Title

Pre-service geography teachers' confidence in geographical subject matter
knowledge and teaching geographical skills

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Abstract

This research tracked the confidence of sixteen undergraduate and postgraduate pre-service geography teachers as they completed a single semester, senior phase geography curriculum course. The study focused specifically on the pre-service teachers' confidence in geographical subject matter knowledge and their confidence teaching geographical skills. Data were gathered from participants through two surveys (one at the start of the semester and one at the end of the semester), interviews following video-taped micro-lessons in which participants taught a geographical skill to the class, and focus group discussions. Undergraduate students were more likely to have completed a larger number of geography discipline courses than the postgraduate students – a consequence of the program structure and selection process into the program. Results indicate that undergraduate students were also more likely to report higher levels of confidence in geographical subject matter knowledge and teaching geographical skills. Participation in microteaching activities appears to have had a positive effect on most participants' level of confidence teaching geographical skills. These results have implications for geography curriculum courses taught in initial teacher education programs, particularly shorter graduate entry programs.

Keywords

Geography teaching, teacher confidence, microteaching, pre-service training, Australian curriculum change

Introduction

Geography education in Australia has been in the spotlight in recent years (e.g. Ferrari, 2006; Maude, 2014; Hutchinson, 2005; Topsfield, 2007) including a national study on the teaching of geography in Australian schools (Erebus International, 2008). Much has been written since on the importance of geography education to young Australians and the continued need to develop young people's knowledge and understanding of geographical concepts, content and skills (e.g. Berry & Smith, 2009; McInerney, Berg, Hutchinson, Maude, 2014; Maude & Sorensen, 2009). The recent implementation of the *Australian Curriculum: Geography F-10* (Australian Curriculum, Assessment and Reporting Authority, 2013) is evidence that calls to promote geography's position within the Australian education system have been noticed.

The implementation of the new national geography curriculum has also drawn attention to teachers of geography, including pre-service geography teachers. The Professional Standards for Teaching Geography (GeoStandards, n.d.) provide a framework of aspirational goals for qualified geography teachers in Australia. The first of nine standards suggests that geography teachers should "know the breadth and depth of the academic discipline including its concepts, skills, values and understandings". Subject matter expertise is undoubtedly important for a senior geography teacher; a lack of subject matter expertise identified among geography teacher graduates is therefore of concern (Lambert, 2002; Segall & Helfenbein, 2008).

Previous research has focused on the level of pre-service geography teachers' disciplinary knowledge and ways in which geographic concepts, content and skills can be 'infused' into geography teacher training programs to bolster pre-service teachers' subject matter knowledge (Bednarz, Heffron & Tu Huynh, 2013; Segall & Helfenbein, 2008). The study reported here seeks to contribute to this body of research by examining pre-service geography teachers' confidence in their subject matter knowledge and their confidence teaching geographical skills. The research tracked sixteen under-graduate and graduate-entry pre-service geography teachers as they participated in a senior phase geography curriculum course as part of their teacher training program. It focused specifically on the effectiveness of the use of microteaching opportunities to strengthen the pre-service teachers' subject matter confidence and their confidence teaching geographical skills.

Curriculum change

The subject of Geography was subsumed into the integrated Studies of Society and Environment (SOSE) or Human Society and Its Environment (HSIE) in a number of states and territories in Australia in the 1980s, reducing geography from a stand-alone subject to a single strand of 'space and place' (Australian Education Council,

1994). This integration resulted in a compromise in the quality of geography teaching in schools, a decrease in the number of school students participating in Geography and a generation of Australians with limited geographical literacy (Australian Academy of Science National Committee for Geography, 2007).

In 2007 the committee appointed to review the Adelaide Declaration on National Goals for Schooling in the Twenty-first Century recommended that geography, history and economics should be taught not as an integrated subject but as separate disciplines areas. This was followed by the agreement of national, state and territory governments to work towards a national curriculum for core subjects, which included geography, and the establishment of the Australian Curriculum, Assessment and Reporting Authority (ACARA) (Maude, 2014). The Australian geography education community mobilised to shape the direction and development of the new geography curriculum in response to these developments (e.g. see Berry & Smith, 2009; McInerney, Berg, Hutchinson, Maude & Sorensen, 2009). It is against this backdrop that the Australian Curriculum will offer geography as a core, stand-alone subject with the phasing in of the *Australian Curriculum: Geography F-10* in all states and territories from 2014 onwards (ACARA, n.d.), strengthening the position of geography in Australian schools once again (Maude, 2014).

Geography teacher training programs

In response to the implementation of the national geography curriculum, initial teacher education programs are moving away from SOSE and are instead preparing pre-services teachers to teach geography as a distinct subject. Initial teacher education therefore must develop pre-service teachers' knowledge and understanding, skills, values, and attitudes specific to geography (Berry & Smith, 2009). Teacher education programs offer a number of pathways for those who want to teach geography in secondary schools (see Robertson, 2004). For example, at the university in which this study was conducted, students must have studied at least six geography discipline courses before they undertake two geography curriculum course in the Bachelor of Education (Secondary) (B.Ed.) program. Those students who enter the one-year, full-time Graduate Diploma of Education (Secondary) (Grad Dip) are expected to have completed the requisite discipline courses in their previous tertiary studies. Up until the point of embarking on the curriculum courses, students have knowledge base of the discipline only as "subject matter knowers" (Berliner, 1986). The curriculum courses, on the other hand, are designed to provide prospective teachers with the knowledge and skills to become "subject matter teachers" by providing them with the opportunity to master curriculum and develop pedagogical skills to teach geography.

Pre-service geography teachers' geography experience

In initial teacher education programs it is assumed that pre-service teachers have competence in geographical subject matter (both geographical skills and geographical content) gained during geography discipline courses by the time they enter their geography curriculum courses (Rynne & Lambert, 1997). Based upon this assumed level of competence, geography curriculum courses traditionally focus on curriculum knowledge and pedagogical content knowledge (Stimpson, 2005). However, it is inevitable that even those students who have completed geography coursework, whether as a major or as part of the initial teacher education program, will inevitably find gaps in their geographical subject matter knowledge due to the broad nature of the discipline. Furthermore, Rynne and Lambert (1997) argue that there is often a mismatch between what pre-service teachers learn in university discipline courses and the content that they are expected to teach in a geography classroom.

Pre-service geography teachers' confidence teaching geographical content and skills

Findings specific to geography education suggests that lack of geographical content knowledge (Bednarz, Heffron & Tu Hunh, 2013), geographical and mapping skills (Anderson & Leinhardt, 2002; Gilsbach, 1997) and geographical literacy (Chiodo, 1993) have a negative impact on pre-service teachers' confidence in teaching geography. Alarming, a study conducted by LeVasseur (1999) found that when pre-service teachers' knowledge and skills were tested, they scored no better than, and held the same misconceptions as, their future students. Variations between the content that pre-service teachers learn in their geography discipline courses and the content that they are expected to teach in a geography classroom is suggested as a key factor contributing to feelings of low levels of competence and confidence (Rynne & Lambert, 1997).

This shortfall of geography discipline knowledge leaves many pre-service teachers feeling unprepared to teach geography (Bednarz, Heffron & Tu Huynh, 2013). Anderson, Bartholomew, Moeed & Kinsella, (2009) suggest that a lack of discipline knowledge may directly influence pre-service teachers' classroom practice and ultimately students' learning outcomes (Anderson, Bartholomew, Moeed & Kinsella, 2009). However, other studies (Barrett Hacking, 1996; Wolfe, 2002) have found that the number of geography discipline courses that pre-service teachers complete, and therefore their exposure to geographical subject matter, has little impact on the success of the students taught by the pre-service teachers during their practicum.

Knowledge base for teaching

Shulman (1986) identified categories of knowledge that are necessary for effective teaching, including subject matter content knowledge, pedagogical content knowledge and curricular knowledge:

- *Subject matter content knowledge* includes a knowledge and understanding of the key concepts and skills of the discipline;
- *Pedagogical content knowledge* is knowing how to represent that content knowledge in a way that makes it accessible to students; and
- *Curricular knowledge* includes knowledge of the curriculum and teaching resources and the capacity to assess the applicability of “the use of particular curriculum or program materials in particular circumstances” (Shulman, 1986, p.10).

Pedagogical content knowledge is the knowledge base necessary for geography teachers to achieve effective teaching of their subject area to meet the cognitive and emotional needs of students. First enunciated by Shulman (1986), pedagogical content knowledge involves the blending of content and pedagogy into an understanding of how particular content knowledge is organised, represented and adapted to the diverse interests and abilities of students, and presented for instruction. That is to say, pedagogical content knowledge is that “...particular amalgam of pedagogy and content [that] makes teachers different from [other] scholars in the field...” (Gundmundsdottir, 1987, p.4).

The comprehended ideas are not taught in a form as stored in the teacher’s memory, but *transformed* by thinking “...one’s way from the subject matter as understood by the teacher into the minds and motivation of learners” (Shulman, 1987, p.16). The transformations of *preparation, representation, selection, adaptation* and *tailoring* to student characteristics, require combinations or ordering of these processes, “...each of which employs a kind of repertoire” (Shulman, 1987, p.16). Shulman (1987, p.16) states that these forms of transformations “... are the essence in the act of pedagogical reasoning, of teaching as thinking, and of planning – whether explicitly or implicitly – the performance of teaching.”

However, as Stimpson (2005) notes, the process of developing pedagogical content knowledge is a challenging one for beginning teachers as they try to accommodate the varying theories of classroom practice. Beginning teachers are inclined to make variable judgements about students’ misconceptions and tend to view teaching as telling rather than representing content for student understanding (Hogan, Rabinowitz & Craven, 2003). Wilson (1991) states, however, that we cannot expect beginning teachers to have a wealth of representations that experienced teachers may have accumulated after years of practice. Instead, teacher education courses should at least equip pre-service teachers with the skills and understanding necessary to generate representations of subject matter content knowledge in ways that take advantage of what students already know and believe.

Microteaching geographical skills

Microteaching is a “scaled-down” teaching encounter in which pre-service teachers undertake a peer teaching activity, for which they receive feedback, during a short period of time (Cruickshank & Metcalf, 1993). Microteaching has been established as effective means to help pre-service teachers to master pedagogical skills, develop subject matter content knowledge, and become effective teachers and reflective practitioners (Amobi, 2005; Cruickshank & Metcalf, 1993; Golightly, 2010; l’Anson, Rodrigues & Wilson, 2003). It is also a valuable means to help pre-service teachers connect theory to practice and to build teaching confidence (Bartholomew, Mooed & Anderson, 2011; Brent, Wheatley & Thomson, 1996; Fernandez, 2010).

Video-taping microteaching experiences provides pre-service teachers with the opportunity to reflect upon their pedagogical skills and pedagogical content knowledge through video stimulated recall (Amobi, 2005; Lambert & Balderstone, 2010). Microteaching and videoing has been recommended in geography teacher training (Lambert & Balderstone, 2010) to help pre-service geography teachers develop their geographical content knowledge through ‘doing geography’ (Walker in Bednarz, Heffron & Tu Huynh, 2013, p.46) and to provide pre-service teachers with learner-centred teaching opportunities (Golightly, 2010).

Research objectives and methods

The purpose of this study was to examine pre-service teachers’ confidence in geographical subject matter knowledge (geographical content and geographical skills) and their confidence teaching geographical skills.

Context of the study

The study was conducted in two initial teacher education programs – B.Ed. (Secondary) and Grad Dip (Secondary) – at a university in Queensland, Australia. The university offers a range of teacher education programs that prepare students to teach in a variety of settings (early childhood, primary (Years 1-6); junior secondary (Years 7-10); senior phase (Years 11-12); and vocational and professional education) across three campuses in Southeast Queensland. The B.Ed. program is run over three-and-a-half years (with one summer and one winter semester intensives). Students undertake geography discipline courses during the first two years of the B.Ed. program; in their third year they participate in two geography curriculum courses (junior secondary geography curriculum and senior phase geography curriculum). These students also complete a capstone (discipline-based) course in their final year of study. The Grad Dip is a one year graduate entry program in which students undertake no discipline courses, only curriculum courses in their teaching areas (e.g. junior secondary geography curriculum and senior phase geography curriculum) in addition to teacher education and professional experience courses.

The study reported here was implemented during the senior geography curriculum course, which is run in the second semester. By this time, the B.Ed. students have undertaken four weeks of in-school practicum and the Grad Dip students have undertaken one six week block of in-school practicum. The curriculum course runs for nine weeks, during which time students have 24 hours of face-to-face contact, as well as online contact through the university's electronic BlackBoard site.

The participants

Letters of invitation to participate in the study were distributed to pre-service teachers in their first tutorial of the senior phase geography curriculum course. Sixteen pre-service teachers across two campuses formally agreed to participate in the research project. Participants could withdraw at any stage during the semester, and were assured anonymity. The participants were all assigned a pseudonym.

In total, sixteen pre-service geography teachers participated in the study. This group comprised eight participants from each campus and included ten Grad Dip students and six B.Ed. students. All participants were enrolled in the same curriculum course (senior phase geography curriculum), which prepares pre-service geography teachers to teach senior geography.

Surveys

The participants completed two surveys, one at the start of the semester and one at the end of the semester. The first survey collected data on the participants' completion of geography discipline courses at a tertiary level. Participants were also asked to indicate their level of confidence (on a scale of one to five) in their knowledge and understanding of a list of geographical content that is typical of what they might expect to teach in a high school geography classroom (e.g. hazards, biodiversity, biomes, urban settlement, geography of disease, human and economic development etc.); their confidence in their knowledge and understanding of a list of geographical skills taught and used in a high school geography classroom (i.e. grid and area references, using and interpreting topographical maps, working with statistics, interpreting aerial photographs and satellite images etc.); and their level of confidence if they were asked to teach these geographical skills.

Participants completed the second survey at the end of the semester. During the semester, all students (regardless of whether they elected to participate in the research or not) participated in microteaching activities (see below). The second survey again asked the participants to indicate their level of confidence (on a scale of one to five) in their knowledge and understanding of the same list of geographical skills; and their confidence if they were asked to teach these skills.

Microteaching geographical skills

During the semester, pre-service teachers selected a geographical skill from a predetermined list to prepare a microteaching activity for their peers. The skills were selected from the Queensland Studies Authority (2007) Senior Geography Syllabus and the *Australian Curriculum: Geography F-10* (2013) and are skills that geography teachers could be expected to teach across various year levels of a school geography program (Table 1).

[Table 1 here]

The rationale for implementing the microteaching activities in the senior geography curriculum course was to provide the students with the opportunity to put theory into practice (Fernandez, 2010) while building their teaching confidence (Brent, Wheatley & Thomson, 1996) and developing their subject matter knowledge and pedagogical skills, and ultimately their pedagogical content knowledge (Amobi, 2005; Cruickshank & Metcalf, 1993; Golightly, 2010; l'Anson, Rodrigues & Wilson, 2003).

Data collection methods and data analysis

A mixed method approach to data collection was used, with qualitative and quantitative data gathered from pre-service geography teachers through two surveys, unstructured interviews following microteaching activities, and focus group discussions, as detailed here:

- surveys were completed by pre-service geography teachers at the start of the semester (n = 16) and at the end of the semester (n = 16);
- unstructured interviews with pre-service teachers (n = 13) during video-stimulated recall following microteaching activities (for see Reitano & Harte, forthcoming) ;
- focus group discussions with postgraduate pre-service geography teachers (n = 7) and undergraduate pre-service geography teachers (n = 4).

The data were analysed for patterns and trends in the pre-service teachers' confidence in geographical subject matter knowledge (geographical content and geographical skills) and their confidence teaching geographical skills.

Findings and discussion

The findings of the study are reported and discussed under the following headings: geography education experience; geography education experience and levels of confidence; and confidence teaching geographical skills.

Geography education experience

Subject matter knowledge – geographical content and geographical skills – gained through geography discipline courses is one of the factors identified as contributing to pre-service teachers' confidence in teaching geography (Anderson & Leinhardt, 2002; Bednarz, Heffron & Tu Hunh, 2013; Chiodo, 1993; Gilsbach, 1997). In the initial teacher education programs in which this study was conducted, the expectation is that pre-service teachers would have gained their subject matter knowledge in geography discipline courses before enrolling in their geography curriculum courses. Prospective students in the graduate entry Grad Dip program are assessed for eligibility to teach senior curriculum subjects (i.e. based on completion of the required number of discipline courses in previous tertiary studies), while B.Ed. students complete their discipline courses as a part of their initial teacher training program.

Survey results from the study show that the B.Ed. participants were more likely have completed a larger number of geography discipline courses than the Grad Dip participants. As the discipline courses are part of the overall program, it is not surprising that all B.Ed. participants had completed the requisite six geography discipline courses at the time of the study. Results for the Grad Dip participants were more concerning, however. Only two of the ten Grad Dip participants had completed the requisite six (or more) geography discipline courses during their undergraduate training. The median number of completed courses by the Grad Dip participants was four, with one participant reported completing only one geography discipline course in their previous tertiary studies.

Grad Dip participants were also more likely to raise concerns about the distance of time between their own geography education and the commencement of their geography teacher-training program. Related to this was the shift in geography education since their experience to inquiry-based learning. Diane and Erika discussed how geography education today is 'different' to the geography education they experienced:

[Diane¹, Grad Dip] Well for me, before that it was a really long time since I've done geography at school and when I've done it, it was different to this type of geography ... I think the nature of geography as well has changed, like as a subject from back in the day there was that idea that it was the places and...locating, that kind of thing. Whereas that has totally changed now where it's...

[Erika, Grad Dip] Yes, and now it's like issues and impacts instead of the just your knowledge. It's bringing in the other, those other criteria ...

Most participants identified as a being confident in either human or physical geography; very few reported being confident in both. Although most B.Ed. participants also reported being more confident in either human or physical

geography, no B.Ed. participant raised this as an issue during focus group discussions. This issue appeared to be of greater concern to the Grad Dip participants, as seen in the following conversation between Emily, Erika and Frances:

[Emily, Grad Dip] ... also any of the content that I had was not the human based geography stuff so that was very unfamiliar for me and a little bit scary because I know nothing.

[Erika, Grad Dip] I'm similar too, but the opposite. I only really knew the human stuff ... the scientific kind of background stuff threw me completely and I still would not want to teach that yet. I'm not confident teaching that.

[Frances, Grad Dip] ... I only ever really had a couple of subjects that were kind of geography focused [at university]. Obviously geography content came into the whole of my degree, but only a few that were kind of earth sciences or geography. But that was more like geology and just rocks and that real physical geography, not much of the human stuff.

These concerns most likely reflect the broad nature of the discipline of geography. It is also possible that they highlight a certain degree of mismatch between the content taught in geography discipline courses and the content knowledge expected of geography teachers (Rynne & Lambert, 1997). Both explanations lend support to Barrett Hacking's (1996) suggestion that pre-service geography teachers are more likely to feel that they are learning new content rather than drawing on their existing expertise in their school placements.

Geography education experience and levels of confidence

Results from this study suggest a positive correlation between the number of geography discipline courses completed and the participants' level of confidence in their knowledge and understanding of geographical content (Table 2). This result is in contrast to that reported in previous research (e.g. Barrett Hacking, 1996; National Assessment of Education Progress Report, 2001; Wolfe, 2002), which found that the number of geography discipline courses completed by pre-service teacher did not necessarily translate in an increase in confidence in geographical content knowledge. In the study report here, the level of confidence reported by participants increased with the number of geography discipline courses the participants had completed.

[Table 2 here]

In general, the Grad Dip participants most of whom reported that they had completed less geography discipline courses, indicated lower levels of confidence in their

knowledge and understanding of a list of themes that they might expect to teach in a high school geography classroom. Many of the Grad Dip participants were anxious about their lack of geography experience at tertiary level, recognising the impact that this had on their level of confidence teaching geography. Louise's and Diane's comments are typical of those made by the Grad Dip participants:

[Louise, Grad Dip]... I think another reason why some people might be nervous about [their geographical content knowledge] is because the uni just assumes that you've done so many units in [geography]. So you're competent ... to understand, when you're obviously not ...

[Diane, Grad Dip] Like at uni, like Louise said, they assume that we have this wealth of knowledge from our undergrad [studies] and for some of us that was a bloody long time ago. It's just that knowledge has been dumped because I need space for something else in there.

The B.Ed. students, most of whom had completed six or more geography discipline courses (i.e. the requisite number of discipline courses needed to enrol in the senior geography curriculum course) indicated a higher level of confidence in their geographical content knowledge. A similar pattern emerged in the participants' level of confidence of their knowledge and understanding of geographical skills, a key component of geography teaching and essential in the development of geographical knowledge and understanding (GeoStandards, n.d.; McInerney, Berg, Hutchinson, Maude & Sorensen, 2009).

Confidence teaching geographical skills

The participants selected a geographical skill from a predetermined list (see Table 1) to prepare a microteaching activity for their peers. The skills were ones that the pre-service teachers could expect to teach and use in a high school geography classroom. All participants developed teaching activities based on a particular skill and provided their peers with the opportunity to apply these skills in a practical application (Fernandez, 2010).

The microteaching activities appear to have had a positive effect on many of the participants' level of confidence in their knowledge and understanding of the geographical skills. When participants asked to report on their level of confidence in the second survey (completed at the end of the semester) half reported as increase. The microteaching experiences allowed the participants to acquire or refresh their subject matter knowledge and provided participants with the opportunity to practice and master pedagogical skills (Cruickshank & Metcalf, 1993; Golightly, 2010), as demonstrated by the following observations made by Hamish and Jim:

[Hamish, Grad Dip]: Having the opportunity to practice the skills and revisit the theory behind the skills has removed some of the cobwebs and filled in any gaps that were present.

[Jim, Grad Dip]: The microteachings were a great opportunity to a) reinforce prior knowledge and b) allow us to learn and become better in the areas that I wasn't as confident in teaching before the course.

Similar to the results reported by Bartholomew, Mooed and Anderson (2011) and Brent, Wheatley and Thomson (1996), the microteaching activities also appear to have had a mostly positive impact on participants' level of confidence teaching the geographical skills. Ten of the participants reported an increase in their level of confidence, while six participants reported the same level of confidence in the second survey as they had in the first survey (Table 3). The Grad Dip participants made up the largest proportion of participants who reported an increase ($n = 7$), and showed the largest overall jump in the level of confidence. Having the opportunity to practice their developing pedagogical skills in a safe and supportive environment is important to build teaching confidence (Golightly, 2010), and in this study was identified by the Grad Dip participants as the single largest factor contributing to increased levels of confidence. This shift in confidence is evident in a comment made by Charlotte:

[Charlotte, Grad Dip]: The fact that I got the opportunity to teach something that I was not extremely confident in helped me realise that if I put my mind to teaching myself, I am OK.

Half ($n = 3$) of the B.Ed. participants also reported an increase in their level of confidence teaching the skills. The remaining B.Ed. participants ($n = 3$) whose confidence had not changed, had reported a high level of confidence teaching the skills in both surveys. Jim's and Brian's comment demonstrates a common level of confidence among the undergraduate participants:

[Jim, B.Ed.] Well I don't think I was under confident. There's a few things I wasn't 100 per cent confident with, but I liked the survey, the fact that it had a list for those skills so you could see it, like a checklist. What I found as a result of doing the microteaching this project, for myself and learning for my peers, that I could tick a few boxes at the end. My knowledge had improved and I felt more confident to teach those certain elements.

[Brian, B. Ed.] I found that at the beginning I thought I was reasonably confident in most areas. There was a few that I wasn't as confident on and I felt that I definitely made improvements in those areas ... it felt good to re-engage with some of the content because it felt like it had been a while since I had thoroughly engaged with the content. Coming back to it and visiting the

skills too, it was good to have a chance to be able to demonstrate or expand our ability to explicitly teach skills. It was something that was quite different to ... [the lecturer] just unloading content. It was a good experience to practise and I feel I definitely gained a bit more confidence and ability in my teaching all round for geography from that.

[Table 3 here]

Participants from both focus groups described positive engagement with the content and the peer learning experience within a safe and supportive learning environment during the micro-lessons. Peer teaching and tutoring is well-recognised as a valuable way to actively engage students in learning, while providing the presenter with the opportunity to experiment with and reflect on effective pedagogies (Dart & Clarke, 1991; Falchikov, 2002; McKeachie, Pintrich, Li & Smith, 1986). Edward commented on the reflection process and how this helped to develop his pedagogical skills:

[Edward, B.Ed.] Getting the chance to think about how to teach it ... spending the time reflecting on how. With a lot of the skills I felt I already knew the skill but then spending the time thinking about how to break it down further and explain it to others helps. Definitely watching the other presenters as well because we only taught one or two skills. So getting to see other students as well teaching some of the different skills or even the same skills.

Conclusion

Concerns over pre-service geography teachers' lack of discipline knowledge have been documented (Lambert, 2002; Segall & Helfenbein, 2008) as has the link between pre-service teachers' geographical knowledge, geographical skills-base and geographical literacy and their confidence teaching geography (Anderson & Leinhardt, 2002; Bednarz, Heffron & Tu Huynh, 2013; Chiodo, 1993; Gilsbach, 1997). Microteaching has been used elsewhere to develop pre-service geography teachers' subject matter knowledge, allowing them the opportunity to experiment with and practice their pedagogical skills, and build their teaching confidence in a supportive environment (Amobi, 2005; Bartholomew, Mooed & Anderson, 2011; Cruickshank & Metcalf, 1993; Golightly, 2010; l'Anson, Rodrigues & Wilson, 2003). Microteaching was embraced by participants in this study and proved to be an effective method of infusing geographical content and skills into the senior geography curriculum course, in general boosting the pre-service teachers' confidence to teach geographical skills to a class of peers.

A significant issue that arises from the findings reported here is the assumption of geographical content knowledge of graduate-entry students into teacher training programs. Grad Dip participants reporting a lower rate of completion of geography discipline courses is most likely due to a broad interpretation of what constitutes

geographical content in the program selection process. This raises a challenge for educators who prepare pre-service geography teachers in initial teacher education programs, especially in the shorter graduate entry programs in which there are limited opportunities to incorporate the geographical content and skills that they will need to teach geography in the classroom. This result highlight the need for more research on ways to support pre-service geography teachers in graduate entry programs to bolster their discipline knowledge, and in the process, strengthen their confidence to teach geography.

Note

1. Pseudonyms are used throughout to protect the anonymity of participants

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Table 1. List of geographical skills taught by participants in micro-lessons during geography curriculum course

Direction and bearings	Scale
Calculating distance	Calculating area
Working with statistics	Spearman's co-efficient
Grid and area references	Working with longitude and latitude
Relief	Cross-sections
Gradient	Interpreting topographical maps
Population pyramids	Climate graphs

Table 2. Participants' level of confidence in geographical content

Number of geography discipline courses completed	Number of participants	Participants' level of confidence in geographical content		
1	1	Not very confident		
2	1	Not confident at all		
3	2	Not very confident	Confident	
4	1	Somewhat confident		
5	3	Somewhat confident	Somewhat confident	Confident
6	3	Confident	Confident	Somewhat confident
7	3	Confident	Confident	Confident
8	1	Confident		
9 or more	1	Confident		

Table 3. Participants' level of confidence in teaching geographical skills

	Grad Dip/ B.Ed.	Not confident at all	Not very confident	Somewhat confident	Confident	Extremely confident
1	Grad Dip				1	2
2	Grad Dip			1		2
3	Grad Dip		1		2	
4	Grad Dip			1, 2		
5	Grad Dip	1		2		
6	Grad Dip	1			2	
7	Grad Dip			1		2
8	Grad Dip			1, 2		
9	Grad Dip				1	2
10	Grad Dip					1, 2
11	B.Ed.				1, 2	
12	B.Ed.			1		2
13	B.Ed.			1	2	
14	B.Ed.				1, 2	
15	B.Ed.				1, 2	
16	B.Ed.				1	2

1 = result from survey 1

2 = result from survey 2