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The textbook task as a genre

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ABSTRACT

Schools today face the challenge of preparing students to live, work, and prosper in a rapidly changing world. As a response to this global challenge, Norway has adopted a national curriculum focusing on the development of 21st-century skills. In this study, we investigate if and how the tasks in science and language arts textbooks in upper-secondary school have changed after the curriculum reform. We conduct a content analysis of 5,067 tasks in science and language arts textbooks and compare them to tasks in textbooks published before the reform, which we analysed in two previous studies. The results show only a marginal change in tasks in each subject, indicating that the tasks do not present the students with sufficient opportunities to practice the competences highlighted in the new curriculum. As a possible explanation regarding why textbook tasks in Norway—as well as a number of other countries—appear to change so little over time, we advance the hypothesis that the formulation of tasks in textbooks is influenced and constrained by culturally specific genre norms. These norms may represent a challenge to curriculum implementation and school change, and it is therefore important to raise awareness of textbook tasks.

KEYWORDS

Textbook; task; genre; curriculum reform



Introduction

Students' learning is influenced by the tasks they do at school (Edwards, 2014). According to Doyle (1983), students 'will learn what a task leads them to do', and accomplishing a task has two consequences:

First, a person will acquire information – facts, concepts, principles, solutions – involved in the particular task that is accomplished. Second, a person will practice operations – memorizing, classifying, inferring, analyzing – used to obtain or produce the information demanded by the task. (p. 162)

A major source of tasks for both classroom activities and homework is the textbook (Gracin, 2018; Johansson, 2006). A textbook typically contains hundreds of tasks, while for textbooks in some subjects, such as mathematics and science, the number of tasks can be greater than one thousand (Andersson-Bakken et al., 2020; Gracin, 2018).

If tasks, as Doyle claims, are closely linked to both what students learn in a school subject and how the students learn while studying that subject, one could expect that when the curriculum changes, so will the textbook tasks. Previous research on textbook tasks, however, shows that the types of tasks commonly used in a particular school subject remain more or less the same decade after decade (Gracin, 2018; Limberg, 2016; W. Yang et al., 2019). Furthermore, the information that students can acquire and the operations they practice when working on commonly used textbook

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tasks often conflict with the curriculum and with recommendations from contemporary educational research (Armbruster & Ostertag, 1989; Solihati & Hikmat, 2018).

We reached similar conclusions in two previous studies of tasks in Norwegian science (Andersson-Bakken et al., 2020) and language arts (Bakken & Andersson-Bakken, 2017) textbooks for upper-secondary school published after a curriculum revision in 2013. Since 2006, the Norwegian school system has been governed by a competence-based curriculum focusing on basic skills such as literacy and numeracy (Dale et al., 2011), but our analyses showed that the textbook tasks in both science and language arts were more in line with the content-centred curriculum of the 1990s. Textbooks, however, do not replace curriculum (Deng, 2015), and how these textbooks have influenced students' learning in the subjects may have varied between students, as teachers in Norway have the authority to decide if, how and the extent to which their students should use textbooks. Furthermore, as Ben-Peretz (1975) and Deng (2015) have argued, neither textbooks nor curriculum documents are simply 'fixed intentions of their developers' (Ben-Peretz, 1975, p. 151); instead, they may be interpreted and enacted in different ways by teachers in the classroom. Nevertheless, if a clear discrepancy exists between the national curriculum and the textbooks, it is possible that the textbooks exert the stronger influence on teaching of the two, as a textbook provides a more concrete and complete picture of the school subject than what is typically expressed in curriculum documents (Hutchinson & Torres, 1994). A contributing reason could be that teachers use the textbook as curriculum and assume the image of teachers as curriculum implementers rather than assume their rightful roles of teachers as curriculum makers (Clandinin & Connelly, 1992; Craig & Ross, 2008).

In 2020, a new national curriculum was implemented in Norway. In line with recommendations from, among others, UNESCO, the OECD and the EU, the new curriculum emphasized the development of 21st-century skills (Voogt & Roblin, 2012) in order to prepare students for the knowledge society and the job markets of the future (Meld. St. 28, 2015–2016). Since the curriculum reform, the major publishing companies have revised or replaced the textbooks in both science and language arts, and the aim of the present study is to investigate whether and, if so, how the textbook tasks have been changed in the process. We will use the results from our previous studies as a baseline and compare these with an analysis of the new and revised textbooks. The study is guided by the following research questions:

- (1) How do the tasks in science and language arts textbooks published after the curriculum reform of 2020 compare to the tasks in textbooks published after the curriculum revision of 2013?
- (2) How can the similarities and differences in the tasks be explained?

This study makes several contributions to the study of textbook tasks. First, taking Norway as a case, we provide new empirical data on how textbook tasks change across two curriculum reforms, seven years apart. Internationally, such data are rare (Andersen, 2019; D. Yang et al., 2015; Yasar, 2009), as most previous studies have analysed textbooks from one point in time only and interpreted the results in light of the current curriculum.

Second, we analyse tasks in two different school subjects using the same analytical categories. Such comparisons are also rare in the international literature on textbook tasks (Armbruster & Ostertag, 1989); however, by comparing two school subjects, we hope to shed new light on tasks in different subjects and in the ways that tasks might change over time. Science and language arts are relevant subjects to compare because they represent each of the 'two cultures' in the educational system: the sciences and the humanities (Snow, 2012).

Third, the development of the analytical categories is a methodological contribution. Categorizations of textbook tasks vary between studies and many researchers have derived their categories from the national curriculum for a particular subject. Our categories are more generically defined and as we will demonstrate, they may be used in the analysis of tasks from such different

subjects as language arts and science. These analytical categories could therefore be applied in future studies comparing textbook tasks across subjects.

Fourth, we will draw on linguistic and rhetorical theory to argue that the textbook task can be perceived as a genre. This theoretical perspective may explain a consistent finding in international research on textbook tasks, namely that such tasks in most countries appear to be resistant to change. Genre theory also indicate how changes can be instigated, which may have implications for school policy. If schools are to be reformed so that they can better 'prepare students for rapid economic, environmental and social changes' in the 21st century, we need a better understanding of the 'common challenges of curriculum implementation', according to the OECD project *The Future of Education and Skills 2030* (OECD, n.d.). The stability of textbook tasks appears to be one of these challenges. The Norwegian national curriculum reform of 2020 is a part of what the OECD (2018) has described as 'a global effort for education change' (p. 7; cf. Meld. St. 28, 2015–2016, p. 14), and a study of how this reform has been implemented in textbooks may therefore have implications for other countries attempting to strengthen the development of 21st-century skills.

Previous studies of textbook tasks

A common finding of studies from a wide range of school subjects and in a number of countries is that textbook tasks fail to meet the demands set in the curriculum and the recommendations of educational research. Tasks in *science* textbooks focus on the reproduction of facts and the application of formulas and standardized procedures, while inquiry-based tasks are few and have little in common with the open-ended, explorative nature of authentic scientific inquiry (Andersen, 2019; Chinn & Malhotra, 2002; W. Yang et al., 2019). Science curricula and educational research have placed an increasing emphasis on understanding the nature of science; however, the textbook tasks instead convey an outdated view of science as a collection of established facts (Andersson-Bakken et al., 2020). A majority of tasks in *mathematics* textbooks are at a low cognitive level and can be solved using superficial strategies without a deeper understanding of mathematics (Lithner, 2004). There are few cognitively challenging tasks (Gracin, 2018), such as problem-solving tasks in real-life contexts (Amaral & Hollebrands, 2017; Hadar & Ruby, 2019; Jiang & Cai, 2014), despite the fact that such tasks are promoted in the curriculum and educational research. The tasks in *geography* textbooks are sometimes more challenging than the curriculum requires (D. Yang et al., 2015), but mostly not challenging enough (Jo & Bednarz, 2009; Simon et al., 2020). In *physical education*, the learning activities do not promote student's creativity to the extent that the curriculum demands (You et al., 2019).

Research on learning *English as a foreign/second language* (EFL/ESL) underlines the importance of practicing English in authentic and meaningful contexts (Limberg, 2016). The textbook tasks, however, give the students few opportunities to practice authentic communication (Abid & Moalla, 2019; Limberg, 2016); they focus instead on grammar, drill and repetition (Guilloteaux, 2013; Masuhara et al., 2008). Studies of *language arts* are few, but in Sweden, Ullström (2009) found that tasks related to fiction texts rarely encouraged students to read and explore the texts as fiction but rather to use the texts as inspiration for writing and discussions. In Indonesian language textbooks, Solihati and Hikmat (2018) found few tasks that invited critical thinking. Our previous study of Norwegian language arts (Bakken & Andersson-Bakken, 2017) showed that the tasks to a large extent invited personal interpretations of poetry and other fictional texts, while the curriculum promoted the development of literacy skills.

Another important finding in previous textbook research is that the tasks typically used in a particular school subject appear to change little over time. W. Yang et al. (2019) compared their results with studies of science textbooks from as far back as the 1970s and concluded: 'Decade after decade, the problems are still there' (p. 840). Similarly, Guilloteaux (2013) wrote that 'not so much has changed in the field of [EFL] materials over the past two decades' (p. 235). In one of the few studies comparing textbook tasks before and after a curriculum reform, D. Yang et al. (2015) found that

Chinese geography textbook tasks had only changed according to the requirements in the new curriculum to a limited extent. Two studies from Turkey, however, show that rapid changes in textbook tasks sometimes occur. Comparing geography textbooks before and after a curriculum reform, Yasar (2009) found that 'the majority of the problems' in 'the former program textbooks have been removed and alternatives have been introduced' (p. 20). Likewise, Bayazit (2013) found that the tasks in the latest mathematics textbooks were 'consistent with the philosophy and vision of the new Turkish mathematics curriculum' (p. 674).

Several studies have found that the distribution of different types of tasks is, to a large extent, the same across textbooks within a particular school subject (Chinn & Malhotra, 2002; Gracin, 2018). This was also a key finding of our two previous studies. In each science textbook, approximately three quarters of the tasks were closed, asking students to repeat facts or to apply certain rules or procedures (Andersson-Bakken et al., 2020). In language arts, however, every textbook was dominated by open tasks that ask students to interpret, reflect and express themselves verbally (Bakken & Andersson-Bakken, 2017). Furthermore, we found that the distribution of tasks was different in different parts of the textbook. In all science textbooks, the frequency of open tasks was higher in chapters on scientific methodology and socio-scientific issues (SSI) than in chapters on 'pure' physics, chemistry and biology. In all language arts textbooks, the frequency of open tasks was higher in fiction anthologies than in non-fiction anthologies and in the main texts. Similarly, Jo and Bednarz (2011) found that the tasks in the page margins addressed spatial thinking more than tasks elsewhere in geography textbooks.

There are also indications that the tasks typically used in a particular school subject might be different in different countries. Comparing mathematics textbooks from Cyprus, Ireland and Taiwan, Charalambous et al. (2010) found a greater variety across countries than within any individual country. Other studies have also confirmed differences between countries in the tasks in mathematics (Gatabi et al., 2012; Jiang & Cai, 2014) and geography (Maier & Budke, 2016; Simon et al., 2020) textbooks.

Interpretation of results in previous studies

When interpreting the results of an analysis of textbook tasks, Trachtenberg (1974) noted that researchers might draw inferences about 'the intent of the communicator' or 'the effect of the communication on its recipient' (p. 57). The latter is by far the most common. For example, Gracin (2018) found that Croatian mathematics textbook tasks make low-level cognitive demands; the effect, she infers, is that the students get few opportunities to practice 'reflective thinking skills' and to use mathematics in an 'authentic context' (p. 1020). This inferred effect is then assessed and critiqued on the basis of the objectives in the Croatian national curriculum.

Some researchers also draw inferences about the intent of the textbook authors and publishers. The usual explanation as to why textbook tasks fail to meet the requirements of the curriculum or educational research is a lack of awareness and knowledge among textbook authors and publishers. For example, Armbruster and Ostertag (1989) wrote: 'We suspect, however, that most of the questions in commercially published materials are produced somewhat willy nilly, not according to any informed, systematic, well-articulated plan' (p. 10). Likewise, Solihati and Hikmat (2018) conjectured: 'textbook writers lack creativity in designing tasks that promote critical thinking skills' (p. 6). The rapid change in textbook tasks in Turkey is also explained by awareness and competence. Yasar (2009) pointed out that 'curriculum development experts' and 'assessment and evaluation experts' were involved in the writing of geography textbooks (p. 20). Bayazit (2013) also noted that the Turkish curriculum guidebook includes specific recommendations for and examples of tasks and that textbooks are subjected to rigorous assessments by the Turkish Board of Education.

The consistency of tasks across textbooks, the differences between countries and the stability of tasks over time cannot, however, be fully explained by the intent of individual authors or publishers. One alternative explanation was proposed by Charalambous et al. (2010), who suggested that

'choices made about textbooks may be cultural' (p. 146). They coined the term 'textbook signature' for the distinct pattern that can be observed across textbooks in a particular country, but they do not develop this hypothesis any further (Charalambous et al., 2010, p. 146). In rhetorical and linguistic theory, however, a recurring and culturally specific textual pattern is usually referred to as a *genre*, and in the following section, we will discuss how genre theory could explain the apparent stability of textbook tasks and suggest how changes in tasks can occur.

The concept of genre

Definitions of *genre* vary, but most theories focus on three main points. First, a genre is a category of utterances (Bakhtin, 1986)—or, alternatively, texts (Berge, 1990), discourse (Miller, 1984) or communicative events (Swales, 1990)—which share 'some set of communicative purposes' (Swales, 1990, p. 58). This means that utterances in the same genre perform similar rhetorical actions with similar goals. For example, texts in the genre 'birthday party invitation' perform the action of inviting someone to fulfil the goal of having guests at a party and perhaps also getting presents and strengthening social bonds with friends and family. Second, a genre belongs to a particular culture (Miller, 1984) or, more precisely, to a discourse community. Swales (1990) defines a discourse community as a group of individuals who share a set of goals; moreover, such a group has systems for intercommunication among its members and '*utilizes and hence possesses one or more genres in the communicative furtherance of its aims*' (p. 26). Third, members of a discourse community share a set of norms, rules or conventions for how an utterance should be shaped in order to perform a particular rhetorical action successfully. This set of norms 'influences and constrains choice of content and style' (Swales, 1990, p. 58), thus creating the recurring pattern of discourse within a particular genre. Even if genre norms limit the communicative possibilities of the individual member of a discourse community, they have the benefit of making communication between members predictable (Bartsch, 1987).

The textbook task as a genre

If we are to argue that the textbook task can be perceived as a genre, we must establish that textbook tasks display the three characteristics highlighted by genre theory. In previous textbook studies, the concept of 'task' is often taken for granted and not defined, but the definitions that do exist typically describe textbook tasks as a category of utterances which share a set of communicative purposes. Littlejohn (2011) characterized the rhetorical action performed by tasks as a 'proposal ... for action to be undertaken by the learners' (p. 188); similarly, Gracin (2018) stated that tasks 'require an answer' from the students (p. 1012).

In line with our previous studies (Andersson-Bakken et al., 2020; Bakken & Andersson-Bakken, 2017), we define a textbook task as a *paratext that performs a directive addressed to the student*. A *paratext* is a separate textual element that surrounds the main text (Genette, 1997), and a *directive* is a speech act that encourages or requires the recipient to perform a particular action (Searle, 1976). A directive is usually expressed grammatically as a question (e.g. 'What is the difference between monologue and dialogue?') or an imperative (e.g. 'Explain the terms protagonist and antagonist') (*Grip teksten*, p. 116).¹ The communicative goal of a task is, as described by Littlejohn (2011), 'bringing about ... learning' (p. 188).

Furthermore, textbook tasks may be said to belong to particular discourse communities. Let us take science textbook tasks in Norway as an example. These tasks are written, published and read in a large and complex discourse community that may be labelled *the Norwegian school subject of science*. The members of this discourse community include students, science teachers, textbook authors, publishers, the Ministry of Education and the Directorate for Education and Training, and these members all share a common goal: the advancement of the students' competence in science.

If the textbook task is to be perceived as a genre, members of the discourse community must also share a set of norms that influence and constrain the content and style of tasks. This is not a theoretical question but must be determined empirically. Norms, however, cannot be observed directly but only exist as shared knowledge in a community, and this knowledge may be tacit in part (Yates & Orlikowski, 2002). A strong indication of the existence of genre norms, however, is a recurring pattern in the shaping of utterances that perform similar rhetorical actions. Inferring the existence of genre norms from recurring patterns in discourse is what Peirce (1955) referred to as *abductive reasoning*:

The surprising fact, C, is observed;
 But if A were true, C would be a matter of course,
 Hence, there is reason to suspect that A is true. (p. 151)

The recurring pattern in the formulation of tasks is the observed fact (C). If there existed a set of norms that constrain and influence the choice of content and style in the intercommunication in the discourse community (A), the recurring pattern (C) would be a matter of course. Hence, there is reason to suspect that a set of norms (A) exists. The abductively inferred conclusion is not a logical necessity but a hypothesis that needs to be defended against alternative hypotheses.

The hypothesis that textbook tasks are influenced and constrained by culturally specific genre norms might explain several of the results of previous studies. First, it may explain the similarities in tasks across textbooks in the same subject from the same country (Chinn & Malhotra, 2002; Gracin, 2018): the authors of different textbooks belong to the same discourse community and therefore follow the same genre norms when formulating tasks. Second, this hypothesis may explain the differences between countries in the way textbook tasks are formulated (Charalambous et al., 2010; Simon et al., 2020). For example, mathematics textbooks from Iran and Australia (Gatabi et al., 2012) belong to different discourse communities, and each community is likely to have developed its own set of norms. Third, the hypothesis may explain why textbook tasks appear to be resistant to change: as noted previously, genre norms exist as shared knowledge in the discourse community, and they make communication between members of the community predictable (Bartsch, 1987). If individual members of the community break with the norms and invent new ways of formulating tasks, they run the risk of being rejected or misunderstood by other members.

It should be noted that the definition of textbook tasks used in this study is broad and focuses exclusively on the textual and communicative aspects of tasks. Like Gracin (2018), who defined tasks as ‘all situations that require an answer in the textbooks’ (p. 11), we include everything from simple memorization tasks, worked examples and creative writing assignments to problem-solving tasks with high-level cognitive demands. This broad definition sets our study apart from a number of previous studies, which have been limited to only certain types of tasks. In science education, emphasis has been put on inquiry-based learning, and researchers have mainly analysed textbook tasks that invite students to conduct scientific inquiry, instead of tasks in general (Andersen, 2019; Chinn & Malhotra, 2002; W. Yang et al., 2019). Similarly, studies of language arts textbooks have focused solely on task that develop literary competence (Ullström, 2009) or critical thinking (Solihati & Hikmat, 2018)

Changes in genre norms

Even if norms contribute to stability and predictability, changes in norms do occur, and Berge (1990) has developed a typology describing four ways that norms may be established or changed (see Vagle, 2002, for an introduction in English). *Norm declaration* is the establishment of norms by way of decree. A norm declaration can only be implemented by a member of the discourse community with sufficient authority and the means to sanction violations of the norm. *Norm incorporation* is the drift in norms that may occur when new members are socialized into the discourse community. Because the knowledge of norms often is tacit, misunderstandings may occur when norms are handed down

from experts to novices. *Functional norm constitution* takes place when changes in the discourse community have rendered the established norms inadequate. When the genre norms no longer function as a predictable path to the communicative goal, the members of the discourse community try different ways of expressing themselves until the most successful one is constituted as a new norm. Finally, *revolutionary norm constitution* occurs when an individual member of the discourse community constructs an original norm in opposition to established norms, and this new norm is willingly adopted by the other members.

In previous research, there is an example of what may be interpreted as a norm declaration. Bayazit (2013) and Yasar (2009) described rapid changes in tasks after a curriculum reform in Turkey, and part of the explanation is that the Turkish curriculum guidebook contains specific guidelines for tasks and that each book goes through a thorough assessment. In other words, the Turkish school authorities made an explicit declaration of a new set of norms for tasks, and they had sufficient authority and means of sanction to implement it.

Such norm declarations are rare, but one would expect functional norm constitutions to occur more often and more rapidly than seems to be the case. A number of studies in a variety of subjects across the globe have pointed out that changes in the curricula and recommendations from educational research have rendered the traditional ways of formulating tasks inadequate, and yet the tasks remain unchanged (W. Yang et al., 2019). One reason may be, as indicated in previous studies (Armbruster & Ostertag, 1989), that textbook authors and publishers are unaware of the inadequacy of the traditional tasks. In other discourse communities, members may get an immediate negative response if they follow an outdated set of genre norms. In the case of textbook tasks, however, the communication is mostly one-way, with few opportunities for students to give feedback to authors. The students themselves may also be unaware of the inadequacy of the tasks; furthermore, teachers may limit the negative effect of outdated textbook tasks by selecting which tasks the students should do, modifying the tasks or making their own (Amaral & Hollebrands, 2017; D. Yang et al., 2015).

The discourse communities of science and language arts in Norway

Since changes in genre norms could be explained by certain events or changes in discourse communities (Berge, 1990), we must give an account of the discourse communities to which the science and language arts textbooks examined in our study belong. The school subjects of science and language are included in the centralized Norwegian public school system, which is governed by the Ministry of Education and administered by the Directorate for Education and Training. The national curriculum for each school subject is set by the Ministry of Education. As in most Western countries, textbooks and other learning resources are developed by independent publishing companies, which compete in an open market. Local schools or regional school authorities commonly purchase textbooks based on recommendations from teachers, who distribute them to the students (Gilje et al., 2016). A Norwegian textbook for upper-secondary school is typically written by a group of two to six authors, including experienced teachers, researchers, or teacher educators. Previously, Norway had a system for authorization of textbooks by school authorities, like Turkey (Bayazit, 2013), Korea (You et al., 2019) and the German federal states (Andersen, 2019) have today, but this was abandoned in 2000 (Brathold, 2001). Even if science and language arts belong to the same school system and several of the discourse community members overlap, they can still be considered two separate discourse communities: the teachers have different educational backgrounds, different textbooks are used, and the communities have different goals, as defined by the Ministry of Education in the national curriculum for each school subject.

As noted in the introduction, Norway switched from a content-centred to a competence-based curriculum in 2006 (Dale et al., 2011). The curriculum for a number of subjects, including science and language arts, was revised in 2013. In 2020, the entire national curriculum went through a major reform called the *Subject Renewal* ('Fagfornyelsen'). In line with the OECD's (2018)

educational policy, the reform emphasized the development of 21st-century skills, such as creativity, critical thinking and the ability to transfer knowledge and solve problems in new situations (Meld. St. 28, 2015–2016, p. 14). These skills are also reflected in the national curricula for each of the school subjects.

In science, the curricula of 2006 and 2013 stated that students should not only acquire knowledge of science but also learn scientific methods and experience how scientific knowledge is developed. The curriculum of 2020 goes one step further and describes science as a practical school subject in which students learn science by exploring the world around them using scientific methods (Directorate for Education and Training, 2019a). In Year 11, the students should learn to ‘explore a self-chosen scientific problem, present findings and argue for the choice of methods’ and to ‘discuss how the development of scientific hypotheses, models and theories helps us to understand and explain the world’ (Directorate for Education and Training, 2019a). Furthermore, key scientific topics such as radiation, chemical bonds, DNA and climate change should be learned through ‘varied, practical and explorative methods’ (Directorate for Education and Training, 2019a).

In language arts, the curricula of 2006 and 2013 diverged from the long-standing tradition of learning cultural history and reading classical literature and focused instead on developing literacy skills. The curriculum implemented in 2020 continues this focus on literacy but places particular emphasis on the critical reading of non-fiction texts. The curriculum also stresses that the students should learn about language, texts and culture through active exploration (Directorate for Education and Training, 2019b). In Year 11, the students should learn, among other things, to ‘describe and reflect on the use of rhetorical appeals and literary devices in non-fiction texts’ and to ‘use different sources in a critical, independent and accountable manner’ (Directorate for Education and Training, 2019b).

Methods and materials

We analysed three science textbooks and three language arts textbooks used in Year 11 of Norwegian upper-secondary school that were published after the curriculum reform of 2020. Year 11 was chosen because it is the only year in upper-secondary school when students in university-preparatory programs study both science and language arts, thus making comparisons between these subjects possible. In order to answer our first research question, we compared the tasks in these textbooks with the tasks in three science and three language arts textbooks that were published after the curriculum revision of 2013, which we analysed in two previous studies (Andersson-Bakken et al., 2020; Bakken & Andersson-Bakken, 2017).

The three science textbooks selected were *Naturfag*, *Kosmos 7th ed.* and *Senit 4th ed.*, and the language arts books were *Grip teksten*, *Moment 2nd ed.* and *Appell* (see Table 1). The textbooks were published by three major publishing companies (i.e. Aschehoug, Cappelen Damm and Gyldendal), all with large market shares and a long history of textbook production. *Kosmos*, *Senit* and *Moment* are revised editions, whereas *Naturfag*, *Grip teksten* and *Appell* were written specifically for the new curriculum in 2020. *Grip teksten* from 2020 has the same title as its predecessor, but it is a new book written by a new group of authors. In our analysis, we compare these six textbooks with the

Table 1. Textbooks Published After the Implementation of the 2013 and the 2020 Curricula. (Number of tasks in parentheses.).

Publisher	Science		Language Arts	
	2013	2020	2013	2020
Aschehoug	<i>Nexus 2nd ed.</i> (732 tasks)	<i>Naturfag</i> (1,096 tasks)	<i>Grip teksten 4th ed.</i> (390 tasks)	<i>Grip teksten</i> (793 tasks)
Cappelen Damm	<i>Kosmos 6th ed.</i> (939 tasks)	<i>Kosmos 7th ed.</i> (1,090 tasks)	<i>Moment</i> (608 tasks)	<i>Moment 2nd ed.</i> (501 tasks)
Gyldendal	<i>Senit 3rd ed.</i> (1,256 tasks)	<i>Senit 4th ed.</i> (1,081 tasks)	<i>Panorama 3rd ed.</i> (945 tasks)	<i>Appell</i> (506 tasks)

textbooks published by the same companies after the 2013 curriculum revision. The science textbooks contain a total of 2,927 tasks in the 2013 editions and 3,267 tasks in the 2020 editions. The language arts textbooks contain 1,943 tasks in the 2013 editions and 1,800 tasks in the 2020 editions.

All tasks were analysed using qualitative content analysis (Hsieh & Shannon, 2005; Krippendorff, 2013). Qualitative content analysis is a well-established method in the study of textbook tasks, and it is well suited to our purpose because it enables us to identify patterns in a large set of data (Hsieh & Shannon, 2005; Strijbos et al., 2006). The unit of analysis is the individual textbook task, and as mentioned previously, we define a textbook task as a paratext that performs a directive addressed to the student in the form of a question or imperative. In most cases, a textbook task is easy to identify because, by virtue of being a paratext, it is separated from other textual elements and marked with a number, a letter, framing or other visual cues.

However, some textbook tasks are complex and comprise several questions and/or imperatives. In order to identify the units of analysis in our material with high levels of reliability and reproducibility (Strijbos et al., 2006), we adopted the following principle. If the questions and/or imperatives are separated from each other graphically (for example, by numbering or bullet points), these are counted as more than one task. The use of line breaks and the letters a) and b) in the following example clearly indicate that this should be read as two separate tasks even though both refer to the use of ionizing radiation in medicine:

7.502

- a) Discuss how we can use ionizing radiation for diagnostic purposes.
- b) Explain how we can use ionizing radiation to treat patients (*Naturfag*, p. 269).

If several questions and/or imperatives follow one another in the same paragraph, without being separated graphically, these are counted as one task, for example: 'The poem has an unconventional structure. How would you characterize it? Do you agree with the author that this is a poem? Justify your answer' (*Appell*, p. 269). This task forms an integral whole asking the student to reflect upon the characteristics of poetry.

Coding categories

The tasks were coded deductively using a set of categories on two levels. The categorization was developed in our previous studies of science and language arts textbooks through what Hsieh and Shannon (2005) described as a directed approach to content analysis. Based on previous studies of textbook tasks, we first defined a set of preliminary categories by means of which we attempted to encode the tasks. In interaction with the empirical material, these categories were gradually adjusted, and new ones were added. The final set of categories is shown in Figure 1, and this was used in the present study to code the tasks in the textbooks published after the curriculum reform of 2020. This categorization was chosen partly because it made it possible to compare the results with our previous studies of science and language arts. The categorization has also been thoroughly tested, yielding high Cohen's kappa values in the reliability coding: 0.83 at code level 1 and 0.78 at code level 2 in science (Andersson-Bakken et al., 2020) and 0.88 at code level 1 and 0.86 at code level 2 in language arts (Bakken & Andersson-Bakken, 2017). This categorization also has the advantage of being general enough to compare two different subjects. The drawback, however, is that it might not be specific enough to capture important details in the different subjects. In order to show how tasks are coded, we will explain each code level and each code with examples from both subjects.

Code level 1 distinguishes between open and closed tasks. This distinction has proved to be fruitful in textbook research (Skjeldred et al., 2005) and in studies of teachers' questions for students (see, for example, Nystrand et al., 1997). An *open task* can be answered or solved in different ways; in science, this includes tasks asking for the students' previous knowledge or opinions (e.g. 'Discuss which consumption choices you can make in everyday life that are both economical and environmentally friendly') (*Naturfag*, p. 39). Similar examples can be found in language arts (e.g. 'Are you

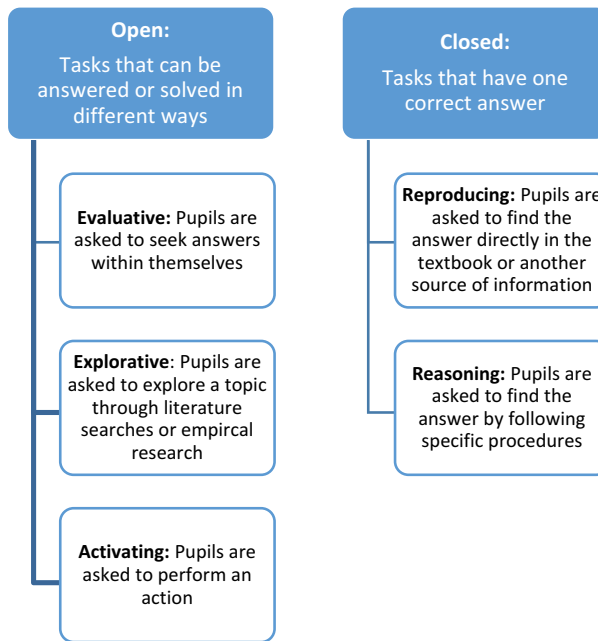


Figure 1. Categorization at two levels: code level 1 (open and closed) and code level 2 (evaluative, explorative, activating, reproducing and reasoning).

familiar with any movies that follow the Hollywood model?') (*Appell*, p. 42). A *closed task* has only one correct answer, such as a fact or a definition. In science, a closed task might be 'What is a gene?' (*Naturfag*, p. 311), and in language arts, 'What does the word *exile* mean?' (*Grip teksten*, p. 46).

At code level 2, the tasks are divided into subcategories according to how the students are asked to solve them. Open tasks are divided into evaluative, explorative and activating tasks. *Evaluative tasks* ask the students to seek the answer within themselves by evaluating, interpreting or taking a position. In science, these tasks often involve ethical or political questions (e.g. 'Do you think we should allow the cultivation of genetically modified plants in Norway?') (*Kosmos*, p. 268). In language arts, evaluative tasks often ask students about their experiences and interpretations of texts (e.g. 'What does the poem as a whole say about the past and the future? Can you find different interpretations?') (*Moment*, p. 423). In an *explorative task*, students are asked to explore a topic by means of a literature search or empirical research. In science, this might consist of inquiry-based experiments where questions, methodology and/or answers are not given (e.g. 'Make the necessary measurements to find the volume of your classroom. Think about how many digits you should include in the answer') (*Naturfag*, p. 23). In language arts, students are typically asked to search the library or the internet for additional information on a topic (e.g. 'What is the difference between fear and anxiety? Think about your opinion, and check on the internet or in a psychology book what the experts say') (*Moment*, p. 394). In *activating tasks*, students are instructed to perform a specific action, often with the object of practicing a certain skill. In science, this might be participating in classroom discussions or presenting scientific information to others (e.g. 'Explain the genetic code to a fellow student') (*Kosmos*, p. 254). Also included in this category are cookbook experiments, in which students are asked to follow a recipe step by step. In language arts, activating tasks typically ask students to write a text or give an oral presentation (e.g. 'Write a creative text about climate change') (*Grip teksten*, p. 307).

Closed tasks are divided into reproducing and reasoning tasks. In *reproducing tasks*, the answer is explicitly expressed in the textbook or in another information source, and the students are asked to

find and repeat it. An example from science is 'What vitamin is formed in the skin when exposed to sunlight?' (*Senit*, p. 203), and one from language arts is 'What is the subject of a sentence?' (*Grip teksten*, p. 256). *Reasoning tasks* ask the students to find the correct answer by applying their knowledge or following a procedure explained in the textbook. In science, this typically involves applying a scientific principle or mathematical formula to a particular case (e.g. 'If you have blood type 0, which blood types might your parents have?') (*Kosmos*, p. 233). In language arts, reasoning tasks can involve using analytical procedures or reading strategies to infer certain pieces of information from a text (e.g. 'Formulate the main argument in the text in your own words') (*Appell*, p. 330).

As noted in the introduction, Doyle (1983) argued that in accomplishing a task, students both 'acquire certain information' and practice certain operations 'used to obtain or produce the information' (p. 162). These two aspects of what students may learn when working on a task are covered by the two code levels in our categorization. The first level describes the types of information the students may acquire, and the second level describes the operation they practice when they are solving the task.

The categories on each code level are defined so that they are mutually exclusive, but some tasks were still difficult to categorize. As mentioned, certain tasks comprise several questions and/or imperatives, and, in some cases, the various parts of the task can be placed in different categories, as in this example: 'What does this text say to you? Write for yourself for 3–5 minutes. Then, discuss in groups or in the whole class' (*Grip teksten*, p. 309). Here, the first part is an evaluative task, while the last two parts are activating. To make the coding consistent, we categorized composite tasks based on their final part, because this is typically the activity or question towards which the rest of the task leads. In the example, the first two parts pertain to the topic and preparations for the classroom discussion described in the final part. Thus, this composite task was coded as an activating task.

Data analysis

There are a total of 5,073 tasks in the six textbooks published after the 2020 curriculum reform, and the coding was divided between the two authors. In order to assess the reliability of the coding, we made a control sample of 500 tasks, 250 from each subject, which both authors coded independently and then compared the results. According to Lombard et al. (2002), a control sample should consist of at least 50 units, and it is seldom necessary to include more than 500. As a statistical measure of inter-coder reliability, we calculated Cohen's kappa. Code level 1 had a kappa value of 0.85, and at code level 2, the value was 0.80. Landis and Koch (1977, p. 165) consider values above 0.80 as 'almost perfect', while Fleiss (1981, p. 218) refers to values above 0.75 as 'excellent'. There is, therefore, reason to consider the coding of the tasks as being reliable. Since we analyse texts that are publicly available, it will be possible for others to test the reliability of our analysis.

To answer research question 1, we compare how frequently the different types of tasks occur in each of the subjects after the implementation of the 2013 curriculum and the 2020 curriculum, respectively. Research question 2 asks for possible explanations for similarities and differences in tasks. We have previously advanced the hypothesis that similarities could be explained by genre norms in the respective discourse communities and that differences could be explained by changes in these norms. To provide empirical support for this hypothesis, we compare the tasks in science and language arts textbooks, as they belong to different discourse communities and might therefore follow different genre norms. Furthermore, we compare the textbooks within each subject. If there are genre norms that influence and constrain the tasks, there should be similarities between books. We examine the frequency of the categories of tasks throughout each book as well as in different parts of the books.

Our previous studies (Andersson-Bakken et al., 2020; Bakken & Andersson-Bakken, 2017) indicated that the genre norms for tasks in science and language arts textbooks were not in line with the curriculum after 2013. Given the changes in the curriculum, these traditional norms would be even more outdated and inadequate after the reform of 2020. The preconditions for a functional norm

constitution (Berge, 1990) should therefore be present. If such a norm change has taken place, we should expect to see certain changes in the tasks from the 2013 to the 2020 textbooks. To reflect the aim that students are supposed to learn science by actively exploring the world, not by memorizing facts, there should be a shift from closed to open tasks, and particularly from reproducing to explorative tasks. The frequency of open tasks should increase not only in the chapters on scientific methodology and SSI but also in the chapters on 'pure' physics, chemistry and biology. To reflect the focus in the curriculum on critical reading of non-fiction, there should be an increase in the frequency of open, evaluative tasks in the non-fiction anthology that ask the students to take a stand and formulate their own opinions about these types of text. Given the emphasis on active exploration of language, texts and culture, we should also see an increase in explorative tasks throughout the textbooks.

Results

As we see in [Figure 2](#), there are only marginal differences in the frequency of categories at code level 1 between textbooks from 2013 and 2020. In science, 22.6% of the tasks in the textbooks from 2013 are open and 77.4% are closed. After the curriculum reform of 2020, the frequency of open tasks increased to 25.6%, while 74.4% of the tasks were closed. In language arts, however, there was a small decrease in the frequency of open tasks. In the textbooks from 2013, 67.9% of the tasks were open, and 32.1% were closed. After the reform of 2020, 66.2% of the tasks were open, and 33.8% were closed.

[Figures 3](#) and [Figures 4](#) show only marginal changes in the frequencies of categories at code level 2 as well. In science ([Figure 3](#)), reproducing tasks comprise a majority in both the 2013 and the 2020 textbooks. The frequency has even increased somewhat, from 54.1% to 55.1%. The most notable difference is seen in the explorative tasks, which have increased from 2.9% to 9.3%. In language arts ([Figure 4](#)), evaluative tasks remain the most frequent category, with a small increase from 38.4% to 40.1%. The frequency of explorative tasks, however, has decreased from 4.9% to 2.1%.

[Figures 2](#), [Figures 3](#) and [Figures 4](#) also show distinct differences between tasks in science and language arts, and these differences are to a large extent the same in the 2013 and the 2020 textbooks. Science is dominated by closed tasks, particularly reproducing tasks, whereas language arts is dominated by open tasks, particularly evaluative and activating tasks. One similarity between

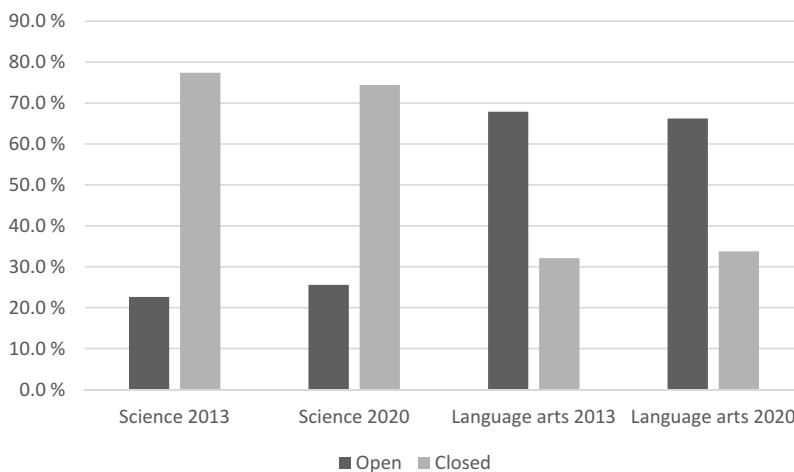


Figure 2. The frequency of categories at code level 1 in science and language arts textbooks published after the curriculum reforms of 2013 and 2020, respectively.

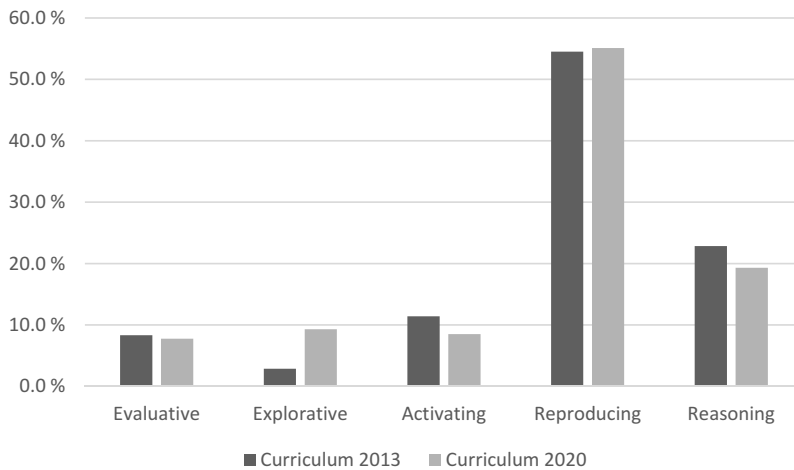


Figure 3. The frequency of categories at code level 2 in science textbooks published after the curriculum reforms of 2013 and 2020, respectively.

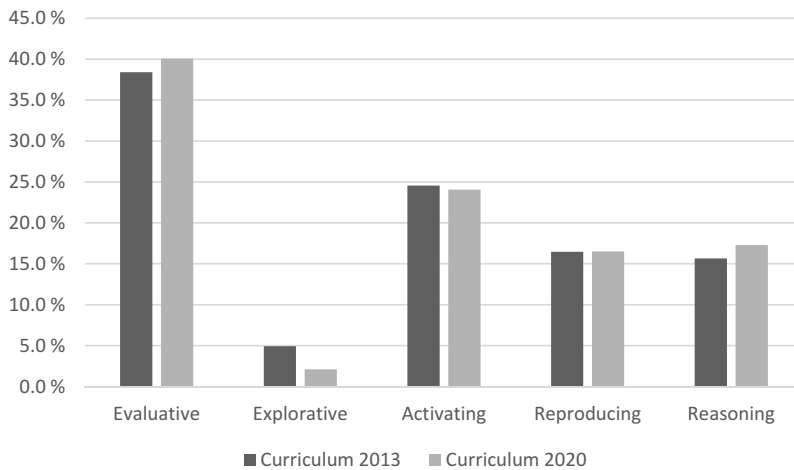


Figure 4. The frequency of categories at code level 2 in language arts textbooks published after the curriculum reforms of 2013 and 2020, respectively.

the two subjects, however, is that explorative tasks are rare, even if the frequency is increasing in science and decreasing in language arts.

As we see in [Figure 5](#), there are clear similarities between the science textbooks. All textbooks, both before and after the curriculum reform of 2020, are dominated by closed tasks, with reproducing tasks being the most-frequent and reasoning tasks the second-most-frequent category. Furthermore, the increase in the frequency of explorative tasks can be observed in textbooks from all three publishing companies. The revised editions of *Kosmos* and *Senit* after the 2020 reform have higher frequencies of explorative tasks than the previous editions, and the newly written *Naturfag* also has a higher frequency than the discontinued *Nexus* from the same publisher.

[Figure 6](#) shows several similarities between the language arts textbooks. All textbooks have high frequencies of evaluative and activating tasks and low frequencies of explorative tasks, and this pattern is the same in both the 2013 and the 2020 textbooks. The figure also shows that all three

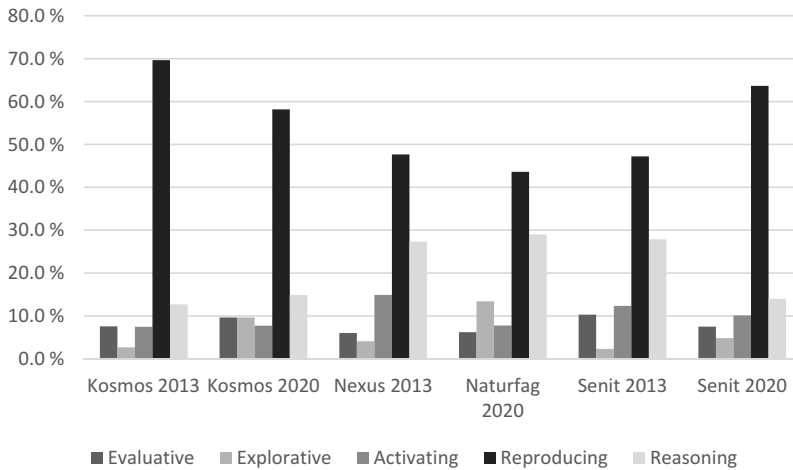


Figure 5. The frequency of categories at code level 2 in individual science textbooks published after the curriculum reforms of 2013 and 2020, respectively.

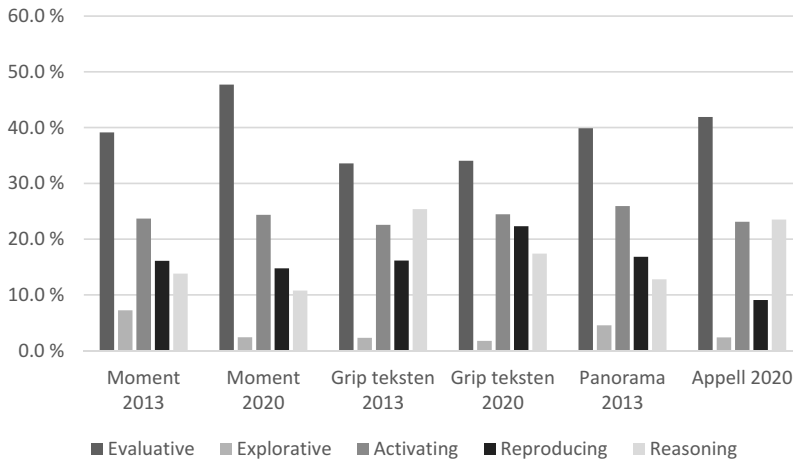


Figure 6. The frequency of categories at code level 2 in individual language arts textbooks published after the curriculum reforms of 2013 and 2020, respectively.

textbooks from 2020 have higher frequencies of evaluative tasks and lower frequencies of explorative tasks than do the previous textbooks from the same publishers.

Figure 7 shows that the distributions of tasks in chapters on scientific methodology and SSI, such as biotechnology, nutrition and sustainable development, differ from the chapters on ‘pure’ chemistry, physics and biology. The former have higher frequencies of open tasks, while the latter have higher frequencies of closed tasks, particularly reasoning tasks. These differences can be found in both 2013 and 2020. It is worth noticing that the increase in explorative tasks in the science textbooks, as shown in Figures 3 and Figures 5, is due to a large increase in these tasks in the chapters on scientific methodology and SSI. In the chapters on ‘pure’ science, the frequency of explorative tasks has decreased.

The textbooks in language arts consist of the main text, which presents the subject knowledge, along with two anthologies, one fiction and one non-fiction. As we see in Figure 8, these parts have distinctly different distributions of tasks. The main texts have the highest frequencies of activating

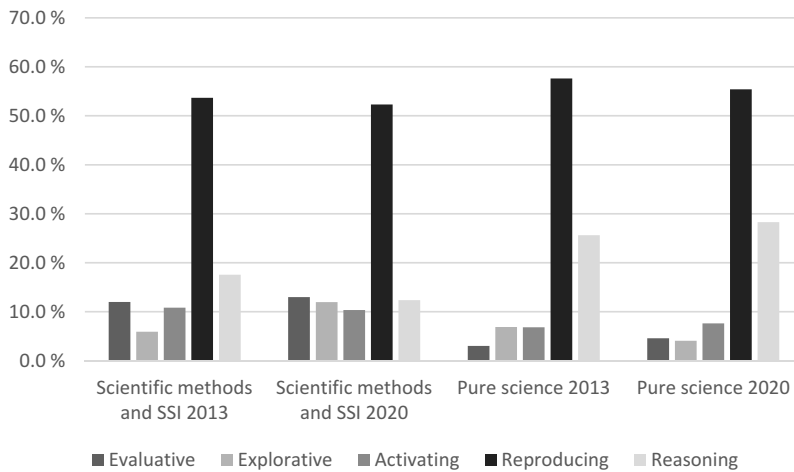


Figure 7. The frequency of categories at code level 2 in chapters on scientific methods and socio-scientific issues (SSI) and chapters on 'pure' science in science textbooks from 2013 and 2020, respectively.

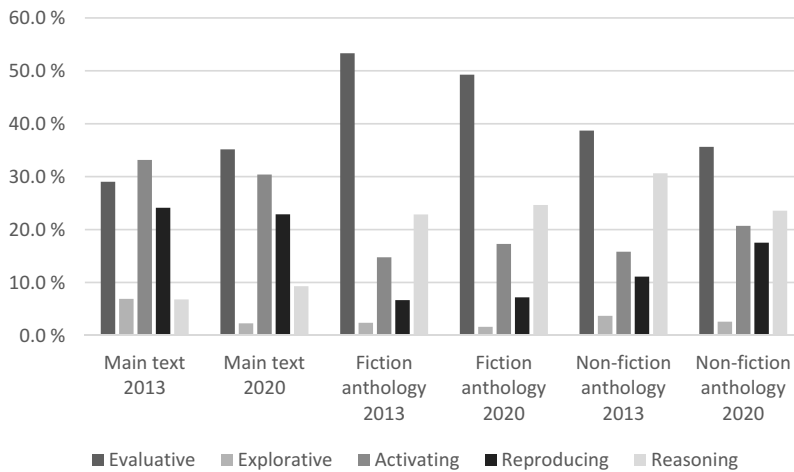


Figure 8. The frequency of categories at code level 2 in the main text, the fiction anthology and the non-fiction anthology in language arts textbooks from 2013 and 2020, respectively.

and reproducing tasks, while the two anthologies are dominated by evaluative and reasoning tasks. The frequency of evaluative tasks is particularly high in the fiction anthologies. These main differences can be observed in the textbooks from both 2013 and 2020, but there are also some minor changes. The frequency of explorative tasks has decreased in all three parts of the textbooks. In the non-fiction anthologies, the frequencies of both evaluative and reasoning tasks have decreased, while the frequency of reproducing tasks has increased from 11.1% to 17.5%. It is also worth noting that the increase in evaluative tasks only occurs in the main text. In the anthologies, the frequencies have decreased.

Discussion

The first research question asks how the tasks in science and language arts textbooks published after the curriculum reform of 2020 compare to those in textbooks published after the curriculum revision

of 2013. The analysis has shown that the similarities clearly outweigh the differences. In science and in language arts, the distributions of tasks at both coding levels 1 and 2 are to a large extent the same in textbooks from 2020 as they were in textbooks from 2013. The only notable change is an increase in the frequency of explorative tasks in science from 2.9% to 9.3%.

The second research question asks how these similarities and differences in tasks might be explained. We have previously argued that the textbook task can be perceived as a genre and that discourse communities might have developed genre norms which influence and constrain the formulation of tasks in textbooks. The findings are consistent with this hypothesis. Science and language arts textbooks belong to different discourse communities, and the analysis shows distinct differences between the tasks in these two subjects. This may indicate that each discourse community has developed its own set of genre norms. Furthermore, there are striking similarities between textbooks in the same subject, which may indicate a set of genre norms which is shared by the members of each discourse community. The stability of tasks over time is also an indication of genre norms. As previously noted, however, the existence of genre norms is an abductively inferred hypothesis that needs to be defended against other hypotheses. An alternative explanation as to why a number of textbooks deviate from the national curriculum in more or less the same manner is that they are all influenced by assessment practices, such as national exams and other high-stakes tests (Alderson & Wall, 1993). In our case, this explanation seems unlikely. All of the textbooks in our research material were published long before the Directorate for Education and Training developed the new guidelines for national exams. Furthermore, the main responsibility for assessing students' competence in Norway is delegated to the individual teachers. There is no national exam in Norwegian language arts until year 13, and only 20% of all students in Year 11 are randomly selected to take an exam in one of their subjects.

An important finding of our study is that there are few indications of functional norm constitution taking place even though the changes in the curricula for science and language arts have rendered the traditional genre norms inadequate. The changes we should expect to see in the tasks, given the changes in the curriculum, were not found in the analysis. Science is still dominated by closed—and particularly reproducing—tasks that promote the memorization of facts rather than scientific inquiry. In language arts, the few explorative tasks have become even fewer, and the frequencies of evaluative and explorative tasks in the non-fiction anthologies have decreased rather than increased. The only change in tasks which is clearly in line with the changes in the curriculum is the increase in explorative tasks in science. This increase, however, only occurs in the chapters on scientific methodology and SSI. In the chapters on 'pure' chemistry, physics and biology, the frequency of exploratory tasks decreases. If students, as Doyle (1983) argued, 'learn what a task leads them to do' (p. 162), it could be argued that students working on the tasks in Norwegian science and language arts textbooks only get a limited opportunity to develop the competences promoted in the national curriculum.

These results are consistent with most previous studies, which have shown that textbook tasks are rarely in line with the current curriculum. Similarly to what Andersen (2019) found in Germany and Luxembourg and what D. Yang et al. (2015) found in China, our analysis shows that the textbook tasks changed little after a curriculum reform. Yasar (2009), conversely, found that the tasks in Turkish textbooks did change after a reform. We have previously argued that this change can be perceived as a norm declaration, whereby the Turkish school authorities gave specific guidelines for tasks and assessed the textbooks. In the discourse communities to which the Norwegian science and language arts textbooks belong, the preconditions for a norm declaration are not present. In Norway, the national curriculum has no guidelines for tasks, and textbooks are published by independent publishing companies without authorization from national school authorities.

Even if our study has largely confirmed previous findings, we have also made some novel contributions. Unlike most other studies (e.g. Armbruster & Ostertag, 1989), we have compared two different school subjects using the same analytical categories. This comparison showed clear differences between science and language arts, which were dominated by closed and open tasks,

respectively. Our analysis has also showed that tasks from both of the 'two cultures' (Snow, 2012) in the educational system—the sciences and the humanities—changed little after a curriculum reform, whereas previous studies primarily focused on the sciences (Andersen, 2019; D. Yang et al., 2015; Yasar, 2009). Furthermore, we have introduced genre theory as a possible explanation, not only for why tasks in a number of school subjects and countries appear to change so little over time, but also for why there are similarities between textbooks in one particular subject and differences across subjects. This explanation supplements the inferences about the intentions of textbook authors and publishers which have been made in previous studies (Armbruster & Ostertag, 1989; Solihati & Hikmat, 2018).

Genre theory also suggests ways in which the norms for textbook tasks might change, thereby overcoming what appears to be one of the 'common challenges of curriculum implementation' (OECD, n.d.). As emphasized in the OECD project *The Future of Education and Skills 2030*, the global effort to change schools and promote competences for the future, of which the Norwegian curriculum reform is a part, relies on successful curriculum implementation. Norm constitution, whereby national school authorities give specific guidelines for tasks and enforce the new norm through rigorous assessments of the textbooks, may be an effective strategy, as shown in the studies from Turkey (Bayazit, 2013; Yasar, 2009). For many countries, however, this approach may not be politically possible or desirable. As mentioned, Norway previously had a system for authorization of textbooks, but this was abandoned in 2000 with the intention of strengthening teachers' autonomy (Brathold, 2001). A different strategy would be to raise awareness of the norms that influence and constrain tasks in the different school subjects and of the fact that these norms may not be in line with the current curriculum. This could initiate a functional norm constitution in which the members of the discourse communities experiment with different ways of formulating tasks until the most successful one is established as the new norm. In this process, textbook researchers have the crucial responsibility of conveying knowledge of tasks to members of the relevant discourse communities, including textbook authors and publishers, teachers, students and policymakers. As far back as the 1970s and in countries around the world, studies have shown that textbook tasks often fail to meet the requirements of curricula and educational research, and yet the problems remain to this day (W. Yang et al., 2019). The discussion of textbook tasks needs to be liberated from the realm of research papers and exposed to public debate.

The existence of genre norms for textbook tasks, however, is still only a hypothesis and needs further research. The hypothesis could be strengthened if similar results were found in other subjects and other countries. The analysis of textbooks could also be supplemented with research interviews with members of the discourse communities involved to gain insight into their understanding of tasks and awareness of possible genre norms. Furthermore, it could be interesting to compare tasks at different grade levels. We have found distinct patterns in the tasks in textbooks for Year 11 in upper-secondary school, but we do not know if these patterns exist at lower grade levels or if primary and lower-secondary school have other genre norms for the formulation of textbook tasks.

Concluding remarks

Textbooks play an important part in education in most countries and the tasks presented in the textbooks may influence students' learning (Doyle, 1983; Edwards, 2014). Our analysis shows that the textbook tasks in Science and Language Arts changed little after the curriculum reform in 2020, resulting in discrepancies between the textbooks and the national curriculum. Nevertheless, textbooks cannot replace teachers or the curriculum. How the textbook tasks ultimately affect students' learning depends on how the teachers interpret and enact the textbooks—as well as the curriculum documents—in the classrooms (Ben-Peretz, 1975; Deng, 2015) and the extent to which the teachers assume the role of curriculum maker (Clandinin & Connelly, 1992; Craig & Ross, 2008).

Note

1. All references to the analysed textbooks are given in the form of a title and page number. All English translations are by the authors.

Disclosure of potential conflicts of interest

No potential conflict of interest was reported by the author(s).

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