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**The barriers and enablers of curriculum thinking and teacher agency in geography education: a multinational study**

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**The barriers and enablers of curriculum thinking and teacher agency in geography education: a multinational study**

There is an increasing urgency, driven by global geopolitical, ecological and climate crises, for geography teachers to use their subject expertise as agents of change to empower children and young people with the knowledge and skills needed to think geographically and better understand our complex and rapidly changing world. This paper brings our international insights about national curriculum contexts and approaches to secondary geography education into dialogue with the concepts of recontextualisation and Future 3 curriculum to consider how we can foster teachers as curriculum makers with agency to decide what to teach and how. We examine the seven national education systems in which the authors work (Czechia, China, United Kingdom (England), Japan, the Netherlands, South Africa and South Korea) to identify the key barriers and enablers geography teachers face when wanting to enact a Future 3 curriculum of engagement that centres powerful knowledge to enhance student capabilities. Guided by Bernstein’s theory of the pedagogic device, we present a novel framework for analysing different curriculum contexts which we suggest could be insightful for educators wanting to foster teacher agency and provide students with epistemic access to powerful disciplinary knowledge in school geography.

Keywords: curriculum thinking; geography education; powerful disciplinary knowledge; recontextualization; teacher agency

# Introduction

Globally, governments seek to improve the performance of their education systems, often through policy reform underpinned by principles of social justice and focused on enhancing the quality of teaching and developing teachers as agents of change (UNESCO, 2021). In developing the ecological model of teacher agency, Priestley et al. (2015) recognise that schools and the social systems in which they exist are complex and that teachers require capacity and supportive school structures and cultures – if they are to achieve agency in their professional practice (Rushton & Bird, 2023). In this context, we recognise agentic geography teachers as specialised knowledge workers able to engage their students in higher-order thinking to develop geographical knowledge and understanding that is emancipatory and powerful - in order to make sense of the world (Béneker et al., 2023).

This article reports on a collaborative international curriculum project that investigated the conditions needed for geography teachers of secondary schools (students aged 11–18) to achieve agency, by analysing the barriers and enablers evident across the seven curriculum contexts (Czechia, China, United Kingdom (England), Japan, the Netherlands, South Africa and South Korea) in which the authorial team work. We recognise that education systems worldwide are unique, due to their different aims and values, cultures and histories, and being situated in varying socio-political systems (OECD, 2024). We thus used Bernstein’s (1999, 2000) pedagogic device as a common language to explore and understand what quality geography education can look like in an emancipatory curriculum; and what barriers and enablers impact the agency of geography teachers responsible for curriculum making. Our aim was to develop and apply a novel framework to analyse different curriculum contexts and identify opportunities for teachers to improve classroom practice and develop young people’s geographic knowledge, skills, and practices.

# Theoretical framework

Our theoretical framework brings our international insights about national curriculum contexts and approaches to geography education into dialogue with the concepts of recontextualisation and F3 curriculum, to consider how we can foster teacher agency and the development of powerful disciplinary knowledge (Barrett & Hordern, 2021). The outcome being curriculum justice: so that all children and young people have access to a quality geographical education (Biddulph et al., 2020; Mitchell et al., 2022).

Curriculum reform goes hand-in-hand with international debates about how education systems can respond to a fast changing world (OECD, 2020). In theorising about curriculum futures, Young and Muller (2010) argue that it is best to avoid a prescriptive (F1) curriculum that emphasises ‘core’ knowledge, which at its extreme could be called a form of reactionary libertarianism (Morgan et al., 2019). An over-socialised (F2) curriculum with a focus on competencies is also problematic. Rather, working towards an F3 curriculum that engages young people with dynamic and evolving powerful knowledge, is desirable. In order to identify the conditions that would support such an emancipatory curriculum, we first consider the nature of knowledge young people access through the school curriculum. Commonsense knowledge or horizontal discourse is ‘local, segmentally organised, context specific and dependent’ (Bernstein, 2000, p. 157). This contrasts with vertical discourse which ‘takes the form of a coherent, explicit, systematically principled structure, hierarchically organised, or it takes the form of a series of specialised languages’ (Bernstein, 1996, pp. 170-71). Knowing this helps one better understand how subjects are structured, their relationship with the parent discipline, and most importantly ‘the relationship between knowledge and “content” in the process of curriculum making’ (Hordern, 2021, p. 592). In turn, this focus on the nature of geographical knowledge can support teachers to engage young people with powerful knowledge which helps them ‘know something about the ways knowledge is created, tested and evaluated within geography’ (Maude, 2020, p. 75).

As a bridge between the earth and social sciences, geography’s knowledge structures are complex and integrate both horizontal and vertical elements. Therefore the role of geography teachers as knowledge workers becomes more important as they use their professional judgement to select the most appropriate knowledge while developing and enacting the curriculum. Lambert and Morgan’s (2010) curriculum making model brings together school geography, student experiences and teacher choices to reflect the possibilities for teachers when transforming disciplinary ideas, concepts and processes from an official curriculum document into teaching content (Béneker et al., 2023, p.399):

The perspective behind curriculum making thus assumes that the teacher has achieved professional agency (Priestley et al., 2015): they make conscious, reflective choices in their professional practice, and do not simply ‘deliver’ prescribed and predetermined content. In contrast, agentive curriculum makers build a curriculum of ‘engagement’ both with what students bring and with the subject discipline.

However, the assumption that all teachers can achieve professional agency is problematic, especially in education systems where policies are increasingly prescriptive and teacher autonomy is limited (Hordern, 2021).

In the GeoCapabilities project, the notion of powerful disciplinary knowledge was an underlying principle of curriculum making in secondary schools (Lambert et al., 2015). Access to this knowledge should be seen as a matter of social justice and with transformative potential (Biddulph et al., 2020). This potential is only possible if the knowledge is first transformed and recontextualised into a coherent curriculum. Taking this approach can help to develop young people’s world knowledge, their relational understanding of people and places, and the propensity and disposition to think about alternative social, economic and environmental futures (Lambert & Morgan 2010, p. 65).

For a more specific identification of powerful geographical knowledge, it is useful to realise that the (geographical) knowledge we have at our disposal is diverse in level of abstraction and explanatory power (Béneker & van der Vaart, 2020, p. 224). Combining and relating different types of knowledge, such as conceptual and theoretical knowledge with substantive, experiential and indigenous knowledges can lead to a powerful geographical education. This is only possible if, as Roberts (2017) suggests, teachers make connections between students’ everyday knowledge and school geography, practise geography in the classroom and in the field, and give young people the space to debate and discuss geography together. Enacting enquiry-based pedagogical practices that promote geographical thinking and critical understanding are ultimately powerful, if the transformative effect of geography education endures in the mind of the student into adult life (Roberts, 2023a).

In order to examine the ways in which powerful knowledge can be fostered, it is helpful to draw on Bernstein’s (1999, 2000) pedagogic device, see Figure 1. It describes the control mechanisms that regulate the development of, and access to, knowledge in the educational domain. The pedagogical device is subdivided into: (1) the field of knowledge production, (2) the official and pedagogical recontextualising field, and (3) the school context. The regulating control mechanisms are driven by two main principles, classification (the knowledge to be transferred) and framing (how meaning is put together). Differences in classification and framing result in variations in the extent to which teachers can exercise their agency in curriculum making.

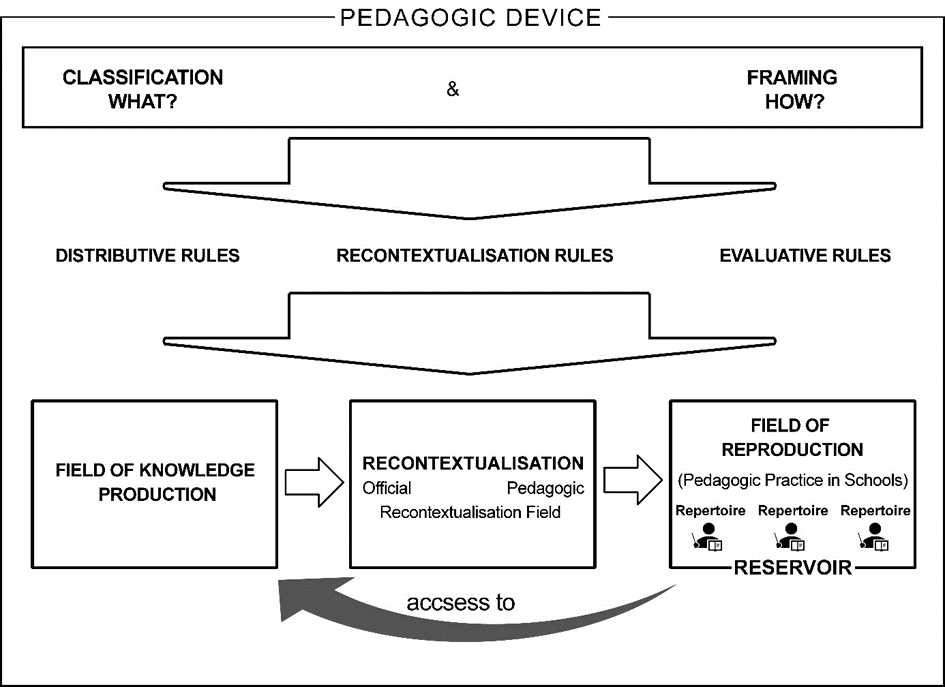


Figure 1: Bernstein’s (2000) pedagogical device and curriculum making (Krause, 2025)

Using Bernstein’s pedagogic device as a guidance for our exploration of teacher agency and F3 curriculum enactment in different national contexts, we generated the following guiding questions:

1. What kind of access do teachers have during their education to scientific geographical and pedagogical knowledge?
2. How does the official recontextualising field control the written curriculum, the examination system and other mechanisms such as school inspection and access to knowledge?
3. How does the pedagogical recontextualising field support teachers in F3 curriculum making (via textbooks, materials in magazines/ websites, CPD courses and teacher networks)?
4. How does the school context influence teachers curriculum making/leadership (e.g. school pedagogy/identity, teachers orientations and teaching skills)?

# Research design, methodology and methods

This research adopted a qualitative research design, and a methodology of multiple case studies (Given, 2008). The seven countries or cases (China, Czechia, United Kingdom (England), Japan, the Netherlands, South Africa and South Korea) are investigated by the ten authors of this paper who are experienced geography education researchers in their own national contexts. The countries display a variety of curriculum contexts in which the subject is at least compulsory in (some years of) lower secondary and optional in upper secondary education.

To develop a shared understanding of how teachers can foster a F3 curriculum in these contexts, we collaborated at the intersection of physical and virtual spaces, with co-writing occurring online either side of an in-person symposium (Yeo & Lewis, 2019). Initially, similarities and differences between national curricula were discussed, guided by Bernstein’s pedagogic device (see Figure 1). Subsequently, in the prototyping phase, a pre-existing scheme that identified elements that give leeway or restrict teachers’ and students’ actions towards enactment of the F3 curriculum, which had previously been used to compare the German and Dutch context (Krause, 2025; Krause, 2021), was adapted for this multi-national study (see Figure 2). For each country, the scheme was used to describe the country’s situation. Then, through group discussion, the schema was revised and adapted and iteratively checked for contextual fit, validity, consistency and practicality (Bakker, 2018). This generated a more robust multi-country schema which may be applicable in a wider variety of contexts. There are of course limitations to our approach; for example, the framework does not account for different social-cultural contexts and there is an assumption that teacher agency is possible in all education systems. Furthermore, the national examples in our findings are not representative but rather function as examples to illustrate the framework and make it more concrete by including at least two examples from each participating country.

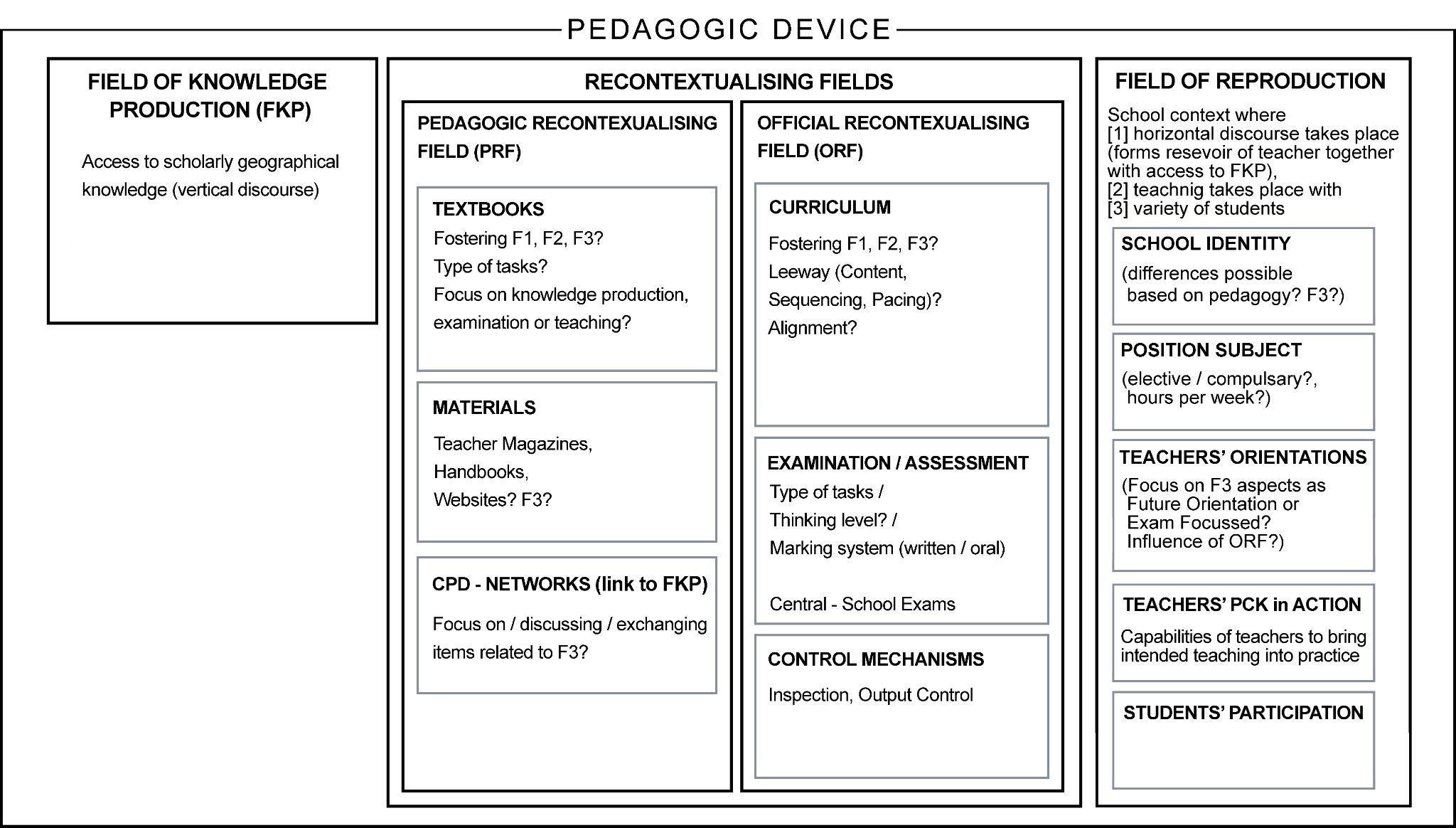


Figure 2: Recontextualisation model (adapted from Krause, 2025)

The resultant schema presented here may be used in other educational contexts to identify: (1) what an ideal F3 curriculum might look like, and (2) what factors may hinder or support F3 curriculum enactment and the related teacher’s agency. The flexibility of this schema could be developed further by including more curricula contexts.

# Findings

Our recontextualisation model, based on Bernstein’s (1999, 2000) pedagogic device, distinguishes three fields (knowledge production, recontextualisation and reproduction) that were examined to analyse and compare the seven national curriculum contexts (see Figure 2). The field of knowledge production refers to geography teachers' access to scientific knowledge during their education. Recontextualisation occurs in two fields. First, the official recontextualising field (ORF) concerns curriculum, assessment and quality assurance, to ensure effective implementation of the curriculum. Second, the pedagogic recontextualising field (PRF) transforms knowledge in textbooks, other educational resources, CPD-courses, teacher networks and other ways. The field of reproduction describes a school context where horizontal discourse and teaching take place with a variety of students.

## Knowledge production

Geography teachers who have the potential to lead the F3 curriculum are expected to systematically acquire scientific knowledge in two areas: (1) knowledge of geography (including subject-specific content, ways of thinking, and epistemology), and (2) knowledge of geography didactics/pedagogy (including teaching strategies, psychological aspects, and assessment of the educational potential of geographical knowledge). The former provides the raw material for recontextualisation, while the latter gives geography teachers possible paths for achieving recontextualisation in their teaching practice.

Teachers’ subject matter and pedagogical content knowledge (Shulman, 1987) are essential to teaching and influence what Bernstein (1999) calls a teacher’s repertoire. A geography teacher's access to this knowledge is determined by their educational background, including whether they have direct or indirect exposure to disciplinary geography, the length of their studies, the level of their education (e.g. bachelor's or master's degree), and whether they have received specialised subject training. Other factors, such as the affordability and accessibility of university education also affect the extent to which teachers acquire this knowledge and can effectively transform it into F3 curriculum practice. Although teacher education systems in different countries take different approaches to develop subject content and pedagogical knowledge, they all provide a wealth of support to ensure that geography teachers can effectively transform this knowledge in professional practice.

Chinese and Czech teacher training mechanisms effectively establish a balance between subject content and pedagogical knowledge through layered learning at the undergraduate and masters level. Geography teachers in these countries typically receive an in-depth study of subject matter content at the undergraduate level to consolidate their subject matter literacy. This is followed by a greater focus on pedagogical knowledge at master's level (e.g. Knecht et al., 2020; Řezníčková, 2010; Xu, 2024). This seeks to bridge educational theory and practice. In addition, China has strengthened the innovation of its teacher training system with an integrated design and support platform for teacher education that encourages role coherence and career-long teacher growth. Since 2010, a five-tier teacher training system at the national, provincial, municipal, county and school levels has been officially formed in China (Ling et al., 2023).

The Dutch teacher education system presents different models for combining subject knowledge and pedagogy, represented by universities of applied sciences and research universities. The programmes at the universities of applied sciences limit students’ access to geographical knowledge production, and focus on the development of teaching skills. Research universities, on the other hand, offer programmes that focus on geography, with a choice of human geography or earth sciences; this optionality complicates teaching at school level. Teacher education courses that occur after a master's degree are limited to one year and as a consequence, teachers start their career with less professional skills. The South African context has structural challenges which have similarities to the Dutch context. Teachers can complete a postgraduate teaching qualification, having completed a three-year undergraduate degree in geography. Or, they can complete an undergraduate education degree; this only includes an 18-month geography programme, in which the breadth and depth of the geography content are limited (Waghid, 2010). Teachers' geographic knowledge and pedagogical education thus differ between the two pathways.

In England, the model of teacher preparation is changing. Teachers traditionally completed an undergraduate geography degree and a postgraduate certificate in education (PGCE). Recent policy reforms have shifted the site of teacher education, with school-led provision expanding and some university programmes forced to close (DfE, 2021). As providers struggle to fill places as a result of the recruitment crisis, some trainees are accepted into PGCE Geography programmes without first completing a geography degree and some schools now struggle to recruit specialist geography teachers (Ofsted, 2023). Our seven education systems recognise the importance of the systematic development of teachers' professional (subject and pedagogical) knowledge and practical judgment as this is the key factor influencing the quality of teachers and education (OECD, 2024).

## Official recontextualisation

In terms of curriculum, we were concerned with understanding whether the formal geography curriculum in the different contexts is F3 curriculum-oriented, and fosters for example world knowledge, relational thinking and the propensity to think in alternative futures (Hammond et al., 2024; Lambert et al., 2015). Furthermore, we were interested in whether the curriculum gives leeway for teachers to develop powerful knowledge while using powerful pedagogical approaches (Roberts 2023a).

The curriculum goals and outcomes in the ORF are crucial to achieving the F3 curriculum. In China for example, the goal of the national geography curriculum is to cultivate students' four core disciplinary competencies through solid subject knowledge and geographical thinking and to encourage students to understand and think about the world like geographers (MoE PRC, 2017). Hammond et al. (2024) analysed three formal curriculum documents from England, Finland and Sweden to assess how geographical knowledge is represented in each. The results show that deep and descriptive knowledge of the world dominated the three national curricula. However, this was at risk of being conceptualised as lists of knowledge to be learned about the world, which may weaken the discourse and space of teachers in curriculum settings.

Likewise, the analysis of the Dutch curriculum for upper secondary displays a high potential for a F3 curriculum due to its emphasis on the development of systematic knowledge and the application of it in topical spatial issues. However, teachers’ leeway may suffer from a high level of specification (Krause et al., 2021). Such specification can also influence the pedagogical recontextualisation field (PRF) as the Japanese example shows. Here, the national curriculum is very detailed, with strict regulations on the arrangement of textbook content, the selection of teaching content, and even the learning sequence (MEXT, 2019, p. 70), leaving teachers with limited discretion. The ideal national curriculum should strike a moderate balance as in the Czech example (VÚP, 2017): it should be specific enough to give teachers a good grasp of the content, but not so detailed as to restrict their flexibility and lead to mechanical teaching of the prescribed content. Teachers should have sufficient leeway in sequencing and pacing topics, as well as in the selection of the content and the pedagogic approach and strategies.

The second aspect of the ORF relates to assessment. The manner of examination is important for teachers’ practices. Considering the type of examination, higher-order thinking should be sufficiently addressed, and a mix of (open-ended) oral and written examination forms are preferable, as they aim at exploring what the student knows instead of emphasising their lack of knowledge. The grading system and to what extent the design of the examination is open to teachers and students, as well as the alignment to (F3) curriculum aims are other essential factors. For example, in England the examination specifications become the ‘de facto curriculum’ (Ofsted, 2023) and teachers focus on covering curriculum content and lower-order geographical thinking as higher-order evaluative command words such as design, create and investigate are not used in formal assessments. In the Netherlands, high stake examinations also focus more on lower-order rather than higher-order geographical thinking, and have a strong pre-shadowing effect on teachers’ use of tasks in classroom settings (Krause et al., 2024). Likewise, in South Korea, schools have a scoring systems which relies on short response questions and performance evaluations and the College Scholastic Ability Test (CSAT) only asks multiple-choice questions (Lee, 2011). These influence teaching and assessment, for example, subject content is only included in geography classes if it relates to the CSAT (Lee, 2011). Thus, national examinations can be a significant barrier to the F3 curriculum because they unduly influence teachers’ content and pedagogical choices to foster academic success.

The last aspect of the ORF focuses on the mechanisms of quality assurance used in a system, i.e. how the government organises the support of geography teachers, and controls the individual or average output, the teaching quality, and the school pedagogy. Here school inspections play a vital role. Critical here is, in what ways the institutions support teachers in their F3-curriculum making and foster public trust, or restrict it – regarding teachers and schools with distrust and to be controlled. For example, Czechia has school inspections that check the quality of schools and their conformity with the national curriculum which follows the F3 curriculum and provides sufficient leeway to teacher’s agency. Whereas in the Netherlands teachers feel pressure by the control mechanisms and a lack of trust (Krause et al., 2024).

## Pedagogical recontextualisation

In order to foster teacher agency for curriculum-making, elements of the PRF including textbooks and teaching materials should have an educative role in supporting teachers to make appropriate pedagogical and subject matter choices for the students they teach in their specific schools (Shulman, 1987), and that promote student agency such as geography enquiry (Roberts, 2023b). This is possible when textbooks and teaching materials are in regular use and offer up-to-date (via digital support) content that blends substantive and disciplinary knowledge with relevant real-world case studies with engaging and challenging activities (Krause et al., 2021). In China and South Africa for example, the engagement of academic geographers in designing textbooks could be an enabler, while the low frequency of textbook revisions is seemingly a barrier. In England, teacher companion guides to textbooks with pedagogical advice can be an enabler, while instrumentally-oriented textbook content that only allows ‘teaching to the test’ can be a significant barrier (Rawlings Smith, 2020).

Instructional resources should be affordable and accessible for all students, with supplementary materials such as teacher guidance available via websites or teaching publications to offer updates and opportunities to localise the curricula offer. In Japan, a publisher with close ties to the Association of Japanese Geographers publishes a monthly magazine, which makes it easier for teachers to keep up with trends in geography education (Ida et al., 2017). A similar magazine is published in Czechia (see www.geograficke-rozhledy.cz) and in England (Teaching Geography journal) but does not exist in this form in the Netherlands (Krause et al., 2021).

Teachers should be supported to develop their professional knowledge base with a strong formal education in geography education. Moreover teachers need sustained, subject-specific and high quality CPD which is low-cost, regularly available locally or online to share good practice or the latest insights from research in teaching geography. In China CPD-courses are obligatory, and research has shown that CPD-courses and geography teacher networks have a positive impact on teachers’ curriculum making (Hanus & Krause, 2025; Krause et al., 2024).

## Reproduction

Opportunities for supporting curriculum-making by the schools vary within and between education systems. Inequalities within the dual-structure of the South Africa education system result in under-resourced no-fee state schools being less capacitated to foster F3 curricula, while better resourced private and fee-paying state schools are better able to foster F3 (Essack & Hindle, 2019). If we consider teachers in England, those working in academy schools under the control of a multi-academy trust (MAT) and not a local authority, are not currently required to follow the Geography National Curriculum (ORF), yet their pedagogical freedoms may be limited where MATs standardised the curriculum and produced prescriptive teaching materials (Ofsted, 2019).

The ways in which schools have freedom in their pedagogical approach influences teacher’s F3 curriculum-making and the extent which they take into account in relation to the requirements of their specific students’ group. Not only the position of geography as a subject (the amount of lessons per week and its optionality) creates opportunities for developing powerful geographical knowledge. It is the teachers and their roles in the curriculum enactment which enables F3 development with students. Although in Bernstein’s model students mainly function as acquirers of knowledge, the F3 curriculum debate acknowledges that students are active agents and co-constructors of powerful knowledge.

If we want to support teachers in their curriculum-making, schools and their teachers need to have leeway for F3 curriculum enactment. Powerful geographical knowledge is developed when teachers’ orientation includes complex and higher-order thinking tasks (Maude & Caldis, 2019) and they are able to choose from a broad repertoire of teaching strategies - adequate to their students and supportive of the use of powerful pedagogies (Roberts 2023a).

Even though schools and teachers in different national contexts could fulfil the above expectations, they are often limited by the national examinations as well as local authorities. In South Africa for example, ‘teaching to the exam’ is common practice to meet pass-rate requirements (Maddock & Maroun, 2018). A pre-shadowing effect on teachers’ task-setting can also be seen in the Netherlands (Krause et al., 2024) and can undermine teachers’ initiative in developing F3 curricula. In contrast, in Czechia there is significant leeway for teachers due to the general national curriculum outcomes which provide teachers the space to develop powerful geographical knowledge. In this context, it is possible for schools to develop an F3-focused school curriculum programme which then becomes compulsory. This however requires methodological support to guide teachers to select appropriate knowledge and the most appropriate teaching and learning strategies; otherwise teachers may not be able to imagine other ways of working (VÚP 2017). Thus, depending on the context, both *too much* and *too little* leeway can be problematic in fostering F3 curricula.

We identified shared experience from different national contexts in relation to teachers’ orientation, their curricular role, and their teaching practice. A mix of teacher orientations were identified within, and across, the seven countries. Most of these were examination and (traditional) national curriculum oriented, though it was always possible to find F3-oriented teachers in all contexts. Usually, such teachers attempt F3 curricula on their individual initiative, despite contextual limitations. Similarly, some teachers develop capabilities and higher-order thinking with students in practice, even when others stick to traditional teaching based on rote teaching and testing F1 knowledge. Student involvement in developing the F3 curriculum is rare in all countries but exceptions exist. Again, this is undertaken by individual teachers who are driven pedagogues.

As we consider students to be co-constructors of powerful knowledge, students should be encouraged to take an active part in learning (Roberts, 2017). Tasks play a vital role, especially at the higher-order thinking level (Bendl et al., 2024) when dealing with complex geographical issues (Maude & Caldis, 2019). The Ministry of Education in South Korea (MoE SK, 2022) introduced a ‘high school credit system’ that allows students to choose geography subjects where they construct their own geographic knowledge via self-learning. Still, students cannot actively participate in selecting specific learning content and tasks. Student agency is more evident in nations where higher-order thinking aims are included in the curriculum and high-stakes examinations are aligned (Krause et al., 2024).

Based on our analysis of seven curriculum contexts using Bernstein’s pedagogic device (1999, 2000), we recognise a range of enablers for a F3 curriculum (Table 1).

Table 1: Enablers of a F3 curriculum

|  |  |
| --- | --- |
| **ASPECT** | **DESCRIPTION OF F3 SUPPORTIVE ELEMENTS** |
| **Knowledge production** |  |
| **Access to scientific knowledge** | Geography teachers are educated in geography (and the specific ways of thinking in the discipline, including its epistemology) at a higher level of education/further education.  Geography teachers have acquired knowledge in the discipline of geography didactics (including pedagogical strategies, psychological aspects and assessment of the education potential of the geographical knowledge) to bring a F3 curriculum into practice.  Geography teaching programs are of high quality (specialist) education and accessible (financially) and studyable (pathways) for prospective teachers from diverse (socioeconomic) backgrounds. |
| **Official recontextualising field** |  |
| **Formal curriculum** | Formal curriculum aims include powerful (disciplinary) knowledge and deep thinking by:   * prioritising content based on the (the integration of) different types of knowledge in the discipline and its formative value. * emphasising higher-order, analytical and critical thinking skills to foster deep conceptual understanding.   Formal curriculum makes space for teachers’ curriculum-making (short-term and long-term) to develop powerful knowledge and use powerful pedagogies.  Formal curriculum allows teachers some flexibility in sequencing, pacing, and instructional methods, while maintaining clear, foundational guidelines for them. |
| **Examination** | Any formal system of assessment of and for learning, should foster and strengthen teachers’ leadership in their F3-curriculum making.  Examinations align with (F3) curricular aims, ensuring they accurately measure the intended learning and conceptual understanding. |
| **Quality assurance** | Monitoring by (national) governments focuses on individual as well as collective outcomes, on assessing student performance as well as teaching quality and school pedagogy to support teachers and schools to realise an F3-curriculum. |
| **Pedagogic recontextualising field** |  |
| **Textbooks** | Textbooks foster the engagement with powerful knowledge and the implementation of powerful pedagogies, including:   * learning tasks designed to be complex, engaging, and promote higher-order thinking skills. * content and resources that are up to date reflecting the best available knowledge.   Textbooks are affordable and accessible to ensure equitable use by all students. |
| **Educational**  **materials** | Educational materials support teachers in their curriculum making according to the Future 3 principles, they are for example topical, engaging, complex, and designed to promote higher-order thinking skills.  Educational materials are affordable and accessible, ensuring equitable access for all teachers and their students. |
| **Continuous professional development and teachers professional networks** | CPD courses and teacher networks are available, focusing their support specifically on teaching powerful geography aligned with Future 3 curriculum principles.  Both CPD courses and professional networks are accessible in multiple formats (e.g., in-person, online) and are affordable for all teachers.  CPD opportunities and network engagements, especially in connecting teachers with specialist experts (in academic geography and in teaching) are offered regularly to support ongoing professional growth. |
| **Reproduction** |  |
| **School identities and politics** | Schools have an autonomy to work from F3 curriculum principles and to adapt them to the specific local context. |
| **Position of subject in school system/ curriculum** | Sufficient amount of compulsory geography lessons is secured at the secondary level to realise the F3 curriculum principles and goals. |
| **Teacher orientation** | Teachers value the importance of powerful knowledge and powerful pedagogies.  Teachers actively fulfil their role as curriculum makers/leaders. |
| **Teacher pedagogical content knowledge in action** | Teachers use a broad repertoire of teaching strategies and methods to effectively implement a Future 3 curriculum, think of enquiry based pedagogies.  Teachers thoroughly plan lesson series with careful consideration of (F3) curriculum goals, geographical disciplinary knowledge, pedagogical strategies, and students' needs. |
| **Student participation** | Students are encouraged to be agentic and are regarded as co-constructors of powerful geographical knowledge.  Students' perspectives and everyday knowledge are valued and integrated into the teaching and learning process. |

## Overarching discussion

This exploratory study identified barriers and enablers for a F3 curriculum using Bernstein’s (1999, 2000) pedagogic device as an analytic tool. Our insights on the (im)possibilities for a F3 curriculum are important in light of the key role teachers play as curriculum makers, tasked with providing students access to knowledge of high epistemic quality, while teaching about important geographical issues of our time in a meaningful way.

Although table 1 displays a range of enablers, we could identify some main aspects that foster or hinder teachers’ F3 curriculum making, as barriers and enablers are often two sides of one coin. These aspects are (in the order of the model based on Bernstein’s pedagogic device):

* teachers’ access to scientific knowledge (compare South Africa or England with China or Czechia)
* the way high-stakes examinations foster higher order thinking (compare England with the Netherlands or South Korea)
* control mechanisms that foster teachers’ trust or limit their leeway (compare Czechia with the Netherlands)
* teachers’ access to CPD-courses or involvement in professional networks addressing pedagogies in line with a F3 curriculum.

Our findings recognise that the leeway teachers have for an ideal F3 curriculum varies with context (see contrasts between Czechia and Japan), and is often limited by the control mechanisms of the pedagogic device, and the way in which the fields of the device interact. These variations occur as the degree of classification and framing differ for all fields, resulting in distinctions not only between curriculum context but also between upper and lower secondary education or types of schools within one country (see Bernstein 2000).

However, the interplay between barriers and enablers is complex. Enablers such as having a scientific geographical background may provide teachers with a strong knowledge base to underpin quality geography teaching (Brooks, 2023; Krause et al., 2024). But this in isolation may not lead to teachers fostering powerful knowledge in practice, if the geography knowledge emphasised is not relevant to students or valued in society. In the Netherlands, control mechanisms such as a prescriptive and detailed curriculum and prescribed textbooks that promote rote learning in preparation for high-stakes examinations can hinder a teacher – even if they had intended to enact a F3 curriculum.

Teachers are curriculum makers, but rarely the curriculum developers. Here, we argue that it is time to acknowledge that the responsibility to enable a F3 curriculum is a shared responsibility, and the developed model based on the pedagogic device is a suitable tool to provide insight into this shared responsibility, as it explicitly identifies agents and power relations. Firstly, for those responsible for teacher education, there is a clear task to give (future) teachers access to powerful disciplinary knowledge and skills to identify such knowledge. This can happen through pre-service and in-service professional development, teacher networks or wider school initiatives that encourage good practices to be shared, i.e. powerful geographical teaching strategies (Roberts, 2017), so that teachers can enlarge both their repertoire and their reservoir. Secondly, the structure of formal curricula and the nature of school examinations are hugely influential over how geography is taught in schools (as is the case in England and South Korea). Wherever there is room for manoeuvre, teachers and leaders should use their influence to convince responsible stakeholders of the importance for students to engage with complex geography; as the world’s challenges are complex and urgent, and both teachers and students should be prepared for that. Finally, textbooks play an important role in most of the examined curriculum contexts and their production involves a range of geography experts, teacher educators and teachers. Publishers and textbook editors need to consider the broader purpose of a good geography education (Oakes & Rawlings Smith, 2022). It is their responsibility to effectively prepare students for high-stakes examinations, while supporting teachers and students to engage with complex geographical issues and encounter powerful disciplinary knowledge (Krause et al., 2017).

When discussing and interpreting the findings of this study, its limitations should also be considered. The variability of national contexts is a limitation that presents challenges when applying a unified framework across diverse educational systems. While Bernstein's (1999, 2000) pedagogic device provided a robust analytical lens, the nuances and unique sociocultural and political factors inherent to each country’s educational policies and practices may impact the generalizability of findings. Additionally, the reliance on examples from seven countries, though multinational and multiregional, has a limit in the breadth as well as the depth of perspectives. Finally, the qualitative approach, while insightful, may benefit from supplementary quantitative data to better understand the significance of certain barriers and enablers to F3 curriculum enactment. Future research might address these limitations by expanding the sample of countries, integrating mixed-method approaches, and add richer case studies examining the influence of specific national factors in greater depth.

# Concluding thoughts

This study highlights the vital role that teachers play as curriculum leaders in creating a transformative learning environment that aligns with Future 3 curriculum principles (Mitchell et al., 2022; Beneker et al., 2023). However, the enactment of such curricula requires robust support mechanisms to overcome the structural, systemic, and practical barriers which teachers face (Barrett & Hordern, 2021). Our findings, rooted in Bernstein’s model of the pedagogic device, reveal that while teachers may aspire to foster powerful geographical knowledge, they are often constrained by policies, prescriptive curricula, and the pressures of high-stakes assessments. This can stifle innovation and limit student engagement with complex geographical issues (Biddulph et al., 2020).

The application of the adapted Bernstein’s model in this study was particularly valuable in uncovering how teachers navigate the complex interplay of barriers and enablers in their curriculum-making. While the model provided a robust framework for analysis, its application revealed limitations in accounting for the nuanced sociopolitical dynamics unique to each education system (Hordern, 2021). Future iterations of the model could integrate these contextual factors to enhance its utility for comparative research. This adaptation could further support educators and researchers in identifying targeted strategies to enable Future 3 curriculum enactment across diverse contexts, as Krause et al. (2024) have done for task setting.

A significant implication of this research is the need for further investigation into how best to support geography teachers in enacting F3 curricula in various curricular contexts. This support may come in many forms: comprehensive professional development opportunities that emphasise powerful pedagogical strategies, accessible and affordable educational resources, and a curriculum structure that offers leeway, flexibility and values teacher agency (Barrett & Hordern, 2021; Roberts, 2023a).

This challenge of aligning curriculum enactment with the F3 principles extends beyond geography educators and touches on the broader community of curriculum developers, policy-makers, textbook authors, and educational institutions. Each stakeholder must recognize their shared responsibility in enabling a curriculum that equips young students with the critical, analytical, and problem-solving skills necessary to navigate and respond to the socio-political and ecological crises of our time (UNESCO, 2021).

Ultimately, for F3 curriculum principles to thrive in practice, it is essential to shift towards a model of education that values and invests in teachers' agency, providing teachers with the knowledge, tools, and support required to fully enact a F3 curriculum. This shift not only advances geography education, but also serves as a model for other disciplines, illustrating the profound impact that agentic teachers can have in shaping a more informed and engaged 21st-century society.

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**Tables and Figures**

Table 1. Enablers of a F3 curriculum

Figure 1. Bernstein’s (2000) pedagogical device and curriculum making

Figure 2. Refinement of Problems, Solutions, Methods, and Design Principles