



Know the Subject and How to Teach It: Using the GEOGstandards to Develop Pedagogical Practice Amongst Pre-Service Geography Teachers Before and During Professional Experience

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Abstract

A set of teaching standards for the subject of geography was developed by the profession for the profession and intended for use as a reflective tool for professional practice. These GEOGstandards were empirically generated from the practice of experienced, specialist geography teachers from across Australia. However, little is known about the use and impact of these standards in developing the practice of geography teachers, particularly in the pre-service years. In this paper, we share findings from the first phase of a qualitative, longitudinal reflexive study with five pre-service geography teachers who were completing their final year of study in an initial teacher education program and preparing to transition into the teaching profession. We argue a sustained approach towards theory–practice reflection, focused on the GEOGstandards and implemented prior to and during professional experience, enables pre-service geography teachers to effectively discern important aspects of teaching geography, and take action to develop their pedagogical practice. Data are generated through the conduct of a social lab, lesson observations and semi-structured interviews and analysed through the lens of reflexivity theory. This paper makes an important contribution to geography education because it is the first known study to empirically investigate how the use of GEOGstandards contributes to the development of pedagogical practice amongst pre-service geography teachers. In doing so, the findings

yield crucial implications for effective initial teacher education in a subject-specific context.

Keywords: GEOGstandards, pre-service teachers, geography, pedagogy, initial teacher education, professional experience

Introduction

A time of transition into the teaching profession is known to be a challenging and complex time. However, greater understanding from research is necessary about how pre-service teachers (PSTs) develop their identity, agency, reflective practice and pedagogical practice to respond to the demands of departing from an initial teacher education program (ITEP) to entering into their early career years (Steadman, 2021; Stenberg & Maaranen, 2020a, 2020b; Stenberg et al., 2016). In a subject-specific context, such understanding is even less clear, particularly in Australia amongst pre-service geography teachers in a secondary education setting. A set of nine Professional Standards for the Accomplished Teaching of School Geography (Hutchinson & Kriewaldt, 2010; Kriewaldt & Mulcahy, 2010), also called the GEOGstandards, were published in 2010. However, a lack of empirical research exists about how these standards are used and their impact on practice amongst geography teachers across career stages.

The purpose of this study is to understand, from the voice of pre-service geography teachers, how they interpreted the GEOGstandards in relation

to their beliefs and teaching context, and to act upon and develop their pedagogical practice in the secondary geography classroom as they completed their professional experience.

The current research is significant because it addresses an under-researched area on how pre-service geography teachers interpret and develop their practice during professional experience using their subject-specific context as a reference point. In doing so, we seek to advance understanding about how pre-service geography teachers engage with the GEOGstandards through a sustained and explicit theory–practice reflection approach to develop their practice, and to incorporate reflection into their daily work (Stenberg & Maaranen, 2020a, 2020b; Stenberg et al., 2016). The study also addresses the need for more research into understanding the outcomes of teaching practice on practitioners themselves as educators (Catling, 2017; Lambert, 2015).

Literature review

We start with a literature review of important aspects of teaching geography as a known influence on developing the practice of pre-service geography teachers. An overview of the GEOGstandards follows, and an exploration about the role of theory–practice reflection with pre-service teachers concludes the background within which the current study occurs.

Emphasising important aspects of teaching geography

Recent research into making the *how* of teaching geography visible arose from Healy et al. (2020). Healy's team focused on the ways in which geography teacher mentors in school and ITE contexts incorporated *subject* into their lesson observation feedback for PSTs during professional experience. This was undertaken by questioning PSTs about the type of feedback that best helps them to teach geography and critically engage with geographical thinking. Results from Healy et al. (2020) showed (i) the importance of PSTs having access to subject-specific feedback for dialogic reflection about their curriculum interpretation and pedagogical choices in geography lessons; (ii) that PST identities as specialist geography teachers need to be well supported by mentors or teacher educators; (iii) that pedagogical choices need to be more carefully considered in the context of the curriculum; and finally (iv) the provision of written feedback offers a foundation for dialogic reflection between the PST and mentor or teacher educator, while also providing scope for the PST to take ownership of personal reflection on their geography teaching practice.

Active learning pedagogies, which permit a personal stance from students to be taken on controversial issues, is another important aspect of teaching geography. Seow and Ho (2016) conducted a study with four PSTs and six experienced teachers of geography in Singapore to understand how personal beliefs influenced the way in which curriculum requirements about geographical issues, such as climate change, were taught. Findings from the study showed that pre-service geography teachers believed it was important to be aware of personal values and beliefs about controversial geographical issues and, in so doing, it helped them to propose appropriate pedagogical approaches. For example, one PST thought it was important for their future students to be able to understand a range of perspectives about climate change and, therefore, suggested adopting active learning pedagogies where students would be motivated to adopt a personal stance towards taking action. Other PSTs believed it was important to break down a complex geographical issue into small, relevant critical thinking activities, such as questioning the reliability of available information and forming a justified position about the climate change phenomenon.

An overview of the GEOGstandards

The GEOGstandards (AGTA, n.d.) were developed between 2008 and 2010 by researchers, teachers, and representatives from peak professional associations and they articulate common and distinctive elements of the specialised practice of geography teaching as an alternative to generic teaching standards (Hutchinson & Kriewaldt, 2010; Kriewaldt & Mulcahy, 2010). The purpose of these standards is to provide a tool for teachers' individual and collaborative reflection about their pedagogical practice in geography; to invite discussion and reflection as part of professional learning; and to also inform strategy for the effective teaching of geography in a secondary education context.

Part of the strength in creating the GEOGstandards is revealed in a discourse analysis which compared the GEOGstandards with the Australian Professional Standards for Teaching (APST) (AITSL, 2011) to determine their regulatory or developmental nature in response to the transformation of teacher quality and professionalism. Findings show the strength of the GEOGstandards lies within them being created *for* the profession of geography teachers *by* the profession, namely, an expert community from geography education (Bourke et al., 2012). The nine GEOGstandards are: GS1 Knowing geography and the curriculum; GS2 Fostering geographical inquiry and fieldwork; GS3 Developing geographical thinking and

communication; GS4 Understanding students and their communities; GS5 Establishing a safe, supportive and intellectually challenging learning environment; GS6 Understanding geography teaching—pedagogical practice;

GS7 Planning, assessing and reporting; GS8 Progressing professional growth and development; GS9 Learning and working collegially. These nine standards are expanded in Table 1.

Table 1: *Professional Standards for the Accomplished Teaching of School Geography (AGTA, n.d.)*

Standard	Overview
1. Knowing geography and the geography curriculum	Understand the discipline, including concepts and skills; understand the curriculum; understand geography draws from sciences, social sciences, and humanities; make connections with other curricula and learning areas.
2. Fostering geographical inquiry and fieldwork	Carry out a range of structured and open-ended inquiries; undertake inquiry in the field, selecting and using geographical tools.
3. Developing geographical thinking and communication	Encourage and support students' understanding of spatial reasoning; conceptual interdependencies, interconnections, and assemblages; real-world contexts at a range of scales; lived experience as a personal geography.
4. Understanding students and their communities	Use local community contexts and personal geographies to connect, enhance, and enrich conceptual and perspective-focused learning.
5. Establishing a safe, supportive, and intellectually challenging learning environment	Facilitate students becoming active participants in their learning by creating a need to know and creating conditions for students to question complex geographical ideas.
6. Understanding geography teaching—pedagogical practices	Extensive understanding of pedagogical content knowledge; encourage students to gather information from a variety of sources; use fieldwork; and introduce a range of tools to students.
7. Planning, assessing, and reporting	Plan, monitor, and assess geographical learning through a range of formal and informal methods; recognise achievement and provide direction for improvement; use diagnostic assessment to inform teaching practice.
8. Progressing professional growth and development	Engage with professional learning communities and recognise that geography is an evolving subject that requires regular updating of content knowledge.
9. Learning and working collegially	Actively engage with the professional community; share expertise; build a culture of professional improvement; promote geographical education.

Theory–practice reflection

Reflection is typically incorporated into ITEPs as part of professional experience so PSTs can engage with reflection and enact reflective practice by meaningfully connecting theory with practice through reviewing events, solving problems, making decisions, and planning for future actions (Darling-Hammond, 2017). Bradbury et al. (2020) and Stenberg et al. (2016) recommend professional experience be designed around purposeful implementation of structured theory–practice reflection activities to promote transformative pedagogical and professional practice amongst PSTs, and develop a shared understanding between the mentor and their PST. To do so is more likely to foster theory–practice reflective discussions because PSTs can build confidence in their decision-making processes and use of professional discourse which results in them being more likely to try new pedagogical approaches to solve problems, and make more robust connections to theory in their reflective portfolios compared with those undertaking a more conventional professional experience (Bradbury et al., 2020; Stenberg et al., 2016).

Furthermore, when PSTs make their own connections between theoretical understanding and practical knowledge, they are empowered to autonomously plan and self-reflect during professional experience (Adoniou & Gallagher, 2017; Bradbury et al., 2020). In doing so, PSTs can develop capacity to think and act like a teacher, and also identify with the role of a teacher which enhances their *classroom readiness* and development as an educator (Eckersley et al., 2017; Strangeways & Papatraianou, 2016). When theory–practice reflection occurs in a subject-specific context such as geography, then critical engagement with subject knowledge occurs. This allows a practitioner to develop self-questioning capabilities to analyse their pedagogical and professional practice, and determine their personal orientation towards their subject, in terms of policy recommendations, curriculum documents, existing context, and reflexive problem-solving capabilities (Butt, 2018; Fögele et al., 2020).

A methodology framed around reflexivity

Reflexivity theory was developed by Margaret Archer (1979) to address structure–agent problems in education. We used reflexivity theory as the theoretical framework to understand how structures either enable or constrain the agency and practice of pre-service geography teachers as they complete their final year of initial teacher education and prepare to transition into the teaching profession. Reflexivity theory identifies three emergent properties of structure, agency,

and culture as transformative causal mechanisms. They are not hierarchical or conflatable, and their presence and interplay differ over time to cause change or stability in response to a given situation and context (Archer, 1979, 1982, 1988). Structural emergent properties (SEPs) include empirical evidence, rules, procedures, policies, and structures which provide guidance and consistency to the conduct of activities (Archer, 1982). Agential, or Personal emergent properties (PEPs) are related to personal values and beliefs and known as a characteristic of change or stability in the education system. PEPs are powerful influences which often cause one to react in response to the strength of their feelings, values, and belief systems (Archer, 1979). Cultural emergent properties (CEPs) refer to behaviour and practice associated with place, time, and people (Archer, 1988). Reflexivity theory considers the nature, influence, and action of emergent properties through the processes of discernment, deliberation, and dedication. Discernment relates to identification of the emergent properties of influence; deliberation is to deeply consider which of the discerned emergent properties are enablers or constraints to practice, and to determine the emergent properties of most influence; and dedication is to decide on a plan of action to mitigate the constraint related to a given emergent property or to maximise its enabling influence (Archer, 1979, 1982, 1988).

Methodology

We employed a longitudinal, qualitative, reflexive design to understand context-specific influences on professional practice over 18 months, conducted in three phases: Preparation, Profession-entry, and Positioned in schools. This paper reports on Phase 1: Preparation which occurred for participants during their final year of study in a four-year combined Arts-Education degree and includes their participation in an unpaid 30-day block of professional experience as part of their training. Five participants joined the study from the same geography methodology class at a large metropolitan university in Australia. Each participant chose their pseudonym: Anna, Emily, Grace, Karen and Matt.

Data generation in Phase 1: Preparation occurred through one social lab conducted when participants were either about to commence or were in their first few days of professional experience, and then two lesson observations and two post-lesson semi-structured interviews conducted during professional experience. Social labs are an experimental, collaborative, reflexive, dialogic and active listening space to exchange ideas and discuss solutions to complex problems (McKenzie, 2015). The social lab was conducted in person at the university and facilitated by

the first author; it was designed to elicit rich descriptions and discussion of themes, issues, and implications on practice for each participant and help participants build their professional identity, share experiences, and develop feelings of trust, rapport, and belonging with each other as a group and with the facilitator (Neale, 2019; Ryan et al., 2019).

The lesson observations and post-lesson semi-structured interviews occurred in Phase 1: Preparation, after the social lab and during professional experience. Researcher observation notes for each lesson were made on the researcher-created lesson observation protocol (Appendix A), derived from the GEOGstandards and geographical education literature. In the post-lesson interviews (Appendix B), each participant was asked to interpret their context, reflect on their lesson planning and delivery, and identify what they thought were the distinctive features of their geography lesson and the relevant GEOGstandards.

A preliminary analysis was completed using memos as a quick, informal, *first stab* at interpreting the data to help organise, explore, and reflect on participants' experiences in connection with the theoretical and conceptual frameworks—for example *enabling, personal belief, inquiry, or discerning* (Cope, 2021). The memos were completed whilst repeatedly listening to the dialogue, transcribing the dialogue and re-reading transcripts. Dialogue was listened to and transcribed verbatim by the first author to provide the best possible record of the interview with the name of each speaker preceding each text as appropriate; transcription by the first author was an opportunity for further immersion in the data as a preliminary form of analysis before commencing a coding process (Dunn, 2016). After transcribing each phase of data, each transcript was read multiple times to identify overall narrative of participant experiences about transition and transformation of pedagogical practices.

Deductive data analysis was based on reflexivity theory and the GEOGstandards. Codes such as *SEP, timetable* and *constraint* were derived from reflexivity theory and codes such as *GS2, inquiry* were drawn from the GEOGstandards. An Excel spreadsheet was created, with tabs for each participant. The horizontal columns identified the timestamp, dialogue comment/transcript, speaker, theme, and the categories for deductive codes such as Emergent Property, Enable or Constrain, and GEOGstandards such as GS1, GS2, etc.

Participants' beliefs and experiences were explored and coded individually through in-depth, open-ended questions focused on *how* and *why* to analyse meaning in specific contexts

rather than be representative of a population and phenomenon. An invitation was extended to participants to *member-check* researcher interpretation of data (Korstjens & Moser, 2018).

Results

A social lab was the first data generation tool of the study, conducted at the beginning of Phase 1: Preparation. Participants were asked to write down and dialogically share their ideas, as PEPs, about what they understood to be the distinctive features of teaching geography, and to set a plan for what they wanted to achieve in their geography teaching whilst on professional experience. Participants considered their responses in conjunction with the GEOGstandards as a SEP. The second data generation tool, lesson observations with researcher observation notes and semi-structured interviews, was conducted throughout the remainder of Phase 1, and used as a point of reflection to determine how participants interpreted their pedagogical practice in terms of personal values and beliefs, and structures such as curriculum documents, and the GEOGstandards.

In the social lab: “What happens in a geography lesson that confirms you’ve observed or participated in a geography lesson?”

Anna started with *discernment* about understanding students (GS4) as a “priority for quality practice and making learning relevant” to student experiences, their learning needs, and surrounds. Anna then *deliberated* about geography lessons having a future-facing approach or *forward focus* and that “geographical tools and skills are unique to geography (GS3), also inquiry and fieldwork (GS2)” and “use of language (GS1),” which resulted in a *dedicated* plan for action during professional experience:

lessons should have at least one geography skill . . . reading a climate graph or looking at a map . . . and a forward focus, [like] thinking about how this disaster happened and what we can do to prevent it in the future.

Grace *deliberated* about the distinctiveness of geography teaching as being about making links between “content delivered as concepts (GS3, GS1),” creating a safe, supportive, and challenging learning environment (GS5), and understanding geographical teaching (GS6) by teaching content through concepts, tools, and skills:

[last week] that big east coast low . . . the boys were asking why we have water

restrictions when we have 5 cm of rain in 3 hours. So, I got up a synoptic chart and a choropleth map of rainfall of NSW and Sydney and showed them this is where the rainfall fell—in the coastal strips not where the dams are.

Grace shared that “integrating skills and content is now one of my goals from being in the geography method class” and it formed her *dedicated* plan for action during professional experience (GS3).

Emily spoke about the desire to position herself as a specialist geography teacher after having embarked upon a career-change from finance. She *discerned* geographical thinking and communication (GS3) as the “number one” standard which was most important to her practice and also “the most relevant to understanding students’ learning needs (GS4) and knowing the content (GS1).” Emily *dedicated* a plan towards developing her own content knowledge whilst on professional experience: “knowing more about physical geography” to overcome her “lack of confidence” in this area of the geography curriculum (GS1).

Karen drew on her beliefs about the importance of relationships and relevance to *deliberate* how the creation of a safe, supportive, and challenging learning environment (GS5) was “the base of everything.” Karen believed GS5 would help students connect syllabus content and geographical language with real-life and personal experience (GS1, GS4) and help them understand “why they are learning the content, and using the concepts like interconnections with spatial dimensions, to see how they can link it to their life and the bigger world” (GS2, GS3). A *dedicated* plan for action in professional experience was based around developing a safe, supportive, and challenging learning environment (GS5).

Matt *discerned* the distinctive features of a geography lesson were focused on knowing the curriculum (GS1), developing geographical thinking and communication (GS3), “understanding the why of what’s going on” (GS2), and understanding pedagogical practice (GS6) “such as walking around different areas, making models, and looking at and touching things.” Matt’s *dedicated* plan for action focused on helping students to make links between theory and practice and then communicate it (GS1, GS3).

In the classroom: Enacting a geographical geography lesson

Anna: Inquiry and knowing your students

Anna taught the syllabus unit *Human Wellbeing* to Year 10. An inquiry focus was used to frame

interpretation of photographs and media about women’s rights in Australia and India and led to implementation of a debate in the second lesson organised around the Tug for Truth visible thinking routine. In the debate, students responded with justification for agree, disagree, or neutral to the proposition “Women’s wellbeing in India has improved in the last decade.”

Inquiry, connection to place within and beyond India, development of understanding about spatial variations and connections about human wellbeing, statistics, maps, and diagrams were observed to feature in her lessons, in connection with GS2 and GS3. When questioned, Anna *discerned* GS1, GS2, GS4 and GS5 as being part of her preparation and intent for delivery. Human Wellbeing is a dense syllabus unit, however Anna found the syllabus to be an enabling structure because it was “clear in terms of what I need to teach,” although there was “a lot to cover.” Furthermore, Anna believed the discussions and readings about inquiry-based learning in the geography methodology unit, and the whole-school priority of inquiry and visible thinking to promote critical thinking, were helpful structures in *dedicating* a plan to develop her practice. Anna also *deliberated* about the success of this lesson sequence being related to her beliefs about the importance of knowing her students. For example, she “already had an idea about which girls needed extra assistance or could be extended” because she taught them in History. Over the two lessons, Anna did achieve her *dedicated* plan for action.

Emily: Geographical terminology and geographical thinking

Emily taught syllabus unit *Sustainable Biomes* to Year 9. An emphasis on geographical terminology occurred in conjunction with an inquiry focus to frame interpretation of maps, diagrams, and media about the Amazon Rainforest and share personal and role-played beliefs and action about consumption of rainforest products. A debate ensued in the second lesson, organised around the Circle of Viewpoints thinking routine about biome productivity and the Amazon basin, where students were invited to consider legal, environmental, economic, and personal views about the implications arising from a rainforest under destruction.

Key features of the geography lessons were observed to be sustained and explicit use of terminology, sustained and thorough connection to the syllabus, use of a real-world context through current media, use of diagrams, scaffolding and chunking of information. A variety of resources was used with targeted discussion and an opportunity for students to choose their preferred position (legal, environmental,

etc.) to discuss the Amazon Rainforest. The GEOGstandards observed to be in focus were GS1, GS3 and GS4. When questioned, Emily discerned the same standards as being part of her preparation and intent for delivery.

Sustainable Biomes is a complex syllabus unit with a physical geography emphasis that can appear abstract to students in metropolitan settings. Emily, however, believed the Amazon situation was “very topical” and connected to biome sustainability. Emily *deliberated* and then *dedicated* her beliefs that as a geography teacher

I’m meant to be making it relevant . . . and if it was my child [in my class], I’d be thinking, “why is the geography teacher not talking about the Amazon right now?”, so that was the reason for my choice.

Emily did mention an area of constraint to her practice as being “not having a permanent classroom [which] limits my lesson planning ability,” however, across both lessons, Emily demonstrated clear content knowledge about Sustainable Biomes and achieved her *dedicated* plan for action.

Grace: Concepts, tools and skills

Grace taught syllabus unit *Water in the World* to Year 8. An emphasis on interpreting and communicating with maps, diagrams, and clear use of terminology occurred through the lens of inquiry. The current weather and use of localised context provided the foundation for interpreting water distribution and scarcity. Scaffolded instructions with a think-pair-share structure for the lesson supported students to construct a model-like annotated diagram and dialogically share their understanding.

Grace was observed to emphasise clear and sustained use of diagrams, choropleth maps and synoptic charts, jigsaw activities, scaffolded and chunked information, and clear, explicit use of geographical terminology. Connections to the following GEOGstandards were observed: GS2, GS3, GS4 and GS5. During the interview, Grace *discerned* GS1, GS2, GS3, GS4 and GS5 as being part of her preparation and intent for delivery. Grace felt it was difficult to teach in classrooms which were not equipped with resources for geography: “teaching in a French classroom . . . no geography materials, can’t put their work up on the walls, it really constrains my ability to teach.” Grace also *deliberated* that going “through the syllabus in the method class” and having evidence-informed approaches modelled during class was an important and enabling structural influence for developing her pedagogical ideas:

Until [the tutor] went through the syllabus, I had no idea about it. It really shaped my understanding about how to teach geography . . . also, integrating skills and content is now one of my goals from being in the geography method class and being shown how to teach skills and content together.

Grace felt very enabled by her school colleagues, saying they “use resources I’ve created, which is really nice and supportive.” Also, Grace liked that her supervising teacher “allows me to try what I want with the classes . . . and his feedback is something I can implement next time, and it has always helped to improve my practice.” Throughout each lesson, Grace met her *dedicated* plan for action.

Karen: Relationships and relevance

Karen taught syllabus unit *Environmental Management and Change* to Year 10. An emphasis on inquiry, use of media, maps and diagrams, and active inclusion of students’ personal beliefs and actions about the importance of rainforests was used to frame discussion about the Amazon Rainforest. A think-pair-share approach provided preparation for a class debate organised around *True for Who?* thinking routine where future action plans for environmental management were shared and justified from various stakeholder positions in response to a proposition “I would prioritise economic success over environmental protection.”

Karen was observed to include an emphasis on inquiry, maps, diagrams and media, student participation and inclusion of their personal views, and use of a current case study that was not originally planned for but included in her final lesson preparation due to an unprecedented real-world event occurring that week. The following GEOGstandards were also observed to be evident: GS1, GS3 and GS5. When asked to reflect on the lesson, Karen *discerned* that GS3, GS4 and GS5 shaped her planning and preparation decisions. Also, that it was important to her to “bring it back to the students, their own beliefs and knowledge, and bring that into a lesson.” Karen rationalised that otherwise, students “won’t feel like it’s a personal topic they can have an opinion on, and then it feels like a fact to learn—then geography becomes boring.” Inquiry was noted as being a strength of the lesson and Karen attributed that to being enabled by readings and discussion in geography method classes about inquiry-based learning: “I’m not the best at it (inquiry) so being able to look at research and discuss it in class enables me to further learn.” Karen *deliberated* about the lack of technology available in the school as being a constraint to her practice: “I

was gobsmacked there was no technology . . . I had no idea how to create a geography lesson without using technology . . . it really made me think.” During each lesson, Karen purposefully set out to include student voice and opinion in response to the content and had clear boundaries for interactions, therefore meeting her *dedicated* plan for action.

Matt: Context, terminology, application

Matt taught syllabus unit *Place and Liveability* to Year 8. An emphasis on inquiry, use of terminology, interpretation of maps, diagrams and statistics, and use of game-based learning occurred within a local area context and explicit links were made to a previous unit of work. A debate ensued in the second lesson, organised around the Circle of Viewpoints strategy.

Inquiry, use of terminology, geographical tools and skills, scaffolding, and local context were observed to be the foundations of Matt’s teaching, with GS3 and GS4 appearing to be most prominent. When asked about planning and preparation decisions, Matt *deliberated* GS2 and GS3 as being instrumental to his focus for the lesson because he needed to support a class of students with additional learning needs to apply their understanding about a cross-section completed in a previous unit to the current topic of instruction. This need arose because there was a test for Landscapes and Landforms in the following week which included a cross-section. However, the school program required Matt to be teaching *Place and Liveability* for the time he was on professional experience. Matt’s students had learnt about cross-sections using examples of sea-cliffs and headlands. To support students in their preparation for the test, Matt revisited the construction and interpretation of cross-sections by linking previous learning with *Place and Liveability*: “looking at things like elevation for liveability, areas of building development in the local area, and why it is that the local area is considered a liveable place, but we haven’t built in this area due to elevation.” In doing so, Matt was able to meet his *dedicated* plan for action. Whilst Matt was enabled by his personal beliefs about teaching geography, he noted the faculty Scope and Sequence documents were driven by a schedule of geography assessments and this put a constraint on his practice. Matt *deliberated* that these documents prevented him from being able to integrate geographical tools and skills in what he believed to be a relevant and timely manner.

I find the school are like “we’re doing this skill in Week 2,” and I’m like “I wanted to do it another time when it actually fits in,” but because of the test coming up, I have

to stick to their plan. I found it difficult to make it engaging and interesting.

Discussion

The purpose of the study was to understand, from the voice of pre-service geography teachers, how they interpreted and used the GEOGstandards to reflect on their beliefs, practice and teaching context, and to act upon and develop their pedagogical practice in the secondary geography classroom as they completed professional experience and prepared to transition into the teaching profession.

We divide the discussion into two sections: one focused on the development of practice of pre-service geography teachers; one focused on implications for initial teacher education, including geography methodology courses.

Developing the practice of pre-service geography teachers

During Phase 1: Preparation, the pedagogical decision-making process was driven by the PEPs of pre-service geography teachers about teaching the subject through a focus on geographical inquiry (Seow & Ho, 2016), combined with the need to understand their students and make geographical learning relevant to students by articulating important parts of the subject and of geographical learning (Healy et al., 2020). The GEOGstandards, which focus on knowing geography and the curriculum (GS1), fostering inquiry and fieldwork (GS2), using concepts, geographical tools and skills (GS3), understanding students and their communities (GS4) and establishing a safe, supportive and intellectually challenging learning environment (GS5) featured heavily in observation notes and participants’ dialogue and written reports. It was also noted that SEPs, such as faculty planning documents and timetabling arrangements for classrooms designated for the teaching of geography, also had an influence on the way in which the GEOGstandards were chosen and emphasised

Theory–practice reflection, with explicit use of the GEOGstandards and Archer’s reflexivity theory, was an effective formative tool of development for PSTs to understand their own practice. The opportunities to connect geography teaching conversations to the formal language of the GEOGstandards enabled participants to engage in reflexive practice, justify their individual practice, and hold their decisions accountable. This reflects the work of Adoniou and Gallagher (2017), who suggested that theory–practice reflection in response to general professional standards for teaching has a positive and empowering influence

on their professional practice, although they acknowledged the standards do not provide a complete picture of effective teaching.

Sustained and explicit opportunities for individual and collaborative theory–practice reflection using the GEOGstandards and reflexivity theory meant the geography became visible in discussion (Healy et al., 2020). PSTs could connect their theoretical understanding to their personal beliefs and individual practice, and sharpen thought and dialogue about geography and geography teaching. In doing so, they became aware of their beliefs about teaching geography, and could autonomously develop and clarify their decisions about pedagogical practice during professional experience, as indicated in the work of Bradbury et al. (2020). Such findings contribute to advice from Stenberg and Maaranen (2020a, 2020b) about how PSTs recognise the influence of personal beliefs on their practice. Additionally, such findings support the outcomes from Stenberg et al. (2016), who explored the effect of an intervention study on professional experience to show that PSTs, who participated in professional experience designed to focus on theory–practice reflection, made more robust connections to theory in their reflective portfolios compared with those undertaking a more conventional professional experience, and it became embedded within their practice. In the present study, the participants discovered their pedagogical practice was enabled by their personal values and beliefs about good teaching or about the importance of geography as a subject.

Implications for initial teacher education

A sustained, explicit, and combined focus on the GEOGstandards and Archer's reflexivity theory allowed the PSTs to demonstrate dialogically with peers, about how they became aware of their beliefs about classroom practice for geography, and to clarify their personal beliefs about geography and geography teaching. This finding contributes to findings from Stenberg and Maaranen (2020a, 2020b) about how PSTs recognise the influence of personal beliefs on their practice. This finding also reflects the work of Healy et al. (2020) about the need for teacher educators and mentors to support the identity of PSTs as specialist geography teachers and offer scope for PSTs to take ownership of personal reflection on their geography teaching practice, in addition to the need for pedagogical choices in the geography classroom to be considered in the context of the curriculum.

Participants readily engaged with what was distinctive about teaching geography during and

prior to professional experience. Butt (2018) believed that when practitioners engage deeply with their subject knowledge, they can analyse their pedagogical and professional practice to develop reflexive problem-solving capabilities in response to policy recommendations, curriculum documents, existing context, and an empirical evidence base. Additionally, findings from the present study reinforce the need to include opportunities for theory–practice reflection in geography methodology units so PSTs can develop self-questioning capabilities and an understanding of their professional orientation towards the subject, as suggested by Fögele et al. (2020).

The research design of this study, incorporating subject standards and reflection on personal beliefs about teaching geography, supports an assertion by Butt (2018) that when theory–practice reflection is contextualised within subject-based research, practitioners can critically engage with their subject-based knowledge. Participants justified their personal beliefs about teaching geography and discovered how these were enabled or constrained by a range of structural properties encountered over time, such as syllabus documents, and school-based Scope and Sequences.

The ease with which the PSTs identified, reflected on, and incorporated a range of GEOGstandards into their practice suggests there are distinctive features about teaching geography, and that the GEOGstandards are applicable for use in the pre-service years despite the standards being derived from the practice of and input from experienced geography teachers (Hutchinson & Kriewaldt, 2010; Kriewaldt & Mulcahy, 2010). It is also interesting to note that GS1 to GS5 feature prominently in the discernment, deliberation and dedication of pre-service geography teachers about their pedagogical practice. We suggest this is most likely because PSTs are still preparing to be a teacher and the first five GEOGstandards clearly identify important and distinctive aspects of geography teaching.

The way in which pre-service geography teachers readily connected their ideas to the GEOGstandards, and focused on developing selected standards in their practice according to the influences of their teaching context, demonstrates the attributes of quality teaching and professionalism by meaningfully connecting theory with practice. In doing so, an outcome is reinforced from a discourse analysis by Bourke et al. (2012) that compared the GEOGstandards with the APSTs to determine their potential influence on teacher quality and professionalism. The strength of the GEOGstandards in developing teacher identity was attributed to their creation

from the profession for the profession (Bourke et al., 2012). Having a set of standards specific to the teaching of geography provides value and identity to the subject, and to those who teach it, at a time when public perception about the discipline and the profile of geography education in schools and at universities is diminishing.

Recommendations and conclusion

This paper makes an important contribution to geography education because it is the first known study to empirically investigate how theory–practice reflection based on the GEOGstandards contributes to the development of pedagogical practice amongst pre-service geography teachers. In doing so, the findings yield crucial implications for effective initial teacher education in a subject-specific context.

We recommend geography methodology units, and professional experience opportunities, adopt an explicit and sustained approach towards theory–practice reflection by actively and purposefully incorporating the GEOGstandards, or relevant teaching standards as relevant, into reflective discussion and unit design. We make this recommendation in the face of findings which demonstrate dialogue and reflection about personal beliefs of geography teaching, in conjunction with structures such as the GEOGstandards, professional readings and the geography syllabus, were an enabling influence in PST explanations and decisions about how to teach geography. When each PST had an opportunity to specifically reflect on, and articulate, beliefs and justifications about their pedagogy in geography lessons, and were supported to formally connect their ideas to the structure of the GEOGstandards, they developed their capacity to think and act like a teacher and identify with the role.

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Appendix A

Date	Time
Lesson duration	Location
Year Level	Unit
Rating scale: 1 – 5 where 1 = no use, 3 = some use, 5 = extensive use	
Rating scale: M = implicit use, X = explicit use	
Inquiry questions	Please circle: 1 2 3 4 5 M X Comment:
Concepts	Please circle: 1 2 3 4 5 M X Comment:
Fieldwork	Please circle: 1 2 3 4 5 M X Comment:
Textbook	Please circle: 1 2 3 4 5 M X Comment:
Interdisciplinary connections	Please circle: 1 2 3 4 5 M X Comment:
Geospatial technologies	Please circle: 1 2 3 4 5 M X Comment:
Geographical tools and skills	Please circle: 1 2 3 4 5 M X Comment:
Syllabus connection	Please circle: 1 2 3 4 5 M X Comment:
Geographical terminology	Please circle: 1 2 3 4 5 M X Comment:
Inquiry based learning	Please circle: 1 2 3 4 5 M X Comment:
Explicit instruction	Please circle: 1 2 3 4 5 M X Comment:
Technology	Please circle: 1 2 3 4 5 M X Comment:
GEOGstandard 1: Knowing Geography and the Geography Curriculum	Please circle: 1 2 3 4 5 M X Comment:
GEOGstandard 2: Fostering geographical inquiry and fieldwork	Please circle: 1 2 3 4 5 M X Comment:
GEOGstandard 3: Developing geographical thinking and communication	Please circle: 1 2 3 4 5 M X Comment:
GEOGstandard 4: Understanding students and their communities	Please circle: 1 2 3 4 5 M X Comment:

GEOGstandard 5: Establishing a safe, supportive and intellectually challenging learning environment	Please circle: 1 2 3 4 5 M X Comment:
GEOGstandard 6: Understanding Geography teaching–pedagogical practice	Please circle: 1 2 3 4 5 M X Comment:
GEOGstandard 7: Planning, assessing and reporting	Please circle: 1 2 3 4 5 M X Comment:
GEOGstandard 8: Progressing professional growth and development	Please circle: 1 2 3 4 5 M X Comment:
GEOGstandard 9: Learning and working collegially	Please circle: 1 2 3 4 5 M X Comment:
Other	

Appendix B

Post-lesson semi-structured interview questions

1	How does this lesson fit in to the teaching, learning and assessment program for <Year group> and <name of syllabus unit being taught>?
2	What do you believe made your Geography lesson geographical?
3	In response to the GEOGstandards, which one(s) do you feel were important in the development of this lesson? Why?
4	If you were to repeat this lesson with the same class (a) What would you change or do differently? Why? and (b) What would you keep or do the same? Why?
5	Is there anything else you would like to add either overall or to any of the responses provided for the questions already?
6	Methodology classes been incorporated into the observed lessons (and unit of work for this year group)?
7	How has guidance from your supervising teacher and/or other colleagues in the faculty been incorporated into the observed lessons (and unit of work for this year group)?