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ESSENTIAL MODELS OF TEACHING GEOGRAPHY THROUGH ENGLISH LANGUAGE

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Abstract: The subject of Geography plays a crucial role in understanding our world. It makes a vital contribution to our knowledge of the rapidly changing environmental and social challenges facing us and how we should tackle them. Engaging higher education students with these issues and supporting them effectively can present multiple opportunities and challenges for academic staff for academic staff. For those embarking on a career in geographical teaching and learning, recognising these issues, and developing a toolbox of strategies with which to address them, is key to developing good teaching practice. This guide offers a starting point for this process for graduate teaching assistants, teaching fellows and demonstrators.

Key words: teacher knowledge, models, pedagogical content knowledge, geography, education.

Pedagogy is a word you often hear in higher education. Educators often talk about their 'pedagogical approach' to teaching. But what does it mean? One way to think about pedagogy is as the method, and practice, of teaching as opposed to the content of what is taught. Pedagogy encompasses teaching styles, teaching theory and our approach to assessment and feedback. Another way to think about pedagogy is the way we (as a community of practitioners teaching geography) reflect on what we know about our students and their needs, and how we use this to shape the delivery of content in our classes. Consequently, when we plan any teaching – whether it's a lecture, seminar, lab class or fieldwork; whether it's in person or online – we need to consider different ways to deliver the content. These decisions become our pedagogical principles or pedagogic approach. Our decisions will be guided by our own teaching preferences, our experience, the context in which we are teaching, and by our knowledge of teaching theory and what that tells us about how best to deliver content to achieve our aims for the students.

Funded by the National Center for Research in Geography Education, this study investigated the nature of the knowledge needed for geography teaching. Informed by existing research about science and mathematics teachers' pedagogical content knowledge (PCK), the research group developed a conceptual model of the knowledge base for geography teaching, identifying six key components:

1) orientations toward teaching geography,
2) knowledge of geography curricula,
3) knowledge of students' understanding of geography and responses to geography learning,
4) knowledge of instructional strategies' appropriateness to learning geography,
5) knowledge of assessment of geography learning
6) knowledge of educational contexts.

The conceptual model was refined and revised according to the results of case studies of four expert geography teachers. Data analyzed included classroom observations, teacher interviews, geography lesson video-recordings, teachers' lesson plans and reflections, and student work samples. The resulting preliminary model is offered to the geography education community to inform both geography

teacher education and further research on geography-related pedagogical knowledge.

Geography teachers have long known something that educational researchers began to explore only about 30 years ago: that teaching is an "outrageously complex activity" (Shulman, 1987, p. 11). Teaching requires multiple, intersecting, and interdependent types of specialized knowledge that are used in complex recursive processes before, during, and after interactions with students. When Lee Shulman (1986) named and described pedagogical content knowledge (PCK) as a key component of teachers' unique expertise in a 1985 presidential address to the members of the American Educational Research Association, it ignited decades of active research about the knowledge needed for teachers' specialized work. Although this scholarship has been pursued in many content areas (Park & Oliver, 2008), PCK has yet to be explored in depth in geography education research.

Education researchers, especially those exploring science and mathematics teaching, have been actively identifying and conceptualizing teachers' PCK since it was first introduced by Shulman in the mid-1980's (Hill, Schilling, & Ball, 2004; Loughran, Mulhall, & Berry, 2004; Magnusson, Krajcik, & Borko, 1999). More recently, geography education researchers have examined geography teachers' PCK via several case studies (e.g., Blankman, van der Schee, Volman, & Boogaard, 2015; Lane, 2009; Lane, 2015). These cases are contextspecific, and as such, their results have limited applicability. Broader inquiries could inform research and practice that address the overall knowledge base needed for geography teaching.

This study explored a tentative model of the knowledge needed for geography teaching; the scope, nature, and components of the complete geography knowledge base used by secondary-level geography teachers. To do this, a working group of researchers and expert practitioners in geography and teacher education was established, funded by the National Center for Research in Geography Education. The group's expertise and experience in geography, educational research, and geography teaching provided this research with theoretical rigor and practical validity. This article describes both the processes used to create and refine the proposed knowledge base for geography teaching (GeoKBT), and the content and organization of the model itself. This work helps to address the 13 recommendations put forth in the *Road Map for 21st Century Geography Education* (Bednarz, Heffron, & Huynh, 2013) by establishing the specific parameters of the knowledge needed by geography teachers as a comprehensive model. As such, the model can help researchers and teacher educators to pay "close attention to the content knowledge and pedagogical content knowledge necessary for effective teaching of geographic concepts, skills, and practices to foster geographic literacy..." (p. 59).

In the sections that follow, we explain what is known about the nature of teachers' knowledge across content areas, the methods we implemented to identify the specific knowledge needed for geography teaching, and the conceptual model of this knowledge base that we synthesized from past PCK research and our collaboration with four expert secondary geography teachers, illustrated with classroom-based examples. We end the article by discussing the potentially transformative nature of future research that could refine and use the proposed GeoKBT model.

Content knowledge is disciplinary subject matter knowledge. According to Shulman, curriculum knowledge refers to awareness of the full range of available programs, learning materials, and tools that

are used within a particular educational context, such as a school district. PCK is "subject matter knowledge for teaching" (Shulman, 1986, p. 9). PCK includes an understanding of why and how particular content topics are easier or more difficult for students to understand, and how to represent the topics in ways that help students to comprehend and use them effectively in their learning. General pedagogical knowledge is process-focused knowledge that guides the act of teaching; "those broad principles and strategies of classroom management and organization that appear to transcend subject matter" (Shulman,1987, p. 8). Unlike content, curriculum, and PCK, general pedagogical knowledge is not specific to different content areas, such as geography.

Shulman (1987) also theorized six simultaneous and interconnected processes that comprise teachers' pedagogical reasoning and action (PR&A):

1. comprehension of the content to be taught and the purposes for teaching it;
2. transformation of the content to be taught into conceptual models and learning activities that are adapted to specific learners' needs and preferences;
3. instruction, which is the acts of teaching that can be observed;
4. evaluation of both students' learning and instructors' own teaching practices;
5. reflection upon teaching and learning processes; and
6. new comprehension, which is built continually from reflexive experience of the other five processes.

These six PR&A processes operationalize Shulman's (1987) seven components of the knowledge base for teaching enumerated above. Beginning in 2001, PCK was extended by multiple researchers to become technological PCK or technology, pedagogy, and content knowledge, abbreviated respectively as TPCK and TPACK (Angeli & Valanides, 2005; Keating & Evans, 2001; Koehler, Mishra, & Yahya, 2004; Niess, 2005; Pierson, 2001; Thompson & Mishra, 2007-2008). Although there are more than fifty different versions of TP(A)CK (Trevisan & De Rossi, 2018) represented in current literature (Harris, 2019), all note the necessity of adding technological (specifically digital-tool) knowledge (TK) to the knowledge base for teachers working in the 21st century. Adding TK modifies teachers' PCK in important ways, requiring new types of knowledge in both choosing content-specific digital materials and tools appropriately, termed technological content knowledge, and in teaching with those tools effectively, or technological pedagogical knowledge (Mishra & Koehler, 2006) within multiple and varied educational contexts (Porras-Hernández & Salinas-Amescua, 2013). This is the "total package," or TP(A)CK (Thompson & Mishra, 2007-2008) of teacher knowledge needed in this updated conceptualization of PCK to teach effectively with digital tools and resources.

As we come to the geography teachers' knowledge, while several research teams have explored particular aspects of geography teachers' knowledge (e.g., Lane, 2009; Ormrod & Cole, 1996), only one has conceptualized a model for geography-related PCK to date. Using a survey instrument, Blankman et al. (2015) explored 39 primary-level teacher educators' perceptions of the geography-specific PCK needed by student teaching interns. They called this knowledge PCK-G, which they explained as: First, student teachers need well-developed geographic subject knowledge, skills, and drive (WHAT). Second, they need to transform such knowledge, skills, and drive into forms suitable for teaching (HOW)…[and] must do that from the perspective of helping pupils to become responsible and active global citizens (WHY) (p. 84 - 85).

The model is depicted visually as a three-part Venn diagram in which the "what," "how," and "why" elements

intersect to form PCK-G. Our analysis of this geography-specific model of teachers' knowledge suggests that it incorporates PCK and other aspects of Shulman's (1987) knowledge base for teaching, including content knowledge, curriculum knowledge, knowledge of learners and their characteristics, and knowledge of educational ends, purposes and values. It also seems to include the comprehension and transformation aspects of Shulman's model of PR&A. These additions are recognizable in the encapsulated version of PCK-G that the authors offer for student teachers to consider: "What am I going to teach? How am I going to teach it? Why am I going to teach it in this way?" (Blankman, et al., 2015, p. 83). Similar conceptual expansions of latter-day PCK models are not unusual in more recent PCK (Park & Oliver, 2008) and TP(A)CK research (Phillips & Harris, 2018).

Instead of adding elements from Shulman's (1987) knowledge base and/or PR&A models to PCK, we sought to conceptualize and vet (with experienced geography teachers) a comprehensive depiction of teachers' geography-related knowledge, including, but not limited to, their PCK. We grounded this work in Shulman's original knowledge base model, since the great majority of educational research done about the nature of teachers' knowledge is rooted in Shulman's conceptualizations (Park & Oliver, 2008). Our processes for creating this model are described next.

In education system, there are two categories that encompass teachers' knowledge of this GeoKBT component: students' knowledge and ways of knowing geography, and aspects of geography that students find difficult to learn.

The first category: Knowledge of students' knowledge and ways of knowing geography.

This category addresses teachers' knowledge of the prerequisites that students need to be able to understand specific geography concepts, plus an understanding of prior learning or experiences that are required when students are engaged in geography-related learning. For example, students need to understand latitude and longitude before learning about map projections and must be able to read a map and understand map scales before learning how to interpret geospatial data at various scales. Teachers may be able to obtain this knowledge from their previous teaching experiences, particularly when they teach similar or lower grade levels over multiple years. They can also gain this knowledge from current students via the results of pre-tests and formative assessments, or by observing students during in-class learning activities.

Teachers also need to be aware of varying conceptualizations that students have about geography. For example, without understanding the importance and impact of geography, students may think that it is primarily about locations and place names. Other students may understand it to be the study of exotic places in the world. There may also be students who have never thought of what geography is about and how learning geography can benefit them. The knowledge in this category also includes teachers' awareness of variations in students' approaches to the development of geographic understanding. Individual students have different geography-related learning needs, so it is important for teachers to have knowledge of learners' variability (Meyer & Rose, 2005) within their discipline.

The second category: Knowledge of areas of student difficulty in geography learning.

This category includes teachers' knowledge of the particular geography concepts or topics that students find difficult to understand, and why this is so, along with

the ways in which students find learning difficult in geography. With the participating teachers' help, we were able to identify many examples and aspects of geography learning that many students find particularly difficult. For example, the teachers shared that many students have difficulty understanding interconnections and interdependency among people and places in the world. Acquiring information about a country is not a difficult task, but it is challenging for students to understand the different relationships one country has with other countries in economic, historical, and political contexts. Students also have a difficult time understanding how geographic knowledge and ways of thinking can inform decision-making that can affect their daily lives. The teachers also said that there are some geographic concepts that students often confuse. One example is the concept of *region*. Many students use *region* and *continent* interchangeably and think Latin America is the same as South America; the Middle East is the same as Southwest Asia, etc. Not surprisingly, the teachers also shared that students often have difficulty understanding larger-scale geographic phenomena in depth, such as the Earth-Sun relationship, climate zones, and natural hazards, mainly because those phenomena are too large in scale to directly observe or analyze. This learning often occurs abstractly, using spatial representations such as maps, diagrams, models, or video clips, but students are not likely to understand these representations well without teachers' guidance. These examples illustrate just a few of the geographic concepts that the participants highlighted as difficult for students to grasp.

In conclusion, Geography education research has yet to make a similar transformative shift with reference to its conception of teachers' knowledge. When contrasted with pedagogical subdisciplines such as mathematics, science, and literacy education, geographers know comparatively little about the types of knowledge that teachers need to effectively teach geography. Indeed, in the *Road Map for 21st Century Geography Education*, research about the nature of geography
teachers' knowledge is described as a key component of essential future research:
We need to know more about teachers' content knowledge, pedagogical knowledge (e.g., sequencing, organization), pedagogical content knowledge, and the balance among the three. Future research should identify what teachers know, what they need to know, how they deploy their knowledge, and how their knowledge of geography and geography education can be promoted and supported (Bednarz, Heffron, & Huynh, 2013, p. 47).

The purpose of this study, therefore, was to draft what might become a viable
model of the knowledge base for geography teaching. Based in extant, related research about teachers' knowledge in general, and their knowledge for science teaching specifically, we identified and described six components of GeoKBT, the geography knowledge base for teaching. We believe that this work will help researchers better understand the nature of the knowledge that underlies effective geography teaching. The GeoKBT model can assist research and professional learning designs by identifying the multiple dimensions of knowledge for geography teachers. We acknowledge, however, that there are limitations in the development of the GeoKBT model. Due to funding and time restrictions, only four expert geography teachers participated in this study.

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