

Fagdidaktiske perspektiver på formativ evaluering og faglig udvikling i forskellige fagområder

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Higher order thinking in social science education

– an empirical study with classroom observations from Denmark and Norway

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The aim of this article is to discuss what kinds of higher order thinking are encouraged in social science lessons in lower secondary school. The study used a research design employed by Klette et al. (2017) with video-taped lessons from social science education in Denmark and Norway. We identified teaching segments that included activities promoting higher order thinking and analysed them to produce an overview of the characteristics of cognitively demanding teaching. We found several examples of teaching that encouraged students' higher order thinking, either by facilitating student's interaction with complex knowledge or engaging them in demanding cognitive processes. By analysing selected examples, we found that the relationship between knowledge and processes was not linear: it seems possible to have a cognitively demanding task with little knowledge, and simple tasks performed on complex knowledge. We argue for using a two-dimensional model that captures cognitive processes as well as different types of knowledge required.

Setting the stage—Higher order thinking in social science education

In the Scandinavian countries, preparing young people to contribute to society is an important educational aim. The school subject of social science plays an important role in this mission because of its aim to contribute to young people's knowledgeable participation in democratic and political institutions and processes. Particularly, social science in school focuses on knowledge, skills and values that contribute to equipping students to take an active part in society, including analytic and higher order thinking about society based on the subject's content and concepts (Christensen, 2021; Mathé & Elstad, 2018). Recent research has demonstrated the impact of the related field of citizenship education on students' knowledge and engagement (e.g., Keating & Janmaat, 2015; Reichert & Print, 2018). However, social science education is also characterised by knowledge about social and political structures and institutions, social scientific concepts and thinking and increasing demands for justifications and argumentation (Blanck & Löden, 2017; Mathé & Elstad, 2020). Mathé and Elstad (2020) found that students' self-efficacy and perceptions of the subject's citizenship preparation were positively associated with their self-reported efforts in the subject. Moreover, Sandahl (2015) found that activities in classes he observed in Sweden focused on students' abilities to analyse, critically review and contextualise subject matter issues, which he labelled *second-order thinking concepts*. There is a need, however, to develop empirical analyses of higher

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order thinking in the classroom as well as theoretical frameworks enabling such analyses. Building on this previous knowledge, we aim to develop a more precise understanding of what characterises teaching that encourages higher order thinking in social science education by analysing video-recorded teaching in Danish and Norwegian social science classrooms.

Higher order thinking is generally considered a quality in education; it is commonplace to express that education is not aimed at a mere reproduction of given knowledge or the acquisition of factual knowledge by students (Newmann, 1990). Depending on scientific traditions, the desired skills, or competences, may be described as critical thinking or analytical thinking. An important aim of education is for students to be able to think (and act) independently, which includes being able to “do” something with the acquired knowledge (e.g., Christensen, 2021, p. 50). In a proposal for a framework for higher order thinking in social studies, Newmann defined it in opposition to lower order thinking, which “demands only routine, mechanistic application of previously acquired knowledge”, while higher order thinking “challenges the student to interpret, analyse, or manipulate information, because a question to be answered or a problem to be solved cannot be resolved through the routine application of previously learned knowledge” (Newmann, 1990, p. 44). Newmann emphasises that higher order thinking in social studies must include in-depth knowledge of subject matter, skills in processing information, and what he calls dispositions constituting thoughtfulness (Newmann, 1990, p. 46-47). The point is that higher order thinking in social studies means to be able to apply knowledge and skills in the subject on new (unknown) problems.

An important question when trying to identify higher order thinking practices in classroom teaching is whether higher order thinking refers to generic or subject specific skills. In this article, we assume that there are subject-specific forms of knowledge and skills that define higher order thinking in a specific context (e.g., Christensen, 2015) but the knowledge and skills from the different subjects together can contribute to a more general competence.

The purpose of this article is to investigate what higher order thinking can look like in social science education and study the connection between intellectually challenging teaching and students’ higher order thinking. To the best of our knowledge, this is the first time this has been done in a comparative light in Scandinavian social science education. The article is guided by the following research question:

What kinds of higher order thinking are encouraged in social science lessons in lower secondary school?

To respond to this question, we first discuss what higher order thinking means in education, and more specifically, what it can mean in social science education. Second, we detail our methodological approach before presenting our analyses and results.

The value of higher order thinking in education

For educators, the distinction between educational tasks based on *rote* or *recall* as opposed to *higher order thinking* is intuitively recognisable. Many traditions in educational theory/pedagogy criticise teaching and learning as aimed at a mere reproduction of

knowledge. This can be found in the liberation pedagogy of Paulo Freire, and in Norway and Denmark, the critique of the “black school” dating back to Grundtvig and the problem-based pedagogy in the tradition of John Dewey, which all share an aim of the student actively doing something with their knowledge rather than simply acquiring factual knowledge. In addition, reports from the OECD (2005) about education stress the need for active engagement with knowledge.

In the German tradition of *Bildung* and *politische Bildung*, the aim of *Mündigkeit* focuses on the mature individual who is able, following Immanuel Kant, to make use of their own reason instead of being guided by others. According to Kant (1999), this is the answer to the question: “What is enlightenment?” In this tradition, it would be an offence to human reason if education were purely aimed at the reproduction of knowledge. Instead, students should be empowered by their education to be able to use reason to develop as autonomous individuals.

Even if there is a widespread consensus on the positive value of higher order thinking in education, there is no clear consensus on how to describe and operationalise it. In this study we have taken empirical material, videotaped lessons that were coded using the PLATO observation protocol, as a point of departure (Klette, Blikstad-Balas & Roe, 2017; Grossman, 2019). One of the coded elements is “Intellectual Challenge” which is aimed at capturing high and low levels of intellectual demand in the teaching.

As the element “Intellectual challenge” is described in general and not subject specific terms, our aim in the following is to provide a more precise interpretation of what this means, both as a general term, and as a term with a specific meaning for social science education. We use the concept of higher order thinking as this is a widely used term which encompasses much of what is considered desirable in “intellectually challenging” teaching. We acknowledge that teaching must be differentiated according to students’ needs and the purpose of the activity and that what is challenging for student varies. However, we assume as a working hypothesis that engaging students in higher order thinking is a central aim of intellectually challenging teaching.

Taxonomies of learning and higher order thinking

A generic approach to higher order thinking can be rooted in educational or learning psychology in research and discussions of aims in education. Discussions of taxonomies of learning can be viewed in this light. The taxonomies of Anderson and Krathwohl (2001) and Biggs and Tang (2011) emphasise the movement from reproduction (knowledge) to analysis and evaluation. In these taxonomies, there is a clear distinction between reproductive knowledge and the ability to make use of this knowledge—for instance, in an analysis.

The “original” taxonomy, most often referred to as Bloom’s taxonomy, applies to the cognitive domain, and consists of the following categories: *remember*, *understand*, *apply*, *analyse*, *evaluate* and *create* all of which refer to cognitive processes (Anderson & Krathwohl, 2001, p. 13). This taxonomy has been highly influential in the Danish school system, forming the basis for the formulation of assessment and grading standards.

In 2001, Anderson and Krathwohl published a revision of Bloom's taxonomy. In this publication, the authors complemented the cognitive dimension of the original taxonomy with what they called the *knowledge dimension*, which includes the four following types of knowledge: a) factual knowledge, b) conceptual knowledge, c) procedural knowledge and d) meta-cognitive knowledge. *Factual knowledge* includes "the basic elements that experts use in communicating about their academic discipline, understanding it, and organising it systematically" (Anderson & Krathwohl, 2001, p. 45). It entails knowledge of terminology and specific elements. As Anderson and Krathwohl (2001) noted, this kind of knowledge is at a low level of abstraction, but there is nevertheless an enormous amount of potential factual knowledge in each field of study that forces educators to choose what factual knowledge is important and the level of precision desired in a given educational context (Anderson & Krathwohl, 2001, p. 48). *Conceptual knowledge* includes "knowledge of categories and classifications and the relationships between and among them", as well as schemas and models. It is subdivided into knowledge of "classifications and categories"; "principles and generalizations"; and knowledge of "theories, models and structures" (p. 46).

"Principles and generalisations" and "theories, models and structures" are not necessarily easy to distinguish. From social sciences, the authors used "knowledge of the principle of federalism" as an example of principles and generalisations (Anderson & Krathwohl, 2001, p. 51) and "knowledge of the basic structural organization of the local city government" as an example of theories, models and structures (2001, p. 52). For our purpose, however, the important distinction is between factual knowledge and conceptual knowledge, where factual knowledge involves knowledge of basic facts and conceptual knowledge involves knowledge of classifications and categories, as well as principles and theories. In social studies, knowing that the Danish parliament has 179 members and that it is a form of representative democracy is factual knowledge. Knowing the principles of representative democracy versus direct democracy is conceptual knowledge, as is (if we follow Anderson & Krathwohl, 2001) knowledge of the division of power between government (executive), parliament (legislative) and court (judiciary).

The third kind of knowledge in the revised taxonomy takes the step from *knowing that* to *knowing how*. *Procedural knowledge* is defined as knowledge of procedures (skills, algorithms, techniques and methods), as well as knowledge of criteria of when to use these procedures (Anderson & Krathwohl, 2001, p. 52). It is important to note that in Anderson and Krathwohl's version, procedural knowledge is still only the *knowledge* of these procedures because their *use* is part of the *cognitive process dimension* (with the verbs stated above). In this category, there is a rather broad example for social sciences, comprising "knowledge of research methods relevant to the social sciences" (Anderson & Krathwohl, 2001, p. 54). *Meta-cognitive knowledge* is the fourth kind of knowledge, defined as "knowledge about cognition in general as well as awareness of and knowledge about one's own cognition". It includes *strategic knowledge*, *knowledge about cognitive tasks* and *self-knowledge* (Anderson & Krathwohl, 2001, pp. 55–56).

To sum up, we ask: How could the revised taxonomy shed light on higher order thinking in social science education? The revised taxonomy uses the categories of cognitive processes

from Bloom's original taxonomy. These include remembering, understanding, applying, analysing, evaluating and creating. Remembering, when seen as a mere recollection of predefined knowledge is a lower order process. This is also the case for understanding, when it concerns factual knowledge, while the others are higher order processes, when, if we follow the definition from Newmann (1990), they are applied to new problems/knowledge. The addition of the kinds of knowledge – factual, conceptual, procedural and meta-cognitive knowledge – makes possible the distinction between simple descriptive knowledge of facts, knowledge of relationships and knowledge of complex procedures in social science education.

With the above in mind, we can describe higher level thinking in social science education on the two dimensions, and we can tentatively say that higher order thinking implies that the student can not only *remember* or *understand* but also *analyse*, *evaluate* or *create* conceptual and procedural knowledge. *Applying* knowledge is lower order thinking if it is done routinely, but higher order, if it is done on new, unknown, problems or questions. We return to the meaning of this after the discussion of how higher order thinking has been described in social science didactics.

Higher order thinking in social science education

The choice of content in teaching is not only defined by some scientific content but also by its educational value – this is central in the German-inspired tradition(s) of *Bildung*, as well as for educational thinkers like Joseph Schwab, who posed the question when discussing the structure of scientific disciplines in relation to curriculum: “What relevance may the structure of disciplines have for the purpose of education?” (Schwab, 1978, p. 229). This is perhaps a more recurrent question in the German tradition; for a current example, Engartner et al. (2021) argue:

Social scientific knowledge and skills is not a goal in itself; it has only its legitimate space in curriculum and teaching when it has consequences for education - that is, it contributes to the formation of personality for youth and children (Engartner, Hedtke, & Zurstrassen, 2021 p. 24)(Engartner, Hedtke, & Zurstrassen, 2021, p. 24)(p. 24; our translation).

In line with this argument, we share the view that the scientific disciplines in themselves do not give criteria for the choice of content in education; however, the scientific disciplines provide the highest quality of knowledge that the school subjects should draw on.

Scientific knowledge is only one of several forms of knowledge that are represented in school subjects (cf. Christensen, 2021, p. 15; Grammes, 2009), but it is crucial in distinguishing the contributions of the subjects in education. The methods and concepts employed by a social scientist depend on the discipline and paradigm referred to. Even if a one-to-one relationship between the social sciences and the school subject were the aim, educators would still be faced with the question of which discipline or paradigm to use as a standard.

What could the specific forms of higher order thinking, or reasoning be in social science education? If we apply the concepts from the revised taxonomy (Anderson & Krathwohl,

2001), we see that *conceptual knowledge* entails knowledge of classifications and categories and knowledge of principles and generalisations, as well as knowledge of theories, models and structures. *Procedural knowledge* includes knowledge of subject-specific skills and algorithms, knowledge of subject-specific techniques and methods and knowledge of criteria for determining when to use appropriate procedures.

Sandahl (2015) built on the established notion of historical thinking to develop a framework of disciplinary thinking in social science education. Sandahl distinguished first order concepts and second order thinking concepts, where first order concepts are divided into *propositional concepts* and *compound concepts*. The second order thinking concepts are defined as “[d]isciplinary and procedural knowledge on how social scientists generate knowledge and how they organize, analyse and critically review societal issues” (2015, p. 27). The concepts that Sandahl (2015) identified are social science causality, evidence and inference, abstraction, comparison and contrast, perspective taking and the evaluative dimension (2015, p. 27).

If we take a theoretical look at the distinctions from Sandahl in light of how Anderson and Krathwohl (2001) used concepts, we see some differences. First, there is no consensus on the level of concepts. Sandahl’s first-order concepts are propositional or compound, whereas the second-order concepts appear to relate to different levels. Here, the distinction between factual knowledge, conceptual knowledge and procedural knowledge may provide some clarification. Second, the taxonomy of the cognitive dimension may prove useful in clarifying what the students are supposed to be able to *do* with the content knowledge. If we regard social science causality as a form of procedural knowledge, it may be possible to evaluate the level of student competence using the concepts from the cognitive dimension: Are the students able to *apply* or *analyse* and *evaluate* using social scientific understanding of cause and effect? It must be noted, however, that there is not *one* social science notion of cause and effect, which means that it matters *what* social scientific perspective is applied. Based on the above discussion of higher order thinking, figure 1 illustrates our theoretical framework.

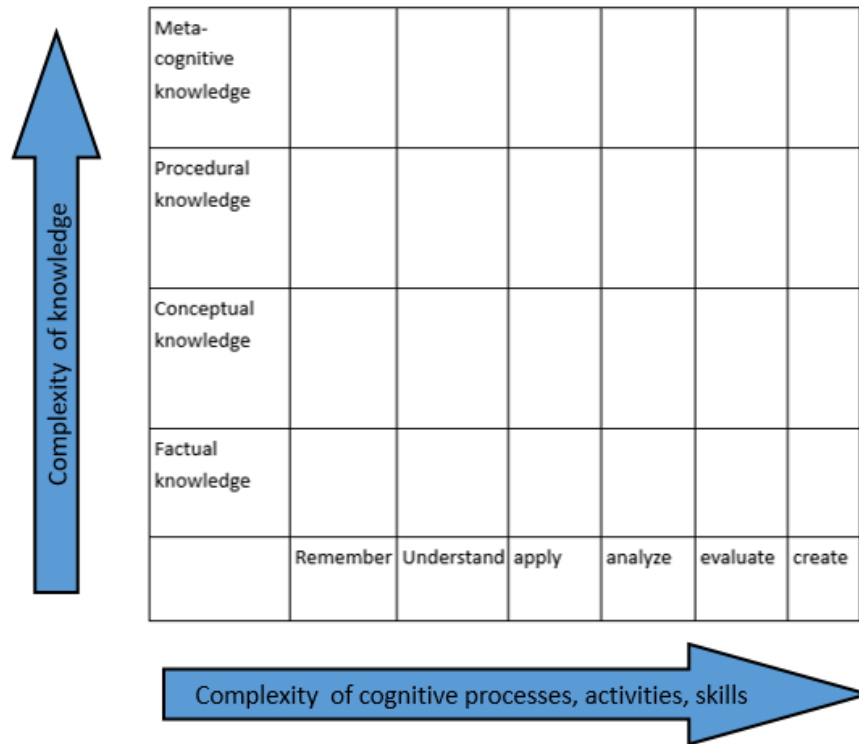


Figure 1: Theoretical framing (adapted from Anderson & Krathwohl, 2001)

The model has two dimensions, which makes it possible to give a more complete picture of what intellectually challenging teaching can be in social studies. In this way, we can capture that higher order thinking is not only a kind of thinking but also a way of thinking about content on a higher level. To put it more precisely, students perform complex cognitive processes.

On the vertical scale, we have the knowledge dimension. Anderson and Krathwohl (2001) distinguished the aforementioned types of knowledge: *Factual knowledge*, *conceptual knowledge*, *procedural knowledge* and *meta-cognitive knowledge*.

When we translate this to social science, we can describe factual knowledge as basic terminology that is merely descriptive – the number of seats in parliament or member states in the EU. The step from factual to conceptual knowledge is important because most of the knowledge in use in social science is knowledge of concepts that have some complexity in themselves, although they represent a form of descriptive knowledge. For instance, the concepts of a *state* or *government* are in themselves complex. In addition, knowledge of theories, models and structures is defined as conceptual knowledge. This means that such concepts as the structure of government or the theory of market mechanisms fall into this category.

Procedural knowledge in social sciences includes knowledge on how to perform subject-specific skills. In social studies, this can include such methods as how to read and produce statistics, how to perform an inquiry or how to use source criticism. In traditional social

studies, at least in Denmark, this is often described as being able to analyse and discuss. These skills would be on the cognitive process dimension, but knowledge of what it means to perform an analysis or give an argument is procedural knowledge.

In social science education, analysis could mean using social scientific concepts to investigate and understand a phenomenon, for instance, to analyse economic policy from a neoclassical or Keynesian perspective, a situation in international relations from a liberal or realistic point of view or a taxation policy issue from a liberal or social-democratic point of view. The procedural knowledge in these cases is the ability to apply theoretical concepts to a specific phenomenon/problem. Thus, we can give a tentative definition of higher order thinking in social science education: higher order thinking entails applying factual, conceptual and procedural knowledge, in the analysis and evaluation of non-routine problems or questions within the domain of the social sciences.

The Scandinavian context: Social studies in Denmark and Norway

In the Scandinavian countries, there are several social science subjects. In Denmark, lower secondary social studies is a mandatory subject consisting only of the social sciences (*samfundsfag*). In Norway, social studies (*samfunnsfag*) is a mandatory subject from grade 1 in primary school to grade 10 in lower secondary school and includes history, geography and social science. The Danish and Norwegian school subjects share many of the same aims. The purpose of the Norwegian mandatory social studies subject in lower secondary school states the following:

Social studies is an important subject furnishing the pupils with the skills to be participating, engaged and deliberating members of society. The subject shall help the pupils to recognise the connections between individual choices, societal structures and tolerance limits in nature. In social studies, the pupils shall have the opportunity to explore their own identity, the local communities they live in and national and global challenges (The Norwegian Directorate of Education and Training, 2020)

Similarly, in Denmark, the purpose of the subject includes: “attain knowledge and competencies for active participation in a democratic society.” Furthermore, students shall attain the “preconditions for developing critical thinking and foundational values, for participating qualified and engaged in society” (Ministry of Children and Education, 2019).

Methods

The study applied the research design described by Klette et al. (2017), in which lessons of Norwegian language arts and mathematics were videorecorded. It was conducted as a part of QUINT – Quality in Nordic Teaching, Nordic Centre of Excellence and focuses on videotaped lessons in social science education in Denmark and Norway. All videos were analysed using the Protocol for Language Arts Teaching Observation (PLATO), developed by Grossman et al. (2013; 2019) to capture the quality of English language arts (ELA) instruction. According to Bell et al. (2019, p. 18), PLATO “privileges socioconstructivist approaches to learning but combines this with more cognitive approaches.” The

socioconstructivist approach can be seen for instance in the way that PLATO looks at how the tasks presented for the students by the teacher provide the opportunity for analytical and inferential thinking, thus enabling construction of their own knowledge rather than merely taking in already given knowledge.

Although initially developed for ELA, PLATO has also been used in mathematics (Cohen, 2018) and science (Kloser, 2014). PLATO is organised into four broader domains: Instructional Scaffolding, Disciplinary Demand, Representations and Use of Content, and Classroom Environment, which are in turn divided into sub-elements, with 12 elements in total (see Table 1). Recorded lessons were divided into 15-minute segments and scored on each element using a 4-point scale, on which 1 indicates the lack or weak evidence of a certain practice and 4 indicates strong and consistent evidence of a practice.

PLATO allowed us to analyse teaching practices systematically, focusing on aspects of teaching that have been found to be important for student learning in empirical research (Klette et al., 2017). One of these aspects is what PLATO labels intellectual challenge (IC), which captures teaching that encourages such practices as idea generation and analytic thinking. As these kinds of practices are important in social science education, and we have few classroom studies focusing on higher order thinking practices in this subject (e.g., Sandahl, 2015, 2020), we focus specifically on the element of IC; moreover, we go into depth by supplementing PLATO scores with thematic analyses aiming to understand what higher order thinking can look like in social science teaching in lower secondary schools.

Instructional scaffolding	Disciplinary demand	Representations and use of content	Classroom environment
Modelling Strategy use and instruction Feedback Accommodations for language learning	Intellectual challenge Classroom discourse Text-based instruction	Representation of content Connections to prior knowledge Purpose	Behavior management Time management

Table 1: PLATO elements

Sample

The sample consists of videotaped social science lessons from 16 social studies classes in different lower secondary schools from Denmark and Norway. Of the total number of video segments of 15 minutes ($N = 183$), we used the PLATO scores to identify the segments that scored at the highest level for IC, which we describe below.

Observations of teaching

Video observations were conducted by using a setup with two cameras (one in front to capture the students and one in the back to capture the teacher) and two microphones (one in

the ceiling in the middle of the room to capture student talk and one worn by the teacher to capture teacher talk). The QUINT research team filmed four to six lessons in each classroom.

Analysis

We conducted analyses in several steps. First, all videos were analysed using the PLATO manual, as described above. To identify lessons that include activities promoting higher order thinking, we sampled segments using the element IC, which at the highest level is defined as teaching that promotes sophisticated or high-level analytic and inferential thinking, including synthesizing and evaluating information and/or justifying or defending their answers or positions (Grossman, 2019). Only segments scoring at the highest level were included for further analysis (N= 32, see Table 2). Second, we reviewed all segments that scored at the highest level for IC to produce an overview of the kinds of knowledge, concepts and activities present by noting the social scientific concepts used and what kind of task the students were working on (i.e., how students were cognitively activated; see Tables 3 and 4). Third, we selected two segments that represented variation in terms of tasks and analysed them thematically using the framework adapted from Anderson and Krathwohl (2001; see Figure 1). The purpose of this stage of analysis was to go into more depth to see what higher order thinking can look like in social science education as it is expressed in teaching.

Reliability and ethical considerations

All raters were trained and certified to use PLATO (a minimum requirement for a rater to become certified was to score at a reliability of 80%). Participating students and teachers were informed about the purpose of the research, the uses of the data and their rights as participants in the research project. They were also given the opportunity to ask questions before the data collection began and informed that participation was voluntary. All participants signed consent forms. Students who chose not to participate were seated such that they could participate in lessons without being captured on video. That teachers self-selected to participate may pose bias, for example, in terms of including teachers who are generally more comfortable with their teaching. The participating teachers varied in age, gender and qualifications. The data material was collected, stored and analysed in accordance with national guidelines in each country,

There is much we cannot observe in the video data that may influence our findings, such as the students' previous knowledge and actual thinking and teaching that occurred before filming started. Consequently, we can only draw tentative inferences based on what teachers and students say and do in the specific lessons to which we have access, and we make no attempts at generalisations. Hence, through this exploratory study, we investigate the connection between intellectually challenging teaching and students' higher order thinking as it is expressed in the classroom.

Analyses of the video data

To present our analyses, first, we give an overview of the PLATO scores for all the video segments in social science education recorded in Denmark and Norway. Second, we present our thematic analyses using our adapted model of Anderson and Krathwohl's (2001) framework. In Tables 3 and 4, we briefly describe the main concepts and activities in all the segments scoring 4 on IC before we provide an in-depth analysis of two selected segments.

Preliminary analyses

Table 2 shows an overview of the PLATO scores for IC.

Country	Score	Frequency	Percent
Denmark	1	4	3,8
	2	38	36,5
	3	42	40,4
	4	20	19,2
	Total	104	100
Norway	1	18	22,8
	2	22	27,8
	3	27	34,2
	4	12	15,2
	Total	79	100

Table 2: Overview of PLATO scores for IC

The table shows that in the observed classes, just over half the segments score at the higher end on IC as defined in the PLATO manual. In the classes observed in Denmark, most segments scored 3 or 4, which means that there was “evidence with some weaknesses” (3) or “consistent strong evidence” of “high-level analytic or inferential thinking” (4). In the classes observed in Norway, that pattern was similar, with the notable difference that over 20 % of the segments received a score of 1.

In themselves, the numbers do not say much about the quality of the teaching. Segments with a score of 1 can mean that there are tasks where the students practice routine exercises that are necessary for performing higher order tasks.

Class and topic	Main Concepts	Activities	Why it is considered high on IC
Class 1 (DEN): Welfare state, private and public.	Public, private, tax.	Discussion: Public or private financing of goods.	The assignment is open-ended, promote idea generation and analytic thinking.
Class 2 (DEN): Lifestyles, clothes, market segmentation.	Lifestyles, Minerva model (segmentation model).	Apply concepts/model on examples.	Open-ended, analytical thinking.
Class 2 (DEN): Take a stand and give reasons.	Abortion rights.	Take a stand, discuss.	Open-ended, taking a stand, justify answers.
Class 2 (DEN): Take a stand and give reasons.	Police protection for controversial political activist, Paludan.	Take a stand, discuss.	Open-ended, taking a stand, justify position.
Class 2 (DEN): Lifestyle, political consumer.	Lifestyle, political consumer, consumer boycott.	Investigate consumption choices in Denmark.	Open-ended, investigation.
Class 3 (DEN): Election and themes.	Election.	Talk about which themes have been prevalent in the elections.	Open-ended question.
Class 3 (DEN): EU.	EU parliament.	Investigate what the European parliament does.	Open-ended, investigative.
Class 4 (DEN): Economics, circular flow.	Circular flow, economics, Household, public sector.	Answer questions on circular flow.	Applying theory (circular flow).
Class 4 (DEN): Economics, supply demand.	Supply, demand, equilibrium price.	Answer questions on how equilibrium price is formed.	Applying theory.
Class 5 (DEN): International politics.	Superpowers, small states. Great powers.	Explain drawings of superpowers and small states.	Open-ended, explain own interpretations and us of concepts.
Class 5 (DEN): Climate politics, evaluation of work.	Climate politics and evaluation of work.	Discussion of climate politics, evaluation of earlier work.	Open-ended discussion.
Class 5 (DEN): Local politics, discussion of Fridays for Future, Denmark at war.	Local politics, Fridays for future, war, Danish foreign policy.	Discussion of local politics (visit to municipality), of Fridays for future, starting work on Danish foreign policy.	Open-ended discussion, challenging task on Danish foreign policy.

Table 3: Content in the segments from Denmark scoring 4 on IC

Class and topic	Main concepts	Activities	Why it is considered high on IC
Class 1 (NO): The American presidential election 2020.	The American presidential election.	Group work. Students choose what kind of product to produce and present (flyer, debate, podcast or article). There are different tasks for each kind of product, but all include finding, evaluating and synthesizing and discussing information.	Assignments are open-ended and promote idea generation and analytic thinking.
Class 2 (NO): Development of the Norwegian welfare state.	Gender equality, living standards, public education.	Students are asked to describe how a set of pictures is relevant for Norway's development after the war and relate them to each other using a causal logic.	The assignment promotes understanding and application of procedural knowledge.
Class 2 (NO): International conflicts.	Conflict, underlying and triggering causes.	Group work. Students produce and film a news report presenting an ongoing international conflict based on a set of mostly open-ended questions.	The assignment promotes idea generation and analytic thinking, f.ex. by asking students to identify and distinguish underlying and triggering causes.
Class 3 (NO): Demography: population pyramids.	Population pyramid, demographic development phases.	Students choose a country and are asked, based on its population pyramid, to act as a benevolent dictator and recommend policies for a positive future development.	The assignment is open-ended and requires students to evaluate information and draw inferences.
Class 3 (NO): Demographic transitions.	Population pyramid, demographic development phases.	Teacher – student dialogue about demographic development phases. Teacher asks many open-ended how and why questions. Students present the countries and policies they worked with in the previous lesson.	The teachers' questions ask students to interpret and evaluate information and justify their answers.
Class 4 (NO): Demography.	Population density, life expectancy, child mortality, demographic development, political, financial, social & cultural situation.	Individual project work (English and social studies). Students select two countries and compare their economic status, social, political and cultural situation, demographic development etc.	Assignment asks students to compare and contrast.

Table 4: Content in the segments from Norway scoring 4 on IC

Content and higher order thinking

The tables above show that the segments scoring high on IC according to the PLATO definition are not limited to specific areas of the subject. In the observations from Denmark, we find sociological knowledge, such as lifestyles and segmentation, represented in two segments. Economic issues are dealt with in two segments. Politics on the local, national and European levels, as well as global security policy, are evident. In the observations from

Norway, we also have the welfare state and international relations as topics. Three segments from Norway are about demography, including political and social issues, which would be part of the geography subject in lower secondary school in Denmark.

Since the classes were not selected with the aim of representativeness from the outset, we cannot say whether the sample is representative, but the examples show a broad selection of content; therefore, higher order thinking does not appear to be limited to special areas of the subject.

In-depth qualitative analyses

This analysis consists of two parts. In the first part, we analyse a segment about public or private financing from Denmark. In the second part, we analyse a segment about the development of the welfare state from Norway.

Funding of welfare - Denmark

The overall theme of the segment from Denmark (class 1 (DEN)) is the question of what should be funded publicly versus privately. The task is presented on a digital blackboard and lists some services (school, healthcare, etc.). The students were asked to state whether it should be financed privately or publicly, and to give a percentage, for instance that a service should be 50% privately funded. After the discussion in groups, the teacher asked the students to present their opinions and give arguments. The teacher emphasised that the students should respect each other and listen. As he stated, "It might be that you totally disagree, but then you must use your argumentation".

The task alone justifies the PLATO score of 4; it is an example of higher order thinking (if executed as intended). Students work with complex conceptual knowledge (public and private financing of welfare goods) and are asked to take a stand, which means that they can evaluate and give their opinion. The teacher underscores the need for argumentation to support their opinions.

The expression of opinion places the task in the evaluative category on the cognitive process scale, although our use of the scale might differ from the way it was intended by Anderson and Krathwohl. In Anderson and Krathwohl (2001), *evaluation* was defined as making judgements based on criteria and standards (2001, p. 83). The sub-process of *critiquing* was defined as judging based on external standards, and as an example, the authors pointed out that in social sciences, the students could be asked to evaluate a proposed solution to a social problem in terms of its effectiveness (2001, p. 84). In the example below, there is a clear evaluation (school should be publicly or privately funded), but although the teacher demands argument, he does not state what the criteria should be for the evaluation – at least not while formulating the task. Therefore, it is not clear from the formulation of the task what kinds of knowledge the students are expected to apply when presenting arguments.

The two issues discussed in this segment are *folkeskolen* and private schools. One excerpt of the dialogue on *folkeskolen* is as follows:

S: In my opinion, they should be fully financed and public because everybody should have the opportunity to learn something.

T: Like today. Do you know societies where it is not like that?

S: Yes, down in Africa.

T: What is it like in Africa?

S: There you have to pay money, so poor people cannot go to school and learn something.

T: Okay, and you might even have to work at home in the family to make ends meet. What about the USA – (...)

S: There you have to pay and it is super bad. (continues to argue that it is better if it is free)... - because then it is how smart you are, and not the size of your parents' wallet that shows how far you can get.

T: So it is the equality in society you like about the Danish system. It is actually okay that everybody has equal opportunities to get an education and become something.

In this excerpt, we can see that the argument by the first student is that “everybody should have the opportunity to learn something”, whereas that of the other student is that it is how smart you are and not the size of your wallet that should decide how far you can get. The students do not provide further evidence and are not asked to give it by the teacher – he asks them to give examples of places that are different and appears to be satisfied with the examples of Africa and the United States. The knowledge presented by the students is that if you are poor in Africa, you cannot afford education, and in the United States, it is your parents' wealth that defines your opportunities.

The above excerpt is an example of using the United States (and Africa) as an instance of a less desirable social structure, the opposite of the Danish welfare society. This is not uncommon, and it could also partly be backed by social scientific knowledge. However, in this case, it is only used as a negative contrast to Denmark.

In the discussion of private schools, more diverse opinions emerged. The introduction by the teacher was as follows:

T: We jump to private schools (...) there could be private schools that care a lot about the children being silent and not make noise. There was this school in Vejle, they cared a lot about academic standards (*faglighed*) (...) If they opened other schools than the *folkeskole*, what would you think?

S1: I have set private schools to 50% because I think that while it is free to attend *folkeskolen*, if you need to go to a private school, it may be that your child has psychological problems or something like that and you didn't go to the handicap school (*handikapskolen*) and (...) you couldn't stand the noise in the *folkeskolen*. I think there should be the possibility for the state to help you go to the private school.

T: Because the *folkeskole* can't manage it (...)

...

S2: I have put it at a 100% user's fee. It makes sense, (...) if you have the opportunity to attend the *folkeskole* and choose something else, I think you should pay for it. But as (S1) says, if you have psychological problems, there should be a possibility to get some help for it.

T: So where do you put the number?

S2: Around 15 000.

T: Okay.

S3: I think you should pay yourself; if you have psychological problems, then you should go to another school where the state pays an amount for it. It is far from everybody who goes to private schools that has psychological problems; not a lot have these problems.

(...)

S4: I think it should be 90%; you pay 90% yourself.

S5: A 100% user fee. It is typically the ones who attend private schools who have somewhat richer parents.

T: We could also talk about prejudices at some point.

At this point, the student who suggested 50% because of the possibility of having psychological problems joins the discussion again:

S1: I hear what you are saying: because it is not everybody, so if you say 50%, there are many who would take advantage of it, and think they can go there to get more learning. Then you could say those who are having a hard time, they could get help.

T: Okay.

At the end of the discussion, a student enters the debate with a longer contribution that ends with this statement:

S6: I have set a 100% user fee because (...) it's like if you are offered something, no I don't want this, then you pay by yourself because now I have offered you that you can attend *folkeskolen*. I would rather go to the private school, then you pay by yourself.

S1: 50%	because of psychological needs – later changes opinion
S2: 100% user's fee	because you have other opportunities
S3: 100% user's fee	if you have problems, you should get help; not everybody in private schools has problems
S4: 90% user's fee	
S5: 100 % user's fee	most have richer parents
S 6: 100% user's fee	if you choose not to go to folkeskolen you must pay

Table 5: Overview of students' opinions, on the financing of private schools and arguments

In this part of the dialogue, the students apply higher order thinking in the way that they express judgement/opinion on the question. On the cognitive dimension, they are at the evaluative level. The knowledge that their judgement is based on can be seen in the reasons they give: S1 considers psychological needs first, then changes opinion. S2, S3, S5 and S6 agree that the user fee should be 100% either because the students have a choice – they have been offered *folkeskole* - or because their parents can afford the fee.

The argument that if there is a free offer, then the private alternative should be paid for by the users is a logically consistent and valid argument.

Regarding the knowledge content in the segment, the teacher's statement at the start of the discussion, as well as his response to of the students' opinions, appears not to be aimed at providing or asking for factual or conceptual knowledge about public and private schools. The students' arguments are based on their assumptions and ethical judgement (if there is a free offer, it is fair that you have to pay if you want something else), but not on knowledge of, for instance the school system. For instance, it would be relevant to consider that the current state of affairs is that also private schools in Denmark are mainly financed by the state.

If we apply the terminology from Andersen and Krathwohl (2001) we can say that the students are asked to *evaluate*, thus on a high level of complexity of the cognitive process. In this process the teacher asks them to use the concepts of private and public funding, thus in a sense they are *applying* these concepts, though not in a way that demands a thorough analysis of the differences between public and private funding of goods. On the knowledge dimension the teacher does not ask for factual knowledge, and the conceptual knowledge is limited to the concepts of private and public financing.

The development of the Norwegian Welfare State – Norway

In this selected segment, the class (class 2 (NO)) worked on the development of the Norwegian welfare state. The teacher had prepared a PowerPoint presentation with pictures illustrating different aspects of Norway after World War II. Above the pictures, the task was stated as follows: "You will now see 12 pictures that can be related to Norwegian development after World War II. Briefly explain how the pictures are relevant for Norway's development after the war and how they can be related to the founding of the welfare state."

Applying the framework developed by Anderson and Krathwohl (2001), the task can be said to be at the level of procedural knowledge because it asks students to use cause and effect as a model through which to understand the development of the Norwegian welfare state after World War II. During the lesson, the teacher followed up on the task by reminding students to connect different images and talk about how they were related to each other and the development of the welfare state. He also specifically asked them to think in terms of causal relationships, as the following excerpt illustrates:

T: OK, we'll do four more minutes. Those of you who feel that you are... Those of you who are scratching the back of your heads and looking out the window, draw links between the different images. Like we did together: Because this, so that. Explain.

The teacher also asked specific questions to challenge students to think in terms of relationships and cause and effect. In the following example, he did this by asking a student why the fight for gender equality came about when it did:

T: Yes, and let's try to see this in relation to an image we have been working with earlier today. Because why is it all of a sudden so pressing with a fight for women's rights? Why right now?

In terms of the cognitive process dimension, these questions fall in the category of applying procedural knowledge – that is, the teacher asks students to use a causal logic in their responses. In this case, students are asked to relate phenomena and events to each other by thinking in terms of how one influenced or led to another.

Although there is no one-to-one relationship between teaching and learning, or thought processes and speech acts, we use students' statements, questions and responses to teacher questions as indicative of the types of knowledge they are working with and the cognitive processes they engage in. Students' oral communication can be seen as an expression of how they carry out the tasks they are given. That is, when the IC is high and when the students respond in line with the task, we would expect their response to be expressions of higher order thinking.

In the segment on the Norwegian welfare state, there are several examples of students responding to the task in the way the teacher requested (i.e., relating the images to the development of the welfare state and to each other demonstrating a causal logic). For example, in response to the teacher's question about the fight for women's rights quoted above, one student said: "Because people get an education and then, when they have the same job, they want equal pay as well". In the same vein, when commenting on a picture of the logo of the University of Oslo, another student said: "People could get study loans, which led to more people being able to get a higher education".

In these examples, students' utterances can be said to be at the level of conceptual and procedural knowledge, like the task itself. That is, based on what we can observe, students seemingly not only understand the cause-and-effect model but also show how to use it with specific content. However, the statements cannot be categorised as expressions of higher

order thinking on the cognitive process dimension because students *apply* procedural knowledge rather than, for example, using it in an analysis.

To conclude, there are several examples of teaching that encourages higher order thinking in this segment. This is in line with the PLATO score of 4 in that a segment can score at the highest level if there are one or more instances of higher order thinking practices. When applying Anderson and Krathwohl's (2001) framework, student and teacher utterances fall into the category of *apply*, which is less complex than *analysing* a phenomenon. However, the knowledge students use when they apply causal logic is rather complex. That is, if performing the task as intended by the teacher, students are not simply relying on factual knowledge but combining conceptual and procedural knowledge when they apply causal logic to the development of the welfare state. To be considered an analysis, the activity would require independent and in-depth consideration of knowledge, relationships and causal mechanisms to a greater extent.

Comprehensive analysis

When comparing the analyses of the Danish and Norwegian segments, we found certain combinations of knowledge and cognitive processes. To give an overview, it is possible to distinguish between high and low demand on the cognitive process (skill) and high and low demand on the knowledge dimension, respectively. Figure 2 illustrates these patterns.

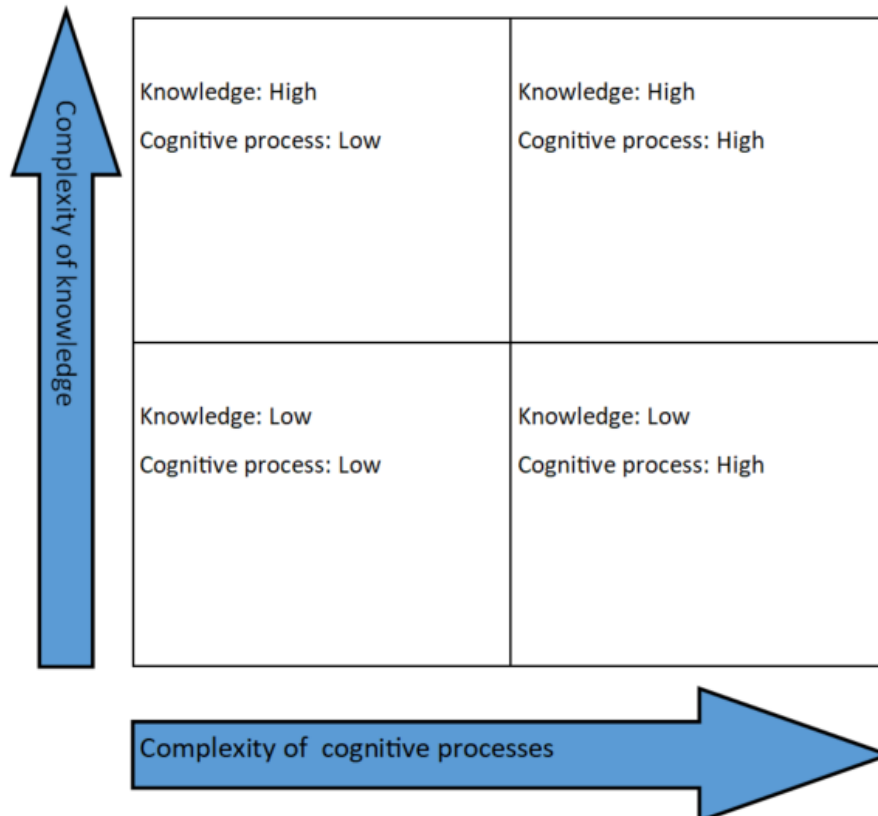


Figure 2: Combinations of knowledge and cognitive processes

An example of a low-complexity task with a high level of knowledge would be if the students were asked to account for the processes in the economic cycle. This is complex conceptual knowledge, but the cognitive complexity is low. A high-complexity task with a low level of knowledge is when the students are asked to take a stand on an issue (e.g., whether private schools should be publicly funded) but where there is a low level of knowledge. A low-complexity task with a low level of knowledge is when the students are asked to repeat simple knowledge (number of members of the Danish parliament, how many members it takes to form a majority). A high-complexity task combined with complex knowledge could be having students analyse a country's population pyramid and use the information gained combined with conceptual knowledge to suggest policies for future social, economic and/or political development.

For completion, a third dimension considering the amount of knowledge could be added; it might be that a person has complex knowledge and can perform creative actions with this knowledge but can only do so within a very narrow area. A student may be able to discuss a policy issue of interest in detail but be ignorant about other areas. Hence, the breadth of the knowledge must also be a factor in assessing the quality of knowledge and skills. In this article, we limit our discussion to the two dimensions because an assessment of the breadth of knowledge would demand an overview over a longer period of teaching.

We can see that the example from Denmark has high complexity in the cognitive process but a low level of knowledge. The example from Norway has a high complexity in knowledge, and to some extent, also in the cognitive process, although this depends on the interpretation of what the students are actually doing. We cannot rule out that students are merely repeating a narrative about the welfare state that has been presented previously by the teacher.

Main findings

Using the PLATO manual and the definition of Intellectual Challenge gave us the opportunity of sampling segments of teaching that were intellectually challenging according to the PLATO characteristics: not only characterised by rote and recall tasks, but activities requiring analytical thinking. The sample of segments scoring 4 on IC proved to be interesting examples of social science teaching (see Tables 3 and 4), but we needed to conduct qualitative analysis to get a deeper understanding of the actual teaching.

Using the two-dimensional Anderson and Krathwohl (2001) taxonomy we distinguished between levels of knowledge and cognitive processes encouraged by the activities in class. This taxonomy made it possible to get a more precise understanding of what "higher" and "lower" intellectually challenging teaching might entail. Especially in the example from Norway we can see that the distinction between "applying" and "analysing" is relevant, even if it is not unambiguous in the material we have. Such examples call for further investigation of what it means to apply knowledge and concepts in social science education, and what it means to perform an analysis.

Despite the usefulness of Anderson and Krathwohl's (2001) model, patterns in our findings made it possible to make a new model (Figure 2), maintaining the two dimensions of knowledge and cognitive processes and indicating possible relationships between the two.

The content of the selected segments shows a variety of themes pointing towards higher order thinking not being confined to certain areas of social science education. In the thematic, qualitative analysis, we found that there are parts of the segments that encourage students' higher order thinking, either by facilitating students' interaction with complex knowledge or engaging them in demanding cognitive processes. More specifically, we identified tasks encouraging procedural knowledge and evaluative activities. The relationship with demanding tasks on the two dimensions is not linear—it is possible to have a cognitively demanding task with little knowledge and simple tasks performed relying on complex knowledge. To understand what higher order thinking can mean in social science education or analysis, it is necessary to work with a two-dimensional model that can capture both the cognitive processes and the different types of knowledge.

Discussion and concluding remarks

By investigating what kinds of higher order thinking are encouraged in social science in selected teaching segments in Denmark and Norway, this study contributes to our knowledge about classroom practices in social studies in the Scandinavian context. While previous studies have found that social science teaching incorporates both specific content and concepts, as well as a focus on building skills (Mathé & Elstad, 2018; Sandahl, 2015), this study specifically analyses higher order teaching practices on two dimensions, illustrating potential relationships between knowledge and cognitive processes.

Earlier models of higher order thinking in social science education do not distinguish between higher order thinking (as a process) and higher order knowledge. The models proposed in this article seek to avoid this conflation of the two dimensions. While there is some overlap between Sandahl's (2015) second order thinking concepts and the various levels on the process dimension we have used. A difference, however, is that Sandahl's concepts can be performed on several levels of complexity. Moreover, while they seem to rely on the first order concepts, they include both disciplinary and procedural knowledge. The present study demonstrates the value of analytically distinguishing between knowledge and processes. We have seen that even if the task presented is on a high level—for example, open-ended and giving the students room for evaluating an issue—the teacher may not follow this up by challenging the ideas of the students or requiring them to justify their stances or arguments. That is, it seems to be difficult for the teacher to combine a focus on complex knowledge and intellectually challenging thinking processes.

For research, it is valuable to develop models and understandings of higher order thinking in social sciences. Our empirical findings demonstrate the theoretical contribution of this study: The two-dimensional model can be used to analyse teaching practices in social science education. However, the model can be further developed in future research.

For teaching and teacher education, an enhanced and more targeted focus on teaching strategies that foster higher order thinking is necessary, as well as an understanding of when to engage in lower order thinking and rote and recall activities in social science. From the empirical material, it seems that there is often a trade-off between students taking a stand and forming an opinion or engaging with higher order knowledge. Therefore, it is necessary to engage in further studies that can clarify what this means in an educational setting: Must it be the case that the teacher lets the students bring forward opinions without backing them up with knowledge, in order to foster a free democratic dialogue? Or is it possible to facilitate a kind of teaching that combines the acquisition of skills and knowledge with the formation of opinion and lively discussion where the students can get the feeling of participating in a democratic community?

Although more research is needed to understand the fine-grained mechanisms of facilitating higher order thinking practices, as well as students' actual thinking, we argue that this article contributes both empirical and theoretical insights that may be used to develop both social science didactic research and practice in the Scandinavian and Nordic context.

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Danish summary

Samfundsfagsundervisningen skal fremme eleveres viden om samfundsmæssige og politiske sammenhænge, samfundsfaglige begreber og styrke deres evne til at argumentere og begrunde holdninger. I denne artikel diskuteres højere ordens tænkning i grundskolens samfundsfagsundervisning. Som en del af QUINT- Quality in Nordic Teaching blev undervisning filmet på video i Danmark og Norge. I disse videooptagelser udvalgte vi først segmenter, der inkluderede aktiviteter, der gav mulighed for højere ordens tænkning. Disse blev analyseret for at få et overblik over, hvilke former for kognitivt krævende undervisning, der kunne identificeres. Vi fandt adskillige eksempler på undervisning, der kunne fremme eleveres højere ordens tænkning, enten ved at facilitere interaktion med kompleks viden eller engagement i krævende kognitive processer. Ydermere fandt vi, at forholdet mellem viden og proces ikke er lineær: det er muligt at have en opgave, der er kognitivt krævende, men som kræver begrænset viden, og der kan være simple opgaver med komplekst vidensindhold.

Nøgleord

Højere ordens tænkning, kognitiv udfordring, samfundsfag, samfundsfagsdidaktik, undervisning

Keywords

Higher order thinking, intellectual challenge, social science education, social studies, teaching

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