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Curriculum making and knowledge conceptions in classrooms in the context of standards-based curricula

Daniel Alvunger

Abstract

This paper explores the knowledge conceptions in teachers’ curriculum making within a classroom perspective through a lens of social realist theory. Curriculum making is conceptualised as a process that occurs between students, teachers, knowledge content and contextual factors, in which teachers must balance various priorities and knowledge boundaries. The analytical distinctions between knowledge conceptions, boundaries and structures are based on Young and Muller’s three future curriculum scenarios and applied to empirical data retrieved from two eighth-grade (14–15 year olds) classrooms in Sweden regarding lessons on Swedish and the natural sciences. The findings show that the curriculum knowledge requirements impede the agency of teachers and shape the conditions for curriculum making. Teachers seek to balance priorities in terms of the aim and content of subject knowledge, teaching activities and their knowledge of the students. Conceptions of knowledge and boundaries are constructed in complex ways as teachers try to build bridges and engage in disciplinary boundary crossing between subject-specific knowledge and knowledge from the world of students’ subjective
INTRODUCTION

Over the years, questions about knowledge in the curriculum have been extensively discussed in *The Curriculum Journal* (Adolfsson, 2018; Alvunger, 2018; Lambert, 2011; McPhail, 2017; Muller & Young, 2019; Priestley & Sinnema, 2014; Roberts, 2014; Vernon, 2020; Wyse et al., 2014; Yates & Millar, 2016; Young, 2014). A recurring theme in this conversation is Young and Muller's conceptualisation of 'powerful knowledge' and 'curriculum futures'. While the overwhelming majority of papers come from Anglophone countries, this paper wishes to contribute to this contemporary discussion by exploring the knowledge conceptions and curriculum making from a northern European curriculum tradition and classroom context, using the Swedish national curriculum for compulsory schooling from 2011 (NAE, 2011), henceforth LGR11, as a case.1

From a social realist perspective, everyday knowledge and social knowledge must be distinguished from 'specialised disciplinary knowledge', which is produced in institutions such as universities and academic communities. Disciplinary knowledge is context-independent, abstract and theoretical and can be integrated into and applied to new contexts, while social knowledge is contingent and subjective (Young, 2014). Young and Muller (2015) state that '[k]nowledge is structured, partly independently of how we acquire it, and knowledge fields differ in their internal coherence, their principles of cohesion and their procedures for producing new knowledge' (pp. 68–69). What makes specialised disciplinary knowledge 'powerful' is that it 'provides reliable explanations or new ways of thinking about the world' (p. 110).

Against this backdrop of disciplinary and powerful knowledge as the foundation for schooling, the social realists heavily criticise what are referred to as new curricula, or 21st century skills curricula. These are outcomes-based and progressive learner-centred curricula, generally with a social constructivist approach to learning and the appraisal of teacher agency and curriculum autonomy (Priestley & Sinnema, 2014). However, social realist scholars claim that new curricula are fraught with neo-liberal ideas about education and accountability, as well as a technical-instrumentalist and performance-oriented focus (McPhail, 2017; Yates & Collins, 2010). The new curricula lead to curriculum narrowing, a reduction of critical content knowledge, a teaching-to-the-test attitude and negligence of student interests (Ormond, 2019; Wood & Sheehan, 2020). Teachers tend to be forced into instrumental considerations of what is easy to assess and what content considered tangible for students, rather than challenging students to develop critical capabilities (Smith, 2019). McPhail and Rata (2016) argue that a social constructivist and skills- and learner-focused curriculum downplays the importance of knowledge because it takes the learning subject as a starting point for knowledge formation. Conversely, a knowledge-led curriculum that originates from the epistemic knowledge of academic disciplines enables abstract and theoretical thinking.

**KEYWORDS**
competencies, content, curriculum, curriculum making, curriculum theory, knowledge, secondary schools
It helps students to move beyond their everyday experience and context (cf. Yates & Millar, 2016; Young & Muller, 2015). According to Rata (2016), a ‘pedagogy of conceptual progression’ will ‘enable teachers and students to find relationships between the conceptual scientific knowledge acquired in academic subjects and the world of their immediate experience’ (2016, p. 179).

The transformation of academic disciplinary knowledge to school subject knowledge in pedagogic practices is complex. As Roberts (2014) has shown through examples from school geography, the idea of powerful knowledge does not itself help to entangle practical issues about curriculum and pedagogy; rather, it raises further questions about the selection of knowledge content. Vernon (2020) has suggested that the transformation of knowledge in the context of pedagogy can be described as taking on two opposing epistemic trajectories, based on the theories of Durkheim and Vygotsky. In one, movement occurs from abstract and complex systematic disciplinary knowledge to concrete knowledge in the subjective world of human experience (Durkheim). In the other, movement is in the opposite direction, from individual knowledge and experience to more complex, abstract forms of knowledge (Vygotsky). The interplay between these epistemic movements in teaching is necessary for the development of an ‘epistemic Self’.

In the northern European tradition of Bildung-centred didactics, the focus is on the triad of learner, teacher and content; and the surrounding local/societal context (Deng, 2020; Hudson, 2007; Klette, 2007). One topical question is how students, as autonomous learners, should develop knowledge and a sense of self in the world. Through students’ critical reflection, content can be transformed into many different meanings (Hopmann, 2007). This tradition also includes a specific view of the professional autonomy of the teacher. Subject matter knowledge should be transformed and serve an educational purpose in terms of the potential and significance the content has for the students, how they may experience this and in what ways it shapes their formation of self. Recently, Deng (2020) has discussed powerful knowledge in an attempt to move ‘beyond social realism’ by integrating ideas from Schwab’s thinking about the ‘practical curriculum’, liberal education and Bildung-centred didactics. Deng affirms the importance of disciplinary knowledge but frames it as a means, rather than an end in itself. The individual in the 21st century is an ‘agent’, not primarily a ‘knower’ (cf. Vernon, 2020). The purpose of schooling is to develop and cultivate human (e.g. intellectual, social, cultural and moral) powers, and this requires acknowledging the potential of various forms of knowledge.

We know that classrooms may be quite messy, a hodgepodge of actors’ beliefs, demands and histories; multiple transactions; different meanings; and the contingencies of everyday life. In practice, the distinction between curriculum questions (what) and questions of pedagogy (how) is difficult to make visible (Vernon, 2020). In order to grapple with the question of knowledge conceptions in classroom discourse, I will use the concept of ‘curriculum making’. Curriculum making is a process in which the interplay between students, teachers, teaching materials and the contextual setting in the classroom shape and construct meanings among the participating individuals. First and foremost, it recognises teachers as makers—and not deliverers—of curriculum together with other actors in their contexts (Doyle, 1992; Hudson, 2007; Lambert & Biddulph, 2015; Priestley et al., 2021).

The aim of this paper is to explore knowledge conceptions in teachers’ curriculum making from a classroom perspective. The empirical data consist of 32 video-recorded lessons in Swedish and the natural sciences from two eighth-grade (14–15 year olds) classes and interviews with their teachers during the course of a full school year. The following research questions will guide the analysis: What conceptions of knowledge are emphasised in the enactment of the curriculum? How are boundaries between and structures
within the knowledge content constructed in the ‘making’ of curriculum in classrooms in
the school subjects?

THE SWEDISH CURRICULUM FOR COMPULSORY SCHOOLING AS
A CASE

Curriculum standardisation concerns content, procedures, assessment and guidelines and
has several implications for teachers’ curriculum making (Ormond, 2019; Sundberg, 2018).
Research on the introduction of the standards-based curriculum LGR11 in Sweden has
highlighted trends towards a focus on performance (Bergh & Wahlström, 2017; Wahlström,
2018) and an ‘overloaded curriculum’ (Adolfsson, 2018; Adolfsson & Alvunger, 2018).
Strandler (2017) argues that social science teachers have tended to shift their teaching to-
wards the transmission of knowledge and the ‘intrinsic dimensions’ of the subjects. Students
are less challenged to critically examine and deliberate on the ‘extrinsic dimensions’ (de-
mocracy, social and ethical values and citizenship) of the social sciences. Another observa-
tion by Wahlström (2018) is that teaching seems to be reduced to exploring and ensuring
that students have acquired the knowledge requirements prescribed in the curriculum. The
curriculum standards have reinforced knowledge boundaries between disciplinary (school
subject) knowledge and the experiential knowledge of the students (Adolfsson, 2018). The
stronger focus on standards and assessment seems to restrict the space for students’ own
experiences and questions in classroom discourse (cf. Lambert, 2011). However, there is
evidence of an emerging interdisciplinary dimension in teaching because teachers com-
bine and ‘patch’ content together between curriculum areas to deal with content crowding
and time pressure (Adolfsson & Alvunger, 2018). The move towards interdisciplinary knowl-
edge areas and collaboration in teachers’ curriculum making is a way of seeking to achieve
agency (Alvunger, 2018).

With the introduction of LGR11, Sweden moved from a learner-centred, competence-
based, high-autonomy curriculum with over-arching aims and goals (dated back from 1994)
to a curriculum with standardised aims and goals, specified criteria regarding prescribed
content and abilities (competences), and ‘knowledge requirements’ for assessment in each
school subject (Nordin & Sundberg, 2016). While many countries in Europe have introduced
competence-based curricula, Sweden has followed a path towards subject-based curricula
and explicit standards (Alvunger et al., 2021). In fact, LGR11 displays a ‘combination of a
neo-conservative curriculum tradition (the subject tradition) and a technical-instrumental
curriculum ideology’ (Sundberg & Wahlström, 2012, p. 352). It is structured based on the
school subjects and constituted of aims, core content and knowledge requirements, with
specified standards for assessment and grading. The relationship between the main ele-
ments of the curriculum is illustrated in Figure 1 below.

The core content of the school subject is divided into topical areas of study, together with
abilities, which can be equated with the concept of competences that the students must ac-
quire. It consists of facts (e.g. events, processes and names) and concepts (e.g. ideologies,
historical periods, subject-specific terms, physical laws, axioms, systems of governance and
procedural terms). The core content is combined with abilities that can be categorised as
analytical, meta-cognitive, communicative, procedural and conceptual. The principal struc-
ture for the abilities is verbs, for example, name, describe, comprehend, apply, analyse,
compare and discuss content and descriptive attributes in a taxonomic structure, such as
basic, nuanced, elaborated and advanced, to express progression and increasing complex-
ity. Grading is performed on a scale from A (top grade) to E. Grades A–E are awarded to a
student who has passed, while an F grade means that the student has failed (NAE, 2011).
CURRICULUM FUTURES, POWERFUL KNOWLEDGE AND CURRICULUM MAKING

On the basis of different forms of knowledge and curriculum policy trends, Young and Muller (2015) discuss three future curriculum scenarios. I will use their characterisation in making analytical distinctions between knowledge conceptions and how boundaries and various knowledge structures are perceived. The different futures are defined as follows:

*Future 1*—Boundaries are given and fixed—the ‘Future’ is associated with a naturalised or ‘under-socialised’ concept of knowledge;

*Future 2*—The end of boundaries—the ‘Future’ is associated with an ‘over-socialised’ concept of knowledge; and

*Future 3*—Boundary maintenance as prior to boundary crossing. It follows that the variable relationship between the two is the condition for the creation and acquisition of new knowledge.

(Young & Muller, 2015, p. 70)

Future 1 is characterised by ‘knowledge of the powerful’, meaning that education is an instrument for symbolic control, with unequal distributions and restricted access for underprivileged groups. The emphasis is on academic content knowledge as static and given, strictly divided through subject boundaries and transmitted through the teacher. Social and cultural diversity and the needs of the students are ignored. Conversely, Future 2 disregards the boundaries between social/experiential knowledge and disciplinary knowledge and focusses on the outcomes of learning in terms of generic skills and competences. The learner is positioned in the centre of knowledge acquisition, and the teacher becomes a facilitator of learning (Young, 2014; Young & Muller, 2015).

The Future 3 curriculum recognises the importance of knowledge boundaries between subjects and different types of knowledge, but unlike Future 1, it acknowledges the...
dynamic and changing character of epistemic knowledge as a result of systematic exploration. Young and Muller (2015) differentiate between internal structures of disciplinary knowledge using Bernstein's vertical and horizontal discourse, hierarchical knowledge structures, and horizontal knowledge structures. According to Bernstein (2000), vertical discourse is abstract, theoretical and context-independent, while horizontal discourse is context-bound and based on common knowledge. Vertical discourse is comprised of (a) a hierarchical knowledge structure, which is ‘a coherent, explicit and systematically principled structure’ (p. 160) and (b) a horizontal knowledge structure, which is ‘a series of specialised languages with specialised modes of interrogation and criteria for the circulation of texts’ (p. 161). The horizontal structure is characteristic of the social sciences, arts and humanities, with their competing languages and theories that make them more subject to interpretation and change. In the natural sciences, knowledge is hierarchically and cumulatively structured, and the various theories are positioned vertically with respect to one another, which makes them more stable (Bernstein, 2000). It is to this ‘knowledge-led’ Future 3 curriculum Young and Muller connect to the concept of ‘powerful knowledge’ because it allows access to specialised disciplinary knowledge—within the frames of school subjects—that enables students to go beyond what they already know and their everyday experiences. Here, powerful knowledge, in a Future 3 curriculum, also distinguishes itself from Future 1’s knowledge of the powerful: all students should have access to powerful knowledge as a matter of social inclusion (Muller & Young, 2019; Young & Muller, 2015).

Lambert and Biddulph (2015) have elaborated on Young and Muller’s three curriculum futures, using school geography as a case. They argue that a ‘curriculum for engagement’ should consider students’ experiences of geography and their cultural and social capital. This aligns with Vernon’s (2020) idea of various epistemic movements from disciplinary knowledge to experience-based knowledge (and vice versa). By drawing from a Future 3 curriculum, Lambert and Biddulph (2015) explore the creation of a ‘dialogic space’ to clarify distinctions between curriculum and pedagogy, as well as between disciplinary knowledge and experience-based knowledge. They highlight four major aspects in the intersection between the content of the school subject, student experiences and teachers’ choices. The teacher must consider the key concepts of the subject matter, the capability to think about a subject (epistemic knowledge), the appropriate learning activities and finally, how knowledge may help the students go beyond what is already known (cf. Lambert, 2011). Lambert and Biddulph suggest a metaphor of teachers as ‘boundary workers’, who must build bridges connecting various interests and perform a balancing act in their curriculum making:

In essence, it requires teachers to hold in balance three interrelated priorities: the needs, prior knowledge and experiences of students; the nature and purposes of the discipline; plus the understanding and performative craft of pedagogic technique. Curriculum making is in effect curriculum thinking in practical action. (Lambert & Biddulph, 2015, p. 217)

Lambert and Biddulph capture the complexity of teachers’ curriculum making with regard to the considerations and choices of teachers. Above all, they offer a perspective on how the conceptual distinction between curriculum and pedagogy (Young & Muller, 2015) can be understood in practice, which aligns with the general conception of the relationship between learner, teacher and content in the tradition of Bildung-centred didactics. This is important considering LGR11 is the object of study and as I move on to the methodological considerations presented in the next section.
Empirical material, methodological considerations and research ethics

This study draws from a selection of empirical data collected during a research project that included four eighth-grade (14–15 year olds) classes in various schools in Sweden. Each class was studied during the course of a full school year from 2018 to 2019 through 16 video-recorded lessons, with participatory observation and field notes for Swedish lessons (eight lessons) and for lessons on the natural sciences (eight lessons). After a general review of the coded transcripts and selected parts of the video-recorded lessons, I chose empirical examples from classroom studies from two classes because they represented different classroom contexts and included students with various backgrounds. The sample consists of 32 lessons from the following curriculum areas (Table 1).

The schools will be referred to as Castor School and Pollux School to protect the identities of the teachers and students. Before initiating the study, the project was subject to an ethical review by an independent research ethics committee because it concerned video recording and interviewing students under the age of 18. Teachers, students and their guardians had to provide written consent. The data were collected in compliance with the general principles for good research ethics, incorporating confidentiality, consent and information about the study and the use of the data (Swedish Research Council, 2011). The following table (Table 2) describes the context and characteristics of the schools.

The video-recorded lessons were coded and analysed from a coding scheme that included categories and sub-categories based on approaches to knowledge and curricular content (Wahlström et al., 2019) (Table 3).

### Table 1  Curriculum areas included in the study

<table>
<thead>
<tr>
<th>Natural sciences</th>
<th>Swedish</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electromagnetism</td>
<td>History of literature: The Renaissance, the Enlightenment and the Romantic movement</td>
</tr>
<tr>
<td>Pressure and power</td>
<td>Poetry and literature analysis</td>
</tr>
<tr>
<td>Optics and light</td>
<td>Source criticism and references</td>
</tr>
<tr>
<td>Human biology, body and health</td>
<td>Text types and genres: News coverage, editorials and chronicles</td>
</tr>
<tr>
<td>Sound and waves</td>
<td></td>
</tr>
</tbody>
</table>

### Table 2  Description of the schools in the study

<table>
<thead>
<tr>
<th>The Castor school</th>
<th>The Pollux school</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Context</strong>: A secondary school located in a small-sized municipality in a rural area: Main employment industry, small- and medium-sized enterprises; relatively small public sector</td>
<td><strong>Context</strong>: A secondary school with an international profile located in an urban area outside a large-sized municipality; substantial public sector; large industries and commerce and trade companies</td>
</tr>
<tr>
<td><strong>Size</strong>: 25 students</td>
<td><strong>Size</strong>: 29 students</td>
</tr>
<tr>
<td><strong>Cultural background</strong>: Less than half of the students have a background other than Swedish</td>
<td><strong>Cultural background</strong>: More than half of the students have a background other than Swedish; half of them study Swedish as a second language</td>
</tr>
<tr>
<td><strong>Parents’ education</strong>: About two out of five students have parents with tertiary education</td>
<td><strong>Parents’ education</strong>: Over half of the students have parents with tertiary education</td>
</tr>
<tr>
<td><strong>Student achievement over the last 5 years: Results based on grades in year 9 is within the 25th percentile</strong></td>
<td><strong>Student achievement over the last 5 years: Results based on grades in year 9 is within the 75th percentile</strong></td>
</tr>
<tr>
<td><strong>Attainment of all knowledge requirements year 9</strong>: Proportion of student attainment below national average</td>
<td><strong>Attainment of all knowledge requirements year 9</strong>: Proportion of student attainment above national average</td>
</tr>
</tbody>
</table>
Through the coding, it became possible to determine when knowledge content (facts and concepts) and competences were related to various forms of knowledge, meanings and contexts in curriculum making. In line with the perspective on curriculum making as a complex, dynamic and interactive process, which I argue for in this paper, the provided examples illustrate varying dimensions of classroom curriculum making and do not represent a certain classroom or teaching. To provide an in-depth understanding of teachers’ considerations, individual interviews (8) were held with two teachers in Swedish and two teachers in the natural sciences from each school. Each interview lasted between 15 and 30 minutes and was recorded and sequentially transcribed. The interview guide was comprised of questions regarding the content of the lesson and its connection to knowledge in the curriculum. The teachers were asked questions about what they wanted the students to learn during the lesson, why they considered this to be important for the students, the most essential knowledge and skills they wanted the students to remember from a specific curriculum area and how they usually selected content for teaching.

RESULTS AND ANALYSIS

Subject disciplinary knowledge content and competences

From the analysis, it is possible to discern a significant emphasis on school subject-specific content (facts and concepts) and competences (abilities) in classroom curriculum making. One distinctive feature in the empirical data is teacher-centred teaching, in which the characteristics and aims of the school subject are in the foreground. Repertoires of teaching generally include monologues (lecturing) and recitation (the presentation of content, combined
with questions to determine what students know) in which subject-specific concepts are related to one another to help students connect different types of content. There are activities in which students are encouraged to reflect on the specific nature and methods of the subject based on prior knowledge and experience, but the main dimensions of curriculum making focused upon here are aligned with what Young and Muller (2015) define as a Future 1 curriculum, stressing academic disciplinary knowledge and standards. There are subject-level differences in curriculum making. Content in the natural sciences tends to be more organised in hierarchical knowledge structures, while in Swedish, content is attached to horizontal structures and abilities, with isolated skill training or functional application being acquired to interpret and analyse texts.

The analysis reveals that the curriculum standards have a significant influence on teachers' curriculum making. When knowledge content and competences are presented, they are often embedded in references to knowledge requirements. Teachers tend to use repertoires of teaching to assess student performance and/or deal with classroom management so that students do not lose their concentration during curriculum tasks. Thus, the emphasis on subject matter knowledge and knowledge boundaries is sometimes simultaneously combined with a performance-oriented and results-focused approach. As Lambert and Biddulph (2015) have argued, too much stress on academic subject content in line with a Future 1 curriculum, combined with a notion of social efficacy and accountability, may result in a performance-oriented and compliance-driven teaching-to-the-test attitude or curriculum narrowing (cf. McPhail & Rata, 2015). The following two examples are representative of the subject-based conception of disciplinary knowledge and illustrate teaching in which knowledge content and competences are significantly framed within the context of knowledge requirements.

Example 1 physics—Sound and waves, frequency and amplitude

This example consists of the first lesson in physics in the curriculum area 'sound and waves'. The lesson lasted for 70 minutes and began with a presentation of the area and its knowledge requirements. The teacher refers to frequency and amplitude as a conceptual base for the knowledge area and what is expected of the students if they want to achieve a certain grade:

> for an E today, I want you just to simply state what sound is. [...] So, you give me a one-word answer to this. Sound is this. For a C, I want you to describe for me how sound travels. And for an A, explain the frequency and amplitude of a sound by looking at its features and its waves. [...] And frequency and amplitude, right? These are the scientific words. If you have a test about sound, and about soundwaves, these are the two words I want you to use.

Excerpt 1. Natural sciences, Pollux School, Lesson 5

The teacher has an idea of a knowledge hierarchy, from basic knowledge to the ability to visually analyse and explain a sound by its pattern using the concepts of frequency and amplitude. These concepts are described as 'scientific words' within the discipline of physics. Each step up the knowledge ladder means a higher grade. The teacher shows a few informative movies and then, lets the students work individually with a task sheet. The final part of the lesson is dedicated to a review of the answers to the assigned questions, a
short movie for repetition, an experiment and an individual formative assessment, which is handed in to the teacher.

In the interview after the lesson, the teacher explains the intentions behind his pedagogy. A somewhat critical attitude towards project work and the learner-centred approach, in which ‘you are a facilitator of learning’, is expressed. Such an approach can be tough for certain students:

Sometimes, you just have to stand there at the board and tell them and try to get them to understand these concepts. Because the E-kids at the front, they are not gonna get those harder concepts by working in groups. They need me to guide them and try to explain it as simply as possible.

(Teacher, natural sciences, Pollux School, Interview 3)

The subject matter content of the lesson is strongly framed by a performance-oriented approach, but the teacher is aware of the importance of key concepts and the fact that students must develop a capability for epistemic thinking. As shown above, the teacher also considers the relationship between curriculum and pedagogy in light of student capacities. During the interview, the teacher talks about the relationship between disciplinary knowledge, the significance of understanding how young people think and contextualising content in a larger theoretical frame, in this case the fact that sound is composed of waves of moving particles. The following quote illustrates how the teacher seeks to handle the demands of assessment in curriculum making while also attempting to help students understand phenomena in their everyday lives. The quote also exemplifies the teacher’s consideration of curriculum and pedagogy and the movement between epistemologies:

I don’t believe that they are thinking in particles, but I want them to because that was how I started to understand things when I was at their age. /…/A good science teacher has to make these connections. Like, it’s all science at the end of the day. […]it is important to bring it together. […]it is my job to rewrite the curriculum.

(Teacher, natural sciences, Pollux School, Interview 3)

Thus, the teacher points to the importance of assuming the students’ perspective on the knowledge content and how subjective knowledge and human experience can be tied to the abstraction of sound waves as moving particles, which may help students to grasp general laws of physics.

Example 2 Swedish —Text types and genres, chronicle

This 1-hour lesson in Swedish focused on key concepts and competences in a curriculum area focusing on text types: the ability to analyse texts (chronicles), present opinions within a coherent text and provide feedback to peers. During the following lessons, an individual chronicle should be written and assessed. The teacher starts the lesson by repeating key words related to chronicles, which the students had worked with during the previous lesson. After that, the students worked individually, reviewing chronicles written by earlier students to identify qualitative differences, potential for improvement and how these texts were graded.

As in the case of Example 1 above, subject-specific concepts are linked to the knowledge requirements. Teaching is predominantly teacher-centred, but there is also time for the training of individual skills. The sequence from a whole-class conversation below provides an elucidative example of teacher–student interaction in classroom curriculum making.
concerning subject-characteristic concepts and competences taken from the knowledge requirements:

*Teacher:* Okay, listen up you guys. Hush. What knowledge requirements will I assess when I read your two chronicles? Lucy?

*Lucy:* Linguistic norms.

*Teacher:* Linguistic norms. Good. But also? Kenny?

*Kenny:* Genres.

*Teacher:* Good. Genres. [Writes the answers on the board.] And what is it that one looks for when one looks for genres? [Several students raise their hands.] What do I think about? Hm. Has the student included this? Has the student included that? [Referring to the board.] Cindy?

*Cindy:* Hey, now, what is it… Well, it is what type of text we are writing.

*Teacher:* Exactly! The text type or genre! And, now, it is a chronicle, and what do I look for? [...] What do I check when I am about to assess this? [Students raise their hands.]

*Cindy:* What you look at if it’s a chronicle is if it is an argumentative text.

*Teacher:* Ah, exactly! Exactly!

**Excerpt 2. Swedish, Pollux School, Lesson 2**

In this sequence, curriculum and pedagogy are conflated because of the language of assessment. The curriculum standards of LGR11 are made explicit and the teacher moves within a horizontal knowledge structure, with central concepts and procedural dimensions in terms of the subject. In the interview, the teacher explains the considerations and decision making regarding the lesson, referring to the need for transparency regarding the requirements and the use of instructional material:

...so they also get an understanding of my assessment, how I do when I assess their texts. It is not possible to make it crystal clear, but I try to show them texts from previous students. And, so they can understand what it takes to get a C in linguistic norms, for example. And what would be required to get an A. (*Teacher, Swedish, Pollux School, Interview 2*)

The teacher states that this curriculum area is important because a chronicle usually is a text type used on the national standardised test in Year 9. Considering the quote and the sequence above, it is easy to receive the impression that the teacher is mainly focused on assessment at all times. This is, of course, not the case. However, tasks and activities during this particular lesson are characterised by a performance-oriented logic and chosen based on their functional use and the disciplinary ‘language’ of Swedish.

**Student-centred and experience-based knowledge approaches**

Based on the analysis of the coded transcripts of the lessons and the interviews, several examples of curriculum making characterised by a learner-centred approach related to students’ previous experiences emerge in the empirical material. References to the knowledge requirements are frequent, meaning that the focus is on performing tasks that are directly linked to and motivated by the standards. There is an emphasis on the acquisition of certain competences for future studies or abilities that will be required for the students as adults.
This approach is much like what Young and Muller (2015) define as a Future 2 curriculum. One argument for such a curriculum is that students, to some extent, should be allowed to choose the knowledge content because of the importance of subjective relevance and meaningfulness, rather than requiring a knowledge base needed for making generalisations or abstract claims. This is similar to what McPhail and Rata (2015) argue characterises a ‘21st century learning curriculum’, which seeks to move away from rote-learning and restricted forms of teaching and allocate substantial time for individual/group work, with the teacher in a facilitating role. In the examples below, it is obvious that the teachers attempt to balance competing demands and priorities derived from the knowledge requirements while they attempt to engage the students in an activity or make the content tangible for them by appealing to their experiences and social and cultural contexts.

Example 3 Swedish lesson—Poetry analysis

The lesson on poetry analysis lasted about an hour, of which about 80% was individual work on the task of choosing a song, downloading the lyrics and analysing its message. The teacher began the lesson by repeating what a message is and providing a previous example of analysis. In this case, the importance of conceptual knowledge is downplayed, and the teacher does not mark any boundaries between the school subject and non-school knowledge. The idea is that the students must show the ability to identify and interpret messages in a text based on own experiences and social/everyday issues and relate such to what they know about the author. In the interview that was conducted after the lesson, the teacher explains that the task is about life-long learning and being critical when listening to music, particularly of the lyrics. Of course, this is an important skill that can be related to the horizontal knowledge structure of the discipline Swedish, in which competences represent complex functions. However, it is the students’ experiences that are brought forward as the central foundation for knowledge content.

The following sequence is an illustrative example of the complexity involved in teacher-student interactions, in which the teacher attempts to guide the student based on his experiences and help them relate to the assignment:

Teacher: So, what do you think the author wants to say with the lyrics? What's the message? And then you have to give examples from the song, for example, if he talks about drugs in this song, is everybody supposed to do drugs?
George: Hell no!
Teacher: The other way around then?
George: Yes, it is not a smart thing to do.
Teacher: But write it down then.
George: I just think I want to do this tomorrow instead.
Teacher: But you have found some points. Write them.
George: It has got stuck in my ears.
Teacher: That's what is called a message. How can you see it in the lyrics? This is what you need to tell me.
George: It can't be described. It is tough.
Teacher: Right, it can be tough with messages, but that is your task.
George: It's not supposed to be hard to do this. It should be easy.
Teacher: [ignoring the last reply from the student]. It all depends on the thoughts of the author, but the main point is that this is what you need to show me. This is what I assess.
Excerpt 3. Swedish, Castor School, Lesson 1

The teacher moves between attempting to help the student grasp the message and, at the same time, reminding him of the task that is to be assessed. During individual work, there is unrest in the classroom, and the majority of the students have a hard time focusing on the task, spending most of their time on various websites. This a challenge for the teacher, who also struggles to maintain order while helping the students. Thus, there are contextual factors that strongly affect the teaching. Together with the unclear definition of content and competences (curriculum) and the free activity (pedagogy), this shows how curriculum making becomes complicated. Most of the students did not seem to have enough knowledge about the meaning of the activity and how to perform an analysis, and the students were not able to find a song, due to the many distractions in the classroom.

Example 4 physics —Power and pressure, friction

‘This particular group—concepts and that stuff, it doesn’t seem to be so interesting for them. They seem to more enjoy experimenting/…/It was more focus on concepts in the former curriculum area about electromagnetism. So, I think we have done that already. Now, we focus on abilities this time instead’.

(Teacher, natural sciences, Castor School, Interview 8)

The next example concerns a lesson in physics, which lasted 50 minutes. In the interview, the teacher presents considerations about introducing friction as a physical concept based on prior knowledge of what is challenging for the students and the fact that they are not generally interested in this curriculum area. The concept is approached by referring to various everyday situations. However, the teacher also aims to work across school subject boundaries and establish an interdisciplinary connection with the forthcoming curriculum area ‘Human Biology, Body, and Health’, together with sex education, as an interdisciplinary theme.

The teacher shows movies of cars sliding and crashing on icy roads and then, introduces the relationship between friction and gravity on the whiteboard. The students discuss what causes this and what they know about slippery surfaces. After that, the teacher gives instructions for a lab exercise, pulling a small box containing various weights and measuring the required force with a dynamometer. The students are told to try using surfaces indoors and outdoors. At the end of the instruction, the teacher holds up a tube with lubricant and says that the students should use this and see what happens. The teacher explains that friction can cause pain during sexual intercourse and adds that sex and relationship education is an important part of the students’ curriculum. Below is a short excerpt that illustrates some of the students’ reactions while completing the test, pulling the box on lubricant and measuring it with the dynamometer:

Lucy: [To the teacher.] This isn’t normal for a lesson in physics!
Teacher: We thought— [interrupted by student Edward.]
Edward: Yes, this should be in biology!
Teacher: … when do you students learn? Generally, when you are supposed to do something meaningful or encouraging, that is when you learn, and that was exactly what we were thinking. If you are only supposed to pull a box, how fun is that, actually?
Excerpt 4. Natural sciences, Castor School, Lesson 8

In line with the teacher’s intentions with the lesson, the focus is on the students’ ability to perform experiments and document them. The students express an awareness of boundaries between physics and biology and an interesting observation is that this lesson has the potential for disciplinary boundary crossing by appealing to subjective experience (cf. Vernon, 2020). The excitement on the part the students regarding their teenage fascination with sexuality and the unusual way of experimenting helps the teacher to strike a balance between pedagogy and the key concept for the lesson; it becomes a horizontal bridge into a new curriculum area and school subject. While the students are working in groups, the classroom is quite chaotic, but they are focused on the assignment. Teaching is characterised by episodes in which the teacher comments on the different results from the tested surfaces in Newton-metres and openly reflects on what is tangible for the students’ learning.

Progressive knowledge-led curriculum making

The previous examples have been used to illustrate different approaches within teachers’ curriculum making, from the boundaries between conceptions of knowledge and practical implications. Thus far, the analysis has highlighted emphases on either subject-disciplinary knowledge content and abilities (Future 1) or experience-based knowledge and a learner-centred approach, along with the acquisition of skills and competences (Future 2). In both cases, the curriculum standards have a decisive influence on teachers’ curriculum making. In reality, curriculum making is, of course, far more complex and involves a constant flow of epistemic movements of knowledge boundary crossing.

The final example of classroom curriculum making below displays a number of characteristic features of a Future 3 curriculum. During this lesson, knowledge becomes ‘powerful’ because concepts are positioned both within a hierarchical knowledge structure and explained by references and connections to other horizontally structured domains of knowledge that open up for new perspectives on the students’ subjective world of experience (cf. McPhail & Rata, 2015 and Rata, 2016). The example also embodies Lambert and Biddulph’s (2015) notion of a dialogic space, in which the teacher seeks to balance priorities between curriculum decisions, the students and the school subject and aims to bridge conceptual distinctions of experience-based knowledge and disciplinary knowledge with an engaging pedagogy.

Example 5 physics lesson: Electromagnetism, induction

During this 1-hour lesson, the starting-point is taking in prior knowledge from earlier lessons, with each step being built on the previous one. There is a dialectic and iterative movement between abstract systematic knowledge and experience-based and subjective knowledge. Teaching repertoires and content are varied, and the teacher orchestrates a conceptual progression, starting with concepts that are basic to an understanding of a generator and its practical use, magnets, iron core, spools and electric current, and then moving to higher-level concepts, such as shifting magnetic north and south poles, electromagnetism, and the ‘right-hand rule’. This particular rule is helpful for remembering the direction of an electric current relative to a magnetic field.

Circuit diagrams were used for illustration purposes, and by displaying the basic components of a generator, the teacher could repeat the general parts of the curriculum area ‘Electricity’ from Grade 7. To explain the concepts of ‘direct current’ and ‘alternate current’,
the teacher first showed a movie about how a magnet influences an electric circuit in order to generate electrical power and later made a practical experiment in front of the class. Together with instructive movies about generators in water power stations and nuclear power plants, electric current and electromagnetism, the teacher explained the concept of 'induction' and how it is used in induction stoves today. Thus, there was a constant move between subject-specific knowledge content and other domains of knowledge, and students were encouraged to think epistemically and relate different phenomena to everyday experiences. In addition to a concluding discussion on what the students thought they had learned during the lesson, the last 15 minutes of the lesson included a whole-class discussion, with a three-column table on the board comparing the historical development of sources of energy and heating in the past and present. The following sequence is a brief excerpt from this discussion, illustrating how the teacher engages the class in a discussion about how technological changes have had an impact on the development of society:

**Teacher:** To use wood for fire consumes time. Where do we get the wood from?

**Mona:** Trees.

**Teacher:** From the forest, of course, and there, you have to cut down trees, and that is time-consuming. ‘Time thief.’ [Writes on the board.] Wesley, do you agree that we save time if we have an induction stove instead of a wood-burning iron stove? [Student nods.] Yes, it will ‘save time.’ [Writes on the board.] What could that lead to? Rodney?

**Rodney:** More money.

**Teacher:** That’s right! How come?

**Rodney:** You can work more.

**Teacher:** That’s right! More time to do something else. Nice! Here’s a guy who can think and reason in several steps. ‘More time left.’ [Writes on the board.] And, then, you can work more. Neat. Earn more money. Pay taxes. A wealthier society, greater wealth because society is financed by taxes. /…/ Who was the one who cooked and worked in the kitchen during the 19th century?

**Edward:** All the women.

**Teacher:** What do most women do nowadays, statistically speaking? Are they at home cooking, or are they working?

**Many students reply in one voice:** Working.

**Teacher:** Can you see what a substantial change in society this really is? [...] If I had lived in the 19th century, more than 90 percent of the women would have stayed at home and taken care of the household. Most likely, I do not think this is the life you expect. [Speaking to the girls in the class.] You probably anticipate something else, like working and earning your own salary, not being dependent on your husband or father, or something like that.

Excerpt 5. Natural sciences, Castor School, Lesson 6

In light of the movement between abstract and theoretical knowledge (hierarchical knowledge structures); causalities between work, the economy; and family structure in society (horizontal knowledge structures); and the experiential subjective knowledge of the students, this example demonstrates how the teacher can be characterised as a ‘boundary-worker’ (Lambert & Biddulph, 2015). The teacher maintains the disciplinary borders and the hierarchical knowledge structure of the school subject, while ultimately expanding the discussion to include socio-technological changes by reaching across disciplinary school
subject borders (the social sciences). This teaching approach implies disciplinary boundary crossing, in which students are encouraged to reason and make connections. There is also a reference to gender equality and an emphasis on the independence of young girls, that is, topical contemporary issues. The teacher thus appeals to the social and experiential knowledge of the students and makes epistemic movements while encouraging participation and open inquiry. It has not been determined beforehand what the ‘correct’ answers should be, which is conducive to student autonomy and creating a dynamic classroom discourse.

CONCLUSIONS

The exploration and analysis of curriculum making in classrooms from the standpoint of social realist theory has provided important perspectives on the interplay between content, students, teachers and pedagogy. Drawing inspiration from Lambert and Biddulph’s (2015) work on curriculum making, the paper has sought to contribute to the discussion on the distinctions between curriculum questions and pedagogic questions by presenting examples from teaching in different school subjects and classrooms. Once again, it is significant to stress that the examples are not representative of a certain teacher or classroom. Rather, they illustrate various dimensions of curriculum making as a complex, dynamic and interactive process in which forms of knowledge and hierarchical and horizontal knowledge structures converge and intersperse (Lambert & Biddulph, 2015; Priestley et al., 2021; Vernon, 2020). In this final section of the paper, I will outline the major conclusions regarding teachers’ curriculum making with regard to knowledge conceptions, the construction of boundaries, boundary crossing and practical implications.

Curriculum making in light of curriculum standards

One argument made in the social realist critique of ‘new curricula’ relates to the downgrading of knowledge in curricula, together with the challenges posed by genericism, assessable outcomes and technical-instrumentalist curricula (McPhail, 2017; Priestley & Sinnema, 2014; Rata, 2016; Young & Muller, 2015). From previous research in Sweden, we know that the introduction of knowledge requirements and a specified body of subject matter knowledge in LGR11 has made teachers less inclined to provide room for students’ questions and experiences (Strandler, 2017; Wahlström, 2018) and reinforced boundaries between disciplinary and everyday knowledge (Adolfsson, 2018). This influence on the part of the knowledge requirements on teachers’ curriculum making is confirmed in this study.

In the case of teaching that departs from an approach in which subject disciplinary knowledge is brought to the foreground (Future 1), an interesting implication is the tendency to conflate disciplinary knowledge content and hierarchical/horizontal knowledge structures with a results- and assessment-oriented discourse. Even if this relationship is already in place in the knowledge requirements, it is worth noting how it works its way into the making of curricula in classrooms and becomes a dominant theme. In its most extreme form, this kind of conflation of high-order theoretical/abstract concepts and assessment criteria could be characterised as a ‘spurious verticality’; it is the grade that represents higher orders of knowledge, not knowledge as such. We also see stress placed on performance and results when teaching is focused on the students as learners and their experiences (Future 2). Practical exercises are justified based on the knowledge requirements (the students should ‘show’ what they can do), rather than being a foundation for exploration or extending towards other knowledge areas and school subjects. Clearly, this implies that the agency of both teachers and students is circumscribed when the pressures of assessment and
performativity shape the conditions for curriculum making. Above all, it hampers the creation of a relationship between the subjective world of experience and progressive scientific conceptual knowledge (Rata, 2016) and, thus, stands in the way of a Future 3 knowledge-led curriculum (Young & Muller, 2015).

Balancing acts, boundary work and epistemic transactions

The empirical data illustrate how conceptions of knowledge are being played out simultaneously in complex ways. Teachers constantly move between subject-disciplinary knowledge and experience-based knowledge, from the world of students and must balance between these in their curriculum making. In this respect, Lambert and Biddulph’s (2015) notion of the teacher as a boundary worker who builds bridges between different epistemological worlds is a suitable metaphor. By following the decision-making processes in the minds of teachers, we can see that judgements and considerations regarding the activities of teaching and the presentation of content are made based on the teachers’ knowledge of the students’ capacities and what they know to be challenging or tangible for them. Contextual conditions and frame factors, in terms of an overloaded curriculum and time pressure, also play a significant role (cf. Adolfsson & Alvunger, 2018) in what priorities teachers must have in their classrooms. Here, the perspective of curriculum making becomes very powerful for highlighting contextual, ethical, epistemological and ideological factors that either constrain or enable teachers to become makers of curriculum (Hudson, 2007; Lambert, 2011).

In addition to moving between disciplinary systematic and progressive conceptual/theoretical knowledge to include concrete, social and everyday knowledge and thus appeal to students’ subjective experience, the teachers’ boundary work also includes disciplinary boundary crossing. This intricate interplay has been described by Vernon (2020) in terms of contrasting epistemic movements between systematic disciplinary knowledge and concrete knowledge in the subjective world to create an epistemic self. Example 5 in physics was used to illustrate aspects of a Future 3 curriculum (Lambert & Biddulph, 2015; Young & Muller, 2015), with boundary maintenance and a hierarchical structuring of knowledge prior to boundary crossing and an exploration of new meanings via the integration of the horizontal knowledge structures of other school subjects. Drawing on Vernon’s (2020) discussion of the dialectic between epistemic movements, I would like to suggest that there are epistemic transactions in terms of an intersection in teachers’ curriculum making, in which the student’s view of the subjective world of experience is transformed through school subject knowledge. It is a kind of nexus with the potential to encourage systematic exploration, knowledge formation and interdisciplinarity and provide space for students’ experiences and reflections on the knowledge content that move beyond social contexts and everyday experience.

Teachers must make complex decisions based on the purpose and goals of education, content, contextual conditions, knowledge about the learner and pedagogic methods. As we have seen, the balancing of content and context in teachers’ curriculum making rests on conscious choices of actions where teachers are perceptive and aware of the next steps to take. However, due to the contingent and situational character of classrooms, we also know that teachers sometimes must act intuitively. This particular tacit dimension of curriculum making has not been in focus for this paper but may well be further explored for extending our understanding of how knowledge boundaries are conceived. Seeing teachers as makers of curricula requires that we not only ask what knowledge is worth the most but also what purposes, conceptions of knowledge, epistemic transactions and pedagogic practices enable students to acquire empowering and worthwhile knowledge in our classrooms.
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