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mathematics teachers: A pilot study**

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Exploring the identity negotiation of early career mathematics teachers: A pilot study

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Becoming a mathematics teacher is a period of intense identity negotiation. This study aims to understand how secondary mathematics teachers negotiate their identities during their first two years of teaching by exploring the internal forces that shape their understanding of being a mathematics teacher while navigating the social and cultural conditions of schools. Three early career teachers participated in a pilot study, which employed exploratory interviews supplemented with written personal reflections, and the collection of artefacts. In this paper I will look at the design of these data collection methods, and their potential to help develop a narrative inquiry. Such methods provide opportunities to collect extended narratives which explore teachers' histories, beliefs about mathematics, and the context in which they work.

Keywords: teacher identity; early career teachers; tensions; agency.

Background

A significant number of secondary mathematics teachers choose to leave the profession each year, and those in the first five years of teaching (early career teachers) are the most likely to leave. When making decisions about whether they can sustain a career in teaching, early career teachers will question both their personal and professional identities (Schaefer & Clandinin, 2019). Therefore, these multiple identities need exploring if there is to be an increased understanding of how best to support and retain new teachers. By allowing teachers the opportunity to voice how they navigate their school and policy contexts alongside their personal goals and ideals, teacher identity tensions are exposed and examined. Early career teachers are particularly likely to experience such tensions relating to their teacher identity (Pillen et al., 2013). These tensions can be productive, and support professional learning, but they can lead to frustration when teachers are unable to act in ways which are analogous to their identity. In this way, the teacher's identity is both a contributory factor to the tension and a way of resolving it, drawing on their identity to establish their priorities to make a decision (Enyedy et al., 2006). This demonstrates that for teachers, identity negotiation is an ongoing process (Beijaard et al., 2004) and one which relies "on prior iterations of a self while at the same time recreating themselves as professionals in relation to others" (Olsen, 2011, p. 244).

In this paper I will discuss the design of a pilot study which aims to understand how secondary mathematics teachers in their first two years of teaching negotiate their identities. Early career teachers' identity negotiations are shaped by interacting personal and contextual factors (Flores & Day, 2006), and few studies have looked at this interaction for secondary mathematics teachers. For my study to make an important contribution in this area, both context and personal experiences with mathematics are included in my research questions.

- What are the influences on early career mathematics teachers' emerging identities?
- How does context shape their teacher identities?
- How do teachers' experiences with mathematics influence the negotiation of teacher identities?

Methodology

In the main study, teachers' stories of their experiences will be collected in accordance with the definition of identities as "collections of stories about persons or, more specifically, as those narratives about individuals that are reifying, endorsable and significant" (Sfard & Prusak, 2005, p. 16). The stories represent who teachers are and becoming (Schaefer & Clandinin, 2019) and their identity negotiations as personal, contextual, and policy influences interact. The relationship between teachers' stories and their identity provides a sound theoretical basis (Beijaard et al., 2004) and therefore a small-scale narrative inquiry will be developed.

A pilot study is currently underway with the aim of trialling and evaluating the methods of data collection and analysis I propose to use in the main study. The participants are three secondary mathematics teachers from schools in the north of England, all in their second year of teaching. Although not an original intention during recruitment, two of the teachers work in the same mathematics department and are aware of each other's participation. Data collection has taken place online due to the COVID-19 pandemic and has consisted of each teacher completing a small number of written reflections, collecting artefacts, and participating in an individual interview conducted via a video conferencing platform.

I will now look at each data collection method in turn, discussing their potential to provide extended narratives of teachers' experiences and beliefs in order to better understand their identity negotiations as early career teachers of mathematics.

Written reflections

Written reflections have been used in previous research to explore the development of teacher identity during the early stage of a career, either with a particular focus on agency (Losano et al., 2018) or identity tensions (van der Wal et al., 2019). Tensions are an important concept in the identity negotiation of early career teachers, representing the potential conflicts that teachers can face between their ideals and the opportunities that are afforded to them within the school context. While these tensions can have a negative impact on both early career teachers' feelings and professional development (Pillen et al., 2013), they also have the potential to be a source of professional learning. When teachers are confronted with new approaches and alternative views, such tensions can prove to be productive (Goos & Bennison, 2019; Smagorinsky et al., 2004). Tensions experienced by the participants were therefore the focus of one of the two written reflections they completed at the start of the pilot study, prior to interviews. Participants were asked to describe an experience, either positive or negative, where they disagreed with a colleague. Follow up prompts were provided which probed their emotions and responses to the event and, while they were not mandatory to respond to, were designed to encourage deeper responses and reflections (see, e.g., van der Wal et al., 2019).

The second of the written reflections focused on identity negotiation as an answer to both “Who am I at the moment”, and “Who do I want to become?” (Beijaard et al., 2004). Participants were asked to describe a lesson they taught which they believe to best represent them as a mathematics teacher. Further prompts invited them to consider whether they would change anything about the lesson, allowing an opportunity to reflect on any changes in their practice or beliefs since then, and possibilities for the future. In a study which also utilised written reflections to explore identity development, Beauchamp and Thomas (2010) found that beginning teachers were more easily able to reflect on their past practice and improvements they could make, rather than look forward to their ideal future identity. This written reflection was therefore used to support participants in anticipatory reflection. By asking them to choose a lesson which best represented them, or their ideal self, the follow up interview could explore in further depth what aspects of this lesson were important to them and if they saw themselves teaching mathematics like this in the future.

A final prompt for the second written reflection asked participants to discuss how typical this lesson was of their teaching, in order to understand whether participants’ day-to-day practice aligned with the kind of teacher they saw themselves as or wished to be. Consequently, the extent to which they can teach in the way they had written about within their school context begins to expose any workplace opportunities or constraints which impact on their practice and emerging teacher identity. Where there are identified constraints, there is a potential for further discussion of how the participants navigate these. Some early career teachers may exercise agency by finding room to manoeuvre within these constraints (Day et al., 2006) or, at the very least, change their interpretation of these constraints (Goos & Bennison, 2019). However, for those teachers facing numerous constraints, the ‘costs’ of exercising their agency becomes higher (Day et al., 2006), demonstrating how institutional relationships have the power to shape a teacher’s identity and practice (Enyedy et al., 2006).

The collection of artefacts

Alongside writing about a lesson which best represents them, participants were asked to choose one or two artefacts that would help them discuss this lesson in more depth in an individual interview. The aim in identifying and sharing these artefacts was supporting participants’ recollection of the lesson and to encourage extended narratives in both their writing and interview. Artefacts can also help me to understand and contextualise the nature of the participants’ practice (Clandinin & Connelly, 2000; Hodges & Cady, 2012) and how this may be influenced by objects found in their particular school context. In this way, artefacts offer a potential opportunity to move between the micro-context (participants’ individual classrooms and interactions with others) and the macro-context (the impact of the school culture and educational policy). Akkerman and Meijer (2011, p. 316) argue that this micro-macro analysis enables a study of teacher identity “as a matter of the teacher being an active participant with a specific identity at a particular moment in a specific context, as well as the teacher being historically meaningful as a transcendent self recognizable through time”.

Interviewing participants

Interviews were chosen to discuss the participants’ written reflections in further depth, using their writing as starting points to explore their emerging teacher identities. With

the aim of producing detailed narratives, I used several open-ended prompts which offer interviewees more scope to share what is meaningful for them (Kaasila, 2007). Prompts such as “tell me more about...” were used, and occasionally coupled with short extracts of their writing. I chose these extracts in advance, paying attention to both explicit and implicit mentions of the school context, for example interactions with colleagues and students, school policies, norms, and resources.

Attention was also paid to the three-dimensional narrative inquiry space (Clandinin et al., 2009) when choosing extracts and question prompts for the interviews. This inquiry space is defined by sociality (the dialectic between inner and outer, the personal and social), temporality (past, present, and future) and place (in which experiences are lived out and told). The inclusion of the temporal space ensures that past experiences, both as a learner and teacher of mathematics, and future imaginings of participants’ teaching careers can be incorporated into a more comprehensive narrative.

Conclusion

Although I am yet to analyse this data, I would argue that the data collection methods discussed in this paper have encouraged participants to engage in extended narratives. What is perhaps more important for my main study is how the methods complement each other. Written reflections are a useful method of providing time and space to participants, in which they can reflect on their emerging identities. This reflection allows them to consider and write about what is important to them, and answer in ways I may not anticipate. The follow up interviews were a chance for me to deepen my understanding of what they wrote, by returning to extracts of their writing and using them as discussion points. This enabled me to clarify and probe where required, and better understand who these teachers were, are, and are becoming.

Further consideration is needed on the collection of artefacts alongside these two methods. While they succeeded in supporting participants’ recollections and narratives of their chosen lesson in the interview, and therefore possibly in their written reflections, they were less helpful in allowing me to understand the macro-context in which these teachers work. I acknowledge that the pilot study only provides a limited chance to collect artefacts, but it is not yet clear what strategies should be used in the main study for these artefacts to illuminate the contexts in which the participants work.

Working on the pilot study has exposed some of the challenges in researching something as complex as teacher identity. As I begin to analyse my data, I expect that further issues will become apparent in my choices and their ability to capture the intricacies of identity negotiation. But by allowing early career teachers the opportunity to share and reflect on such an intense period of identity negotiation, the findings of my study may provide valuable insights into the complexities of being, and supporting, an early career mathematics teacher.

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