FROM CLASSROOM TO CAMPUS: THE PERCEPTIONS OF MATHEMATICS AND PRIMARY TEACHERS ON THEIR TRANSITION FROM TEACHER TO TEACHER EDUCATOR

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This paper examines the experiences of teachers seconded as mathematics educators in the Faculty of Education at an Australian University. Data were collected from four participants who responded to a series of questions derived from an existing framework on the transition from teacher to teacher educator. The purpose of the study was to undertake a reflective exploration of the major challenges faced by seconded teachers from their perspectives, with the findings indicating that participants generally felt they lacked the requisite skills and knowledge required to teach in a tertiary environment. The study adds to the limited research in this area and has implications for tertiary providers and teacher educators.

Introduction

While extensive reference is made in the literature regarding the transition from pre-service teacher to beginning teacher, Badali and Housego (2000) claim that another very important transition is that from teacher to teacher educator. The two separate transitions, from pre-service teacher to teacher and then from teacher to teacher educator should be considered as a continuum of professional development (Badali & Housego, 2000).This appears, however, to be an under-researched area, as even within the widely researched realm of teacher education there has been relatively little written about teacher educators as an occupational group (Martinez, 2008). More specifically, research into the transition and experience of secondees from the role of teacher to teacher educator in the area of mathematics education appears to be uncharted territory. Such arrangements—often referred to as secondments—involve a teacher taking leave from a school temporarily to teach at the university in a full time capacity. Secondees are usually appointed for one or two years and in this context, undertake an 80% teaching load. At the time of writing, the author was in her second year of a seconded arrangement.

Review of the literature

There has been relatively little research about beginning teacher educators and even less about the experience of seconded teachers or seconded mathematics teachers. Some recent studies have used self study and reflective narrative to examine the transition process and experiences of new teacher educators (Swennen, Shagrir & Cooper, 2009;

Wood & Borg, 2010). These studies have recognised that whilst the transition from teacher to teacher educator can be rewarding it is also demanding and complex and requires supportive systems in place to facilitate the transition. In practice, however, it seems that new teacher educators are often given little guidance, with Swennen et al. (2009) suggesting that most new teacher educators organise their own induction. Zaslavsky (2008), who provides a rare example of research in this area directly related to mathematics teacher educators, claimed that teacher educators are essentially 'self-made'. That is, new teacher educators make their own transition from their experience as a mathematics teacher and there are few explicit curricula for mathematics teacher education. Some research, (e.g., Adams & Rytmeister, 2000; Martinez, 2008; Swennen et al., 2009) has attempted to address this through the identification of several key activities that could help facilitate the successful transition from teacher to teacher educator. These activities include new teacher educators working collaboratively with experienced colleagues on developing teaching material, receiving feedback on their tertiary teaching from colleagues in a supportive learning environment and creating a support group for professional discussion and the exchange of ideas (Swennen et al., 2009). There is little research, however, on how these ideas are enacted in practice or whether or not they make a difference to the experiences of new teacher educators.

The work of new teacher educators demands professional knowledge of content and pedagogy skills beyond those required by the classroom teacher (Swennen et al., 2009). Although new teacher educators may be considered good classroom teachers, they may not possess the knowledge and skills to be effective teacher educators. The category of teacher knowledge of particular importance for the new teacher educator is pedagogical content knowledge (PCK). This category, as conceptualised in the seminal work of Shulman (1986), represents the blending of content and pedagogy, and is the category most likely to distinguish the understanding of the teacher from that of the student. While PCK has been the focus of many studies involving pre-service teachers and practising teachers, it appears that research into the type of PCK that might be required for a teacher educator is still to be carried out. Murray and Male (2005) address this to some extent, in that they distinguish between first and second order teaching, whereby the classroom teacher practises first order teaching and the teacher educator practises second order teaching. According to them, second order teaching requires more than the skills and knowledge to teach particular content; it also involves the knowledge and skills about the education of teachers, implying a certain level of PCK. Similarly, Peled and Hershkovitz (2004) suggest that whilst there are inherent similarities between the learning of teachers and teacher educators, the teacher educators have a greater responsibility for connecting theory with practice. Other research (e.g., Guilfoyle 1995) highlights the requirement by teacher educators to understand the culture of academia. As new teacher educators usually have limited experience in academia, they may have difficulty making sense of the complexity of the role. For example, new teacher educators can experience conflict between teaching and research responsibilities (Adams & Rytmeister, 2000; Martinez, 2008; Wood & Borg, 2010).

Martinez (2008) identifies a gap in the field of research in the area of teacher education by highlighting a need for more systematic research into the fundamental characteristics of teacher educators. Such characteristics include how the work of teacher educators is constructed, the competencies relevant to teaching about teaching

and the necessary support and professional development required by teacher educators. He also identified six challenges for new teacher educators, including the changed nature of the learners (from school age students to adults), professional autonomy, institutional structures and size, work environment including technology, the modelling imperative (practising what we preach) and the research and promotion culture. Of particular relevance to this paper are the challenges he identified as being the shift from teaching school age children to adults, the need for self-management in an autonomous role and coming to terms with the research culture of university. Badali and Housego (2000) also constructed a framework for understanding the challenges involved with seconded arrangements, but they extended this to include the transition back into the classroom. Their framework identified seven phases of secondment: seeking the position, preparing for secondment, expressing self doubt, adjusting to tempo and workload and working with adult learners, looking for support, and returning to the school community. Both frameworks acknowledged the changed nature of the learners that the new teacher educator is required to teach, from school aged students to diverse adults in a non-compulsory environment. As Martinez's framework focused specifically on the transition from teacher to teacher educator, it was used as the main theoretical framework in the study discussed in this paper.

Methodology

Data collection and analysis

Using the framework devised by Martinez (2008) as a guide, a questionnaire was developed and administered to the participants via email. The items were as follows:

1. How did your past classroom teaching impact upon your tertiary teaching? (For example, were there any similarities or differences and what adaptations to your practice did you need to make when you began teaching at the university?)
2. How confident were you with the content that you were required to teach?
3. Comment on your experience of having to deliver other people's prepared material as a secondee.
4. List the top three challenges you faced as a classroom teacher making the transition to teacher educator.
5. What advice, if any, would you give a future secondee in light of your own experience?

The participants emailed their responses to the questionnaire to the author between five and ten days after receiving the questionnaire. Each participant answered all questions. The most detailed responses were given for the first item on the questionnaire. The responses provided for each of the five items were allocated to one or more of the six categories identified by Martinez.

The participants

The participants were four seconded teachers who were experienced classroom teachers. The author is included as one of the participants, with the other three participants being teaching colleagues of the author (one on a different campus). Jo, Ann, and the author were in the second year of their secondment, while Darryl had several years' experience as a secondee. (Names are pseudonyms.) Jo and Ann were both from a primary school teaching background whereas the author and Darryl were high school mathematics

teachers. Darryl and the author taught only mathematics curriculum units whereas Jo and Ann were asked to teach into a range of discipline areas including literacy, numeracy, and generic Education units.

Results and discussion

This section presents the results and discussion, structured around the challenges identified by Martinez (2008).

New learners: Children to adults

Martinez (2008) acknowledges that a different set of skills and knowledge is required to teach a diverse range of adults in a non-compulsory educational setting, and that this marks a key transition challenge for new teacher educators. For example, while classroom management of challenging behaviour from children is less of an issue in the tertiary setting, dealing with older students in a fee paying non-compulsory setting "can be daunting and harrowing" (Martinez, 2008, p. 39). The same concern was raised by the participants in this study, who commented on the management of adult learners, including establishing rapport and communicating expectations (such as mobile phone etiquette). Ann and Jo both indicated that they needed to make adaptations to their style of teaching at university, from the inquiry-based student centred style in the primary classroom, to a more teacher centred delivery of content. "It was different using power points and having to be the leader more; less discovery work than primary school" (Jo).

Assessment emerged as a strong theme in terms of highlighting the differences between teaching children and adults. The process of assessment in the primary setting is often ongoing and formative, and influenced by opportunities for sustained interactions over a year long period. Assessment of assignments at university, however is summative and proved to be challenging for Ann in particular:

> As the more structured approach was not the main approach used in my primary/learning support teaching years, I find the assessment structures and practices frustrating sometimes. In the primary setting I was used to ongoing assessment of students that I taught daily, allowing me to get to know them well.

Jo, Ann, and the author saw the marking of assignments for students as an issue, made even more challenging by needing to cater for students studying in both online and face-to-face modes. The issue of providing pre-service teachers with feedback on assignments and how much time to spend marking each assignment were common themes within the responses given by the participants, with Jo indicating that she was challenged with "knowing what to expect in assignments and to be able to give clear feedback" The author found the marking particularly challenging at first given that her experience with assessment as a high school mathematics teacher involved marking mathematical items rather than written assignments:

> The marking is so relentless and I found it a real challenge to mark a written assignment of 2000 words as I have been used to marking mathematics problems. Getting used to understanding referencing was a challenge.

It is not surprising that the assessment processes in a tertiary setting proved to be challenging in that most of the participants had not undertaken any further academic study since receiving their teaching qualifications, nor were they used to marking large volumes of material. While moderation processes assisted with establishing

expectations, many participants still felt that they lacked the in-depth knowledge and skills required to critique tertiary writing.

While some contrasts between teaching children and adults were evident, interestingly the secondees indicated that they did not tend to change their approach to teaching mathematical content. In general, they found that the pre-service teachers lacked confidence with mathematics, had poor mathematical content knowledge and had similar learning needs to school age students. Ann noted the following:

> Not so much of a big change with the first year students because their needs are quite high and I found myself using the strategies I used as a primary teacher to get maths concepts across.

Darryl suggested that the pre-service teachers' lack of "productive dispositions" towards mathematics presented a major challenge for developing their mathematical knowledge for teaching. This point was also raised by the author who indicated that some groups of pre-service teachers held the view that mathematics is about knowing formulae and following procedures and that they may not be receptive to developing a more relational understanding of mathematical concepts. Overall, the participants were surprised at the pre-service teachers' lack of content knowledge and the extra challenges this raised; essentially they were seconded to teach 'how to teach mathematics' but instead found themselves teaching mathematics. This issue raises the question as to whether or not this challenge is unique to secondees teaching in this particular discipline area.

Autonomy

In her framework, Martinez (2008) refers to autonomy as the requirement for self-management by a new teacher educator. Items 2, 3, and 4 from the questionnaire were particularly useful in eliciting responses from the participants that were related to this category. Three secondees, for example, highlighted the contrast between the regimen of the school term and the more flexible working arrangements at the university. Jo, Ann, and author commented that this new autonomy made them feel more like trusted professionals. "I have been included as part of the staff, and trusted to act professionally, such as being able to work from home" (Jo). There were, however, some challenges associated with professional autonomy including the issue of self management. Jo, Ann, and the author highlighted the need to learn to cope with the contrast between relatively 'quiet' times and more hectic periods involving a combination of teaching, marking, study, and research. Similarly, Martinez claims that new teacher educators' autonomy is often accompanied by overwhelming workloads at particular times during the academic year.

Institutional structures and size

The institutional structures and size of a university are often vastly different to a school. According to Martinez (2008) studies have indicated that coming to terms with institutional complexities is a key challenge for new teacher educators. Contrary to this claim, responses from the participants in this study indicated that this was not a particular issue or challenge for them.

Work environment (including technology)

Martinez (2008) highlighted the increasing sophistication of the online learning environment and its implications for new teacher educators who may be required to teach in this mode. The participants in this study were expected to teach in a variety of modes, including online, and to make use of online communication systems. Three participants commented on the requirement to grasp the technology associated with online teaching; however, they were primarily concerned with the pedagogy of online teaching rather than the use of the technology. The participants' main concern in terms of teaching mathematics was the perceived difficulty in an online environment of replicating the types of practical experiences afforded in the face-to-face mode, which they were more comfortable with having come from the classroom. The following quote was part of Ann's response to the fourth item on the questionnaire:

> Online learning is new to me. I have only had one online (maths) unit to teach so far and I did not enjoy this compared to face-to-face delivery. In face-to-face tutorials I can give instant feedback in many ways: verbally, using a model or diagram and this is much more difficult through online delivery

The modelling imperative

Martinez (2008) suggests that the modelling imperative is the most challenging aspect of the transition of a new teacher educator. "Practising what [we] preach" (Martinez, 2008, p. 42) involves a very high level of meta-cognition, as the teacher educator must be able to explain and justify their teaching practices. Jo and Ann generally felt confident with teaching content that was closely aligned with the content of the primary school curriculum, but often found the more theoretical aspects of the units challenging, as the following quote illustrates:

> In some areas I was confident—curriculum ones especially reasonably confident especially with first year pre-service teachers. Less confident in some where there is a huge theory base—I needed to read a lot and understand some of the particular theories again (Jo).

Darryl and the author expressed an initial lack of confidence with teaching about primary pedagogy, rather than the mathematics itself. Although both had a strong mathematics background, they lacked the experience of teaching in a primary setting and therefore felt their PCK, particularly in the area of primary mathematics, was inadequate. Darryl highlighted the challenges involved, particularly at the beginning of the secondment, with understanding the fundamental ideas underpinning a particular lecture or tutorial when it was written by someone else, usually an established academic. The author experienced similar concerns and had not anticipated the level of background reading and thought processing required to make sense of a pre-prepared lecture, as the following quote illustrates:

> I felt out of my depth. I had anticipated that teaching a primary mathematics curriculum unit would be difficult as I have a high school maths teaching background. Sometimes I appeared ill prepared because at times I resorted to reading the slide and the students can really see through that. The background reading and mental thought processing that has to happen to make sense of one slide is considerable.

In contrast, Jo and Ann commented that one of the strengths of being a secondee was that the pre-service teachers valued their 'real world' classroom teaching. "The students

appreciate what you have to offer and are grateful for your school experience" (Jo). It is interesting to note that Jo's comment was made in relation to her teaching of a generic unit on assessment and reporting, rather than mathematics.

Research and promotion

A lot of the references to this category came from responses to the fourth item on the questionnaire. Although secondees may be encouraged to become involved in research, unlike academic appointments they are not required as part of their conditions to do so. Ann and Daryl expressed concerns about the pressure to undertake research and the negative impact this may have on their teaching. The extent to which all the participants perceived this to be a challenge varied.

> As a teaching only secondee, I have limited knowledge of this area. However it appears that there is great pressure on and a struggle for academics to meet research deadlines. I have decided not to go down this path as it would impinge on the quality of my teaching. (Ann)

This comment tends to suggest that Ann considers teaching and research to be mutually exclusive, and that it is not possible to excel at both. Darryl, too, felt strongly about what he perceived as conflicting interests between teaching and research:

> I had expected the university to be an intellectually vigorous institution focused on producing students who had the capacity to be effective teachers upon completion of their degree but I think the University is primarily concerned with research.

For others, however, the opportunity to become involved in the research culture was viewed as stimulating and highly motivating. "At the start of the secondment, hearing academics talk about writing papers or journal articles seemed so new and foreign, whereas now it's part of working life at university and something I hope to aspire towards" (the author).

Summary

The data provided an insight into some of the key issues with becoming a new teacher educator as identified by the four secondees at a particular time during their secondment. Whilst many of the responses were able to be categorised into Martinez's (2008) framework of challenges, some appeared to be more relevant than others, and some additional themes arose. One of these relates to the skills and knowledge needed to teach teachers. Although the secondees were experienced and competent classroom teachers, they felt they did not have the skills and knowledge to effectively link theory with practice as required by the teacher educator. While their recent classroom experience was unexpectedly advantageous in assisting pre-service teachers with their mathematical content knowledge, they were all too aware of a lack of experience with teaching in a tertiary environment. Related to this were the additional challenges associated with assessment processes, teaching in an online environment, and not being part of the research culture. This raises the question of how best to support secondees with this knowledge acquisition given that ultimately this knowledge must be actively and personally constructed by the individual secondee. Another related theme to emerge was the conflicting combination of pre-service teachers' low mathematical skills proficiency and the secondees' developing knowledge for teaching in a tertiary setting. Although the secondees aimed to teach the pre-service teachers how to teach the

mathematics, they first had to address the content itself because the pre-service teachers did not have the foundational content knowledge.

Conclusions

This study has added to the limited research on the transition from teacher to teacher educator in the area of mathematics education, through providing an account of four different perceptions of aspects of this transition. The findings indicate that Martinez's (2008) framework proved useful in interpreting participants' responses, but there are indications that the framework could be extended to include other aspects; a future study involving in-depth interviewing of secondees' experiences may help to inform this. The main concern or challenge raised by the participants related to their perceived lack of teacher-educator PCK. This raises the question of how best to support secondees with this knowledge acquisition, given that ultimately this knowledge must be actively and personally constructed by the individual secondee. An unexpected challenge, and perhaps one that was unique to mathematics education secondees, was the need to address the pre-service teachers' lack of mathematical content knowledge. While some participants viewed this as an opportunity to capitalise on their recent primary classroom teaching, others felt that their secondary teaching background impacted upon their ability to do this credibly.

While admittedly the study was limited in terms of sample size and data generation, it does raise some questions about the preparedness of secondees to teach pre-service teachers about teaching, particularly in the area of mathematics education. It was also interesting to note that at least two of the participants questioned the value of research, leading one to question whether or not the University's policy of not requiring secondees to research is counterproductive to the research culture it should be trying to foster. Overall, however, the participants were positive about their seconded experiences and the opportunities to link practice with theory; it is hoped that this account will help to inform tertiary providers about the need to foster secondees' transition from teacher to teacher educator.

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