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UNDERSTANDING IDENTITY AS A TEACHER OF NUMERACY IN HISTORY: A SOCIOCULTURAL APPROACH

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Abstract

Teachers of all school subjects have an important role to play in developing the numeracy capabilities of students. However, to fully exploit the numeracy learning opportunities that exist in the subjects they teach, teachers need to have an identity as a teacher of numeracy. In this paper some findings are presented from a two-year study designed to investigate how teachers develop this type of identity. The specific purpose of this paper is to present a preliminary case study of one of the teachers to illustrate how an adaptation of Valsiner's zone theory can be employed to describe and analyse a teacher's identity as an embedder of-numeracy. Drawing on interviews and lesson observations, a preliminary case study of a secondary school history teacher is presented. The case study includes information about the teacher, his professional context, and a classroom vignette to illustrate practice. Data are mapped onto the teacher's Zone of Proximal Development, Zone of Free Movement, and Zone of Promoted Action and his identity as an embedder-of-numeracy is described and analysed in these terms. The analysis suggests that there are several ways that this teacher could be supported to develop his capacity to embed numeracy into the history curriculum.

Introduction

Numeracy, sometimes referred to as mathematical or quantitative literacy, has been defined in many ways (e.g., DEETYA, 1997; OECD, 2012; Steen, 2001). Goos (2007) drew on a number of widely accepted definitions to develop a model of numeracy that includes the *disposition* to be confident and willing to use the requisite *mathematical knowledge* and appropriate *tools* in a given *context*. These four elements are set within a *critical orientation* that enables a numerate person to evaluate their results and information presented to them (see Goos, Geiger & Dole, 2014 for further elaboration of this model). Possessing all five elements of the numeracy model (i.e., being numerate) is important for individuals in life beyond school (OECD & Statistics Canada, 2011; Steen, 2001).

While the development of numeracy capabilities does not only occur within the school context, schools nevertheless have an important obligation in this area. However, this function is not solely the responsibility of mathematics teachers as is the belief of some teachers (Thornton & Hogan, 2004). In Australia it has been recognised for many years that teachers of all school subjects have a role to play (e.g., DEETYA, 1997); however, the implementation of the Australian Curriculum (ACARA, 2014) and introduction of professional standards for teachers (AITSL, 2012) make this role for all teachers and the importance of an approach to numeracy that encompasses all school subjects explicit. If teachers are to support numeracy learning across the curriculum, then they must see themselves not only as teachers of their own discipline, but also as teachers of numeracy; in other words, have an identity as a teacher of numeracy. However, there is evidence that for many Australian beginning secondary teachers from all disciplines this is not the case (Milton, Rohl, & House, 2007). Although a similar study does not appear to have been conducted with practicing teachers, this result suggests a need for pre-service education and in-service professional development that can assist teachers from all disciplines to develop a strong identity as a teacher of numeracy. If teachers are to be supported in this way, it is first necessary to have an appreciation of how such an identity is developed.

In this paper some findings are presented from the first year of a two-year study that aims to build an understanding of identity as a teacher of numeracy. So far the study has developed a conceptual framework for identity as an embedder-of-numeracy (Bennison, 2014) and suggested that an adaptation of Valsiner's (1997) zone theory could be used as a theoretical framework (Bennison &

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Goos, 2013) for the study. The purpose of this paper is to extend the above research by addressing the following question:

> How can empirical data be mapped onto Valsiner's zones so that identity as a teacher of numeracy can be described and analysed?

Theoretical Framework

Although research on teacher identity has grown enormously over the last decade, identities are situated in specific settings (Wenger, 1998) and there does not appear to be any research on teacher identity in the context of teachers fostering the development of students' numeracy proficiency. One of the difficulties encountered by researchers investigating teacher identity has been developing a framework that is both comprehensive and at the same time amenable to empirical studies (Enyedy, Goldberg, & Welsh, 2005). For example, the complexity of the framework for mathematics teacher identity developed by van Zoest and Bohl (2005) gives it theoretical strength but makes it difficult to use in practical studies. One possible approach to overcome this dilemma is to develop a framework that is situation specific, such as the one that I developed for *identity as an embedder-of-numeracy* (Bennison, 2014). This framework is organised around five interconnected Domains of Influence (knowledge, affective, social, life history, and context). Within each of these domains there is a focus on those characteristics that are particularly relevant in the context of a teacher providing opportunities for students' numeracy development. Focusing on these characteristics make it possible to design an empirical study that investigates how teachers develop an identity as an embedder-of-numeracy.

The framework for identity as an embedder-of-numeracy that I developed brings together cognitive and social elements and therefore lends itself to analysis from a sociocultural perspective. One approach that could be utilised is an adaptation of Valsiner's (1997) zone theory. This theoretical framework has been adapted and utilised by a number of researchers in mathematics education (e.g., Blanton, Westbrook & Carter, 2005; Goos, 2005, 2013; Hussain, Monaghan & Threlfall, 2013).

According to Valsiner (1997), the Zone of Proximal Development (ZPD) depends on the knowledge and previous experience of an individual and creates *a set of possibilities* for development that are dependent on how the individual interacts with their environment and the people in it; the Zone of Free Movement (ZFM) is related the actions that an individual *is allowed* to perform within their environment; and the Zone of Promoted Action (ZPA) is related to actions that are *promoted* by others. The ZFM and ZPA work together as a ZFM/ZPA complex and the individual is able to act as an agent in their own development. Goos (2013) used Valsiner's ZPD, ZFM, and ZPA and focused on the ZFM/ZPA complexes *experienced by the teacher* to understand teacher learning and development, thus making this particular adaptation an appropriate theoretical framework for understanding identity as an embedder-of-numeracy. Using this theoretical framework involves mapping the characteristics that constitute the five *Domains of Influence* onto a teacher's ZPD, ZFM and ZPA. While a characteristic such as Mathematics Content Knowledge (MCK, part of the knowledge domain) "fits" neatly into the ZPD, others such as school communities (part of the social domain) do not. School communities can influence a teacher's beliefs about numeracy (ZPD), provide support or otherwise (ZFM), and can provide opportunities for learning (ZPA). This mapping is summarised in Table 1 (see Bennison & Goos, 2013 for more detail). While the Domains of Influence present in the framework for identity as an embedder-of-numeracy (Bennison, 2014) can guide the design of empirical studies, it is the adaptation of Valsiner's (1997) zone theory, as used by Goos (2013), that enables analysis of data collected in such studies so that an understanding of identity as an embedder-of-numeracy can be developed.

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Table 1
Valsiner's zones and characteristics of the Domains of Influence

Valsiner's zones	Characteristics of the Domains of Influence
Zone of Proximal Development (ZPD)	Mathematics content knowledge (MCK)
	Pedagogical content knowledge (PCK)
	Curriculum knowledge (CK)
	Beliefs about numeracy
	Confidence with numeracy
Zone of Free Movement (ZFM)	Support from colleagues and administrators
	Curriculum requirements
	Characteristics of students
Zone of Promoted Action (ZPA)	Professional development
	Participation in research projects
	Informal interactions with colleagues

Research Design and Methods

Eight teachers from two Australian secondary schools, one in a metropolitan area and one in a regional area, are participating in a study being conducted over a two-year period (2013-2014). The teachers have differing disciplinary backgrounds and experience. The study is non-interventionist; however, the teachers were recruited because they had previously agreed to participate in a larger study conducted over a three-year period (2012–2014, hereafter referred to as the *Numeracy Project*) designed to investigate the potential of professional learning opportunities based on the numeracy model developed by Goos (2007).

During three school visits in 2013, lesson observations were conducted and teachers interviewed after the lesson about the task that was used, student learning, and teacher learning. Teachers also participated in a scoping interview to ascertain information about their backgrounds, beliefs about numeracy, school context, and the opportunities they have had to learn about supporting their students' subject-specific numeracy development. Information from these data collection events was analysed by mapping it onto each teacher's ZPD, ZFM and ZPA. For example, information about a teacher's pre-service education was included in the teacher's ZPD as it gave some indication of their MCK and PCK. Comments about colleagues could be linked to the teacher's ZFM or ZPA, depending on the nature of the comment. Classroom activities and teachers' personal conceptions of numeracy were described in terms of the numeracy model (Goos, 2007), as has been done in previous research (e.g., Goos et al, 2014). Individual case studies are being developed for each of the eight teachers that include a description of each teacher's personal conception of numeracy, classroom vignettes that illustrate how they provide numeracy learning opportunities in the subjects they teach, and a description and analysis of their identity as a teacher of numeracy in terms of their ZPD, ZFM, and ZPA.

A preliminary case study of Martin, an experienced history teacher from the metropolitan school, is presented in this paper. In particular, the case study illustrates how the adaptation of Valsiner's (1997) zone theory employed in this study can be utilised to describe and analyse identity as an embedder-of-numeracy. This case study includes information about Martin, a classroom vignette, and a description and analysis of his identity as a teacher of numeracy. While Martin teaches both history and English, the analysis presented in this paper focuses on his identity as an embedder-of-numeracy in history.

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Martins' story

School context

The school where Martin teaches is located in a low socioeconomic area in large metropolitan city. There are approximately 900 students, of whom 8% have Indigenous backgrounds and 5% have a language background other than English. Martin said that the profile of the school had not changed much since he began teaching there over twenty years ago. However, he feels that over the last few years there had been increased pressure on students to perform and he reported being required to allocate time during English lessons to prepare students for National Assessment Program – Literacy and Numeracy (NAPLAN) tests. For the last few years the schools' results in NAPLAN have been close to schools with students who have a similar average level of educational advantage but have been substantially below the Australian schools' average. In an effort to improve the numeracy capabilities of students, the principal of the school had agreed to the school's participation in the *Numeracy Project*.

Pastoral care at the school is organised around a "House system" where students belong to one of four Houses, each consisting of students from all year levels and administered by a group of teachers led by a "House master". Teachers at the school are allocated to a staffroom based on their affiliation to one of these Houses. In Year 8 and Year 9 classes are arranged in "POD groups" where students have one teacher for English and history and another teacher for mathematics and science. These two teachers belong to the same House and are therefore located in the same staffroom. Students in Year 8 study English, mathematics, science, and history in both semesters. In Year 9 the core subjects (English, mathematics and science) are taken in both semesters, while physical education replaces one semester of history. The school day is structured around four seventy-minute lessons, which means that three lessons per week are devoted to each of these subjects.

Background

Martin trained as a secondary physical education teacher, with history as his second teaching area. After completing this qualification over 30 years ago, Martin began his teaching career as a primary school physical education teacher. He remained in this role in primary schools for nearly ten years until he transferred to his current school. Over the last nine years he has gradually moved away from teaching physical education and has been teaching Studies of Society and Environment (SOSE) and English. He has also taught Year 8 and Year 9 mathematics; despite having only completed Social Mathematics, a non-calculus based subject taken in his final two years of school, and describing his mathematics ability at school as "very ordinary". Martin was familiar with the SOSE curriculum and, currently in his fourth year teaching English, described himself as "not really experienced in terms of English". In 2013 Martin's school introduced the Australian Curriculum: History (ACARA, 2011); however, Martin tends to refer to himself as a SOSE teacher rather than a history teacher. His teaching load in 2013 included a Year 10 history class and a Year 9 class that he had for both English and history.

Having completed his pre-service program prior to the time when numeracy was beginning to be a priority for the Australian Government, there was no focus on numeracy in this program and Martin had not taken part in any professional development that addressed numeracy across the curriculum, until his current participation in the *Numeracy Project*. Martin's involvement in this project resulted from a conversation in 2012 with one of the science teachers at his school. This teacher taught mathematics and science to the Year 9 POD group that Martin had for English and SOSE, a situation that was going to continue in 2013 (with history replacing SOSE). This teacher was interested in participating in the *Numeracy Project* so it seemed logical to Martin for him to be involved in the project as well. However, when asked about his motivation for agreeing to participate in the *Numeracy Project*, he linked it to his previous experience of teaching junior mathematics, saying that what appealed to him about the project was a focus on "non-maths trained people teaching maths" and that this "could be just another feather up your sleeve that you could use".

While there are opportunities for teachers from the same discipline to meet once a fortnight, Martin

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prefers to be in a staffroom with colleagues who are teaching the same subjects "because you have those day-to-day conversations that are incidental but are very, very important." He finds that many issues that could have been resolved through incidental face-to-face conversations now need to be dealt with via email.

According to Martin there is a lack of engagement from students and he finds it frustrating when students do not bring the correct equipment to class, citing laptops as an example. Although many students have hired laptops through a school program, Martin finds that often they "will leave the computer at home because they don't want to carry something like that".

Understanding of numeracy

Martin describes numeracy as part of everyday life; "money management, estimating time, distances, just general stuff like that". While he believes that in the past there was a perception that numeracy is the responsibility of the mathematics department and literacy is the responsibility of English teachers, this is slowly changing. He considers that "when an opportunity arises you've got to explore it if you can, if you've got the time, whether it's in the context of a science or a HPE lesson or whatever."

In his professional context as a history teacher, Martin sees his role in promoting students' numeracy learning as using opportunities when they arise within the course of lessons. He went on to clarify this:

> Do they understand the timelines? Do they understand the figures that are put there, say in terms of population growth? Things like that. Do they know what percentages mean in the context of the social science classroom? Do they understand when we are talking about mathematical things in the context of SOSE?"

Martins' classroom practice

A classroom vignette from Martin's Year 9 history class, that was part of a unit on the Industrial Revolution, illustrates how he was able utilise numeracy learning opportunities in the history curriculum.

Lesson description

Martin began the lesson by asking students to write a definition for life expectancy and average income per capita and then to compare their responses with another student. Following a class discussion about what these terms meant, Martin provided definitions and talked about the use of average income per capita to compare the wealth of nations. Students were asked if they thought there might be a relationship between life expectancy and income, what these criteria might have to do with the Industrial Revolution, and how they might be represented on a graph. Martin drew a set of axes on the whiteboard with life expectancy on the vertical axis and annual income on the horizontal axis but didn't provide a reason for presenting the data on a graph or labelling the axes in the way he did.

In the next phase of the lesson Martin showed a short video, Hans Rosling's 200 Countries, 200 Years, 4 minutes – The Joy of Statistics (http://www.youtube.com/watch?v=jbkSRLYSojo). This video is an animated presentation of data on lifespan and income for 200 countries over 200 years beginning in 1810. The graph had lifespan on the vertical axis and income on the horizontal axis (different labels from those used previously by Martin and in the task sheet students were subsequently given). The vertical axis is marked with 25, 50, and 75 years and horizontal axis is marked at $400, $4,000, and $40,000. These marks are equally spaced and no mention was made about the scales that were used. The animation began in 1810 with the names of all countries in the bottom left hand corner of the graph (described as poor and unhealthy). As the animation progresses towards 2010 the names of countries, beginning with those of European countries, moved towards the upper right hand corner (described as rich and wealthy). Students watched the video with no comment from Martin.

Following the video, students were given a task sheet that presented data on life expectancy and average income per person from 1800 to 2010 for the United Kingdom, Australia, and China (see Table 2 for an excerpt from this data) and included several questions about the data. Martin led a class discussion about the data that encompassed identifying the countries, the reasons for the squiggly lines in the table, and the purpose for using US dollars for the income data. He then asked students to

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construct two line graphs over time; one for life expectancy and one for average income per person. While he suggested that students use a legend to identify the graphs for each country, there was no discussion about the reason for using a line graph or what students should consider when choosing scales for their graphs.

Table 2
Excerpt of data from the task sheet

	United Kingdom	Australia	China
1880	Life expectancy 44 Average income per person $US 4894	Life expectancy 39 Average income per person $US 5800	Life expectancy 32 Average income per person $US 787
1900	Life expectancy 46 Average income per person $US 6322	Life expectancy 50 Average income per person $US 5432	Life expectancy 32 Average income per person $US 802
1920	Life expectancy 57 Average income per person $US 6401	Life expectancy 61 Average income per person $US 6450	Life expectancy 32 Average income per person $US 892
			
2010	Life expectancy 80 Average income per person $US 31217	Life expectancy 82 Average income per person $US 34835	Life expectancy 73 Average income per person $US 7931

After students had been given time to construct their two line graphs, the class discussed the graphs and possible reasons behind the changes in life expectancy and average income per person over time. This discussion was focused on questions such as: Why did the average income per person in Australia increase before that in the UK? Why were there differences in average income per person between Australia, the UK and China in 2010? At the conclusion of the lesson Martin collected students' work so that he could review it prior to the next lesson.

Teacher reflections

Martin's intention for the lesson was to use statistics to give students a better understanding of the Industrial Revolution, choosing life expectancy and average income per person because they were criteria that he felt students could relate to.

> You can look at things like the amount of cotton produced in Britain, how it dramatically increased or the amount of coal that was consumed. But I thought these were a little more real life data for them. In terms of how long a person lives, a very simple concept and the amount of money they have and then that relates back to obviously the idea of the Industrial Revolution generally. For most people the Industrial Revolution led to a better life.

The task sheet that Martin used for the lesson was from a resource package developed by the state

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education authority. Although he had not modified the task sheet prior to using it, in hindsight, Martin thought that the wording of some of the questions on the task sheet could have been improved.

> I looked at that question [referring to a question that asked students to give the year in which life expectancy in Australia overtook that in the United Kingdom] actually and I thought well that's one question I would have reworded because I thought it is asking for a specific year, in which year … I pointed out to some well, look, the time period is 1800 to 1900, no 1880 sorry to 1900. It seemed to cross about the mid-point so what's halfway between?

Martin felt that the activity had been beneficial for students although he thought that some students still didn't understand that China went through an industrial revolution later than the United Kingdom and Australia, even though this had been discussed in previous lessons. When asked about his planning for the lesson, Martin conceded that he was not aware of the icons in the Australian Curriculum that identified numeracy demands and could not remember anything about the numeracy model used in the professional development workshops of the *Numeracy Project*. If he were to use this activity in a future lesson, Martin would modify the questions on the task sheet but would still get students to construct the graphs because he thinks that is a "solid skill that they can use and in answering some of those questions it was easier actually to look at the graph."

Analysis of classroom practice

There were many numeracy learning opportunities in this lesson and, while he was able to utilise some of these, Martin did not fully exploit their potential. Martin's use of the video illustrates some lost opportunities. In terms of the numeracy model, the video clip included a *context* for the mathematics, used representational and digital *tools*, and promoted a positive *disposition* towards the use of statistics by the way the data was presented. Some *mathematical knowledge* was needed to interpret the graph. However, by making no comment on the video Martin missed the opportunity to emphasise a *critical orientation* by talking about the type of scale used (linear for the vertical axis and logarithmic for the horizontal axis) or how the scales used in the video could be misleading (horizontal axis crosses the vertical axis at approximately 20 years).

Getting students to construct a line graph from the table of data (both representational *tools)* and answer related questions required students to use *mathematical knowledge* in the *context* of understanding the impact of the Industrial Revolution on the lives of people. Some of the questions, such as the one that asked students to explain whether the data indicated that industrialisation was good for people, required students to use a *critical orientation* (i.e., what criteria could be used to make this judgment?). However, Martin's response to the question that asked students for the *year* in which life expectancy and income in Australia overtook that in the United Kingdom demonstrates another missed opportunity. For life expectancy, this occurred sometime between 1880 and 1900 (see Table 2). Instead of suggesting to students that they take the mid-point, he could have asked students if it was possible to answer the question from the data provided and if it was appropriate for the data points in the graph to be joined.

Martin's identity as an embedder-of-numeracy

Martin's potential to learn about developing students' numeracy capabilities through history (ZPD) is supported by his beliefs about numeracy being part of everyday life and his desire to utilise opportunities that arise in the subjects he teaches (e.g., comments about numeracy in SOSE). However, he may lack the necessary MCK and PCK as his formal study of mathematics was limited and numeracy across the curriculum was not part of his pre-service training, respectively. Evidence of potential lack of MCK and PCK is provided by the opportunities that Martin missed in the lesson described above. Martin may also lack confidence in his ability to provide numeracy learning opportunities for students if he lacks confidence in his own ability in mathematics and/or numeracy (e.g., his opinion of his mathematics ability as "very ordinary"). The introduction of the Australian Curriculum: History may present additional challenges for Martin as he comes to terms with the new curriculum. His admission that he is yet to look at the numeracy demands that are identified within the curriculum document suggests that, at the present time, his CK is inadequate.

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As Martin's opportunities for informal interactions with other history teachers is limited because of the way teachers are allocated to staffrooms, his only opportunity to learn about numeracy in history has come from his involvement in the *Numeracy Project* (ZPA). However, his engagement with this project appears to have been limited (indicated by his inability to remember anything about the numeracy model), perhaps due in part to the introduction of the new curriculum and the school priority to improve NAPLAN results (ZFM). Both of these provide affordances and constraints on the development of Martin's identity as an embedder-of-numeracy. Firstly, as numeracy is a general capability that must be developed across all curriculum areas, the introduction of the new curriculum gives Martin permission to have numeracy focused activities in history (ZFM); however, the introduction of a new curriculum also places additional time pressure on him as he becomes familiar with it (ZFM). Secondly, the school's focus of improving NAPLAN results has led to Martin's participation in the *Numeracy Project* (ZPA), while the need to use limited classroom time in English lessons to prepare students for NAPLAN tests may create pressure on him to "borrow" time from history lessons for NAPLAN preparation (ZFM) and may have contributed to Martin not having a clearly defined and rich personal conception of numeracy (ZPD). On one hand Martin describes numeracy in terms of understanding (e.g., "Do they understand the timelines?"); yet, on the other hand, he describes it as skills (e.g., drawing graphs). Availability of technology and lack of student engagement (ZFM) are also likely to impact on the activities that Martin feels he is able to do in the classroom.

Martin's capacity to utilise numeracy learning opportunities within history (i.e., his identity as an embedder-of-numeracy) will be determined by how characteristics within his ZPD, ZFM and ZPA interact. In the early stages of his participation in this study (and the *Numeracy Project*) it appears that while some of these characteristics are consistent and could potentially lead to him strengthening his identity as an embedder-of-numeracy, others are in conflict and could impede such growth. For example, he may be able to develop his knowledge base, in particular PCK and CK; and broaden his personal conception of numeracy (elements of his ZPD) through his participation in the *Numeracy Project* (ZPA). This may also foster growth in his MCK, resulting in greater confidence in his own ability to use mathematics in the context of history lessons. However, demands on classroom time and lack of access to technology (ZFM) along with limited opportunities for interaction with colleagues teaching history (ZPA) may place constraints on what is able to do in the classroom and how he is able to work collaboratively with colleagues, respectively. These characteristics are summarised in Table 3 with characteristics that might support or impede his development of an identity as a teacher of numeracy indicated with + and – symbols, respectively. Where a characteristic has both a positive and negative impact on his development, such as the introduction of the Australian Curriculum: History, both + and – symbols are used.

Table 3
Elements that contribute to Martin's identity as an embedder-of-numeracy

Zone of Proximal Development	Zone of Free Movement	Zone of Promoted Action
Belief that numeracy is part of everyday life (+)	Students' engagement (-)	Participation in Numeracy Project (+)
Personal conception of numeracy is not clearly defined (-)	Availability of technology (-)	Lack of informal interactions with other history teachers (-)
Limited MCK, PCK & CK (-)	Principal who supports the Numeracy Project (+)	
May lack of confidence in own mathematics ability (-)	Need to prepare students for NAPLAN tests (+ and -)	
	Introduction of the Australian Curriculum: History (+ and -)	

Concluding Remarks

In the current Australian context that includes a new curriculum (ACARA, 2014) and professional

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standards for teachers (AITSL, 2012) it is important to find ways to support teachers to acquire the attributes to recognise and exploit numeracy learning opportunities across the curriculum. One way of achieving this is to build an understanding of how teachers develop an identity as an embedder-of-numeracy. This will facilitate the design of professional development that assists teachers utilise these opportunities in the subjects they teach. In this paper some initial findings from a 2-year study have been used to demonstrate how an adaptation of Valsiner's (1997) zone theory could be employed to develop such an understanding, thereby extending earlier work in the study. Previously, this research has developed a conceptual framework for identity as an embedder-of-numeracy to guide data collection (Bennison, 2014) and argued that the adaptation of Valsiner's (1997) zone theory, as employed by Goos (2013), is an appropriate theoretical framework for the current study (Bennison & Goos, 2013).

A preliminary case study of Martin, one of the teachers participating in the study, is presented here and illustrates how empirical data can be mapped onto the ZPD, ZFM, and ZPA of a teacher to describe and analyse his identity as an embedder-of-numeracy. Martin understands that it is important for students to be numerate but does not appear to have a clear understanding of what numeracy is or how he can fully exploit numeracy learning opportunities in history. The findings from this case study suggest that assisting Martin to develop a clearly defined and rich personal conception of numeracy, providing opportunities for him to deepen his understanding of the connection between numeracy and learning history, assisting him to gain confidence using the mathematics associated with history, and aiding growth in his PCK may be ways to promote his development of a strong identity as an embedder-of-numeracy. Further work is needed to fully develop this case study and those of the other teachers participating in the study. This will allow cross-case analysis and identification of similarities and differences between the teachers, thus enabling recommendations to be made to assist in the design of meaningful professional development to support teachers from all disciplines to develop a strong identity as an embedder-of-numeracy.

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