy what he is doing

he is turning up on time

he is turning up to every lesson

I saw with [student] was this "I can see the answer I am just going to write the answer down"

I think he smokes

he is also quite fit, he likes doing a bit of exercise

he is putting more or more explanation down

he is putting it down in a different way sometimes

then he will come up with somethings and I think you know what I wouldn't have expected because he doesn't realise he has taught me something.

## Phase 2

In appendix F, I include examples of notes and jottings that supported the analysis process. The analysis of the data in this study is documented in the thesis, phase 1 in chapter 7 and phase 2 in chapters 9 and 10. The full analysis is available on request, within ethical guidelines.

Thoughts on an early iteration of Claire's I poem from cycle 1

### **Claire's poem (chronological)**

#### Cycle 1

I have chosen  
I had to go  
I struggled  
How I felt  
I am in  
I am finally  
I couldn't  
I kept trying  
I felt  
I could finally

I didn't get  
I struggled  
I asked  
I wouldn't get  
I had to face  
Now I get  
I understand  
I benefit  
I understand  
I keep trying  
I also used to  
I struggle with  
what I am struggling at

#### Thoughts

There seems to be two stories- a then and a now. It is interesting that there is a struggle/struggled/struggling and a trying and trying. Long way...it would take me longer...image and language suggest a journey or pathway of learning maybe? Twists and turns...mistakes, not straight and long way..., hurdles, and perseverance. At one point, S1 uses a second person voice to talk about maths. I wonder how this will compare with the THEY poem.

The word struggle is used a lot, both in the past and present tense.

#### I poem

Stanzas? Or maybe an intertwining? Maybe the stanzas are not grouped in consecutive statements? (Note to self: from Gilligan et al page 260, often the I poem will fall into stanzas, sometimes it captures something not directly stated. Sometimes it does not.)

Help me! Why won't you help me? Frustration?  
Journey? Destination?

Examining categories of voice in Claire' data

Receiving vs doing vs being  
Chapter 1 data

understand → get math (positive) → know how to → able to → find heavy

struggle = not understanding

**Aligned I poem**

	i	have chosen
	i	had to go to achieve
as	i	struggled
how	i	felt about
that	i	am in
	i	am finally understanding
like	i	couldn't understand
as	i	keep trying - dancy
	i	felt like
	i	could finally answer
	i	didn't get much help
therefore	i	struggled
	i	asked
	i	wouldn't get
that	i	had to face
now	i	get
in a way	i	understand
	i	benefit more
which	i	understand
	i	keep trying doing
	i	also used to struggle
that	i	struggle with
what	i	am struggling at
the way that	i	learn
when	i	have to understand
	i	find
	i	would know how
that's when	i	need
	i	also work dancy

being in a state →

strive in difficulties

receiving gaining? (external)

comprehend a state

struggle vs understand?

**Original narrative**

I have chosen this image because for me my path was not straight at all there was mistakes and a very long way I had to go to achieve my grades and it wasn't always easy for me as I struggled to understand maths therefore this image is a perfect example of how I felt about my experience of maths however during the college period that I am in I am finally understanding maths and being able to recognize and interpret maths. Maths did annoy me at times and it made me feel like I couldn't understand maths but as I kept trying and trying to understand maths it got a lot clearer to me and I felt like I could finally answer questions and be able to get maths it just would of taken me longer to do so . Finally my opinion of maths is that it is a very difficult subject to get and understand and acknowledge but if you just keep trying and keep persevering you can get through the hurdles of maths and you do very well.

For me what changed between these two stories was the fact that at school in the past I didn't get much help therefore I struggled a lot and every time I asked for help and support I wouldn't get it. When my school teacher set the homework he didn't do it on a platform which benefited me and he didn't really explain the work or homework well therefore it was a daily struggle that I had to face. Whereas now I get support and help from my maths teacher and he always explains it in a way which I understand which I benefit more from and secondly he always gives us feedback which I understand and lastly he uses a platform for the class work and home work which is more suitable for me and I keep trying and things do become clearer and I also used to struggle a lot with maths but now there is still some topics that I struggle with but there is the right material for me to get better with what I am struggling at.

The certain part of the way that I learn about an maths topic is when I have to understand what the question in the exam paper read as because I find it easy if a question says e.g. Share 400 in the ratio of 10:4 I would know how to answer that but when it says Gavin Has 10 apples and Sharon has 14 bananas to share between a class of 20 that's when I need help to understand how to answer the question. I also work online using Mathswatch which provides videos this has helped massively for me not to struggle so much.

external → help/support → teacher → resources/platforms/material

own effort



## #1 analysis chapter 3 - Categories from previous analyses (100521)

#2 analysis Claire's data (150421)

Following on from #1 analysis, there are five categories:

- Struggle (negative)\*
- Understand (positive)\*\*
- Receiving (positive and negative)\*\*\*
- Doing (own effort)
- Inner (thoughts and responses)

\* this will include *didn't understand* and various versions

\*\*this would include *no longer struggle* and various versions

\*\*\* I am not sure if the positive and negative need to be separated; maybe use OUTER

As can be seen in this iteration, I decided to highlight in one colour *struggle* as the negative responses and highlight in other colour *understanding* as the positive response.

Type	definition	Colour	Variants
Struggle	Negative responses	Pink	<ul style="list-style-type: none"> <li>• It wasn't easy</li> <li>• I couldn't understand</li> <li>• I need help to understand</li> </ul>
Understand	Positive responses	Blue*	<ul style="list-style-type: none"> <li>• It got clearer/get better/get maths</li> <li>• I could finally answer/I would know how</li> <li>• Not struggle</li> </ul>
Receiving	External factors	Green	<ul style="list-style-type: none"> <li>• Help/no help from teacher</li> <li>• Materials/resources/online platforms</li> </ul>
Doing	Own actions	Yellow	
Inner	Own thoughts and feeling	Grey	<ul style="list-style-type: none"> <li>• Think/notice/see</li> <li>• Please/thankful</li> </ul>

\*this was previously orange in the hand highlighted version #1

#3 iteration Brief notes from Alf and Laurinda input (200421) see personal diary for discussion

Past, present, future (could be a result of questioning); state vs process, being vs becoming?

'I' dressed as 'you' creating distance?; 'I feel'

Notes from #1 analysis of chapter 3

**I am and I can**

Questions: Is there any other ways to say these phrases? How were they used in previous chapters?

Aligned I poem

	i	am now feeling happy
how much	i	have progressed
	i	am no longer thinking
	i	can now clearly see
because	i	didn't have
now	i	am at
	i	am getting
	i	feel like
	i	have come so much further
than	i	thought
	i	would
	i	am currently revising
but	i	am certain that

Original narrative

**I am now feeling happy** about how much I have progressed in maths and that **I am no longer thinking maths like a maze. I can now clearly see two paths in front of me** both of which will help me to progress to my future career. Personally it was difficult to start off with because I didn't have much help at school however **now I am at college** and **I am getting more help** from Neil I feel like I have come so much further than I thought I would. **I am currently revising** for my Proportion and Number assessments which are on the 6<sup>th</sup> and on the 12<sup>th</sup> but **I am certain that my grade will be at least a 4.**

## Examining categories of voice in Mike's stories about Claire from cycle 2

An early iteration of testing out a they poem in cycle 2

Possible categories from the they poem

**Yellow** = attitudes and thoughts?

**Green** = the positive of she can?

**Blue** = her own actions?

	she	'll kick herself
	she	'll probably kick herself
	she	's assumed
	she	can do that
i'm just thinking	she	didn't look at
	she	's just gone
	she	's assumed
	she	know
	she	lost
again	she	'll kick herself
	she	's got
	she	got
	she	did
	she	's now starting to write it
	she	picks up
	she	thinks
	she	has to do
where	she	pulled
	she	fell apart
	she	's done
then	she	didn't
that	she	thought
where	she	went
	she	had to go
	she	's like
so	she	knew
	she	knew
	she	's added
then	she	stopped
	she	didn't then work out
	she	got so far
	she	's really really confident
i don't think	she	's read
	she	done
this time	she	has got

An later iteration of returning to the full narrative to start refining the categories

**Be aware, as this is a later iteration, the colour coding of the key does not follow from the iteration shown above**

**Yellow** = effort/success?

**Green** = mitigated error?

**Blue** = external issues?

Image type	Page #	Statement
<b>Mathswatch dashboard</b>	3	<ul style="list-style-type: none"> <li>• you can see how much effort she has out in</li> </ul>
		<ul style="list-style-type: none"> <li>• so there you go look over an hours worth of work and completed them both so more evidence there</li> </ul>
		<ul style="list-style-type: none"> <li>• non calculator money questions .....Percentage change and problems within coordinate axis there were three areas individually she needed to work on which which she's done</li> </ul>
<b>Referencing question 18 in P1 intervention</b>	5	<ul style="list-style-type: none"> <li>• i don't think she fully understand what the AuB was so we went through and drew the the diagram where you know i put the two circles in there so right if it is AuB I said it's everything it's in A and also everything that's in B and she was like oh right ok and given her a simple explanation like you know call it like an umbrella and she went yeah that's like a bucket then isn't it a bucket a bucket captures everything so she's making her own analogies to it which is quite nice as well</li> </ul>
<b>Intervention work referring to gradients</b>	31	<ul style="list-style-type: none"> <li>• i recognize and said look you know there's your first bit so you know that <math>y = mx + 6</math> and then we talked about how we found the m which was the rise divided by the run and she's like oh yeah that makes sense now and i said that's why we then end up with <math>y = 2x + + 6</math> she could see afterwards but i think it would be a little bit of repetition needed there</li> </ul>
<b>Intervention work referring to simultaneous equations</b>		<ul style="list-style-type: none"> <li>• see how it was this one she wanted to have a go at but wasn't quite sure how to start</li> <li>• and as soon as we started and we went through the whole process then we talked it through</li> <li>• no worries at all and it was quite nice the way we went through that then i was yeah and again i was really happy with that</li> </ul>
<b>Post topic assessment dashboard</b>	7	<ul style="list-style-type: none"> <li>• The ratio I am putting that down to a bad question</li> </ul>
		<ul style="list-style-type: none"> <li>• so but everything else you know it it shows improvement so you can see where she is there</li> </ul>

Correct (full marks)	10	<ul style="list-style-type: none"> <li>so there you go look first 8 questions no problems at all</li> </ul>
	13	<ul style="list-style-type: none"> <li>there you go there was the ratio question... yeah but yeah she did ratio but didn't didn't struggle with it is what i meant</li> <li>definitely built on it yeah so working percentages you know and again but it was shock that she couldn't get percentages in the initial and exit assessments</li> </ul>
	14	<ul style="list-style-type: none"> <li>but like I say her algebra is so strong</li> </ul>
	14	<ul style="list-style-type: none"> <li>again ratios... there you go there you go you see...yeah it does work they didn't they hated it to begin with and she can get it right now</li> </ul>
	15	<ul style="list-style-type: none"> <li>so her fractions yeah her fractions were ok but collectively they weren't so</li> </ul>
	15	<ul style="list-style-type: none"> <li>again ratio question again look</li> </ul>
	16	<ul style="list-style-type: none"> <li>she's the only one to get this question right</li> </ul>
	18	<ul style="list-style-type: none"> <li>again the only one of the class to get that question right and she was happy to explain it to them yesterday about how it worked</li> </ul>
	20	<ul style="list-style-type: none"> <li>look the algebra's is no worries at all there</li> </ul>
	21	<ul style="list-style-type: none"> <li>yeah she got that one</li> </ul>
		<ul style="list-style-type: none"> <li>tree diagrams no problem at all</li> </ul>
	22	<ul style="list-style-type: none"> <li>happy look (indicates table of values, buttons vs frequency)</li> </ul>
	29	<ul style="list-style-type: none"> <li>so again fractions she's confident with fractions which is nice</li> </ul>
	33	<ul style="list-style-type: none"> <li>so again no worries all with numbers there and BIDMAS easy peasy</li> </ul>
	35	<ul style="list-style-type: none"> <li>there you go algebra again no worries at all</li> </ul>
	36	<ul style="list-style-type: none"> <li>so probability again no worries at all there</li> </ul>

Partially correct (some marks)	11	<ul style="list-style-type: none"> <li>and you know what she done and it's very very hard i can't turn around and say to her you made a mistake here she got this bit right (indicates £720) she got this bit right (indicates £180 per person) and she got this bit right (indicates £45 per person)</li> <li>but she didn't add the 45 she went back to the 180 again</li> <li>so where she's got 1 out of 3 there i'm giving her 2 out of 3</li> </ul>
	12	<ul style="list-style-type: none"> <li>and again this was wording and not really zooming in on to getting these so when we looked at the the mobile phones not recognizing that this actually was only 120 not 280 (indicates on 2017 bar)</li> <li>so there is again not a huge error but it was misinterpretation of graphs</li> <li>yeah yeah so you know so that's why she got specific ones on this was it specifically let me have a look on my notes 'cause i wrote some notes down before i set this work for them so Claire ..er..no that was a collective that that wasn't just Claire that was everybody it was a little bit weak on there but i don't have any other composite barchart questions so you know this one here what we'll probably do is we'll do that on paper</li> </ul>
	13	<ul style="list-style-type: none"> <li>she got one out of three but actually it's three out of three because she's not again she's not looking at what the wording tells her in the question</li> <li>make your answer clear by writing there so you know it's right that it's five 40 centimetre bars but if she'd written 5 lengths she got three marks so there's another couple marks so when you look at this you know she's building up more marks all the way through which which is demonstrating that security that she can do it</li> </ul>
	17	<ul style="list-style-type: none"> <li>so yeah not quite understood so 24 28 she's kind of looking up here somewhere (indicates top square in diagram) so yeah we can we can look into that and that's that's good</li> </ul>
	20	<ul style="list-style-type: none"> <li>but this one here (indicates part b) i'm just thinking she didn't look at it logically</li> <li>she's just gone in and and just she's assumed that if speed equals distance divided by time then distance must be speed divided by time instead of realizing that it's multiplied by time</li> <li>so a bit of a shame that she know she lost two easy marks there</li> </ul>
		<ul style="list-style-type: none"> <li>yeah the less we say about this I am just like arrr but again she'll kick herself and you know she's got two marks out of them there but i said you know even if you put an extra number in there then you will lose a mark because it's not showing your understanding</li> </ul>
	21	<ul style="list-style-type: none"> <li>but look at look at this look how she's now starting to write it in (indistinct) (indicates notation)</li> </ul>

	<ul style="list-style-type: none"> <li>• and i love the fact she picks up on what she thinks is important</li> <li>• so so not recognizing that she has to do it out of because you know it's just that concrete part of nailing that probability is a fraction or a decimal</li> </ul>
23	<ul style="list-style-type: none"> <li>• this caught lots of people out</li> <li>• yeah so but she's done <math>\pi * 70</math> to find the diameter then she didn't half it</li> <li>• didn't half it and didn't add on the diameter</li> <li>• you can see that she thought you can see how her brain is thinking now</li> </ul>
24	<ul style="list-style-type: none"> <li>• yeah i'm not quite sure where she went on this one other than the fact that this is correct (indicates LCM:144)</li> <li>• see how it yes see how how how difficult it is to gain these marks at which is why it's important that we then go back and look through to see what what marks they've got on them</li> </ul>
25	<ul style="list-style-type: none"> <li>• right ok so she knew what 10% was and she knew what 20% was which is good but then stop</li> <li>• she's added on to the original price</li> <li>• but then she's stopped she didn't then work out what was 18 equal monthly payments</li> <li>• and then find it in the ratio she got so far and then stopped</li> </ul>
26	<ul style="list-style-type: none"> <li>• so again you know i haven't taught them with the quadratic express but she's really really confident in filling out tables of values</li> <li>• this is more more guesstimate than anything else (indicates answer to part c)</li> <li>• the value of the questions doesn't warrant the time when there's only we got bigger fish to fry with with some of them</li> </ul>
28	<ul style="list-style-type: none"> <li>• so again you know that one there having watched her when she answered that question i was just like oh my god why has she done this you know she's got the 4 and 6 around number blindness more than anything else there</li> </ul>
28	<ul style="list-style-type: none"> <li>• she's made such a such a minor mistake because the answer is 7:56</li> <li>• but i think because because there's no working out there i can't see where i can give us some marks</li> <li>• yeah so and you know but we'll take this one as a as a you know learn from it's not you know it's not no effect my my overall impression of how she's doing but it's just to reiterate that actually working out should be in there especially when it's 3 mark question</li> </ul>
29	<ul style="list-style-type: none"> <li>• yeah question 10 again this is you know this one is with a calculator now so she still has this blindness with money</li> </ul>
30	<ul style="list-style-type: none"> <li>• this one here surprised i'm surprised that she didn't know <math>y = x</math> was</li> </ul>

	<ul style="list-style-type: none"> <li>i'm glad that she recognizes what x equals you know but where she got that i don't know because even guessing was either going to be a or c but yeah so not quite sure and this one here (indicates <math>x + y = 3</math>) i would have thought that she would have recognized that if <math>y = 3</math> and even though there's an x there that <math>y = 3</math> then it's going across the y axis at 3 so that would either be b or y and then recognize that it has to be <math>y = mx + c</math> but again it's that is that re reiterating each time of what we're looking for and we talked a graph question through yesterday and she she knew what <math>y = mx + c</math> meant she knew the +c was where it crossed the y axis but she wasn't as strong on knowing where what the gradient on how to find the gradient on a</li> </ul>
32	<ul style="list-style-type: none"> <li>I potentially given another mark there but then again no because you know it would probably say that you get one mark if you've got at least ten of them right two marks if you've got at least 15 of them right</li> <li>yeah but like the mathwatch is good because if we got the question right you can just you can move on from it but if they haven't then you can look at where can you give them some more marks</li> </ul>
33	<ul style="list-style-type: none"> <li>this one surprised me</li> <li>this is this is worth marks here</li> <li>because it's correct 1 1/2 to 3 (indicate answer in part b) but it's asking for whole numbers</li> <li>1 to 2</li> <li>yeah yeah obviously i went 3 to 6 and went yeah right there right so working out the yeah so she's got a mark for saying that he's got £3.00 even though he's wrong she's wrong because it's £4.50 so we need to work and again look but this is where she falls down anything to do with money she struggles so there's a little bit of that and that could be where the number block comes out of</li> </ul>
34	<ul style="list-style-type: none"> <li>so yeah little bit work there standard form she's missing she's misunderstood the question there because she's used her calculator and her calculator probably hasn't given it in standard form</li> </ul>
35	<ul style="list-style-type: none"> <li>19 again so positive correlation yeah one of is the coordinates where she get 662 why has it not given her that mark then Urch really ... oh i see</li> <li>so yeah but one little mark there not a huge drama</li> </ul>
36	<ul style="list-style-type: none"> <li>not quite sure how she got nine pins there</li> </ul>



Incorrect (no marks)	Intervention feedback and 11	<ul style="list-style-type: none"> <li>• Claire was absolutely adamant that this was a diameter because she said it goes from one (indistinct) of the circle to the other</li> <li>• ok and as you can see i've highlighted you know that is i said look at the centre of the circles is marked the cross and it was it was that realization realization that oh then maybe it isn't a diameter and then she said well so why isn't it the diamonds then so so we explained and so it has to go through the centre for it because it's splits a circle in half and then and then i said to her you know we had talked about this and i said to remember i said about a guitar we look at the strings and you got the circle an and you know when you're strumming the strings i said each one of them plays a chord</li> <li>• and just trying to link it and she said oh yeah i remember that now yeah so so it's just looking at the things this one frustrating because all of my learners didn't do that</li> </ul>
	12	<ul style="list-style-type: none"> <li>• and there you go so she'll get a mark for that because i know that that's right and again she's picked on one here (indicates part b) because she picked the starts with an odd number so it must be odd so you know they all have that but this is this is it's almost like a little bit of problem solving interpretation isn't it</li> </ul>
	15	<ul style="list-style-type: none"> <li>• so she got this one these two she misunderstood about which way she should have been going with them so and so you know not necessary the numbers that go in there but necessarily what these two meant (indicates venn notation, intersection and union) so we've clarified that now and hopefully we can move on from that 'cause i would normally assume that learners are quite good with venn diagrams they're quite nicely quite visual and even if it hasn't drawn there they could probably do it and get away with it</li> </ul>
	16	<ul style="list-style-type: none"> <li>• not quite there so but again we can work we can work through on that and that's not a problem</li> </ul>
	16/17	<ul style="list-style-type: none"> <li>• so er.....not quite sure with this now this is a mathwatch thing</li> <li>• this is what she should have been doing (moves red lines)</li> <li>• so she's not quite understood how this works and a lot them do that and again i'll take that into account but where there's no marks six there so you know she's not understanding and also the the surface area i'm surprised she didn't get that right</li> </ul>