Chapter 2
Germany

The Need for Rigorous Conceptualization
of Progression

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Abstract In Germany the concept of learning progression (LP) has long been neglected. Although inherent in ideas of sequencing geographical topics in the 1970s and also partly in hierarchical goal oriented approaches, progression only gained broader attention when competence oriented curricula were developed. But even here it is hardly underpinned by theoretical concepts. Instead there is a declared emphasis on empirical studies: while proponents of competence orientation call for assessments of the outcomes, another strain of research focuses on students' conceptions. Not surprisingly this rather unsatisfactory situation has led to an empirically proven lack in students' learning progressions. Yet, it seems that impulses for a more rigorous conceptualization of LP may come from new curricula of some of the federal states.

Keywords Exemplary learning · Competence orientation · Level definition · Student performance · Subject content

2.1 Introduction

"Progression" is a term that young German teacher students are frequently confronted with in the evaluations of their lessons by their supervisors. It is often used in the negative sense that the teacher trainers were missing a target-oriented learning progression (LP) in the one lesson they had just witnessed. Their

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conclusion is regularly based on observable student behavior and consequently they do not evaluate the teacher student's effort, but an assumed outcome.[1]

This routine sharply contrasts with the understanding of the idea of progression in the English-speaking world. Following the overview offered by Huynh and Gotwals (2014), learning progressions describe the development of the ways of thinking of children in relation to a specific topic and over a longer period of time. Aspects of LPs are a learning goal or upper anchor, a hypothesized development of thinking in relation to the concept in question, formative assessments, which help to see the progressions made, and instructional sequences, namely the planning procedure a teacher has to undertake before he/she enters the classroom. These aspects are all derived from subject-based theoretical conceptualizations of learning progressions, thus to better integrate the students' learning experience other authors also add a lower anchor, that describes student knowledge at the entry point of the learning progression (Mohan et al. 2014). The learning targets focused by the concept of progression are the disciplinary core ideas of the subject in question, as for example place, distance, space, networks or scale in geography.

In the following chapter we will explore three questions: (1) Why does the German teacher trainers' understanding of LP seem to be so different from the theoretical approach just outlined? (2) Which developments in the German geography education debate can be linked to the aspects of learning progression just mentioned and may hence be starting points for new developments? (3) What current practical approaches may stimulate the theoretical debate?

2.2 Progression: Past and Present

In this section we will address the first two questions by discussing two theoretical approaches, one of which has received widespread recognition in the 1970s and another which is more recent, but has its roots in the 1970s as well. In the second part of this section we will turn to empirical evidence from German research relating to the lower anchor and the development of thinking respectively.

2.2.1 Exemplary Learning and Progression

One of the few German geography educationists who explicitly used learning progressions in his argumentation was Schultze (1970). In the early 1970s when the academic discipline was undergoing a paradigm shift from regional to thematic geography, Schultze supported this change using educational arguments. These

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[1]This assertion is based on the authors' experience. The procedure is documented in confidential examination reviews that cannot be quoted here.
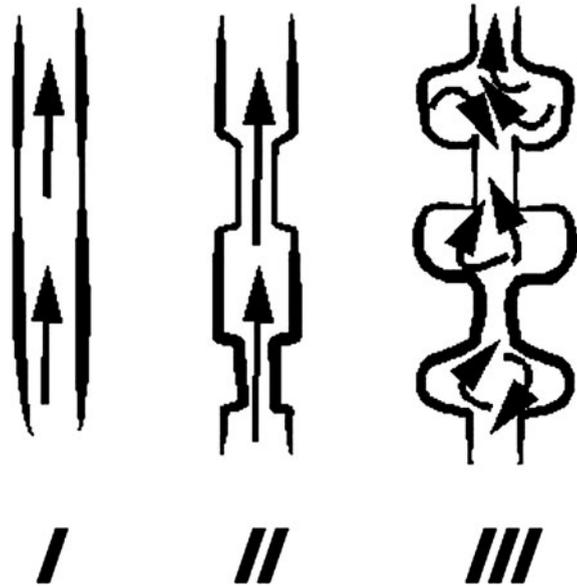
arguments were based on his introduction to the American High School Geography
Project (Uhlenwinkel 2006) and on his reception of the idea of exemplary learning
developed by the German physics educationist Wagenschein (1999).

Wagenschein (1999) criticized what he considered to be 'systematic' teaching
approaches of content to transmit the entire knowledge available to a subject and
thus necessarily produce fast learning without reaching any depths of understanding
(Fig. 2.1—column I). He also criticized some teachers' strategies to avoid pro-
ducing heaps of content knowledge by displaying what he called the 'courage to
leave gaps,' which in his view led to less knowledge without leading to more
understanding (Fig. 2.1—column II). Instead he promoted a procedure that con-
tained periods of transmission of knowledge interspersed by platforms of deeper,
disciplinary thinking (Fig. 2.1—column III). The starter for work on these plat-
forms would be an inquiry question, and the answer to this question would inform
the choice of knowledge transmitted during the systematic parts of the course.
Wagenschein thus conceived education not as a systematic accumulation of facts
and figures but as an introduction to systematic thinking. Hence his ideas are
compatible to the current debate on progression.

Schultze (1970) adopted these ideas for geography education, both theoretically
and practically. In his theoretical approach he argued that exemplary learning could
not be achieved while traditional regional curricula were still valid. Learning about
different countries hardly allowed for any progression as every country was new to
the learner and would be treated on almost the same level of understanding as the
country that had been taught before it (Fig. 2.2). Instead he proposed the intro-
duction of a curriculum based on a thematic approach that would also have the

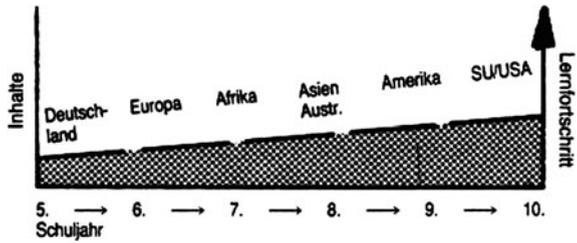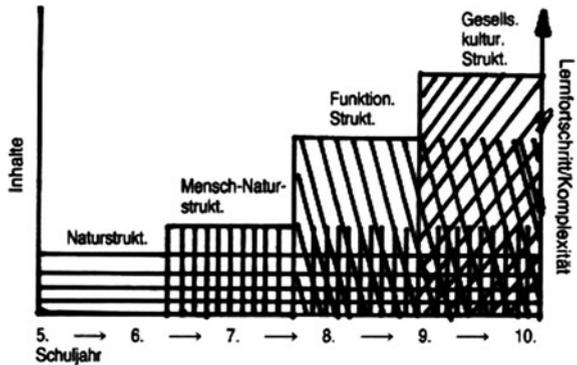**Fig. 2.2** Progression in a regional curriculum

Fig. 2.3 Progression in a thematic curriculum (year 5 to 10) based on structures. *Source* Schmidt-Wulffen (1982: 16)

advantage of being consistent with developments in the academic science. For educational purposes this thematic approach would cover four different fields or 'structures' in Schultze's terms of geography: natural structures, human-nature structures, spatial structures (Schultze called these 'functional', they were mainly related to economic geography) and societal structures. Learners would start their geography course with the natural foundations and then add the other structures in the course of their studies (Fig. 2.3). Although a step ahead in relation to the conceptualization of LPs as a core idea of education, this approach was firmly based in content knowledge and did not encompass the idea of a progression in spatial thinking (Mohan et al. 2014). This may have been one of the reasons why it was soon criticized because of its implicit environmental determinism (Schmidt-Wulffen 1982). Justified as this criticism was, it nevertheless missed the main flaw in Schultze's argument which was that he did not take the conceptual thinking that can be witnessed in his practical work to its logical end: Schultze was—at least in his theoretical approach—deeply rooted in an object-based definition of the subject. He did not use disciplinary concepts to define the platforms Wagenschein (1999) had envisaged, but he used generalized concepts like nature, economy and society.

Schultze's thinking was notably more conceptual in relation to his practical approach. In a time when the old curricula were obsolete and no new ones published yet, he enjoyed an almost unbelievable freedom to develop a completely new textbook (Uhlenwinkel 2006), that was soon to be entitled 'Terra,' a series title that

still exists today. When examining the first edition of this textbook series, one will easily note that Schultze did not only disregard his own theoretical approach starting with man-nature structures, that is starting with the concept of place, and only then moving on to natural structures, he also devised a whole range of tasks promoting spatial thinking. The textbook was an economic success and Schultze improved it during the following years adding more spatial models than he used in the first edition, hence putting an even greater emphasis on spatial thinking. But after a study on the new generation of textbooks found that teachers liked the book except for the tasks because they thought they were too difficult for students to work with (Scholl 1977), the publishing house started changing the books' contents and approaches considerably. What followed was a gradual return to learning facts and figures. Hence, Schultze's original approach that was tremendously promising for the development of school geography fell into oblivion and today is all but history.

2.2.2   Learning Goals and Competences

More or less at the same time as Schultze thought about progression in relation to content, another group of geography educationists borrowed ideas from a new educational approach that promoted target orientation. In German school geography, one of the many proponents of this approach was Ernst (1970). He suggested a number of learning goals which should help to structure the curriculum. These learning goals were not organized on a longitudinal timeline, but vertically in a hierarchy. They can thus be seen as upper anchors that were articulated for different levels of abstraction. Motivated by the political discussion of the day, Ernst chose 'emancipation' as the most abstract and more general goal that geography lessons should strive for. This overarching goal was divided into three specific sub-goals: ability and readiness for rational orientation in a scientific world, ability and readiness for rational analysis of the contemporary and the future world as well as the ability and readiness for participation in the democratic society. Each of these three was further subdivided into three slightly more subject-specific goals respectively, and these were then related to ten subject-specific sub-goals, such as the ability to analyze and evaluate the factors involved in defining borders or the ability to understand regional conflicts as a consequence of social-economic and political tensions. The idea behind this was not so much progression but deduction of specialized subject goals from the more general political goals expressed in the education laws of the federal states.

The approach did have practical impacts first in the production of learning programs and second in the training courses of teacher students. But while learning programs have not been used much, almost every young geography teacher had to formulate a hierarchy of learning goals for his or her examination lessons, even after the theoretical approach had lost its appeal in the 1980s and was not pursued any further.

Surprisingly though, in the mid-2000s the approach saw a comeback in the form of competence orientation. This time learning goals were formulated solely from the perspective of the subject and published in the form of the German educational standards called *Bildungsstandards* (DGfG 2012), a national non-binding document that proposed the standards an average student should reach at the end of year 10, which is the final obligatory school year in Germany. The paper proposed six fields of competences (e.g., subject-specific knowledge, spatial orientation, gathering information/methods, communication, evaluation and action), which are each divided into several competences. These competences are then specified by a number of standards. In this fashion, the first competence in the field of subject-specific knowledge is defined as the ability to describe the Earth as a planet, and the first standard to specify this competence is the students being able to 'describe the Earth's fundamental planetary characteristics (e.g., size, shape, structure, inclination of the Earth's axis, gravitational pull)' (DGfG 2012: 13). Added up, there are 77 standards to be achieved in six years of learning (and in some federal states only four), where each year comprises either 30 or 60 lessons of geography depending on the federal state. Or, put another way, to achieve each of these standards teachers and learners have between one and a half to four and a half lessons time.

After the standards were published a large group of German geography educators applied for funding to support a number of projects to investigate the progressions in different competences theoretically and empirically. Three of the competences researched in this context were concerned with maps: map reading competence, competence to use maps reflectively and the competence to draw sketch maps. The other competences were concerned with understanding geographic systems, the ability for geographic argumentation and geographic agency (Uhlenwinkel 2011). To support the application the researchers of these groups made first attempts at conceptualizing the progressions, and some even conducted a number of pilot studies.

We will here use the example of the team working on argumentation competence as it allows us to present theoretical and empirical results, which makes it easier to see the possible relations between the two. The competence model constructed to describe argumentation competence is based on the theoretical work of Toulmin (2003) and the Common European Framework of Reference for Languages (Europarat 2001; Fig. 2.4). It is a model designed for geography as a social science, since Toulmin had developed his model for arguments beyond the mathematical logic of the natural sciences (Toulmin 2003; Alexy 2012), and the framework is directed towards debate involving multiple perspectives. Toulmin's argumentation structure served as a tool to develop an understanding of possible levels of argumentation competence (Fig. 2.5). First, the competence of argumentation was divided into a written and an oral competence. Both of these can be defined by the same dimensions, namely perception of arguments, production of arguments and interchanging of arguments. For each of these dimensions achievement levels can be developed. The levels proposed here for the dimension of producing a written argument are very similar to those defined almost at the same time, but in a different context to describe a progression for evidence-based explanations (Stevens et al. 2014).
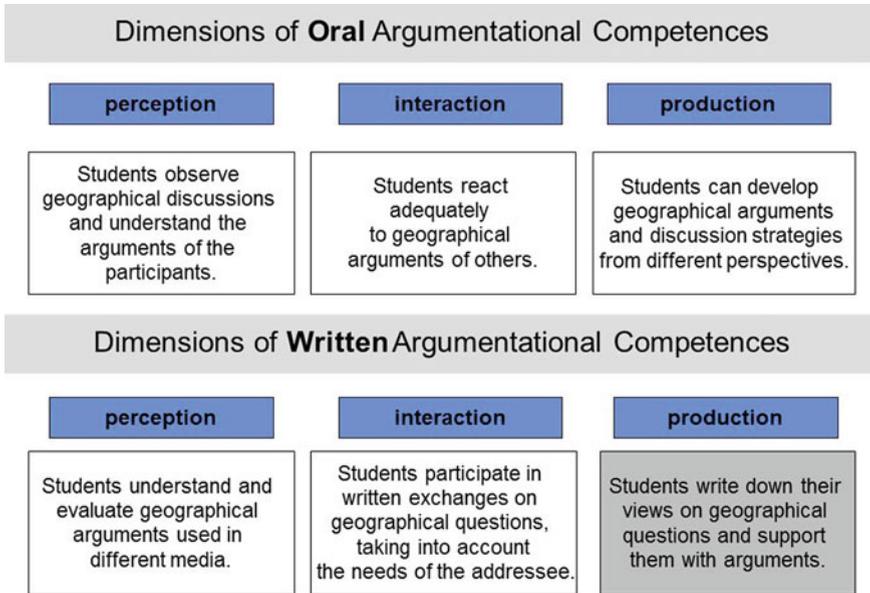
Fig. 2.4 Dimensions of geographic argumentation competence. *Source* Budke et al. (2010: 184); based on Common European Framework of Reference for Languages: Europarat (2001)

	production
level 1	Students state their opinion on a geographical question, but don't give reasons
level 2	Students state and justify their opinion on a geographical question mainly using irrelevant, inappropriate and invalid arguments. They do not relate their argumentation to the addressee.
level 3	Students state and justify their opinion on a geographical question mainly using relevant, appropriate and valid arguments. They adequately take into account the needs of their addressee. Overall their argumentation remains rather simple.
level 4	Students state and justify their opinion on a geographical question mainly using relevant, appropriate and valid arguments. They adequately take into account the needs of their addressee. They offer a complex argumentation.

Fig. 2.5 Competence levels of the dimension "written argumentation—production". *Source* Budke et al. (2010: 186)

Although the large-scale project did yield a number of publications mostly discussing hypothesized progressions, most of the research teams stopped working on the topic once it became clear that there would be no funding from the DFG (Deutsche Forschungsgemeinschaft). The readiness to go on with research of this vital aspect of teaching and learning seems to have been comparatively low, with other projects being given preference.

This is unfortunate as the developments described in this chapter, in our view, may at least partly explain why the German teacher trainers' understanding of progression seems so different from the current debate in the English-speaking world. In the absence of much theoretical underpinning by academic geography educators they may have muddled their ongoing involvement in hierarchical goal formulations with the vertical approach envisioned by competence orientation.

2.3 Empirical Studies

Contrary to theoretical work on progression, empirical studies can hardly claim a large number of historical forerunners. Also, not all the research views itself as contributing to a debate about learning progression. This is especially true for the numerous works that can loosely be associated to research on conceptual change. Compared to these works, studies that are interested in progression are extremely rare. We will here give a brief overview of both of these efforts.

2.3.1 Students' Preconceptions

Numerous studies in Germany have addressed the ideas students have about certain topics at a certain point in their learning biography. Most of the time, these topics are taken from physical geography and include ideas on climate change, especially with regard to the confusion and synthesis of the greenhouse effect and the ozone layer, on glacier movement, on avalanches and on groundwater (Schuler and Felzmann 2013). Another major area of research in this context is research on stereotypes related to people but also to landscapes such as deserts. The emphasis on topics from physical geography is due to the early development of research on conceptual change in the natural science subjects. This research is the main source for the theoretical foundation of the research done in geography. Unfortunately this strong influence also entailed a focus on aspects that are more related to concepts from the natural sciences than to geographical concepts. Thus the studies on groundwater discuss students' concepts in relation to the mode in which water occurs underground (as underground rivers or lakes or as capillary water) instead of examining the spatial interactions of where the water may come from or where it is stored and how that influences the environment (as groundwater in dry regions might).

Apart from its over-reliance on concepts from the natural sciences, there are two more aspects that imply a limited usefulness of the results for research on LPs. First, although based on the approach of conceptual change even in their theoretical discussions the authors often use the terms 'idea,' 'concept,' or 'knowledge' almost synonymously. This often leads to the idea that students need more correct knowledge to be able to overcome their preconceptions. Although it is certainly true

that knowledge can help, this approach rarely goes beyond the realm of declarative knowledge. Instead it remains tied to the object and fails to address the question of developing basic geographical concepts into more mature ones. Second, and related to this, most of the research is restricted to studies regarding the lower anchor. Thus, what is researched is the entry point, but what one does not learn is how students develop their ideas or even whether these ideas might not simply be a passing phase in the learning process and would then have to be addressed in a different way.

2.3.2 Learning Progressions

Before and after the application for funding, the team of researchers working on argumentation competence conducted a number of smaller research projects. One of these projects was organized in a year 7 class at a school and a seminar of BA-teacher-students who were close to the end of their course. In the year 7 class, a teacher student taught a lesson on China's one-child-policy using a textbook page and an educational game published in one of the journals for geography teachers. The game juxtaposed a family having one child with another having a second child. The player of the one child family was given all sorts of benefits and could thus proceed faster, while the player of the two child family had to care for himself or even pay penalties and thus proceeded slower and regularly lost the game. At the end of the lesson the students were asked to write a letter to the editor of a Chinese newspaper voicing their view of the one-child-policy. The letter should be about a 100 words long. This situation was later replicated in the BA-seminar on geography education. The participants of this seminar had accomplished most of their academic geography courses and an introductory lecture in geography education. They were given the same materials and task as the school students. Although the decision to use the same content in both groups appears inappropriate considering the age difference, other studies have shown that using materials and tasks of different scope and also different scaffolding may produce quite different competence levels in the same group at almost the same age (Berland and McNeill 2009).

The analysis then conducted comprised 13 texts by school students and 34 texts by BA-students. The texts of the school students were on average 134 words long, those of the BA-students averaged 122 words. Although their texts were slightly shorter the BA-students offered 11 arguments in the sense of Walton's argument diagramming (Walton 2006), while the school students used only nine arguments on average. Of all the arguments four could be considered geographical in the case of the BA-students and two and a half in the case of the school students. In the same wane, the BA-students produced on average six links between arguments, while the school students produced five. Although there are observable differences, they seem marginal considering that there are seven to eight years of learning between these two groups (Uhlenwinkel 2015).

When the differences between two groups of students are as small as in this case single students of each group are likely to produce very similar results even if their
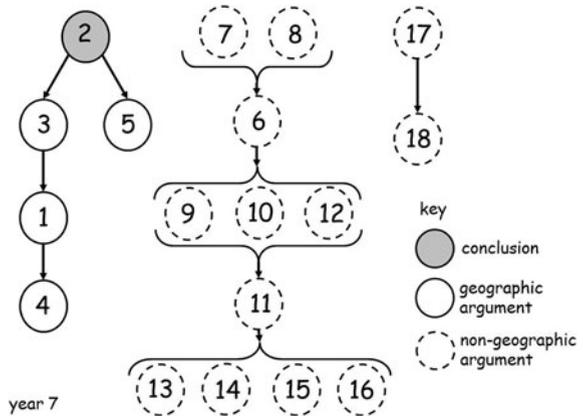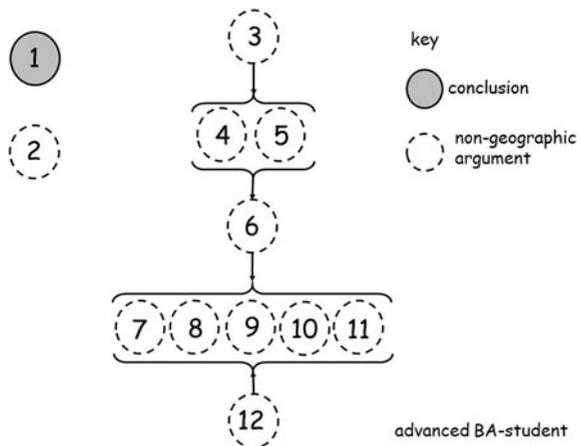
Fig. 2.6 Argument diagram of a year 7-student

Fig. 2.7 Argument diagram of a BA-student close to the end of his/her studies. *Source* Uhlenwinkel (2015: 57)

learning experiences might have been quite different. This can be seen comparing the argument diagram of a text produced by a year 7-student (Fig. 2.6) with one produced by a BA-student: their structure is almost identical with the one difference that the year 7-student uses geographical arguments, while the BA-student does not (Fig. 2.7).

Although it has to be taken into account that this has not been a longitudinal study, and thus what has been measured was not the LP of a number of students over a number of years but the difference between two groups of students at almost the same time, these results are rather thought-provoking. One hypothesis that might explain the results is the lack of conceptual thought in the German school discipline. This leaves the BA-students with more or less the same level of understanding facts as the school students. The results may thus as well be the outcome of the missing debate on progression as of the students' abilities.

2.4   Prospects

While the academic discussion on learning progressions has come to a perceived halt, there are notable developments at school level. These may inspire a new debate, but it is hard to anticipate whether or not academia will take notice of these developments at all, as there are some conceptual barriers that hinder reasonable theorizing about progressions. Once these are overcome though, there is a good chance that both teachers at school and researchers at the university might profit from a more intensive exchange of ideas on progression. We will first take a look at a promising new curriculum recently inaugurated in the federal states of Berlin and Brandenburg.

2.4.1   Promising Innovative Approaches

After two years of development and almost one year of public debate the new curriculum of Berlin and Brandenburg has been ratified by the legislations of the two federal states. The final outcome has at least implicitly been shaped by several changes in the structure of the German educational system. Beside the emphasis on competences that was triggered by the disappointing results of the country in the PISA-studies, there are at least two developments that have had major influences.

For one, the German educational system has undergone enormous changes since the 1960s. At that time education was still characterized by a three tier system in which most students went to 'Hauptschule,' the better learners went to 'Realschule' and the elite went to 'Gymnasium'. Since then the attendance has shifted dramatically. One reason for this was the introduction of comprehensive schools in the 1970s, another was a general shift towards higher education. Thus, today at least one third of all students visit Gymnasium, while in numerous communities Hauptschule and Realschule have merged for lack of students. But even though there are now political efforts to reduce the number of different types of schools to two (Gymnasium and a new type of school comprising all the other schools), the final examinations students can take seem more diversified than ever before (Autorengruppe Bildungsberichterstattung 2014).

Furthermore, in 2009 Germany has ratified the Convention on the Rights of Persons with Disabilities (Dörschner 2014), which has led to increased efforts regarding inclusion. Together with a growing proportion of students with learning difficulties, this has also added to the diversity of schools and classrooms making issues of individual LP more vital for teachers.

The new Berlin-Brandenburg curriculum (SBJW and MBJS 2015) has tried to meet these demands based on three pillars: level definitions, competences and subject content.

The first pillar defines possible progressions for students wanting to earn different credits on a general level (Fig. 2.8). Throughout the school years teachers are expected to address between two to four different levels in one class.

Fig. 2.8 Envisaged progressions in different school levels. *Source* SBJW and MBJS (2015: 9)

This is combined with a set of competences and standards defined by the subjects and at least formally based on the respective *Bildungsstandards* (DGfG 2012). They form the second pillar. The geography curriculum of Berlin and Brandenburg proposes five fields of competence (e.g., spatial orientation, understanding systems, using methods, communication and evaluation), each divided into two to four competences. These competences are then specified by standards that are described on different achievement levels thus identifying a hypothesized progression. For the competence 'evaluating situations and processes using subject-based and interdisciplinary values and norms' there are three identified levels of standards: (1) to judge a regional conflict using an individual, but well-reasoned framework of values (level D in Fig. 2.8), (2) to judge a regional conflict using the different normative frameworks of those involved (level E and F in Fig. 2.8) and (3) to judge a regional conflict using general values and norms such as human rights, environmental protection or sustainability (level G and H in Fig. 2.8).

The third pillar of the curriculum proposes the subject-specific fields of knowledge to be taught in different school years: living in risk areas, migration and population, diversity of the planet, poverty and wealth, resources, climate change as an example for international conflicts and conflict management, economic interdependencies and globalization, Europe and the world. As some of these topics are designed to facilitate interdisciplinary cooperation between the subjects of geography, history and political education, they are accompanied by an introduction that identifies the geographical concepts (place, space, scale, interaction) that should underpin them in the geography classroom.

Teachers are expected to use the curriculum as a kind of tool box for their own curriculum making. Thus, every time a lesson is planned, they have to decide on the competence they want to achieve while teaching a specific content and at which level they want to achieve it with which students. Theoretically and practically this is quite a demanding undertaking, especially since academic geography education has neglected the problem of defining and identifying progressions for such a long period of time. Then again it is now a challenge for researchers and an opportunity for a common effort of teachers and researchers.

2.4.2 Barriers to Developing Precise Understanding of Concepts and Skills

Considering the arguments above, there is something like a common theme. It revolves around the conceptualization of the school subject of geography. Arnold Schultze seems to have had an idea about this, but did not take it to its logical end. He was also stopped short in developing his thoughts further by critiques that claimed that this approach was too difficult for students. The core protagonists of competence orientation are happy with a virtually concept-free understanding of the subject. In the *Bildungsstandards*, geography is thus introduced by the sentence: 'Geographically and geoscientifically relevant phenomena and processes such as globalization, climatic change, earthquakes, flooding and storms, as well as population change, migration, disparities and conflicts over resources, shape many aspects of our lives and our societies on planet Earth' (DGfG 2012: 5). In this view, phenomena of the outside world can be classified as geographic: climate change *is* a geographically relevant process. Hence, selected phenomena seem to have a characteristic that makes them geographic and thus an object of geographical studies (Uhlenwinkel 2013). Such an understanding must consequently lead to Wagenschein's columns I or II as there is no limit to the things one may view as geographic and there is no limit to the aspects one may discuss in relation to these objects. This definition of the subject is also in stark contrast to definitions offered internationally. In the GA's manifesto 'A different view' almost the same phenomena are named, but they are conceptualized in a completely different framework, one of geographical thinking: 'Geography *deepens understanding*: many contemporary challenges—climate change, food security, energy choices—cannot be understood without a geographical perspective' (GA 2009: 5). Here the emphasis is on understanding and a geographical perspective to help students make sense of some aspects of some phenomena. Both of these highlighted attributes are basic conceptualizations in the context of learning progressions. Hence, what is needed in Germany is the development of a better understanding of the foundations of subjects, and in this context specifically of the subject of geography, as without a conceptual understanding of the subject, one of the preconditions of thinking about learning progressions is lacking.

There are improvements in this direction though and it may not come as a surprise to the reader that they can be found in the new Berlin-Brandenburg curriculum. Here the aim of teaching geography is defined as: 'students study structures, functions and processes related to natural as well as social phenomena from a geographical perspective' (SBJW and MBJS 2015: 3—our translation). If this attempt at a revitalization of the subject can inform a broader debate, that would be a big step forward to conceptualizing learning progressions. It would also hopefully avoid research on conceptual change that mainly exposes a lack of knowledge and in the long term make results as those related to argumentation competence impossible to replicate.

2.5   Conclusion

Going back to the definition of learning progressions in the introduction, one has to conclude that the efforts that can be observed in German academic geography education put an emphasis on describing the upper anchor and to a certain extent also investigate the lower anchor. There is little conceptual thought or empirical research on what happens in between, namely there are hardly any attempts to describe hypothesized progressions or to develop instructional sequences. Also formative assessment is a rather marginal topic.

Although this state of discussion has led to some inconsistencies in the evaluation of lessons held by teacher students, at the moment it seems as if conceptual developments relating to learning progressions can sooner be expected from practical geography education than from the academic institutions.

Finally, summarizing the answers to our questions: (1) The German teacher trainers' understanding of learning progression seems to be different from the theoretical approach outlined in the introduction mainly because there is a lack of conceptual geographic thought in the discipline and as that would be a precondition to identify progressions, it is hard for them to develop a profound understanding. Being more or less left alone, teachers and teacher trainers turn to everyday concepts that may be misleading. (2) There are a number of aspects in the German geography education debate that can be developed in a way that they can contribute to a better understanding of learning progression. These aspects include forgotten approaches to learning as the one elaborated by Arnold Schultze or recent empirical studies on conceptual change or argumentation competence. (3) Current developments in the curricula of some federal states offer practical approaches that may stimulate the theoretical debate. What would be needed here is a stronger cooperation between engaged teachers and researchers that would help both to better understand the issues related to progressions.

Overall, the agenda to learning progression research in Germany in our view would be (1) to strengthen the researchers' and the teachers' understanding of their subject's powerful knowledge (see Solem and Lambert 2014: 62), (2) to rediscover some of the approaches of the 1970s and to improve upon them so they fit today's demands of schools, (3) to develop an understanding of progressions in a social subject predominantly linked to citizenship education, (4) to encourage researchers to dwell into the depths of what geographical thinking is constituted of (ibid., p. 63) and (5) to support teachers to develop their capacities of curriculum making (ibid., p. 68).

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