

Mapping Powerful Knowledge in Initial Geography Teacher Education: An Analysis of Portuguese Teacher Education Curricula

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Abstract (English)

Powerful knowledge has emerged as a significant topic of research and theoretical debate within Geography Education. In recent years, several scholars in the field of Geographical Education have contributed to this discussion through theoretical reflections and empirical research. At the same time, Geography Teacher Education constitutes an important context in which ideas related to powerful knowledge can be developed and incorporated into teacher preparation. Therefore, it is relevant to examine how initial Geography teacher education programs address the concept of powerful knowledge and how they prepare future teachers to engage with and apply it in their professional practice. This article explores how initial Geography teacher education programs in Portugal address powerful knowledge and contribute to preparing future Geography teachers to incorporate this perspective into their teaching. To this end, we analyzed the syllabi of curricular units related to Geography Education, identifying whether the concept of powerful knowledge is explicitly addressed and examining how its different dimensions are represented in the curricula, drawing on Béneker's theoretical framework for the conceptualization of powerful knowledge. The findings indicate that, although powerful knowledge is not explicitly mentioned in the syllabi analyzed, several of its dimensions may nevertheless be addressed by teacher educators through references to specific geographical knowledge, engagement with societal debates, and the development of metacognitive processes. These findings suggest that powerful knowledge may be implicitly embedded in Geography teacher education, even when the concept itself is not explicitly articulated in curricular documents.

By examining the presence and potential development of powerful knowledge within initial Geography teacher education, this article seeks to contribute to the ongoing debate about the relevance of this concept and the ways in which its principles and dimensions can be more explicitly incorporated into Geography teacher education programs.

Key words: *Powerful knowledge; Geography Education; Geography Teacher Education; Content Analysis*

Introduction

Powerful knowledge is a research and theoretical reflection topic that is part of the current work agenda of several researchers in Geographic Education, such as Béneker (2025), Miguel González (2024) or Winter, *et. al.* (2024). In this context, it is important to reflect on how Geography Teacher Education is addressing “powerful knowledge” in their teaching programs. In this article, we present and discuss how Geography teacher training programs (that are a master’s degree) in Portugal address the issue of “powerful knowledge” and prepare new Geography teachers to apply it. For that, we analyzed the syllabus of curricular unities of Geography Education. We already analyzed how the content of the reports of these courses and we identified the need to students to develop reports in these Geography teacher training programs about powerful knowledge (Martinha, 2021).

Demonstrating the relevance of the themes of “powerful knowledge” and “Geography teacher education” in Geographic Education is the recent creation of two special interest groups within the context of the IGU (International Geographical Union) Commission on Geographic Education dedicated to these topics, called “Powerful Geographical Knowledge and Recontextualisation” and “Initial and Continuing Teacher Education” (<https://www.igu-cge.org/igu-cge-special-interest-groups-sigs/>).

Lee and Kriewaldt state that powerful knowledge draws attention to the importance of disciplinary knowledge for learners (Lee and Kriewaldt, 2025:82). Geography is a discipline that plays an important role in curricula because it allows students to develop various types of knowledge to understand the current world and the near future. It provides knowledge that will enable students to be active citizens and able to better understand the world in which they live. Powerful knowledge is, therefore, a key concept in this process because it is

a type of knowledge that gives "power" to students and without certain knowledge, these students will be at a disadvantage compared to other students.

The notion of powerful knowledge began to be developed in the context of Curriculum Theory and in the specific didactics of other disciplines (Börjesson and Lilliestam, 2015; Deng, *et. al.*, 2025; Duarte, *et. al.*, 2025; Elliott, 2026; Hordern, 2022; Hudson, *et. al.*, 2023; Kurup, *et al.*, 2023; McPhail, 2025; Markwick and Reiss, 2025; Muller, 2022; Ndlovu and Mavhunga, 2026; Talbot, 2023; Talbot, 2025) and is a notion that was initially developed by Michael Young. It can be understood as a body of knowledge that school subjects can pass to students, which gives them some kind of power, allowing a reduction in inequalities between them.

According to Maude (cited in Virranmäki, *et. al.*, 2019:4), powerful geographical knowledge is understood as knowledge that provides new ways of thinking about the world, that offers students powerful forms of analysis, explanation, and understanding, that gives students some power over their own geographical knowledge, that allows young people to follow and participate in debates on relevant issues at the local, national, and global levels, and that offers knowledge of the world.

Relatively recent discussion (Béneker, 2018; Béneker, 2025; Béneker and Palings, 2017; Boehm, *et. al.*, 2018; Bouwmans and Béneker, 2018; Cachinho, 2019; Catling and Martin, 2011; Dangalle, 2021; Davidson, *et. al.*, 2022; Gong, *et. al.*, 2021; Granados-Sánchez and Reid, 2024; Grmuša, *et. al.*, 2024; Hucle, 2019; Krause, *et. al.*, 2021; Lambert, 2018; Lee and Kriewaldt, 2025; Mahdavi, 2023; Maude, 2017; Maude, 2018; Miguel González, 2024; Simik, *et. al.*, 2023; Stefanon, 2023; Tani, *et. al.*, 2018; Virranmäki, *et. al.*, 2019; Windsor and Kriewaldt, 2023; Winter, *et. al.*, 2024). In Portugal, we do not find many studies or reflections on the topic. The few that we found attempt to explain what constitutes powerful knowledge in Geography and seek to introduce the topic into the theoretical debate in the field of Geographic Education (Cachinho, 2019).

In this way, powerful knowledge in Geography Education is specialized knowledge that takes students beyond their everyday experiences and show them new ways of understanding the world where they live. The concept of powerful knowledge, initially developed by Michael Young within Curriculum Theory, has become one of the most influential theoretical perspectives in contemporary Geography Education. It refers to specialized disciplinary knowledge that enables students to move beyond their everyday experiences and develop

deeper, more systematic understandings of the world. Unlike common-sense or experiential knowledge, powerful knowledge is generated through academic disciplines and provides learners with conceptual frameworks that allow them to analyse, interpret and explain complex geographical phenomena. Consequently, Geography Education has increasingly adopted this concept as a foundation for curriculum development, teaching practices and teacher education.

Powerful geographical knowledge equips students with ways of thinking that are unique to the discipline of Geography. Rather than simply learning facts about places, students develop an understanding of spatial relationships, human-environment interactions, scale, place, landscape, territory and globalization. These concepts enable learners to examine contemporary challenges such as climate change, migration, urbanization, environmental degradation and geopolitical conflicts from informed and critical perspectives. Powerful geographical knowledge provides students with new ways of thinking about the world, supports explanation and prediction, and enables them to participate more effectively in democratic decision-making.

Several scholars have contributed to expanding the theoretical understanding of powerful knowledge in Geography Education. Béneker (2018; 2025), for example, identifies four complementary dimensions: conceptual and theoretical geographical knowledge, concrete geographical knowledge, knowledge of societal debates, and knowledge about knowledge itself. These dimensions demonstrate that powerful knowledge extends beyond disciplinary content to include critical reflection, metacognition and the capacity to engage with complex social and environmental issues. Geography therefore becomes not only a school subject but also a means through which students develop intellectual autonomy and informed citizenship.

One of the major strengths of powerful knowledge is its contribution to educational equity. Schools have the responsibility to provide all students with access to disciplinary knowledge that they may not acquire through their everyday experiences or social backgrounds. In this sense, powerful geographical knowledge can reduce educational inequalities by ensuring that all learners have opportunities to understand complex global processes through rigorous conceptual frameworks. Geography classrooms therefore become spaces where students develop analytical skills that empower them to interpret the world critically and make informed decisions.

Powerful knowledge also has important implications for Geography teacher education. Future teachers require not only strong disciplinary knowledge but also the pedagogical expertise necessary to transform academic Geography into meaningful learning experiences for school students. Teacher education programs should therefore help prospective teachers understand what constitutes powerful geographical knowledge, why it matters for students' learning, and how it can be effectively taught through inquiry, fieldwork, problem-based learning and critical discussion. This requires integrating disciplinary knowledge with pedagogical content knowledge and reflective practice.

Overall, powerful knowledge has become a central concept for understanding the educational purpose of Geography. By combining disciplinary rigor with critical thinking and social relevance, it enables students to understand complex spatial realities and participate actively in addressing the challenges of an interconnected world. As Geography Education continues to evolve, powerful knowledge provides an important framework for designing curricula, preparing teachers and promoting meaningful geographical learning that empowers students both academically and as informed global citizens.

In recent years, many authors have written about teacher education in Geography in Portugal. The focus has been on the beliefs of Portuguese geography teachers and the content analysis of initial training programs (Alexandre, 2009); the “universitisation” of geography teacher education has also been highlighted (Alexandre, 2013; Alexandre and Ferreira, 2015). These studies are very relevant to understanding the Geography teacher training process in Portugal. About Geography teacher education in the international context, we would like also to underline authors as Knecht, *et. al.* (2020), Chang (2020), Puttick and Warren-Lee (2020), Scholten, *et. al.* (2022), Kostová and Knecht (2025), Spurná and Knecht (2025; 2026), Bernhäuserová, *et. al.* (2025), Smit, *et. al.* (2023), Saidirasilovna (2025) or Nguyen, *et. al.* (2026), that made relevant reflections on this matter. Specifically, we would like to refer to the work of Caldis, *et. al.*, (2026) that reflected on challenges in geography teacher education and Silva, *et. al.* (2024) that tried to connect Geography to Geography teacher education that plays a fundamental role in preparing professionals capable of helping students understand an increasingly complex, interconnected and rapidly changing world. As Geography addresses contemporary issues such as climate change, sustainability, globalization, migration, urbanization and geopolitical conflicts, future teachers must acquire not only strong disciplinary knowledge but also the pedagogical skills

required to transform this knowledge into meaningful learning experiences. Consequently, Geography teacher education has become an important area of research and curriculum development, reflecting the growing recognition that well-prepared teachers are essential for high-quality Geography Education.

The successful application of powerful knowledge in school Geography depends largely on the quality of Geography teacher education. Although curricula may define the geographical knowledge that students should acquire, it is teachers who interpret, select and transform this knowledge into classroom experiences. In this way, initial Geography teacher education plays an important role in preparing teachers to know the theoretical foundations of powerful knowledge and to implement it in their teaching practice.

One of the central objectives of Geography teacher education should be to make future teachers develop a deep understanding of the discipline itself. Powerful knowledge in Geography Education requires teachers to possess a strong disciplinary background. Teacher education programs should therefore provide opportunities for prospective teachers to deepen their understanding of Geography subject concepts and methods. In this way, teacher education should also prepare future Geography teachers to address contemporary global challenges through the lens of powerful knowledge. Issues such as climate change, sustainability, migration or geopolitical conflicts require teachers who can help students interpret complex content using rigorous disciplinary concepts. Consequently, Geography teacher education should encourage the integration of current societal debates.

Thus, Geography teacher education provides the foundation upon which powerful knowledge can become a reality in schools. By combining strong disciplinary preparation, pedagogical expertise, reflective practice and engagement with educational research, teacher education programs can prepare teachers who are capable of empowering their students with geographical knowledge that extends beyond everyday experience.

However, despite Powerful Knowledge becoming a major research topic in Geography Education, little is known about how it is incorporated into initial Geography teacher education programs. This article aims to contribute in this way.

Method

To develop this research, we analyzed the teaching programs on Geography Teaching in four universities that have master's courses in Geography Teaching (for upper basic education and secondary education) in Portugal (UniA, UniB, UniC and UniD). For each university, we

analyzed the syllabi of curricular units of Geography Didactics and Internship in Geography Teaching (units of Geographical Education), that are available online on the website of each university, a total of 17 curricular unit syllabi. Unfortunately, UniB had not in their website the syllabi of these curricular units (in July of 2026). Then, we made a content analysis, using the categories of powerful knowledge identified by Béneker (2018), because we considered that they are adequate to analyze syllabi of curricular units at the university level. These dimensions of powerful knowledge identified by Béneker (2018:10) are: conceptual and theoretical knowledge; concrete geographical knowledge; knowledge of societal debates and knowledge of knowledge.

After that, we present and discuss the results and we give some suggestions on how “powerful knowledge” can be more deeply inserted in these master’s courses in Portugal that are preparing new Geography teachers.

The study adopted a qualitative document analysis methodology, using content analysis as the principal analytical approach. Official syllabi were selected because they formally define the learning objectives, contents, teaching methodologies, assessment strategies and recommended bibliography of each curricular unit, providing valuable evidence of the educational priorities of teacher education programs. The analytical framework was based on the dimensions of powerful knowledge proposed by Béneker (2018), which were considered particularly suitable for analyzing higher education curricula. These dimensions include conceptual and theoretical knowledge, concrete geographical knowledge, knowledge of societal debates and knowledge about knowledge (metacognition). Each syllabus was systematically examined to identify explicit references to the concept of powerful knowledge as well as implicit references corresponding to these four dimensions. The results of this analysis are subsequently presented and discussed, allowing us to identify strengths and limitations of the current programs and to propose recommendations for strengthening the explicit integration of powerful knowledge into Portuguese Geography teacher education.

Findings and Discussion

The analysis of the syllabus curriculares unities of Geography Education in Portugal (that are inserted in master courses of Geography Teaching) is summarized in table 1.

Table 1

“Powerful knowledge” related issues of the curricular units of Geographical Education in Portuguese universities.

	Reference to “Powerful Knowledge”	Reference to knowledge of geographical concepts	Reference to knowledge about societal debates	Reference to knowledge of the knowledge
Curricular Unit 1 - UniA	no reference	school programs: pedagogical and scientific concepts	contributions to a reflective Geographic Education sustainability, technology and citizenship - perspectives	individual reflective blog
Curricular Unit 2 - UniA	no reference	fieldwork in Geography: conception and relevance in Geographic Education	the teaching methodology of the seminar is Problem- Based Learning.	no reference
Curricular Unit 3 - UniA	no reference	no reference	no reference	no reference
Curricular Unit 1 - UniC	new challenges in geographic education: globalization, ethics, and citizenship Cachinho (2019)	definition of specific objectives, key questions, concepts, strategies, resources, and bibliography	new challenges in geographic education: globalization, ethics, and citizenship Smith and Rushton (2023)	no reference
Curricular Unit 2 - UniC	no reference	ethics and the construction of geospatial content	from "fake news" to credible and contextualized information	no reference
Curricular Unit 3 - UniC	no reference	no reference	no reference	no reference
Curricular Unit 4 - UniC	no reference	no reference	content discussions	no reference
Curricular Unit 5 - UniC	no reference	to deepen scientific knowledge in the field of Geography	no reference	no reference
Curricular Unit 6 - UniC	no reference	no reference	ability to question and problematize	no reference
Curricular Unit 7 - UniC	no reference	no reference	no reference	no reference
Curricular Unit 1 - UniD	no reference	no reference	no reference	no reference
Curricular Unit 2 - UniD	no reference	no reference	no reference	no reference
Curricular Unit 3 - UniD	recent trends in Geography for	knowledge and information -	no reference	no reference

	teaching and education	perspectives between the local and the global		
Curricular Unit 4 UniD	excellence and innovation in geography education	no reference	no reference	no reference
Curricular Unit 5 UniD	no reference	no reference	no reference	no reference
Curricular Unit 6 UniD	no reference	no reference	no reference	no reference
Curricular Unit 7 UniD	no reference	no reference	no reference	teacher portfolio: key characteristics, evidence gathering, and self-assessment

Source: <https://www.igot.ulisboa.pt/mestrado-em-ensino-de-geografia> / <https://www.fcsh.unl.pt/cursos/mestrado-ensino-de-geografia-no-3-o-ciclo-do-ensino-basico-e-no-ensino-secundario/> / <https://apps.uc.pt/courses/pt/course/5641> / https://sigarra.up.pt/flup/pt/cur_geral.cur_view?pv_curso_id=9081 (our translation).

From table 1, we can conclude that there is only an explicit reference to powerful knowledge in these curricular units of Geography teacher training in Portuguese universities. It is the reference to a publication in the bibliography of the curricular unit 1 (UniC), written in the Portuguese language, about powerful knowledge in Geography education. Analyzing the total number of references that we can connect with the idea of powerful knowledge in Geography in these curricular units, we can conclude that the UniC is the university with the most references (8 references), followed by UniA (5 references) and UniD (4 references).

About references to “Powerful Knowledge” we found the following references that we can say that they allow the instructor to clearly approach powerful knowledge with students:

- “new challenges in geographic education: globalization, ethics, and citizenship (...) Cachinho, H. (2019). Desafios da formação em Geografia e na Educação Geográfica, conhecimento poderoso e conceitos liminares. Revista Eletrônica Educação Geográfica em Foco, Ano 3, Nº6, pp 1-22.” – Curricular Unit 1 - UniC
- “recent trends in Geography for teaching and education” – Curricular Unit 3 – UniD
- “excellence and innovation in geography education” - Curricular Unit 4 – UniD

These references show that, although powerful knowledge is not present in the syllabi of these curricular units in an explicit way, it can be approached by the instructors in order to allow students (future Geography teachers) to explore it. Curricular unit 1 from UniC presents a bibliographic reference about powerful knowledge in Geography Education (Cachinho, 2019).

Reference to knowledge of geographical concepts is made in six units and they make reference to the geographical concepts approach:

- “school programs: pedagogical and scientific concepts” - Curricular Unit 1 – UniA
- “fieldwork in Geography: conception and relevance in Geographic Education” - Curricular Unit 2 – UniA
- “definition of specific objectives, key questions, concepts, strategies, resources, and bibliography” - Curricular Unit 1 – UniC
- “ethics and the construction of geospatial content” - Curricular Unit 2 – UniC
- “to deepen scientific knowledge in the field of Geography” - Curricular Unit 5 – UniC
- “knowledge and information - perspectives between the local and the global” - Curricular Unit 3 – UniD

Here, are all references that ask instructors to work on geographical concepts with students, that is a strong base of a powerful knowledge approach in Geography.

About references to knowledge about societal debates, we were able to find in these curricular units six references where students are asked to participate in societal debates, which is deeply connected with powerful knowledge. Some examples of these references are:

- “contributions to a reflective Geographic Education / sustainability, technology and citizenship – perspectives” - Curricular Unit 1 – UniA
- “the teaching methodology of the seminar is Problem-Based Learning” - Curricular Unit 2 – UniA
- “new challenges in geographic education: globalization, ethics, and citizenship / Smith and Rushton (2023)”. - Curricular Unit 1 – UniC
- “from “fake news” to credible and contextualized information” - Curricular Unit 2 – UniC
- “content discussions” - Curricular Unit 4 – UniC

- “ability to question and problematize” - Curricular Unit 6 – UniC

Finally, about reference to knowledge of the knowledge, we identified in curricular unit 1 (UniA) the reference to “individual reflective blog” that allows students to reflect about their own knowledge. We identified the same situation in curricular unit 7 (UniD) with reference to “teacher portfolio: key characteristics, evidence gathering, and self-assessment”. The development of a blog or a portfolio can motivate students to reflect on their knowledge, what they know, and what is missing in their knowledge. This reflection is crucial for powerful knowledge development.

The analyzed data shows that explicit references to powerful knowledge are very limited in the Geography teacher education curricula of Portuguese universities. Only one curricular unit (UniC) directly includes a bibliographic reference on powerful knowledge in Geography Education. However, several curricular units contain references that can contribute to this approach. UniC has the highest number of related references. In these syllabi, we found relevant bibliographic references and syllabi topics that address themes such as innovation in Geography education and recent educational trends, which provide opportunities for instructors to introduce powerful knowledge in their lessons. In addition, several curricular units encourage engagement with societal debates through problem-based learning or critical discussion. Finally, reflective practices, such as blogs and teaching portfolios, promote students’ awareness of their own learning, reinforcing the development of powerful knowledge through metacognition.

Conclusion, Suggestion and Limitation

This study sought to examine how the concept of powerful knowledge is addressed in initial Geography teacher education programs in Portugal. Given the increasing relevance of powerful knowledge within international debates on Geography Education, the research aimed to determine whether Portuguese master's programs preparing future Geography teachers explicitly or implicitly incorporate this theoretical framework into their curricular structures. By analyzing the syllabi of curricular units related to Geography Education and teaching practice in four Portuguese universities, this study contributes to an emerging discussion concerning the relationship between teacher education, disciplinary knowledge, and curriculum development in Geography Education.

The results demonstrate that the explicit presence of the concept of powerful knowledge in Portuguese Geography teacher education is still limited. Among all the curricular units analyzed, only one syllabus included a direct bibliographic reference to the concept (Cachinho, 2019), which discusses powerful knowledge in Geography Education. This finding suggests that, despite the growing international recognition of powerful knowledge as an important theoretical perspective, it has not yet become an explicit organizing principle within the official documentation of Geography teacher education programs in Portugal.

However, the absence of explicit terminology should not be interpreted as an absence of the principles associated with powerful knowledge. The content analysis revealed that several curricular units include objectives, themes, teaching methodologies and assessment strategies that closely correspond to the dimensions of powerful knowledge proposed by Béneker (2018). References to geographical concepts, scientific knowledge, fieldwork, ethical issues, citizenship, sustainability, globalization, problem-based learning, critical discussion, metacognition, self-assessment and reflective practice all demonstrate that important components of powerful geographical knowledge are already embedded within these programs, even if they are not explicitly identified as such.

This finding is particularly significant because it suggests that Portuguese Geography Teacher Education already possesses a solid foundation upon which the concept of powerful knowledge can be more deliberately developed. Rather than requiring a complete redesign of existing curricula, teacher education programs could strengthen their contribution by making explicit the theoretical rationale that connects these different components. Such an approach would help future Geography teachers understand not only what they are learning but also why particular forms of disciplinary knowledge are educationally powerful and socially relevant.

The analysis also revealed differences among the universities examined. UniC presented the greatest number of references that could be associated with powerful knowledge, followed by UniA and UniD. Although these differences should be interpreted cautiously, particularly because the syllabi of UniB were unavailable online, they indicate varying degrees of emphasis on disciplinary knowledge, societal issues and reflective practice within Geography teacher education.

The frequent references to societal debates demonstrate that Geography teacher education in Portugal recognizes the importance of connecting geographical knowledge with contemporary global challenges. Themes such as sustainability, citizenship, globalization, ethics, technological change and misinformation illustrate how Geography can help students understand and critically engage with issues affecting modern societies.

Another important dimension concerns metacognition and reflective practice. The presence of reflective blogs, teaching portfolios, self-assessment activities and opportunities for critical reflection indicates that Portuguese teacher education values the development of reflective practitioners. Reflection enables future teachers to evaluate their own understanding, question assumptions and continuously improve their professional practice. From the perspective of powerful knowledge, this metacognitive dimension is particularly valuable because it helps teachers become aware of how knowledge is constructed, validated and communicated.

The study also reinforces the importance of strengthening the relationship between research and teacher education. However, these theoretical developments appear to have had only limited visibility within Portuguese Geography teacher education. Greater integration of contemporary international research into curricular documents, course bibliographies and classroom discussions could enrich teacher education programs and encourage future teachers to engage critically with current debates in Geography Education.

This research nevertheless presents certain limitations that should be acknowledged. The analysis focused exclusively on the syllabi of curricular units publicly available on university websites. Although syllabi provide important information regarding curricular intentions, they cannot fully capture what actually occurs during teaching and learning processes. Instructors may discuss powerful knowledge extensively during lectures, seminars or supervision sessions without explicitly mentioning it in official documentation. Similarly, teaching practices, classroom discussions and assessment activities may reflect principles of powerful knowledge more strongly than the written syllabi suggest.

Future research could also adopt complementary methodological approaches. Interviews with teacher instructors would provide valuable insights into their understanding of

powerful knowledge and the extent to which they intentionally integrate it into their teaching. Similarly, interviews or questionnaires involving student teachers could explore how future Geography teachers perceive disciplinary knowledge, geographical concepts and the educational purposes of Geography. Classroom observations could further examine how powerful knowledge is translated into pedagogical practice and how it shapes interactions between teacher instructors and student teachers.

Longitudinal research following Geography teachers from initial teacher education into their professional careers would also contribute significantly to understanding how powerful knowledge influences classroom practice. Such studies could examine whether teachers explicitly apply these principles when planning lessons, selecting resources, designing assessment tasks and supporting students' geographical thinking. Comparative international studies would likewise enrich understanding of how different teacher education systems integrate powerful knowledge within their curricula and professional development models.

This study demonstrates that the foundations for incorporating powerful knowledge into Portuguese Geography teacher education already exist. The programs analyzed include numerous elements that correspond to the theoretical dimensions identified by Bénéker, particularly regarding disciplinary concepts, societal debates and reflective practice. Nevertheless, these components often remain disconnected and implicit. Making the concept of powerful knowledge more visible within curricular documents and teacher education practices would strengthen coherence between educational theory, curriculum design and professional preparation.

In conclusion, powerful knowledge represents an important opportunity for enriching Geography teacher education in Portugal. More studies are needed to fill this research gap.

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