Tuula Nygård

“THERE IS A LOT TO PRACTICE”

A NEXUS ANALYTICAL STUDY ON PROMOTING
MULTILITERACY IN HEALTH EDUCATION
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A nexus analytical study on promoting multiliteracy in health education

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Abstract
Children and young people need new competences to seek and evaluate information in the changing multimodal information environment, and teachers do, too, as they have a key role in guiding young people in this task. In health education, these competencies are particularly important because information can be complex and changing, and also because it can have critical consequences.

This thesis addresses the challenges of promoting students’ information seeking and evaluation from the perspective of multiliteracy in health education. It scrutinizes a sociocultural approach to multiliteracy, teachers’ informational authority roles and identities, and nexus analysis as a theoretical–methodological perspective.

The results of Studies 1, 2, and 3 are reported in three empirical articles. Article I focused on examining teachers’ informational authority roles while students worked in groups on information-seeking and evaluation tasks. Article II analyzed health education teachers’ reflections of their teacher identities and Article III explored teachers’ contributions to students’ multiliteracy learning.

The results of the research reveal a multifaceted phenomenon with dimensions of, first, the complexity of modern health communication and online media environments; second, the choice of credible information sources with multimodal and different types of content; and third, teachers’ roles as information facilitators, sources, and guides. The results of this research highlight that while teachers may know what multiliteracy means as a concept, how it can be promoted in all subjects is limited by various factors.

The digital world with social media is an integral part of modern human life. The key question, then, is not whether the internet is being used to seek information, but how best to scaffold students to operate there, make rational use of it, and seek credible information. Promoting these practices in subject content, such as health education, would deepen students’ understanding of the thematic evaluation criteria, and facilitate the comprehension of texts.

The research is topical in Finland, especially because multiliteracy is at the core of the recently published National Literacy Strategy 2030. Making Finland the most literate country in the world by 2030 will require extensive efforts, thorough and long-term support for teachers, and appropriate resources.

Keywords: cognitive authority, information evaluation, information seeking, multiliteracy, nexus analysis, teacher identity, trustee
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Tiivistelmä

Nykypäivän multimodaalisissa tietoympäristöissä lapset ja nuoret tarvitsevat uudenlaisia tiedonhankinnan ja arvioinnin taitoja, joiden avulla he oppivat tulkitaan ja hyödyntämään monipuolisia ja vuorovaikutteisia sisältöjä. Ohjatessaan nuoria tässä tehtävässä myös opettajat ovat uusien vaatimusten edessä. Tiedonhankinnan ja arvioinnin taidot ovat erityisen tärkeitä terveysiedossa, koska terveyteen liittyvä tieto voi olla vaikeaselkoista ja muuttuvaa, ja puutteelliset taidot voivat aiheuttaa jopa terveydellistä vaaraa.

Tässä artikkeliväitöskirjassa käsitellään oppijoiden tiedonhankinnan ja arvioinnin edistämisen haasteita monilukutaidon näkökulmasta terveystedoss. Tutkimuksessa tarkastetaan monilukutaitoa sosiokulttuurisena ilmiönä, opettajan tiedollisia auktoriteettirooleja ja identiteettiä neksusanalyysistä näkökulmasta.


Digitaalinen maailma ja sosiaalinen media ovat olennainen osa meidän kaikkien elämää. Tämän vuoksi on välttämätöntä opettaa koulussa erilaisten tietoympäristöjen järkevää hyödyntämistä ja kehittää oppijoiden tiedonhankinnan, arvioinnin ja tuottamisen prosesseja. Näiden käytäntöjen edistäminen oppiaineiden sisältöä edistää, syventää oppiaineiden ymmärtämistä ja helpottaa tekstien ymmärtämistä. Tutkimus on Suomessa ajankohtainen, erityisesti koska monilukutaiton edistäminen on käytännön ja strategian keskeinen osa monista asioista, erityisesti kansalaisen luottamustoiminnan ja koulutusmukaisuuden kannalta. Tutkimuksen järjestelyjen ja tulosin tulkinnan perusteella vetää tulevat 2030 mennessä vahvasti suuren rollin maailman tiedontaidon kehityksessä. Opettajien, koulutusjärjestelmän ja yhteistyön tekemisestä on tärkeää huomata, että tiedonhankinnan ja arvioinnin taidot ovat osa samanlaista ymmärtämistä ja kehittymistä. Tutkimus on Suomessa ajankohtainen, erityisesti koska monilukutaito on käytännön ja strategian keskeinen osa monista asioista, erityisesti kansalaisen luottamustoiminnan ja koulutusmukaisuuden kannalta.

Asiakirjat:
- kognitiivinen auktoriteetti
- monilukutaito
- neksusanalyysi
- opettajaidentiteetti
- tiedollinen luottohenkilö
- tiedon arviointi
- tiedonhankinta
To my loved ones
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In Oulu, April 2022

Tuula Nygård
### Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>CogAHealth</td>
<td>Cognitive Authorities in Everyday Health Information Environments of Young People</td>
</tr>
<tr>
<td>FNBE</td>
<td>Finnish National Board of Education</td>
</tr>
<tr>
<td>ICT</td>
<td>information and communication technology</td>
</tr>
<tr>
<td>OECD</td>
<td>Organisation for Economic Co-operation and Development</td>
</tr>
<tr>
<td>PISA</td>
<td>Programme for International Student Assessment</td>
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List of original publications

This thesis is based on the following publications, which are referred to throughout the text by their Roman numerals:


My contribution to Article I concerns planning and conducting the data collection in collaboration with the Cognitive Authorities in Everyday Health Information Environments of Young People (CogAHealth) research group. I was responsible for analyzing the data, and was the first author of Article I. My co-authors provided feedback on the research process and commented on and helped edit the paper in general.

My contribution to Articles II and III concerns responsibility for the design, collection, and analysis of the data, as well as taking the lead in the writing process. Co-authors provided feedback on the research process and commented on and helped edit the paper in general.
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1 Introduction

The starting point of this research is that teachers play a key role in providing guidance to young people seeking and evaluating information from various sources. This is especially important in health education because health information has proven to be conflicting and perplexing, and it can have critical consequences for young people’s own health. Except for fluently fulfilling everyday information needs by googling, students struggle, for instance, with questioning and confirming the credibility of information (Heinström & Sormunen, 2019; Kiili; Leu, Marttunen et al., 2018). The importance and timeliness of this research topic materialized in the spring of 2020, when the COVID-19 virus spread around the globe, causing a pandemic and, at the same time, an unprecedented infodemic (e.g., Eysenbach, 2020; Germani & Biller-Andorno, 2021; Solomon et al., 2020). Like an epidemic, an infodemic can be defined as a contagious disease, but it infects our information culture (Solomon et al., 2020). Since then, the internet has been filled with COVID-19 information, only some of which has been truthful and reliable (e.g., Bheekhun et al., 2021; Eysenbach, 2020; Scott, 2021). It is no exaggeration to state that inadequate multiliteracy in a variety of multimodal media environments can, at worst, lead to anxiety, mental health problems, exclusion, and even health hazards. Therefore, it is crucial to be able to seek, interpret, understand, and critically evaluate information, especially in terms of health communication.

1.1 Zooming in on the research landscape

The concept of literacy is in a constant transformation and is given different definitions according to the emphasis. For example, print literacy describes traditional and established understandings of literacy whereas multiliteracy and new literacies take into account aspects such as multimodality and digitalization (Coiro et al., 2008; Kalantzis et al., 2010; Knobel & Lankshear, 2014). Similarly, new social literacy practices are emerging, especially with the introduction of new information and communication technologies (ICT; Leu et al., 2011). Nearly 20 years ago, Kress (2003) stated that the technological change has weakened the role and significance of printed media as the screen has taken the place of the book; the communicational change has altered our ways of representing meanings as the image is brought into the center of communication. Today, digital and printed texts are indistinguishable, so adapting to these changes and developing resilience in an
uncertain world requires competencies that transcend disciplines and fixed sets of skills (Palsa & Mertala, 2019).

Because the use of information technology in and out of school is commonplace among ever younger children, new technologies have been included in the curricula as learning goals in many countries (Leu et al., 2017). Schools and teachers have the demanding task of taking up these challenges and striving to adapt their teaching practices to the requirements of contemporary communication and media environments.

The Finnish National Core Curriculum for basic education (Finnish National Board of Education [FNBE], 2016) sets multiliteracy as a transversal skill that ought to be taken into account across the curriculum. According to the curriculum (FNBE, 2016), “[m]ultiliteracy is the competence to interpret, produce, and make a value judgment across a variety of different texts, which will help the pupils to understand diverse modes of cultural communication and to build their personal identity” (p. 23). This development is necessary today because multimodal text formats are widespread, the amount of information available has increased enormously, the content has become more complex, and the origin of information is increasingly culturally diverse.

According to the latest Programme for International Student Assessment (PISA) results (Organisation for Economic Co-operation and Development [OECD], 2019), on average, 77 % of students across OECD countries can recognize the main idea of a text; read, seek, and find information on the basis of predetermined criteria; and reflect, when prompted, the content and the forms of texts. However, only about 8.7% of students who took the PISA tests in 2018 were categorized as top performers in reading, a distinction that indicated that they could understand long texts, deal with abstract and irrational concepts, and distinguish facts and opinions on the basis of implicit cues related to the content or the information source (OECD, 2019). Suarez-Alvarez (2021) concluded, based on the PISA 2018 results, that in today’s digital world, it is essential to have the ability to establish distinctions between facts and opinions, evaluate the credibility of information, and learn functional strategies to identify false or biased information. Multiliteracy has so far not been included among the test criteria in the PISA tests, but it will be taken into account in the PISA 2025 report Learning in the Digital World (OECD, n.d.).

In this research, multiliteracy is examined in the context of secondary school health education in Finland. Secondary schools were selected as a research site since, in grades seven to nine (ages 13–16) in basic education, health education has been included in the national core curriculum as an independent and compulsory
subject since 2004 (FNBE, 2016). In grades one to six (ages 7–12), health education is a part of environmental studies together with biology, geography, chemistry, and physics (FNBE, 2016). The research started as part of a larger CogAHealth project, which was funded by the Academy of Finland during the years 2016–2020. The project investigated what health information sources adolescents found credible and the ways in which they made credibility assessments in formal, informal, and non-formal environments (Huotari, 2018).

Following the central questions of CogAHealth, this research focused on health education teachers and their roles in guiding students in seeking and evaluating information. The perspective was pedagogical. According to the Finnish National Core Curriculum for basic education (FNBE, 2016, p. 429), “[t]he task of health education is to support the development of the pupils’ versatile health literacy1,” including both individual and communal information seeking, construction, evaluation, and use. Many definitions of health literacy overlap with those of multiliteracy, emphasizing individuals’ capacity to obtain, process, interpret, and understand health information and services so that they can make appropriate health decisions (e.g., Pavlekovíc, 2008; Ratzan & Parker, 2000) or interact with the healthcare system (e.g., Ishikawa & Yano, 2008; Sørensen et al., 2012). Ormshaw et al. (2016) stressed that an important outcome in health education is the improvement to one’s health that leads to changing behavior and adapting these changes to everyday life.

In addition to the subject-specific competence objectives for health education, the curriculum defines transversal competence objectives. These extensive learning objectives and transversal skills, such as multiliteracy, have set new requirements in front of health education teachers, not least because the concept of multiliteracy is relatively new in the Finnish education system and it is defined inconsistently in different Finnish local curricula and by different Finnish researchers (Mertala, 2018; Palsa & Mertala, 2020). According to previous studies (e.g., Kulju et al., 2020; Palsa & Mertala, 2018), teachers do identify competences included in multiliteracy emphasizing skills in reading, evaluating, and producing multimodal texts in

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1 Acknowledging the overlap of the concepts at the definition level, this thesis builds on multiliteracy research. Therefore, while health education in the Finnish curriculum is based on conceptions of health literacy and related research (Paakkari & Paakkari, 2012, 2019), with a strong health promotional basis (Hirvonen et al., 2020), here the focus is on the ways multimodal, multicultural, and multilingual information is sought and evaluated in this context. Previous health literacy research that is, for the most part, quantitative, conducted in medical contexts, and focused on basic health literacy, including reading and writing, numeracy, and self-efficacy measures (e.g., Multas, 2022; Sørensen, 2019), is considered beyond the scope of this research.
printed, audiovisual, and digital form. However, the practices of teaching multiliteracy have still been considered incomplete, especially where collaborative textual practices in different cultural contexts are concerned (Kulju et al., 2020).

As presented by the New London Group (1996), this gap between the theoretically outlined possibilities of a pedagogy of multiliteracies and teachers’ practical application of the concept creates tensions (Bowen & Whithaus, 2013; Howell, 2018). Tensions often arise between teachers’ deep-rooted beliefs, such as teaching practices, the beliefs reflected in instructional materials, and those of multiliteracy pedagogy (Warner & Dupuy, 2018). Furthermore, the tension between what is considered as “modern” teaching and teachers’ own shortcomings may disrupt their teacher identity, which is teachers’ professional perception of themselves (Al-Hazza, 2017; Mockler, 2011). The rapidly changing literacy landscapes and the roles of teachers cause educators to face pressure to break from traditional instruction (Al-Hazza, 2017). For these reasons, it is important for teachers to reflect on the tensions and their actions to develop teaching and learning processes.

1.2 Research aims and questions

The general aim of the present research is to increase understanding of what is required to promote students’ information seeking and evaluation from the perspective of multiliteracy in health education at the secondary school level. The theoretical and methodological aims of the research are intertwined, as the purpose is to use nexus analysis to bring forth tensions that arise during social interactions when teaching multiliteracies in health education lessons. Identifying and becoming familiar with these tensions enables a change in participants’ reflections and actions; that is, nexus analysis “seeks to change the nexus of practice” (Scollon & Scollon, 2004, p. 9).

This research is expected to provide new knowledge from a pedagogical point of view. The practical objectives of this research will help to map out and develop ways to improve students’ multiliteracies, information seeking, and evaluation in health education. The research aims to support the promotion of meaningful and appropriate use of digitalization in teaching health literacy and, thus, to strengthen students’ rational use of digital media and technology.

The research consists of three studies reported in Articles I, II, and III, each with its own perspective, objectives, and findings that can illuminate the research topic from different angles. Therefore, the general aim of this research will be
addressed through three research questions (RQ) based on each article, with wording that covers the scope of the thesis:

- **RQ 1**: What kind of roles do health education teachers take on when students seek and evaluate information?
- **RQ 2**: How is a teacher’s teacher identity manifested in the teaching of information seeking, evaluation, and health education?
- **RQ 3**: What factors cause tensions in teaching multiliteracy in health education?

### 1.3 Structure of the thesis

This thesis includes six chapters. The first chapter zooms in on the research landscape, presenting the topicality, context, and background of the research, as well as the aims and research questions delineated above. Chapter 2, Theoretical Framework, sheds light on the theoretical underpinnings of the research, starting with nexus analysis, which is the central theoretical–methodological perspective of the research. In this chapter, multiliteracy as a sociocultural practice is discussed, emphasizing aspects of information seeking and evaluation, and introducing contemporary challenges, implementation, and research of promoting multiliteracy. Finally, this chapter looks at teachers’ different authority roles and the association of their personality, identity, and professional skills, especially those connected with information and its assessment from the perspective of multiliteracy. Chapter 3 describes poststructuralism as a philosophical foundation and nexus analysis as a methodological foundation, and the concrete actions taken in the empirical studies, following the structure of the three tasks of nexus analysis: engaging, navigating, and changing the nexus of practice. After that, the ethical aspects are considered. Chapter 4 briefly presents the three studies published in scientific journals and included in the thesis and answers the research questions. Chapter 5 is the synthesis, in which the results of the research are summarized. Chapter 6 provides the limitations of the research and zooms out for future considerations. The end of this compilation consists of the three studies that have been published in international peer-reviewed journals. Each of these studies approached the research task from different perspectives and considered what is required to promote students’ multiliteracy and information seeking and evaluation in health education.
2 Theoretical framework

The present chapter concentrates on the theoretical framework of the research. It scrutinizes a sociocultural approach to multiliteracy, teachers’ informational authority roles and identity, and nexus analysis as a theoretical–methodological perspective. These concepts have been chosen as central to this research because the goal is to examine the social actions while promoting students’ information seeking and evaluation from a multiliteracy perspective.

The sociocultural perspective of multiliteracy emphasizes the interpretation, production, and evaluation of texts (see Sub-chapter 2.2), not only as a cognitive but also as a social, cultural, historical, and institutional phenomenon (New London Group, 1996; Tarnanen, 2019). As early as 1996, the New London Group suggested transforming literacy instruction from the basis of an assumption that human knowledge is embedded in social, cultural, and material contexts. Human knowledge is developed through collaborative interactions with others of different skills, backgrounds, and perspectives by engaging in common practices in a particular learning community (New London Group, 1996, p. 82).

The sociocultural approach pays particular attention to the cultural tools that people use. Vygotsky (1978) wrote that all actions change and rearrange as soon as speech and the use of signs are included in them. From a sociocultural perspective, all actions are considered mediated and indistinguishable from the environment in which they are performed (Vygotsky, 1978; Wertsch, 1991). Following this view, Scollon and Scollon (2004) defined the term mediated action to mean that any action is social and is performed by material and symbolic mediational means—a concept originally introduced by Wertsch (1991). Mediational means can, for example, include language, textbooks, webpages, learning environments, research data, technologies, and actions that play a key role in introducing sociocultural practices into the ongoing event (Norris, 2019; Scollon, 1998).

A mediated action is involved in a tension between the mediational means as provided in the sociocultural setting, and the situational and contextual use of these means in the implementation of specific, concrete actions (Wertsch, 1994). Each individual use of mediational means always contains some degree of uniqueness—for example, personal creative interpretations of texts—but at the same time, it involves a reiterative, conventional dimension that is understandable to everyone (Wertsch, 1994). Wertsch (1994) argued that mediational means can be considered “the ‘carriers’ of sociocultural patterns and knowledge” (p. 204). Scollon (2001a) adopted the term nexus analysis to emphasize that all shared meanings are mediated.
by a variety of mediational means (or cultural tools), such as language, gesture, material objects, and institutions. Individuals’ beliefs, thoughts, and acts are shaped by those cultural, historical, and institutional contexts that are reflected in mediational means in everyday life (Lasky, 2005; Wertsch, 1991).

For this research, the sociocultural paradigm combined with the nexus analytical approach offered a landscape to study teachers’ informational authority roles and identities, a pedagogy of multiliteracy in health education, and social interaction between different subjects in the classroom (see Figure 1). Earlier research has shown that complex processes of teaching and learning arise in social interactions where teachers contribute to the ways in which knowledge is created, recreated, and understood (Alexakos, 2015). This perspective provided explanations of the “interested actions” of culturally and historically formed social actors, who remake, transform, and reshape the modes of representation that are available to them (Kress, 2000). Further, the sociocultural approach emphasizes knowledge formation as a social and situational action that keeps human cognition evolving in social interactions in cultural contexts (Kumpulainen & Wray, 2002). A key social action examined in this research is the promotion of students’ information seeking and evaluation in secondary school health education.

Nexus analysis provided a way to investigate the complexity of social and literacy practices in multi-level and multi-layered social interaction, which is why it is a necessary complement to literacy research (Rish, 2015). Literacies today are dynamic and multidimensional, with the primary goal of providing 21st-century individuals with the language skills, visual thinking strategies, and dialogical attitudes necessary to understand and evaluate information, organize ideas, exchange perspectives, make meaning, and think critically in different sociocultural settings (Reyes-Torres & Portales Raga, 2020).

2.1 Nexus analysis as a theoretical lens

Nexus analysis focuses on understanding the complex relationships between discourse and social action (Scollon & Scollon, 2004). In this research, the complexity is reflected in the difficulties of interpreting and understanding health-related information and terminology, in the discussions that seek to address these issues, the interaction at the site of engagement, and teachers’ roles and identities. Nexus analysis allows these different factors to be considered and synthesized, as described below. The theoretical frame of this research is illustrated in Figure 1, which presents the key concepts and their positions in relation to each other and to
the key components of nexus analysis (Scollon & Scollon, 2004). This triad of the components intertwine at the core of any social action. Discourses in place are discourses that circulate in some real, material places (i.e., school, university, café), such as talk, reflections, health education learning materials, and various information sources (Scollon & Scollon, 2004). Interaction order refers to all the social arrangements that enable the formation of social relationships in classrooms and interviews (Scollon & Scollon, 2004). The historical body signifies teachers’, students’, and researcher’s personal histories, life experiences, and identities (Scollon & Scollon, 2004).

Nexus analysis maps the trajectories or discourse cycles that intersect in the moments of personal actions to examine the historical and social processes of promoting multiliteracies in health education (Townendrow & Pereira, 2018). At the heart of this research is the teaching of information seeking and evaluation from the perspective of multiliteracy, meaning that multiliteracy is not explored in its entirety in this research, but specifically in relation to information and health education (see Sub-chapter 2.2). Furthermore, as the research focuses on the social

Fig. 1. The theoretical framework of the research, with an emphasis on social action at the intersection of the main components of nexus analysis (Modified from Scollon & Scollon, 2004, p. 20).

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In accordance with the sociocultural perspective, information seeking in this research is understood as a social practice that is carried out for the specific purpose of looking for information by using sources such as health education textbooks, digital environments, or people (Limberg et al., 2012). Learning and information seeking as a sociocultural process “emphasizes meaning-making through active participation in socially, culturally, historically, and politically situated contexts” (Limberg & Alexandersson, 2009). Likewise, information evaluation and information assessment refer to features such as credibility, relevance, and applicability that are constructed and negotiated in relation to certain social contexts through mediational means (Francke et al., 2011; Limberg et al., 2012; Mansour & Francke, 2017). According to the PISA 2018 Reading Assessment Framework (OECD, 2019), competent readers are able to evaluate the quality and credibility of texts, reflect on content and form of texts, and detect and handle contradictory elements in texts.

### 2.1.1 Discourses in place

Discourses are broadly understood to include “all forms of meaningful semiotic human activity seen in connection with social, cultural, and historical patterns and developments of use” (Blommaert, 2005, p. 3). This wide approach to discourse acknowledges the traditional notion of language as only one of its manifestations; rather, discourse is considered to be all kinds of semiotic actions, which are performed by means of objects, attributes, and activities (Blommaert, 2005). Gee’s (2015) well-known division of discourse indicates that Discourse with a capital “D” contains “distinctive ways of speaking/listening and often, too, writing/reading coupled with distinctive ways of acting, interacting, valuing, feeling, dressing, thinking, believing with other people and with various objects, tools and technologies” (p. 75). Discourse with a lower case “d,” in turn, includes everyday language, such as conversations, stories, essays, and reports, and it is thus a part of Discourse. In the context of this research, this means that Discourse with a capital “D” takes into consideration the classroom interactions, teachers’ reflections in the interviews, and the ways they described and constructed their teacher roles and identities.

Scollon and Scollon (2004) used the concept of discourses in place to call attention to all circulating discourses in a certain time and space. Discourses in
place emphasizes the fact that all social action happens in material places in which a huge range of discourses, such as talk, signs, architecture of the building or furniture, and physical humans inside that building produce a semiotic aggregate, or nexus (Scollon & Scollon, 2003, 2004). Each of these discourse cycles is an implementation of various semiotic functions, but combined they form a place that we can recognize, and thus, we know how to act in that place (Scollon & Scollon, 2003).

In terms of this research, the concept of discourses in place includes language use, health education textbooks, pictures and posters on the classroom wall, and different technology-mediated forms of texts, for instance. It should also be noted that the location of the school has an influence on the discourses in place in the social actions. For example, discourses may differ in a wealthy neighborhood school when compared to a school in a poorer part of the town (Scollon & de Saint-Georges, 2013). Hence, discourses among special skills students and classes (e.g., music, arts, or sport), as was the case in Study 1 (see Article I), may differ from those of students in a regular classroom.

At a nexus of social practices, identities, and goals, the relationship between discourse and action is ever-changing and dynamic (Jones & Norris, 2005). This relationship manifests as the tension between the ways mediational means enable social action and the actual ways people mix these mediational means in real situations to react to their immediate circumstances (Jones & Norris, 2005). Throughout this research, the key objective has been to identify situations in which such tensions are underlying and to address them in more depth. The tension occurred, for instance, in the classroom interaction when we (the researchers) entered the scene with our video cameras, creating a disturbance in the habitual interaction. In addition, tension appeared in the discourses between the teachers and students when they evaluated complex health information and determined concepts. In the interviews, the discussions between myself and the participants brought to light tensions, which occurred as a “change” or need for “change”. Change in this context refers to the moments when established practices are disrupted and thus, they need to be reassessed (Goffman, 1959). During these kinds of moments, discourse is likely to transform traditional norms and stagnant practices into a novel nexus of practice, for instance, in multiliteracy pedagogy (Peppler & Wohlwend, 2018; Scollon & Scollon, 2004).
2.1.2 Interaction order

Another important element of the social action of my research was interaction order (see Figure 1), which refers to the notion of the social arrangements generated mutually by the participants in the action (Scollon & Scollon, 2004). According to Goffman (1983), interaction occurs in social situations when two or more people socialize with each other physically or mediated by technology. This means that when entering the presence of others, individuals seek to clarify the nature of the situation, the relevant social data of others, and even the expected actions and objectives of the other participants (Goffman, 1959). However, information about this interaction order is rarely fully available, and its form varies depending on the people involved in the social activity, what kind of power structures there are between the participants, and where the activity is taking place (Goffman, 1959; Scollon & Scollon, 2004). In the interaction order, universal, written, and unwritten norms provide the basis for human behavior; for instance, in traffic, meetings, and classrooms there are always common rules guiding the interaction (Goffman, 1983). According to Scollon and Scollon (2004), however, the rules guiding the interaction are not universal but “at a site of engagement which is a particular moment of time in a particular place with particular others present in a characteristic interaction order with characteristic discourses in place” (p. 14). In school, for instance, when the school bell rings everyone knows the meaning; it indicates that a lesson either begins or ends. Likewise, when a teacher asks something during the lesson, students have adopted the practice of raising their hands (Scollon & Scollon, 2004).

In all actions, the social actor is set in relation to other participants who engage in the same practice (Scollon, 2001a). Social actors position themselves according to how familiar the practice is, what role they play in it, and what kind of identity they have in that particular practice (Scollon, 2001a). Therefore, social actors’ former experience of the practice, which are embedded in their *habitus* (see Bourdieu, 1990, and Sub-chapter 2.3), develop and construct their identity through a sequence of social or mediated actions of the social practice (Scollon, 2001a).

Identity positions individuals in their social environments by belonging to certain social circles (Stone, 1962; see also Farberman, 2019). Moreover, social actors produce and maintain their identities through Discourse, but identities are also transformed in the social action (Tierney, 2013). Identities are socially constructed and reconstructed in the action in relation to other participants and the event itself (Norris, 2011). In this research, the significance of teacher identity
became apparent, especially in the teachers’ reflections during the interviews, when the teachers described their professional identity.

The interaction order in the social situations of this research varied based on the participants, the presence of the teacher, and the spaces, in which lessons and interviews took place. When the teacher was constantly available to the students in one learning space, the interaction order was shaped in different ways compared to the students’ independent work, for example, outside the classroom. In addition, the roles taken by the teachers in information seeking and evaluation situations were attached to the interaction order, ranging from a fairly traditional teacher-led foundation to students’ self-directed learning or even the shunning of assignments altogether. Also, in the interviews, the space was relevant to the interaction order in that sense whether it supported the emergence of a confidential relationship and open discourse between the participants. The interview spaces were pre-booked, hence there were usually no extra people, passage, or other disruptions.

2.1.3 Historical body

The third contributing factor in the social action of the research is the historical body (see Figure 1), which refers to accumulated human experiences of social actions (Scollon, 2001a)—teachers’ professional history, for instance. The concept of the historical body was deployed in nexus analysis from Nishida (1958), who described the historical body as referring to the idea of a person’s personal history and life experiences reflecting and contradicting one another (see Article II). Scollon and Scollon (2004) understood the historical body in the following way:

Different people play the same role differently depending on their history of personal experience inscribed in what the philosopher Nishida calls the historical body. A lifetime of personal habits come to feel so natural that one’s body carries out actions seemingly without being told. (p. 13)

Scollon and Scollon (2004) preferred the concept of the historical body over Bourdieu’s (1977) concept of habitus because “it situates bodily memories more precisely in the individual body” (p. 13). According to Bourdieu (1977) habitus is a practical sense of what can be done in each situation; it is the product of history, which “produces individual and collective practices” (p. 82). For the sake of clarity, the concept of the historical body is used to describe this phenomenon; more specifically, I understand the historical body in the same way as the Scollons, as outlined above.
This nexus analytical viewpoint emphasizes the historical body as inscribed in an individual body, although it is always linked and transformed by society (Norris, 2019). This means that each individual has a unique history that may share some similarities with the personal history of others in the social interaction. These sociocultural circumstances and the actions taken generates a tension to reform and change the historical bodies of the participants (Scollon, 2001a). The historical body is not a rigid or permanent feature, but it is influenced in sociocultural circumstances by any taken action replicating and recontextualizing the identities of previous social actions (Scollon, 2001a). The historical body can be viewed as a structure on which new history is piled up, as a kind of “a compost heap of social practices” (Scollon, 2003, p. 193), but it also accumulates unconsciously. History in this context is not just a chronological concept, but a time full of social and cultural actions (Blommaert & Huang, 2009).

In this research, the focus is on teaching and learning, therefore, the historical bodies of the participants play an important role. Teachers’ historical bodies are formed gradually by virtue of their learning processes in such a way that others identify them as teachers and most of the practices they perform in school may be of a habitual and routine nature that embodies their professionalism (Blommaert & Huang, 2009). Besides teachers’ lifetime experiences, their teacher identity, professional roles, educational and working backgrounds, and accustomed practices are embedded in their historical bodies. According to Norris (2011), identity elements, which are rooted in a person’s historical body, are produced, and co-produced situationally and socially within a person’s network and/or environment. Hence, the co-production of the teacher identity emerges, for instance, in the school environment, through classroom interaction, via the mediational means used, and within any other network or socio-historic time and place in which they are interacting (Norris, 2011). Higher-level actions, such as teaching, learning, and interviewing, enable the construction of identity elements in “unison with other social actors and the environment” (Norris, 2008, p. 145).

2.2 Opportunities and constraints of multiliteracy pedagogy

Defining the concept of multiliteracy unambiguously is somewhat difficult, partly because it often acts as a hypernym for multiple forms of literacy, and partly because the definitions emphasize different issues depending on the context. The difficulty of defining the concept in detail is also due to different researchers having ascribed different meanings to this concept.
In the school context in Finland, the concept of multiliteracy indicates primarily a text-related competency—interpretation, production, and evaluation skills related to text management—whereas cultural diversity, which is the other dimension of *multi* in multiliteracy, is mentioned only briefly in the curriculum (see FNBE, 2016, p. 23; Mertala, 2018; Palsa & Mertala, 2019; Palsa & Ruokamo, 2015). In this research, the focus is on various forms of texts that have been defined in the curriculum (FNBE, 2016) from a broad perspective, including verbal, visual, aural, numeric, and kinesthetic symbols, and the combinations of all of them. In line with the original multiliteracy framework (New London Group, 1996), the curriculum emphasizes written, spoken, printed, audiovisual, behavioral, or digital interpretation and production of texts (FNBE, 2016). Kalantzis et al. (2010) reconfigured the range of possible modalities further by separating written and oral representations into totally different modes and adding a tactile meaning-making mode that refers to touch, smell, and taste.

However, multiliteracy does not only refer to skills or competencies; it is a pedagogical approach to literacy teaching and learning that recognizes meaning making as an active and transformative process and considers all students’ affective and sociocultural needs and identities (Cope & Kalantzis, 2009; New London Group, 1996). The following sub-chapters introduce the challenges of multiliteracy pedagogy (see Sub-chapter 2.2.1), the ways in which multiliteracy can be promoted in teaching (see Sub-chapter 2.2.2), and how a nexus analytical point of view has been applied in previous literacy research (see Sub-chapter 2.2.3). These themes have been illuminated according to the confines of this research, with an emphasis on information, teaching, and health education from a sociocultural perspective.

### 2.2.1 Challenges in multiliteracy teaching in health education

Although technology and equipment are up-to-date and available in many classrooms, students’ everyday literacy practices seem to contradict literacy in school and 21st-century literacies (e.g., Burnett & Merchant, 2015, 2018; Dowdall, 2019; Kearney & Tangney, 2021; Pizzuto & Kennedy, 2019). Traditional print-based literacy practices often still dominate school curriculum, pedagogy, and assessment, while students in their out-of-school lives are constantly involved in online worlds and digital culture, which changes their expectations and orientations toward texts, literacy, and pedagogy (Kalantzis et al., 2010; see also Cloonan, 2015; Paatsch et al., 2019; Wimmer & Draper, 2019). New technologies and social practices are repeatedly redefining what it means to be a literate human being with
effective communication skills in today’s world (Leu et al., 2011). Recent studies have shown a gap between adolescents’ ICT and social media use in school and leisure, considering, for instance, leaner-generated digital content production (Palmgren-Neuvonen, 2016; Pyo, 2016), teachers’ and students’ views and use of ICT in education (Lindberg et al., 2017), and students’ culturally and socially diverse backgrounds (Mills, 2010; Stewart, 2013).

In schools, non-formal learning of digital skills is not always recognized (Ilomäki et al., 2012), and in addition to the lack of curricular guidance and support, there are also challenges in a rapidly changing set of literacy and communicative practices (Burnett & Merchant, 2015). The use of ICT as a mediational means in the social actions involved in teaching and learning is determined by the teacher’s pedagogical and technological stance (Mercer et al., 2019). Li (2017) argued that to engage this e-generation of students in literacy learning, teachers need to consider the students’ interests in the new technologies and, concurrently, to develop students’ basic skills like reading and writing. Teachers face instability in new communication practices and technology-mediated social interaction that are constantly developing new literacies2 (Burnett & Merchant, 2015; Verbeek, 2005). Moreover, new media environments require online reading processes and proficiencies that not only simultaneously overlap but are also more complex than offline reading (Coiro, 2011). However, there is not yet enough theoretical and assessment work available to promote understanding of reading and learning in these new media contexts (Kiili, Leu, Utriainen et al., 2018). This lack of available work is one of the main dilemmas in multiliteracy research. This research applies a nexus analytical viewpoint to the discussion in the context of health education.

Previous research (Tanhua-Piiroinen et al., 2020) has shown that digitalization enables the diversification of teaching, but the limitless materials and information it provides pose challenges. Tanhua-Piiroinen et al. (2020) reported that, in Finland, there has been no clear improvement in the digital competences of either teachers

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2 The concepts of multiliteracy and new literacies are partly convergent, but they also have different perspectives on literacy. Knobel and Lankshear (2014) explained that compared to traditional print literacy, new literacies contain the idea of moving from material inscription to digital coding. New literacies are also more participatory, collaborative, and decentralized, and less author- or individual-centered. According to Coiro et al. (2008), an epochal change in technologies and related cultural and social practices are identified within new literacies. In turn, the concept of multiliteracy emphasizes a literacy pedagogy that is affected by changing communication and media environments (Kalantzis et al., 2010). Multiliteracy acknowledges meaning-making in different cultural, social, and professional contexts, with the pedagogy of multiliteracy seeking to meet the challenges of multimodal communication and sociocultural diversity (Kalantzis et al., 2010; Mertala, 2018; Palsa & Ruokamo, 2015).
or students; for the latter, the trend has even continued to decline, especially for girls. Studies have also revealed that students or teachers often do not question the accuracy and credibility of information sought online (e.g., Castek et al., 2012; Coiro et al., 2015; Forzani, 2018; Hirvonen & Palmgren-Neuvonen, 2019; Kiili et al., 2019). Kohnen & Mertens (2019) stated that “the ever-changing nature of online literacy spaces, and well-designed hoaxes or manipulative websites may fool even generalists” (p. 293). This means that for literacy researchers and teachers it could, at worst, be impossible to keep up with the development of modern media environments and information that is increasingly difficult to evaluate (Kohnen & Mertens, 2019).

Furthermore, gathering and synthesizing information from multiple online sources is another challenging issue for students, especially when the newly encountered information contradicts their thinking and former perceptions (Castek et al., 2012). The risk of confirmation bias arises when an information seeker focuses on information that confirms their existing beliefs and, therefore, biases evaluation of information and distorts or disregards conflicting ideas (Castek et al., 2012; Meppelink et al., 2019). Meppelink et al. (2019) found that people were inclined to select belief-consistent health information that they perceived as more credible, useful, and convincing than belief-inconsistent health information. Students’ challenges with multiliteracy are exposed to these disadvantages of the technological and communicational change which for its part has created a need for educational change. These historic changes literally change our ways of thinking and processing information to something different from the “old way” of doing things. Teaching literacies, in particular, needs to be further developed into new ways (Pacheco, 2018).

In Finland, the curriculum steers educational content and objectives, including multiliteracies, but teachers can choose their teaching methods quite freely. This enables the implementation of multiliteracy pedagogy in a personal way, taking into account teachers’ historical bodies (e.g., their educational backgrounds and previous experience). This is a significant factor because health education teachers usually teach this stand-alone school subject as their second or third option, with the first choice being, for example, physical exercise, biology, geography, home economics, or crafts (Aira, Tuominiemi et al., 2009). The reasons vary for teaching additional subjects, such as health education. School principals may decide who teaches health education whether the teacher is qualified or not (Mannix McNamara et al., 2012). Other reasons to teach health education include teachers’ own wishes and qualifications, performed health education studies, earlier teaching experience,
health education being included in the teacher’s post, deficiency of teaching lessons, or because no one else is interested (Aira, Välimaa et al., 2009). At best, a teacher’s motives for teaching health education are based on personal interest, the importance of the subject, and an altruistic ideal of promoting students’ health, health literacy, and critical thinking skills (Byrne et al., 2018; Mannix McNamara et al., 2012; Paakkari & Välimaa, 2013). It is no exaggeration to say that this diversity in the professional backgrounds of health education teachers provides a complex starting point for studying the implementation of multiliteracy pedagogy in health education.

2.2.2 Perspectives on the modern multiliteracy pedagogy

Multiliteracy pedagogy offers a means to adapt literacy practices to the technologically and communicationally changing landscape of literacy teaching and learning (Cope & Kalantzis, 2009; New London Group, 1996) and thus builds a bridge between in-and-out-of-school literacies (Jewitt, 2008; Knobel & Lankshear, 2006; Pyo, 2016). However, school assignments that promote literacies are still often separate from young people’s world of experience and their everyday technology and communication practices (Li, 2017). New technology is likelier to be used as traditional mediational means in literacy learning—as an add-on, a “tool” to support well-rehearsed forms of practice (Leander, 2007)—without considering students’ own habitual ways of utilizing them or the possibilities the new “technical stuff” has to offer to students to build and participate in literacy practices (Lankshear & Knobel, 2007; Stolle & Fischmann, 2010). Although some school practices have been renewed, the relationship between knowledge and pedagogy has remained largely unchanged (Kalantzis et al., 2010). It is important to note, however, that the need for new literacy practices is not due to digitality itself but to multimodality, especially in digital environments (Yelland, 2018). The fact that not all adolescents are experts in digital and multimodal practices should also be kept in mind (Mills, 2010). Researchers and teachers have recognized the importance of engaging in a pedagogy of multiliteracies to transform the ways to write, read, make meaning, and understand literacy more generally (Jewitt, 2008).

Transforming literacy learning starts with rearranging the design of traditional classroom practices (Kalantzis & Cope, 2010). According to Li (2017), literacy instruction needs to be guided in two ways: first, by taking into account both the requirements of online reading and writing, and then through traditional literacy from both future and past perspectives. Students should be allowed to use
information from multiple sources and to develop critical thinking by analyzing issues from different viewpoints, as well as to work with new media (Kalantzis & Cope, 2010). In doing so, students can combine writing, images, audio, and video (Kalantzis & Cope, 2010). Ever richer, more diverse, and flexible communication resources necessitate acknowledging and building on students’ repertoires of textual practices as they move fluently among devices, modes, and media (Burnett & Merchant, 2015). However, the use of digital technology should not be considered an intrinsic value, but rather should focus on “rich pedagogical practices and simple digital tools” (Näykki et al., 2019). The purpose of using technology in instruction should be targeted at establishing pedagogically sound best practices and thus developing professionalism in improving learning (Davies & West, 2014).

Previous research has highlighted teachers’ concerns about students’ basic literacy skills focusing on traditional reading and writing and not so much on multiliteracies wherein traditional reading and writing would be included (e.g., Bokhorst-Heng et al., 2014; Kitson et al., 2007; Paesani, 2016; Zhang et al., 2019). Therefore, the promotion of these basic skills has, in general, been a priority in teaching literacy. For instance, multiliteracies have not been included in enhancing the joy of reading and reading motivation (Briere & Wilson, 2018; Miyamoto et al., 2018; Tovli, 2014), or in improving reading fluency and comprehension skills. This also applies to the requirements of post-primary education (McKenna & Bettini, 2018; Rasinski, 2012, 2014; van de Ven et al., 2017). Undoubtedly, the abilities to read and write are fundamental sets of skills, and especially texts online require more complex skills than reading and comprehending traditional printed texts (Coiro, 2011). According to Bauer-Kealey and Mather (2019), computer-based online reading interventions can contribute positively to overall attitudes toward reading, improve both reading and spelling, and increase reading enjoyment. Finding, reading, and understanding information online is important for learning in all areas (Leu et al., 2015).

Multiliteracy and new literacy preferences and practices play an important role in instruction since they contribute to students’ interpretation and transformation of varying textual resources and all sorts of representations (Cope & Kalantzis, 2009; Paesani, 2016). Kalantzis et al. (2010) discovered that the synesthesia of modes is a pedagogical resource that promotes learning in various ways, for example, by considering students’ different learning styles and abilities to make use of versatile modes of representation. Multimodal texts contain a parallel representation of these modes (Cloonan, 2015), which reduces the complexity of writing, but involves increasingly complex multimodality (Kalantzis et al., 2010). Further, ICT-mediated
multimodal texts support learning, and students may value them even more than printed learning materials, considering multimodal materials to be fun, interesting, enjoyable, and exciting (Briere & Wilson, 2018; Forzani & Leu, 2012; Lim et al., 2020).

The sheer amount of information available, as well as increased levels of misinformation and disinformation (especially on the internet), underline the importance of supporting students’ skills in assessing information credibility (Kiili et al., 2019). Not only do students often lack information evaluation skills and practices, but they also tend to overestimate their competencies (Coiro et al., 2015; Miller & Bartlett, 2012; Nygren & Guath, 2019). Therefore, the teacher’s role in assessing the credibility of information is crucial, and students need teacher’s scaffolding for making credibility judgments, especially when it comes to complex issues such as health information (Kiili, Leu, Marttunen et al., 2018). Coiro et al. (2015) stated that students need several sets of instructional practices that help them focus on appropriate and multiple evaluation criteria during online information seeking. They suggested that these practices should be taken into account within subject content at the secondary level to deepen students’ understanding of the use of evaluation criteria, and even to promote the comprehension of texts.

Similarly, Kohnen and Mertens (2019) stated that students’ use of online sources and critical evaluation should be embedded in everyday classroom practices and routines. Forzani (2018), in turn, highlighted the importance of beginning teaching information evaluation at an early age as part of other literacy practices. The key priority is to differentiate teaching according to students’ prior knowledge, offline reading skills, and needs instead of using a single approach to instruction (Coiro, 2011; Forzani, 2018).

As the changing world alters the ways in which literacies are used and how they adapt to the changes, the sociocultural perspective in multiliteracy instruction and research is topical (Perry, 2012). Joint classroom discussions may provide opportunities for students to develop a shared understanding of the information sought and its complexity (Hirvonen & Palmgren-Neuvonen, 2019). Regarding conflicting information, guided discussions can help students identify new viewpoints, compare the newly found information with previous beliefs, and evaluate the accuracy of the new ideas (Coiro et al., 2015). Students’ collaborative work in credibility evaluation may help them achieve better performances due to opportunities to make thinking explicit through mutual interaction and negotiations (Kiili et al., 2019). Miller and Bartlett (2012) have recalled that the communicational and technological landscape has changed so rapidly that all
teachers deserve compassion in their efforts to promote students’ multi- and information literacy. Coiro (2012) has made similar arguments, stating that in terms of supporting teachers’ efforts to learn and practice new literacy ideas, professional development should be long-term, systematic, and situationally authentic.

2.2.3 Nexus analytical literacy research

Nexus analysis is an uncommon approach in the educational sciences; nevertheless, this analytical approach has been applied in some literacy studies. Although there were no literacy studies in health education with nexus analysis, some literacy studies merit reviewing them to determine how the application of nexus analysis can benefit literacy research. Rish (2011) investigated the ways and the reasons in which literacy practices, social interaction, and positional identities formulated the students’ collaborative writing, as well as what kind of online tools the students used in their writing projects. The findings of the study indicated that the students’ historical bodies played an important role in the social practices deployed in collaborative writing. Additionally, the findings revealed that social interaction, relationships, and positional identities had an impact on how and why students used the online tools as mediational means in their literacy practices in the ways that they did (Rish, 2011).

Students and their teachers were also in focus in Tierney’s (2013) study. The researcher examined critical literacy, drawing attention to laughter when young people negotiated their identities and texts in a classroom where critical male students were engaged in “racist joking.” The study indicated that by the mediational means of laughter and humor, the students could joke in this way without being stigmatized as racist (Tierney, 2013).

Chun (2010) examined critical multiliteracy in the context of English for Academic Purposes (EAP) in higher education in North America with student participants whose home countries, ages, and educational backgrounds varied. In the study, nexus analysis was used as a tool to study actions and, more precisely, the co-construction of socially situated meaning-making processes, otherwise known as “resemiotization” (Chun, 2010; Iedema, 2001). Resemiotization refers to “how meaning making shifts from context to context, from practice to practice, or from one stage of a practice to the next” (Iedema, 2003, p. 41). Chun (2010) claimed that classroom practices need to be transformed to facilitate the utilization of multimodal texts more (inter)actively. Thus, more multiliteracy pedagogy should
be implemented in EAP teaching due to the increasingly complex distribution of multimodal information (Chun, 2010).

In the literacy context, primary teachers have been of interest in recent studies (e.g., O’Daniels, 2017; Räisänen, 2015). Räisänen (2015), as a teacher-researcher, examined the change in classroom literacy practices and found that uncertainty, relativity, relationships with the community and students, situational awareness, and the growth of trust shaped the actions of the teacher, as well as the actions of the community and individual students. And vice versa: teachers’, communities’, and students’ actions transformed the interaction order in the classroom. Therefore, the teacher’s agency was involved in changing the practices, but the change also influenced the teacher’s habitus and subjective ways of being a teacher (Räisänen, 2015).

O’Daniels’ (2017) findings, in turn, showed how the school’s established interaction order positioned teachers as technicians—that is, more or less mechanical curriculum implementers—and valued the students as literacy learners on the basis of their previous test scores. This complicated the teachers’ efforts to promote the students’ critical literacy in placemaking, which meant shaping the vision of their community spaces and their future with words, images, and actions. However, the teachers’ actions enabled a change in students’ recognition of how places and texts were culturally produced, which led to a variety of critical literacy practices (O’Daniels, 2017).

The nexus analytical approach is well suited for researching and changing literacy and teaching practices. It is also well suited for teachers’ professional development and the review of this process because nexus analysis prioritizes human action over language or culture (Scollon & Scollon, 2007; see also Chachage, 2020; De Groot, 2017; Jalkanen, 2015; Riekki, 2016; Rollag Yoon, 2019). These relevant studies considered teachers’ social practices and technology usage, as well as teachers’ pedagogical choices and changes, which they brought into the social action in the classroom. This research contributes to the pedagogical discussion of the teachers’ identities and informational authority roles, and to the discussion of how to promote multiliteracies, information seeking, and evaluation among adolescents in modern media environments in the context of health education.
2.3 Teachers as informational authorities

To describe teachers’ roles in the context of information seeking and evaluation, I have adopted the notion of an informational authority (Tuninetti, 2018). The notion refers to teachers’ positions, which enable them to share their own knowledge with students and to direct students to other information sources. In school, teachers’ influence on students is multifaceted and pervasive, both visible and hidden. When it comes to information seeking and evaluation, especially in complex issues like health, teachers’ roles as information mediators, guides, and facilitators of credibility assessments are crucial. Teachers’ traditional roles are transforming toward the roles of more tutoring, challenging, evaluating, and analyzing, as well as a more equal role with students in knowledge creation and meaning making (Alexandersson & Limberg, 2005). In the following sub-chapters, I illustrate the meaning of two informational authority roles—a cognitive authority and a trustee—and a teacher identity as part of teachers’ historical bodies.

2.3.1 Informational authority roles of cognitive authority and trustee

Research on teachers’ authority roles is vibrant, but the emphasis has often been on traditional manifestations of authority, such as pedagogical authority (e.g., Harjunen, 2011; Määttä & Uusiautti, 2012; Mullooly & Varenne, 2006; Zamora-Poblete et al., 2020) or teachers’ legitimacy as a classroom authority (e.g., Bergdahl & Langmann, 2017; Gingo, 2017; Graça et al., 2011; Nelson et al., 2014). I will extend earlier studies in an endeavor to study teachers’ informational authority, referring to teachers’ legitimacy in connection with credible information. Informational authority is related to the teacher’s other authority roles, but it has not yet been extensively studied as a specific aspect of authority. I approach the teachers’ informational authority roles through two concepts that illuminate the phenomenon from slightly different viewpoints. First, I have adopted Wilson’s (1983) notion of a cognitive authority, which refers to an information source that

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3 Bocheński (1974) defined an epistemic authority as the authority of an expert. This means that, for example, a teacher’s position as students’ epistemic authority is based on the knowledge; the teacher knows more than the student (Bocheński, 1974). The concept of epistemic authority emphasizes the idea of being an expert on something (Brožek, 2013); the traditional model of education is based on the epistemic authority of the teacher and the teaching of ready-made models of knowledge, in which students’ subjective views are not considered inherently valid (Puolimatka, 1995). The concept of cognitive authority, in turn, presupposes the influence on one’s thinking, but it is stripped of dominance based on position or hierarchy (Wilson, 1983).
influences one’s thinking, and second, the notion of a trustee, which directs the position toward credible information sources (Jessen & Jørgensen, 2012).

According to Wilson (1983), in addition to our own experiences, we only know what others have told us about the world. However, not all information sources are considered equally credible; their credibility is assessed according to different criteria (Wilson, 1983). Originally introduced in library and information science, the concept of cognitive authority refers to an information source that influences one’s thinking and is found to be trustworthy, worthy to believe (Wilson, 1983). Cognitive authority is based on the recognition of expertise and reputation, which implies a person’s acknowledged position as an expert on a particular topic (Huvila, 2013). In this process, recognition of expertise is necessary, but mere special knowledge, position, or hierarchical dominance may not be sufficient to form a position of cognitive authority (Wilson, 1983). Further, cognitive authority may manifest to varying degrees, as a person may possess it little or a lot (Rieh, 2005; Wilson, 1983). In cognitive authority, it is central to note that it is not limited to people, but it can also be found, for instance, in books, films, organizations, institutions, and web pages (Rieh, 2005). Finally, authority can simply be based on personal trust or on a person’s charisma (see also Weber, 1925/1947), of which Wilson (1983) noted that “[w]e may be so impressed by the person, so attracted or mesmerized by him that we are prepared to believe whatever he says” (p. 25).

The world has changed radically since Wilson defined cognitive authority in the early 1980s, and thus the ways in which information is assessed and understood have new significance (Sundin et al., 2008). Along with the rapid growth in the use of online information sources, interest in the notion of cognitive authority has increased (Huvila, 2013; McKenzie, 2003; Rieh, 2010). Cognitive authority is a topical and useful aspect when looking at students’ information seeking and evaluation, as well as the teachers’ role in this process as an information source—as a kind of cognitive authority.

Accepted contextual professional knowledge in situations of structural inequality, such as at school, often facilitates the acquisition of a position of authority (Browner & Press, 1996; McKenzie, 2003). Traditional teacher-led instruction, with students being passive recipients of information, supports teachers’ position as the only cognitive authority in the classroom (Stroupe, 2014). However, previous research has shown that cognitive authority is constructed on a case-by-case basis within the framework of social interaction through discussions (McKenzie, 2003; Rieh, 2010), in which the community determines the current cognitive authorities (Neal et al., 2011; Oliphant, 2009). Metzger et al. (2010) noted
the growing importance of social and group-based credibility assessment methods, highlighting the key role of cognitive heuristics in evaluations of information credibility, authority, and trust, especially for online information.

Walsh-Moorman and Hovick (2021) claimed that as long as students lack the skills of critical information evaluation, they are exposed to misinformation when conducting online inquiries on their own. This is a risk, especially, when students read foreign information sources with specific contextual and cultural features with which they are unfamiliar (Sundin & Francke, 2009). Sundin and Francke (2009) stated that cognitive authorities are able to transfer or lend their authority to other information sources directly by recommending them or indirectly by incorporating them into contexts deemed plausible, such as a school or a library. A transferred cognitive authority is a trusted person who can help students recognize credible sources: “if a cognitive authority trusts it, so can I” (Sundin & Francke, 2009). Trustworthiness is created on the basis of goodwill, impartiality, and expertise as perceived knowledge, skills, and experience (Fogg, 2003; Jessen & Jørgensen, 2012). Similarly, Di Battista et al. (2020) stated that trustworthiness encompasses both the benevolence and competence of a teacher, the former consisting of, among other things, good interpersonal skills, and the ability to inspire students, the latter charisma, authority, ambition, and charm. Teachers with high credibility are considered believable, knowledgeable, trustworthy, and committed to the content and students (Fischer & Frey, 2019). Considering these aspects in research to promote information seeking and evaluation is important, and nexus analysis can provide useful tools for this.

A teacher can become a trusted person for a student by providing both trustworthiness and expertise in information evaluation and, if necessary, strengthening their understanding of the credibility of information (Jessen & Jørgensen, 2012; Pettinghill, 2006). This underscores the importance of teachers’ literacy practices, as students may be rather superficial in their assessment of information when trusting the teacher (Pettinghill, 2006). In general, students are epistemically dependent on teachers’ knowledge and the information they provide (see also Rolin, 2019); hence, teachers as trustees must meet the requirements of expertise as a “can-do” component and honesty and benevolence as “will-do” components of trustworthiness (Berti & Di Battista, 2011; Di Battista et al., 2020). According to Barki and colleagues (2015), the “can-do” component of trustworthiness is based on a trustee’s abilities and skills by describing their preparedness to act appropriately in a given situation. The “will-do” component of trustworthiness, in turn, is captured in the personality traits of a trustee, suggesting
their willingness to use those skills and abilities in the best interests of the students (Barki et al., 2015).

Previous studies have suggested that students need teachers’ additional support to develop the reasoning of credibility assessments and critical evaluation skills (Kiili et al., 2019). This is especially needed when utilizing Internet environments, which young people prefer in their everyday life (Harris, 2008). It is worth noting that, according to Heinström and Sormunen (2019), students are intrinsically motivated to practice information seeking and source evaluation when conducting inquiry tasks. They also value teachers’ scaffolding and guidance through the complex and occasionally frustrating processes of online information evaluation.

2.3.2 Teacher identity

Teacher identity has been widely researched, for instance, from the poststructuralist perspective, highlighting dimensions such as emotional components in identity formation (Zembylas, 2003), the identity work of non-mathematics graduates who are into retraining as secondary mathematics teachers (Hossain et al., 2013), and in the context of Finnish beginning teacher turnover (Lanas, 2017). To understand teachers and their practices, they were examined using teacher identity as a theoretical lens. The interest of this research is in teacher identity related to information and how health education teachers describe their work. According to Gee (2000), an identity is a feature by which a person is “recognized as a certain ‘kind of person’, in a given context” (p. 99). Rather than being a representation of a person’s self, an identity is a social construction that is situated in practice; it is produced in a social action and may therefore change depending on the context (Gee, 2000; Norris, 2011; Scollon, 1997). Identities are multiple, fluid, and dynamic; they are created, formed, and changed through action in different social situations and cultural contexts (Beijaard et al., 2004; Lane, 2009). Thus, teachers teaching several subjects, such as in this research, may have different identities and ways of doing their work for each subject, which is why teacher identity is one of the key dimensions of the research.

To examine this complexity of identity construction, the nexus analytical approach helped to understand how everyday actions and taken-for-granted practices construct identities in some cases, but not in others, according to the nexus of practice (Wohlwend & Medina, 2012). This research focused specifically on teachers’ professional identities, which are intertwined with their attitudes, emotions, and behaviors—both in and out of school environment, as found in
earlier studies (Caza & Creary, 2016; Crow et al., 2017). As stated above (see Sub-
chapter 2.1.3), identity is embedded in the historical bodies of teachers, as well as in all of their lifelong experiences and personal history, which makes the use of nexus analysis appropriate and justified. This perspective is in line with the view of Ball and Goodson (1985), who argued that teachers’ past careers and life experiences form the way they approach teaching and how they position themselves in it. Also, teachers’ lives and relationships outside of the workplace have an impact on their work and, thus, to the development of their teacher identity (Ball & Goodson, 1985; Day, 2012).

In Finland, secondary school subjects are taught by teachers who have teaching qualifications, including a university degree, in their subjects, but it may also be that subjects are taught for a variety of reasons without the required qualifications (Honkala & Komppa, 2019). In general, as previous research (e.g., Kyriacou et al., 1999; Perryman & Calvert, 2020; Sikes, 1985) has shown, most subject teachers have a special fondness and enjoyment for the subject they teach. The love of the subject may have created a primary motivation to study it, and the teaching profession has mainly been a consequence of that (Chuene et al., 1999). This is an important consideration when examining the identity of Finnish health education teachers because health education is seldom, if ever, chosen as the first subject to be taught (see Sub-chapter 2.2.1). Therefore, it is not self-evident that all teachers who teach health education would determine their professional identity primarily through the subject of health education and their position as health education teachers, but the formation of identity is likely to be more strongly influenced by the main teaching subject, specialization to it, and the status of the subject, as found in studies in other countries (Day et al., 2006; Mannix McNamara et al., 2012).

According to Helms (1998), teachers define dimensions of their identities more or less by their subject matter. In addition to one’s own preference for a certain subject, teachers’ feelings on their expertise and abilities to teach, as well as their self-confidence in subject content knowledge, may play an important role in teacher identity construction (Pillen et al., 2013). Previous studies (e.g., Beijsaard et al., 2000; Leijen et al., 2014; McIntyre & Hobson, 2016) have examined the subject matter connection to teacher identity. It seems that subject matter expertise is important in professional identity development, particularly for early career teachers, but as work experience increases, its significance decreases. According to Hobbs (2013), teachers’ feelings regarding out-of-field teaching—being unqualified or lacking the experience needed to teach a subject—can disrupt their teacher identity and self-confidence. This can be, for instance, due to a lack of
interest or knowledge, or that they cannot relate to the out-of-field subject. Multiple professional expectations and a mismatch between conceptions of self and those expectations create tensions that can conflict with teacher identity (Anspal et al., 2019). In examining teacher identity in relation to such tensions, nexus analysis can be a useful approach.

In the ongoing process of identity formation, teachers’ reflection is a key means of understanding both the personal and professional dimensions of identity (Beauchamp & Thomas, 2009). Reflection enables teachers to reveal the various underlying influences that have shaped their identities (Lasky, 2005). Graham and Phelps (2003) noted that teachers’ lifelong learning, the development of teacher identity, and “being a teacher” necessitate reflection and metacognitive processes. Teachers’ metacognition plays an important role in identity work involving continuous interaction between teachers’ historical bodies and their values, pedagogical beliefs, and practices (Yuan & Jun Zhang, 2020). Beijaard et al. (2004) stated that teachers use professional identity to understand themselves as teachers. Reflection on one’s own perceptions, beliefs, experiences, and practices is a pivotal part of teachers’ work because it gives information about their professional identity (Chua et al., 2018; Walkington, 2005). In addition to developing teacher identity, reflecting on one’s own actions contributes to the development of teachers’ functional roles (Walkington, 2005). However, reflective and metacognitive processes alone do not contribute to the formation of teacher identity; interactions and discussions with others in the professional community reinforce development as well (Beauchamp & Thomas, 2009; Byrne et al., 2018; Räisänen, 2015).
3 Research process

This chapter describes the methodological and philosophical underpinnings that have guided my research and thinking, drawing from poststructuralism and nexus analysis. My methodological choices emerge from the way I see the nature of the socially constructed reality (ontology) and from my assumptions about stance toward knowledge and knowledge systems with their origins, relationships, and limitations—how I know what I know (epistemology; Alexakos, 2015; Creswell, 2007). According to the nature of qualitative research, my goal is to interpret and comprehend the phenomena based on the meanings people give to them and to take the perspectives of the participants as a starting point for the research (Denzin & Lincoln, 2011; Ormston et al., 2013).

The starting point, then, is the foundation of epistemology in understanding the meanings people give to their world, everyday life, and experiences (Becker, 1996). These realities are characterized through my observations, interpretations, and conclusions, as well as through the voices and views of the participants presenting their perspectives, ideas, and practices (Creswell & Poth, 2018). Denzin and Lincoln (2011) found that, from a poststructural perspective, “there is no clear window into the inner life of an individual” (p. 29). In accordance with this, my goal is not to perform objective observations or to find absolute “truths” about people and phenomena. Rather, all observations are located at the intersection of my sphere and that of the observed (Denzin & Lincoln, 2011). Research itself is a set of influential actions that produces reality and affects the research environment and the people in it (Hämeenaho & Koskinen-Koivisto, 2014).

Instead of focusing on large and abstract social structures, the poststructural approach emphasizes local power relations and recognizes local narratives as appropriate for explaining the complexity of situations (Anyon, 1994). Scollon and Scollon (2004, p. 8), nonetheless, pointed out that through a nexus analysis, it is possible to unify the micro-analysis of moments of social interaction with a much larger socio-political-cultural analysis of the relationships between social groups and power interests in society. According to the nexus analytical approach, broader social phenomena are based primarily on social interaction at the micro level but also vice versa, with the largest cycles of social organization and action circulating through everyday micro-actions (Scollon & Scollon, 2004). Poststructural thinking allows for studying the formation of social practices as well as cultural patterns and processes of subjectivation (Søndergaard, 2002); knowing reality means to
“subjectivize” knowledge by participating in reality instead of being objective (Dillet, 2017).

Indeed, the poststructuralist concept of subjectivity emphasizes an understanding of the self in constant change in interaction with other people and the world (Daniels & Varghese, 2020). Here, the self—or the subject—is not meant as pre-existing, self-knowing, and continuous, but rather something that individuals become through their ongoing constitution in and by discourse (Lanas, 2017; Youdell, 2006). The poststructural perspective identifies discourses as knowledges of the world that are mediated in a broad sense of language, for instance in written, verbal, visual, aural, and bodily forms of meaning-making, through which objects, such as teachers’ roles and identities, emerge (Hossain et al., 2013). Hence, subjects are shaped by the surrounding world, and their essence is the result of social processes (Prowell, 2019; Rossiter, 1997). Becoming and being a teacher is constituted in and through social practices; it is constructed and reconstructed according to prevailing time and place by moving into and taking up teachers’ characteristic subject-positionings (Green & Reid, 2008). Accordingly, locating myself as a poststructuralist-informed researcher involves generating data comparable to this location, but also bringing along my own subjective understanding, which is why I prefer first-person voice over objective passive voice (Rhedd-Jones, 1996).

The poststructuralist-informed onto-epistemology of this research acknowledges a sociocultural view of literacy addressing multiliteracy as a social practice and endeavors to understand how teachers’ subject-positionings—informational authority roles and teacher identities—work in promoting multiliteracy (Mills, 2011). The combined perspectives of poststructuralism, a sociocultural approach to multiliteracy research, and nexus analysis provide a multidimensional explanation of information seeking and evaluation as mediated actions in health education (Wohlwend, 2009).

This research design enables analysis of the dynamic relationships between practices, texts, and discourses within the nexus of practice to understand how social actors position themselves in interaction, implement, and transform multiliteracy instruction, and construct their teacher identity (Wohlwend, 2009). To shed light on these versatile perspectives, I compiled this research from three studies, which can be divided into two cases due to two separate collections of data and analyses. Figure 2 illustrates the research design, studies, and articles.
In the first case, 5 teachers and 78 students participated in the research, and in the second case, there were 8 teacher participants. In the following sub-chapters, the research process is explained through the stages with three tasks of nexus analysis (see Figure 3), namely, engaging, navigating, and changing a nexus of practice (Scollon & Scollon, 2004). In nexus analysis, the researcher moves between these three main activities, which do not proceed in a strictly linear manner but are interconnected and interplayed with each other (Lane, 2014).
The concept of a nexus of practice stands for the linkage of discursive and non-discursive social practices that a group of social actors recognizes as “the same” as a type of generally identifiable action (Scollon, 2001b; Scollon & Scollon, 2004). In everyday life, one does not have to be a member of any specific community to know what kind of practices are performed in schools, for instance; specifically, the set of higher-level actions in most schools are similar (Lane, 2014). In the context of this research, the nexus of practice can be found first, in the classroom practices, and second, in the teachers’ narratives in the interviews.

### 3.1 Engaging the nexus of practice

The starting point of nexus analysis is to enter a nexus of practice and engage in the key mediated actions that would explicate the studied social issue (Scollon & Scollon, 2004). Besides identifying the social issue, the engaging phase consists of mapping out the primary social actors, observing the interaction order, and defining the most relevant discourse cycles or itineraries (Lane, 2014; Scollon, 2008).
Moreover, the researcher positions themself within the “zone of identification” as a part of the nexus of practice in question, and most importantly, is recognized by other social actors as part of it as a researcher (Scollon & Scollon, 2004; Scollon & de Saint-Georges, 2013). At this phase of nexus analysis, the data collection methods and objectives are determined; and the data analysis is interwoven with data collection from the beginning (Lane, 2014). This kind of modus operandi allows data collection to be redirected if other types of data have been found to be useful.

In this research, the main engagement phase occurred twice. I began to engage in the field of study by exploring social issues through relevant literature, such as the current Finnish National Core Curriculum for basic education (FNBE, 2016), health education textbooks, and previous research. At this stage, discussions with the rest of the CogAHealth research group were specifically fruitful and contributed to engaging in the nexus of practice. Initially, my intention was to study the teacher’s role as a trustee in the health education context from the perspective of multiliteracy, emphasizing information seeking and evaluation. I planned to establish a virtual teacher network, or to use an existing group of health education teachers, for instance, on Facebook for discussions and data collection purposes. However, I did not carry out this research strategy but instead modified the research design on the grounds of the emerged viewpoints and more accurate research needs.

As my research interests were information seeking and evaluation, multiliteracy pedagogy, and classroom interaction, I needed to personally engage in health education lessons “to deeply understand how discourses, practices, and artifacts mold people’s lives and social practices” (Wohlwend, 2020, p. 15). Together with other CogAHealth researchers, we planned data collection in pre-arranged schools, two of which were secondary schools (three classes) and one of which was a primary school (one class) in compulsory basic education (see Table 1). Participating schools and classes were selected on the basis of purposive and voluntary sampling strategies (Devers & Frankel, 2000). Since we already knew some of these teachers, contacting them was practical and convenient.

The data collection focused on secondary schools due to the independent and separate status of health education at that level. Before the observational period began, we (the researchers) met with the teachers involved in the research and agreed on the details of the data collection when students were working in groups.

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4 In primary school, health education is integrated in other subjects, so the research appeared to be irrelevant on that level.
The teachers determined the duration and themes of the group work, as illustrated in Table 1, but our expectations and views, such as the use of information technology and minor restrictions of information sources, were also considered. The chosen group work themes were based on the health education curriculum and were intentionally such topics that required students to seek information from a variety of sources (see Table 1 and Article I). The first process of data collection was conducted for the needs of the entire CogAHealth project, focusing especially on observing the students ($N = 78$) when they worked in groups.

**Table 1. Research design, the first set of data collection (Modified from Article I).**

<table>
<thead>
<tr>
<th>School/class</th>
<th>N</th>
<th>Data collection tools and sessions</th>
<th>Group work themes</th>
<th>Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/1 8th grade</td>
<td>1 teacher</td>
<td>Video cameras, voice recorders, mobile phones, field notes</td>
<td>Chronic and infectious diseases</td>
<td>PowerPoints</td>
</tr>
<tr>
<td></td>
<td>17 students</td>
<td>3 x 45 min lessons</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A/2 8th grade</td>
<td>1 teacher</td>
<td>Video cameras, voice recorders, mobile phones, field notes</td>
<td>Diets</td>
<td>Handwritten posters, PowerPoint, Keynote-presentation tool</td>
</tr>
<tr>
<td></td>
<td>22 students</td>
<td>2 x 45 min lessons</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B 6th grade</td>
<td>2 teachers</td>
<td>Video cameras, voice recorders, mobile phones, field notes</td>
<td>Screen time and sleep</td>
<td>Sway-storytelling application</td>
</tr>
<tr>
<td></td>
<td>20 students</td>
<td>3 x 60 min lessons</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C 9th grade</td>
<td>1 teacher</td>
<td>Video cameras, voice recorders, mobile phones, field notes</td>
<td>Physical activity and health</td>
<td>Videos</td>
</tr>
<tr>
<td></td>
<td>18 students</td>
<td>6 x 75 min lessons</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I returned to the engaging stage of the nexus of practice, when, after analyzing the observational data, I wanted to go deeper into teachers' roles and their reflections on teaching health education, multiliteracy, and information seeking and evaluation. Therefore, I decided to conduct unstructured narrative interviews in such a way that each interview could develop individually and situationally (Hua, 2016). I determined the interview themes, in advance, such as teacher identity, teacher education and professional background, and multiliteracy, but the structure was otherwise kept open (see Articles II and III).

I started recruiting participants for the interviews by contacting a health education teacher I already knew and introducing my research to her. She agreed
to attend the interview and to share my research interests with her colleagues. She also helped further in the recruitment process.

The recruitment process proceeded through snowball sampling (Goodman, 1961). Each interviewee was asked to name one or more health education teachers who might be interested in taking part in the research. I contacted every nominated teacher by email, outlining my research, data collection methods and schedule, and the CogAHealth research environment. Recruitment continued in this manner until no further interviews were needed and data saturation was achieved. In total, I asked 13 teachers to attend the interview; eight of them agreed, one refused due to a lack of time, and four did not reply to my email. The teachers who volunteered for the interviews found my research topics interesting and important from the perspective of their own work. They considered their participation in and promotion of my research a contribution to their professional competence as well. I conducted the interviews between November and January at locations chosen by the teachers, mostly in their schools.

3.2 Navigating the nexus of practice

Nexus analysis continued by navigating (see Figure 3) the nexus of practice identified at the earlier engaging stage of the research. In this second step, my task was to map the “trajectories of participants, places, and situations both back in time historically and forward through actions and anticipations” (Scollon & Scollon, 2004, p. 9). Navigating involved the main work in nexus analysis as at this stage, data was gathered, and the selected data analyzed (Lane, 2014). Concurrently, in interacting with other social actors, I began to select practices, discourses, and actions for a more in-depth examination (Lane, 2014; Scollon & Scollon, 2004). When participating in the nexus of practice, my attendance and actions changed the interaction order, bringing my historical body into the situation and joining the discourses in place (Halkola et al., 2014; Scollon & Scollon, 2004).

3.2.1 Observing the health education lessons

The first set of data gathering initially focused on students’ ways to collaboratively seek and evaluate health information during the health education lessons. However, this research examines the teachers’ actions in these situations. A total of 14 lessons in the four classes were video-and audio-recorded, and written observational notes were also made. Also, photographs were taken from time to time of, for example,
the teacher’s instructions on the chalkboard and the students’ mind maps (see Appendix 1). The duration of the digitally recorded observation data was approximately 48 hours. Also, the participating teachers \( N = 3 \) from Schools A and C were interviewed after the data collection, with an average interview length of about an hour. The interview data was a total of 2 hours and 59 minutes.

As illustrated in Table 1, the final outputs of the group work varied. In School A, in both classes 1 and 2, students were able to decide themselves what the final product was like, although in class 1, the students only made PowerPoints. In School B, the teacher suggested using the Sway storytelling application, and in School C, the researchers and the teacher planned a video project in co-operation with the local cultural center. The students were split into working groups, which were mainly assigned by the teachers; only in class 2 of School A were students able to choose their groupmates because their teacher felt it promoted work. The nexus of practice in the classrooms is described in more detail in Appendix 2.

When researchers enter the nexus of practice, it is influenced and changed by their presence and actions (Scollon & Scollon, 2004). Scollon and Scollon (2004) explained that “the processes of change are the results of the activities of the researcher in recording the actions, engaging in discourses with the participants, and constructing new courses of action” (p. 152). Similarly, Wohlwend (2020) noted that conducting nexus analysis is a constant challenge for the researcher, not least because the researcher must always be vigilant about shaping and reshaping the research focus based on the concerns and goals of the participants. This became apparent when the lesson observational data was collected: video cameras disturbed students in some classes so much that they not only talked about them being a distraction but also turned off one camera when the researchers did not notice. This happened despite the fact that they had agreed to participate in the research. The fact that the internet is not controllable may have worried the students. Some students raised a concern that the film would end up in public distribution.

These situations, together with students’ scarce explicit negotiation of information sources, were also noted by colleagues in their research (Hirvonen & Palmgren-Neuvonen, 2019) and strengthened the role of the researchers as part of the nexus of practice. We discussed this with the participants while observing the group work and encouraged them to seek information from a variety of sources. I felt that my own role as a researcher, in addition to being an observer, was to be a co-constructor of the object of study together with the participants in the nexus of practice, merging research activities with participation activities (Lane, 2014; Scollon & Scollon, 2004).
As is typical in nexus analysis, data analysis began right from the start of the observations. After each data collection session, we researchers shared our views with one another about the day’s events and the emerging phenomena, such as students’ inactivity or teachers’ benevolence toward their students. These joint discussions of the research group took place throughout the research at different stages of the analysis. The analysis continued by transcribing and coding the observational data and interviews with the qualitative analysis software NVivo using NVivo Collaboration Server, which supported researcher triangulation.

The data were mainly transcribed word for word, but filler words, pauses, and insignificant vocalizations were excluded. The transcription focused on linguistic data, but in my analysis, I considered other data relevant to the purpose of the research. For example, the different classroom situations, as well as the materials and the technologies used in the group work, deepened my understanding of the situations (see Article I). From the point of view of my dissertation, this phase of the research was a turning point, as the data appeared to be very rich, particularly in terms of the teachers’ (N = 5) actions and roles in information seeking and evaluation situations. For this reason, I decided to utilize the video- and audio-recorded observational data, which highlighted the importance of teachers in these kinds of learning situations (see Article I). In addition, as the main focus of the data collection was on the students, the teachers’ actions seemed authentic, fascinating, and worth studying. At that time, I asked the teachers for informed consent to participate in this newly focused research, and they gave their consent (see Appendix 3).

I started coding the data guided by the key concepts of nexus analysis (discourses in place, interaction order, and historical body) to roughly locate the themes that are central to the research topic from the data (see Figure 4). Navigating the nexus of practice includes a cyclic “zooming in and out” —that is, switching perspectives from details to a larger view of the practice (Hult, 2010; Nicolini, 2009; Wohlwend, 2020). Zooming in allows a focus on each element of the social action and thus the closer study of historical bodies, discourses in place, and interaction order (Käsmä, 2020; Scollon & Scollon, 2004). Zooming out of practice scrutinizes the connections between those elements and practices (Nicolini, 2009). At this point in nexus analysis, I zoomed in by conducting a second round of coding to examine the data in more detail and identify the key sites, social actors, and actions to describe and explicate teachers’ actions during health education lessons (Scollon & de Saint-Georges, 2013).
**Fig. 4. The coding themes and subcategories of the observation data.**
Scollon (2001a) explained that a site of engagement is “the real-time window that is opened through an intersection of social practices and mediational means that make that action the focal point of attention of the relevant participants” (p. 3–4). The site of engagement is a specific social space in which a mediated action occurs; it is a unique moment when social practices are joined together to form a real-time action (Scollon, 2001a, 2001b; Scollon & Scollon, 2004). In this data, the site of engagement was constructed from the linkages between several micro-level practices: the teacher writes instructions on the chalkboard for the assignment; the teacher explains the task orally; the students ask clarifying questions; the teacher replies; the students read health education textbooks; the students seek information on the internet and from the teacher-provided learning material; intra-group discursive exchange; discursive exchange between the teacher and one group of students; the teacher explains collectively to the entire class; joint discursive exchange in the classroom.

The visualization of coding (see Figure 4) indicates that the subcategories of the nexus analytical elements include features such as students’ motivation, the mediational means used, the formation of interactions, and factors influencing the participants’ historical bodies. A more detailed analysis highlighted teachers’ pedagogical, cognitive (cognitive authority marked as CA in Figure 4), and trustee authority roles, as well as the use of information sources, information evaluation, and knowledge building. The size of the visualization boxes shows the weight given to each topic in the data. Supported by this NVivo summary, I selected two teachers and their students from School A for closer scrutiny, because my goal was to conduct an in-depth analysis of dense data to reveal the complexity of the studied phenomena (Geertz, 1973; Given, 2008). As qualitative research is often rather dynamic and flexible, research design and settings can be modified based on emerging phenomena (Frankel & Devers, 2000). Therefore, the examination of the teacher’s role as a trustee expanded to include teachers’ different informational authority roles (see Article I).

### 3.2.2 Interviewing the health education teachers

The second set of data was gathered through narrative teacher interviews in Northern Finland. The interviews ranged in length from 56 to 80 minutes and were audio-recorded. The participant group included both female \(N = 5\) and male \(N = 3\) teachers, who taught health education in secondary and upper secondary schools. The teachers’ work experience varied from the newly graduated teacher’s first job.
to nearly 20 years of teaching. Among the participants, the most common subject combination was geography and biology as primary subjects, and health education as an additional subject. Other primary subjects were physical education, home economics, and history and social studies. Only one teacher taught health education as her primary subject, and one teacher worked as a primary teacher, also teaching health education to grades seven to nine. At the time of the interviews, six of the teachers had completed the health education teacher qualifications, and one teacher had these studies in progress. As in Finnish teacher training in general, all the teachers had at least a master’s degree, but some had continued their studies beyond (see Appendix 4).

The narrative approach in the interviews provided room for teachers’ own reflections of their historical bodies including professional choices, life experiences, and teacher identities (see Article II). To encourage the teachers to talk freely, I began by asking questions with words such as “tell” or “reflect” and strove to proceed with the interviews on the basis of the topics raised by the interviewees (Wengraf, 2001). Other key themes in the interviews included multiliteracy specifically in relation to information and health education, and students’ (multi)literacy skills (see Article III). During the interviews, I navigated the key discourse itineraries to determine the relevant actions and discourses that enabled those actions (Jones, 2014). I mapped the discourse itineraries by studying the relationships among talk, action, and the material world through a nexus analysis (Scollon, 2008). I strove for that by listening meticulously to the participants, pausing as things of interest came to the fore, and delving deeper into them without pre-planning.

As in the previous analysis stage, I used the qualitative analysis software NVivo to transcribe and code the interviews. I transcribed the interviews word for word, excluding filler words, pauses, insignificant vocalizations, and chatting from non-participants, such as students popping up in the classroom in the midst of the interview. The interviewed teachers had given written research consent, but since the students had not given it for reasons of research ethics, I did not use their talk in any way. I had given the teachers pseudonyms to guarantee their anonymity in the transcribing phase. I started coding the data based on broader interview themes, proceeding according to the phenomena that emerged from the data (see Figure 5). I continued to code and go through the interviews repeatedly until no new phenomena appeared and the categorization was complete.
Fig. 5. The coding themes and subcategories of the interview data.
The visualization of coding (see Figure 5) indicates that the main themes were health education, information, identity, and multiliteracy, the share of which can be seen in the size of the visualization boxes. This NVivo summary supported my own understanding of which topics were given a great deal of weight in the interviews. Thus, it was a natural choice for me to zoom in on these topics and prepare two separate articles concerning the teacher’s reflections. One article focused on teacher identity and the other on multiliteracy, both from the perspectives of information and health education. The nexus analytical lens served as a link between Studies 2 and 3 (see Articles II and III), as well as helped to identify the construction of teachers’ historical bodies and discourses as a means of reflection. Because I conducted the interviews and analysis independently, I introduced the co-authors to the material and my conclusions through discussions and abundant excerpts from the data.

3.3 Changing the nexus of practice

The third task in nexus analysis is the changing stage, which aims at re-engaging the nexus of practice on the basis of analysis at the navigating stage (Scollon & de Saint-Georges, 2013). In fact, doing nexus analysis is not just about analyzing actions, persons, and discourses, but rather about changing the nexus of practice—that is, the social action under study (Pan, 2014). At this stage of nexus analysis, researchers are considering their ability to influence the studied practices or problems, or to change them (Larsen & Raudaskoski, 2019). Since these three tasks—engaging, navigating, and changing the nexus of practice—do not proceed linearly, but rather alternately, the change can occur continuously throughout the study (Larsen & Raudaskoski, 2019; Scollon & Scollon, 2004). Change in the nexus of practice may take place through direct actions motivated by the nexus analysis or through bringing back and sharing one’s own understanding based on the analysis with the semiotic ecosystem—that is, a system at an intersection of many discourse cycles in the form of the historical bodies, the interaction order, and the discourses circulating through that moment of action (Scollon & Scollon, 2004).

In mediated action, growing tensions between the mediational means provided by the sociocultural setting, and social actors using these means to carry out concrete actions trigger a change in the nexus of practice (Lin, 2008; Norris, 2016; Wertsch, 1994). In my research, tension-creating mediational means were observation and my presence as such, but also circulating discourses and material
objects like audio and video recorders. Reciprocally, the change may cause tension and perplexity, for instance, in the teacher’s work, because changes to teaching also influence the teacher’s self-reflective assessment of thinking (Lanas & Kiilakoski, 2013; Mezirow, 2009; Räisänen, 2015). In the nexus of practice, the dynamic relationship between discourse and action is often manifested in the tension between the actions afforded by discourse and other mediational means, and the ways in which people mix those means to meet their immediate circumstances (Jones & Norris, 2005). Instead of focusing exclusively on either the social actor or the mediational means, studying the mediated action allows us to reveal an existing tension between these two elements (Norris, 2013).

In this research, the tensions came to light at the navigating stage in two ways, namely, during and after the data collection. In the second set of data gathering, some of the interviews brought forth the tension as a “change” in the discussion between me and the interviewees that at best might transform their pedagogical practices and self-reflective assessment of thinking in the future (see Articles II and III). The moments in which traditional practices are found to be inadequate and need to be re-evaluated (Goffman, 1959) are likeliest the key points where the discourse leads to the transformation of action (Scollon & Scollon, 2004). Also, the analysis process made visible the tension between the teachers’ thoughts, views, and practices. The classroom observation data highlighted the tension in the moments of perplexity when the teachers moved between the informational authority roles and those in which the change was manifested (see Article I). This tension did not attract my attention at the time of observation, but only became apparent afterward during the data analysis.

The process of change began the moment when I contacted the teachers and proposed research collaboration. The change in the nexus of practice began implicitly when I introduced my research to them, which promoted the participants’ initial understanding of the topic. According to the teachers, they had familiarized themselves with my research interests through the CogAHealth websites prior to the interviews; thus, they had reflected on the topics in advance. Also, after the research my actions contributed to the change, since I forwarded the published articles to the participants. In the same manner, there has been a change in the way I scrutinize my research topic. Along the way, my thinking evolved, my understanding increased, and my entire research topic became more multidimensional compared to the beginning of my research. Finally, the change can extend even to the macro level.
The publication and popularization of research results, together with other research, can generate a change in public discussion. In September 2021, the spontaneous Finnish Twitter campaign of #minätutkin (#Istudy) aimed to change general perceptions of Finnish research and research funding. Alongside similar tweets from other researchers, I provided the Twitter audience with a popularized description of my research. This campaign was well received on social media, as the hashtag was the most widely used hashtag on Finnish Twitter for several days (University of Eastern Finland, 2021). Also, the Finnish Association of Communication and Social Interaction awarded the initiators of the campaign with the Act of Interaction 2021 honorary prize (Määttä & Syrjämäki, 2021).

3.4 Ethical considerations

In qualitative research, ethics deserves special attention due to the confidential nature of the interactions between the researcher and the participants (Flick, 2009). Ethical issues, the use of research data, and interpretive and analytical processes are all more important than ever when the landscape of qualitative research is constantly changing and researchers face new questions when using new tools for knowledge production (Birch et al., 2012). Therefore, it is the researcher’s responsibility to take care of the participants’ well-being, dignity, and rights, as well as the scientific quality of the research (Flick, 2009). This research follows the principles of good scientific practice, research integrity, and ethics set by the University of Oulu (2016), All European Academics (2017), and the Finnish Advisory Board on Research Integrity (2012). These guidelines and ethical considerations were emphasized throughout all phases of the research process. My ethical decisions in both the research planning and conducting stages were influenced, for instance, by professional guidelines, disciplinary norms, ethical and legal regulations, and ethical and moral perspectives (Wiles, 2012).

Prior to the actual start of the research, ethical issues were discussed and agreed upon with the municipal education authorities and principals of the selected schools. Before the first set of data collection started, we CogAHealth researchers visited each class in which the teachers had agreed to take part in the research and gave them information about the research, including its aims, methods, and possible benefits and risks. Students received an informed consent for the research form to inform their parents and to be filled out. Consent was requested from the students and, because they were minors, from their parents as well.
Ethical guidelines, such as protection of confidentiality, voluntary and harmless participation, and the possibility to refuse or withdraw their participation in the research without specific reason at any point, were emphasized at every stage of the research (Bogdan & Biklen, 1997; Dockett et al., 2012; Kvale, 2007). The teachers gave their informed consent later, in the analysis phase of the research, when I had decided to study their actions during health education lessons and write an article about them (see Appendix 3). In terms of formulation, the teachers’ consent form was similar to that of the students, as was also the case with the teachers’ consent for the second set of data collection. Teachers who agreed to be interviewed received information about the research in advance by e-mail and during the interviews whenever they needed answers. In accordance with The General Data Protection Regulation, the teachers received a privacy notice stating how their personal data would be stored and processed.

Throughout the research, the anonymity of the participants was assured by protecting personal data and using pseudonyms instead of their real names or the schools’ names. In addition, anonymity also applied to research reporting in writing, and verbally in conferences and seminars so that it was not possible to identify individuals or schools (Bogdan & Biklen, 1997). Faces were blurred when showing video data or pictures. Persons not included in the research have not been able to listen to or read the materials, and the selected citations in publications do not compromise anonymity. In analyzing and writing, my interpretations were based on the data “doing justice to participants” (Flick, 2009, p. 41). Besides justice, ethical decision-making draws on respecting moral principles, such as participants’ autonomy, beneficence, and non-maleficence (Wiles, 2012). These principles guided all stages of this research.

The transfer and protection of the data were monitored throughout the research, particularly in interactive web-based and mobile device-based networks. After the data were transferred from the storage devices to the computer, all the files on the recorders were destroyed. The data from the research were managed and stored in password-secured files in the archives of the network drive provided by the University of Oulu. The data can be used in an ethical manner for further research purposes. Moreover, the metadata of dataset 1 have been stored in the Finnish Social Science Data Archive (Palmgren-Neuvonen et al., n.d.). I have striven for the most possible transparency at each point of the research and to demonstrate it in this summary, for example, with an accurate description of the research process. In addition, the published articles have been made available to the participants, and
based on the feedback from one teacher, the reporting of the results has been accurate and correct.
4 Overview and main results of the articles

In this chapter, I briefly describe and discuss the main results based on the three studies as reported in the empirical articles (see Articles I–III). The results shed light on the research topic from three perspectives. Article I focused on examining teachers’ informational authority roles while students were working in groups on information-seeking and evaluation tasks. Article II analyzed health education teachers’ reflections of their teacher identities. Article III concentrated on exploring the promotion of multiliteracy from the perspectives of both information and health education. Here, my purpose is to increase the understanding of promoting students’ information seeking and evaluation from the perspective of multiliteracy in health education and to answer to research questions of this dissertation.

4.1 Article I: Ask your mother! Teachers’ informational authority roles in information seeking and evaluation tasks in health education lessons

By studying the discourses and practices of health education lessons, the study investigated what kinds of informational authority roles the two secondary school teachers had when they guided students toward credible information sources. These roles were examined empirically by observing social action in situations in which eighth-grade students in two classes sought and evaluated information in groups during health education lessons. The article also sought to answer the question of what factors contributed to the teacher’s positions as informational authorities.

This study indicated that health education teachers can reach informational authority roles as a cognitive authority (Wilson, 1983) and a trustee (Jessen & Jørgensen, 2012), but these positions are not self-evident. To answer the first research question, “What roles do health education teachers play when students seek and evaluate information?”, I analyzed the results of Article I through a theoretical lens of interaction order (see Table 2). Information seeking and evaluation in groups formed the social action in the classrooms, which included discussions to assess the credibility of information sources and to choose between them. These discussions were guided by the school environment with its norms, as well as the social arrangements and positions of the participants (Scollon & Scollon, 2004).

Table 2 summarizes the results of the teachers’ informational authority roles and situations in which they occurred based on the analysis of observational data.
and post-observation teacher interviews. The perspective of interaction order recognizes that interaction in the classroom can be somewhat predictable, but at the same time, it allows us to delve deeper into the relationships between the participants, interactions, and the occurring situations.

### Table 2. A summary of teachers’ informational authority roles in Article 1.

<table>
<thead>
<tr>
<th>Findings</th>
<th>Interaction order</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher as a cognitive authority</td>
<td>In traditional classroom situations, the students relied on their teacher’s knowledge; students were asking questions and teachers were able to provide answers to their questions. Teacher’s guidance: correction, support, approval, disapproval, hint, telling</td>
</tr>
<tr>
<td>Moments of perplexity</td>
<td>The classroom situations where the teacher and the students tried to construct knowledge together; teachers’ established roles were no longer functional and did not meet the learners’ needs, which led to a shift in the role of the teacher. Teacher’s guidance: scaffolding, consultative, thought-provoking, uncertain</td>
</tr>
<tr>
<td>Teacher as a trustee</td>
<td>The situations where the teacher guided students towards credible information sources; teachers did not give straight answers but enabled learning by showing direction. Teacher’s guidance: appraisal, recommending, suggesting</td>
</tr>
</tbody>
</table>

According to the results, the teachers moved fluently between the informational authority roles of a cognitive authority and a trustee. The teacher acted as a cognitive authority in traditional classroom situations, providing answers with which students could move forward with their task (see Table 2). In these situations, students acknowledged the teachers’ position as experts on these particular topics (Huvila, 2013). This is not exceptional in a school setting, as professional knowledge in such a structurally unequal situation facilitates the acquisition of the status of a central cognitive authority (Browner & Press, 1996; McKenzie, 2003; Stroupe, 2014).

Moments of perplexity created tensions in the nexus of practice. The situation challenged the teachers and the students to construct knowledge and make meaning collaboratively, despite the defective and conflicting information sources (see Table 2). As described in Article I, the students and the teacher tried, for instance, to clarify difficult concepts through discussions, but they had to admit that the matter did not come to light at that moment with their knowledge and available information sources. This moment of perplexity changed the interaction order, as
the teacher’s expected actions did not materialize, and established classroom practices were disrupted.

The third situation illustrated in Table 2, when a teacher acts as a trustee can develop from a moment of perplexity. This informational authority role of a trustee occurred when the teacher—unable to answer the student’s question herself—directed the student toward some other information source that she considered credible (i.e., it was her cognitive authority). Such a situation was clearly evident in the research data once and is described in detail in Article I. Concurring with earlier research (Sundin & Francke, 2009), teachers as cognitive authorities can transfer their authority to other information sources both directly and indirectly. This means that teachers can explicitly recommend sources that they find credible—for instance, health education textbooks, teacher-prepared learning material, a person with qualifications—or implicitly suggest directions that could provide credible information, such as a library or an official health authority (Sundin & Francke, 2009).

The students in the studied classrooms relied on the teachers and their subject content knowledge with a low threshold to actively ask and discuss difficult health information together. The interaction between the teachers and the students seemed sincere. Both teachers were well available to the students, and they were easy to approach. Also, the atmosphere in the classrooms was positive for learning. These factors were significantly influenced by the teachers’ historical bodies, as not only their content knowledge and work experience but also their personality traits, such as their good intentions and benevolence toward students, created trustworthiness (Berti & Di Battista, 2011). In line with previous research (McKenzie, 2003; Neal et al., 2011; Oliphant, 2009; Rieh, 2010), a teacher’s position as an informational authority is situationally and contextually constructed within the social interaction as determined by the community. If teachers lack content knowledge, are unable to establish a reciprocal relationship with their students, or are not physically or mentally available for the students, trust and thus credibility cannot develop in the desired way (Di Battista et al., 2020; Fisher & Frey, 2019).

Interaction order in schools is shaped by presumptions about how to act in a school environment and what kind of power structures prevail (Goffman, 1959; Scollon & Scollon, 2004). In this study, this became apparent, for example, in the ways in which information was sought and evaluated, as well as in the tools used for these actions. The students were recommended to use teacher-approved information sources, such as health education textbooks and other learning materials, and to visit the library. Although phones are widely used for information
seeking in everyday life, at school, the students were encouraged to use traditional, safe, and credible information sources and technological tools. This is also what happened: When the students sought information on the internet, they mostly used the school’s laptops and iPads and visited Finnish-language pages, avoiding culturally multifaceted information sources. This finding is consistent with Li’s (2017) study results showing that school assignments that promote literacy are still often separated from young people’s everyday experiences, technologies, and communication practices. Indeed, lacking the skills to critically evaluate foreign information sources with unfamiliar contextual and cultural features, students are exposed to dis- and misinformation when seeking information online independently (Sundin & Francke, 2009; Walsh-Moorman & Hovick, 2021).

4.2 Article II: Health education teachers’ historical bodies: Constructing teacher identity and teaching information evaluation

Whereas Article I highlighted how teachers’ informational authority roles manifest themselves as they encourage, guide, and promote students to think critically and evaluate the credibility of information sources, Article II focused on clarifying the issue in terms of the relevance of teachers’ character, personality, and essence. To answer the second research question, “How is a teacher’s teacher identity manifested in the teaching of information seeking, evaluation, and health education?” I adopt the concept of teacher identity and a theoretical lens of the historical body (see Table 3) to analyze the results of Article II.

Table 3 summarizes the key findings of Study 2 (see Article II), which examined how the teachers (N = 8) verbalized their teacher identities during the interviews and the roles they had in teaching information seeking and evaluation in health education. The perspective of the historical body into which the elements of teacher identity are rooted refers to a person’s accumulated experience of social actions (Norris, 2011; Scollon, 2001a); it is a “compost-heap” of social practices within teacher’s work-related network and/or environment (Norris, 2011; Scollon, 2003).
Table 3. A summary of descriptions of health education teachers’ teacher identities in relation to teaching to seek and evaluate information.

<table>
<thead>
<tr>
<th>Findings</th>
<th>Historical body</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers as “doers”</td>
<td>Active doers and bodily oriented teachers; emphasis on common sense and the practical side of information-seeking skills. Teachers as students’ role models, information sources, and trustees.</td>
</tr>
<tr>
<td>Teachers as content specialists</td>
<td>Specialists of subject content and pedagogical knowledge; emphasis on scientific knowledge and the will to teach their students the same attitude toward knowledge. Teachers as informational authorities, specifically trustees.</td>
</tr>
<tr>
<td>Teachers as relationship builders</td>
<td>People-oriented and the fillers of the students’ needs; emphasis on interaction and genuine relationships with students. Teachers as knowledge co-constructors, gatekeepers, and trustees.</td>
</tr>
</tbody>
</table>

The results revealed that regardless of what the teachers’ identity was based on, the goal of each teacher interviewed was to promote students’ competences and health and to interact with them as a trusted and equal person. According to the interviewed teachers, trust is not self-evident, but it is generated through doing, knowing, and being in the interaction with students (see Table 3). Both student-teacher relationships and the teachers’ strong content knowledge played an important role in creating trusting relationships, and also influencing the teacher identities and the way they teach (Beijaard & Meijer, 2017; Tschannen-Moran & Hoy, 2000). Most importantly, a shared sense of the trustful interaction during lessons seems to have been an essential building block of teachers’ credibility as trustees (Jessen & Jørgensen, 2012). Overall, the ways the interviewed teachers taught information seeking and evaluation, and how they valued teaching those skills in health education were based on their historical bodies. Because the historical body is a combination of a person’s history, social practices, and life experiences (Scollon & de Saint-Georges, 2013), it has an impact on the teacher’s professional perception of themselves—that is, on their teacher identity (Blommaert, 2005; Mockler, 2011).

According to the analysis, teachers’ education, experiences, and personal preferences supported the construction of the teacher identity. This became apparent in the ways in which teachers described their identity as a social construction that takes shape through action and changes in a variety of social and cultural contexts (Beijaard et al., 2004; Gee, 2000; Lane, 2009; Norris, 2011; Scollon, 1997). This is consistent with previous research (e.g., Hult, 2014; Norris, 2005; Scollon, 1997) that identities are not based on absolute or permanent
decisions but, like identity representations more generally, are adaptable to dynamic social circumstances, and thus, challenged and constructed in relation to others. Some of the teachers had a former education and career in another field (see Appendix 4) that contributed to forming their teacher identity (see Article II). Thus, a teacher identity is dynamically produced and reproduced from a number of identity elements that are rooted in their historical body throughout life (Norris, 2011). Teacher identity and historical body have merged as teachers’ previous work and life experiences shape teacher identity (Ball & Goodson, 1985), and then teaching and teachers’ habitual practices at school embody both their professionalism and historical body (Blommaert & Huang, 2009).

The situational nature of identity formation emerged in the interviews in which teachers reflected on their teacher identities and ways of working. The interviews prompted the teachers to verbalize these phenomena, which brought to light key factors in identity construction and tensions in teaching information seeking and evaluation. The results indicated that even if every teacher considered health education a crucial school subject, most of them characterized themselves through their primary teaching subjects and specialization in it (Day et al., 2006; Mannix McNamara et al., 2012). Consistent with previous research (e.g., Kyriacou et al., 1999; Perryman & Calvert, 2019; Sikes, 1985), the teachers in this study had a special love and enjoyment for the subjects they taught, and their everyday life outside of the school influenced their teaching and the development of their teacher identity as described in Article II (Ball & Goodson, 1985; Day, 2012).

From the perspective of teacher identity, Article II addressed the ways in which the teachers viewed and implemented teaching information seeking and evaluation (see Table 3). The teachers agreed that because students are less likely to learn these skills properly on their own, they need to be taught. However, as an interesting result, the study revealed that the need for teachers to teach information seeking and evaluation specifically in health education in terms of health communication cannot be taken for granted. The tension between teachers’ former practices and the practical needs of students emerged in and by discourse, establishing that teachers’ subject position is not preexisting, self-knowing, and continuous but dynamic and changing (Lanas, 2017; Wohlwend, 2009; Youdell, 2006). Concurring with Tierney (2013), social actors produce and maintain their identities through both social action and discourse. When their former experience of the practice is disrupted, it needs to be reevaluated, and the action needs to be changed (Goffman, 1959).
4.3 Article III: Health education teachers’ contributions to students’ multiliteracy learning

Drawing from the results of Studies 1 and 2, Study 3 continued to examine teachers’ actions; consequently, Article III focused on their reflections on multiliteracy, the instructional practices of teaching multiliteracy, and students’ multiliteracy skills. To answer the third research question, “What factors cause tension in teaching multiliteracy in health education?”, I analyzed the teachers’ reflective narratives through the theoretical lens of discourse in place (see Table 4). The research revealed that the teachers understood the concept of multiliteracy in line with the curriculum (FNBE, 2016), and highlighted dimensions such as interpreting, understanding, and producing different forms of texts, multimodality, and information evaluation. The teachers considered information seeking and evaluation to be integral parts of multiliteracy, and they strove to promote these skills in various ways. However, the main concern was the students’ reduced basic skills in reading and writing; therefore, they emphasized the need to develop these skills in all school subjects, including health education.

Table 4 summarizes the main findings from the circulating discourses in the interviews—discourses in place—to increase understanding of multiliteracy teaching and students’ multiliteracy skills.

<table>
<thead>
<tr>
<th>Findings</th>
<th>Discourses in place</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students’ multiliteracy skills</td>
<td>1. Teachers’ biggest concern is students’ declining skills in reading and writing.</td>
</tr>
<tr>
<td></td>
<td>2. The interpretation, understanding, and production of different forms of text, specifically, graphical texts require development.</td>
</tr>
<tr>
<td></td>
<td>3. Students’ skills to critically evaluate information need improvement.</td>
</tr>
<tr>
<td>Multiliteracy instruction</td>
<td>1. Multiliteracy is an integral part of a teacher’s work.</td>
</tr>
<tr>
<td></td>
<td>2. Every subject teacher is a reading teacher.</td>
</tr>
<tr>
<td></td>
<td>3. Emphasis on teaching methods and tasks that can promote reading and writing.</td>
</tr>
<tr>
<td></td>
<td>4. Utilization of various sources, such as advertisements or purposefully selected unreliable texts, as information sources.</td>
</tr>
<tr>
<td></td>
<td>5. Joint classroom discussions to broaden understanding of difficult contents and terminology, and to evaluate information.</td>
</tr>
<tr>
<td></td>
<td>6. Aural, visual, spatial, and kinesthetic learning methods.</td>
</tr>
</tbody>
</table>
The results indicated that the teachers’ most notable concern was students’ impaired traditional literacy—reading and writing (see Table 4). They also considered it their duty as subject teachers to promote these skills and believed that the teaching of literacy does not belong to mother tongue teachers alone. According to the teachers’ narratives, the students’ skills were in line with the results of the PISA surveys (OECD, 2019), and the teachers had, almost surprisingly, fully embraced their role as facilitators of reading and writing. The teachers noticed that the students’ skills in producing written texts had also deteriorated, which was reflected, for example, in their inability to write correctly in accordance with grammar rules. In addition, health-related terminology and defining concepts were difficult for some students. These factors caused tension in teaching multiliteracy, as teachers felt cross-pressured between what they should emphasize according to the curriculum and what were the most important learning needs from their perspective. This is an interesting aspect, because reading and writing skills are included in multiliteracy skills (Kalantzis et al., 2010; New London Group, 1996), and promoting offline literacy skills contributes to promoting the skills needed in online environments (Coiro, 2011). Interpreting and producing multimodal texts requires the management of both traditional literacy skills, such as reading, writing, speaking, and listening, as well as the ability to combine multiple modes of meaning, such as written, oral, aural, spatial, gestural, and tactile representations (Cloonan, 2015; Kalantzis et al., 2010).

The teachers had made observations about students’ skills in interpreting, using, and assessing different forms of texts and found that some of the text forms were easier for students than others. As described in Article III, the students preferred reading and utilizing written texts in assignments instead of statistics, even if the necessary information was easier to find in graphical texts and was recommended by the teachers. The lack of expertise required for the correct interpretation of charts, especially in health communication, is a major drawback, as it can allow for harmful misunderstandings and choices that affect health. In line with previous research (e.g., Cloonan, 2015; Cope & Kalantzis, 2009; Kalantzis et al., 2010), the teachers tended to incorporate other modes of meaning with language to promote learning and to teach reading and writing multimodal texts that are increasingly integrated into everyday media and cultural practices. Thus, some teachers had introduced teaching methods that allowed things to be learned differently—for example, kinesthetically through practical actions such as resuscitation practice, visually by watching videos, spatially using students’ living environment in home assignments, or by combining the above.
This study clearly highlighted the fact that the teachers considered information seeking and evaluation to be key parts of multiliteracy. In the concept of information evaluation, teachers included critical thinking in terms of both text type and content credibility—skills in which they saw students could afford to improve. Laura (a teacher) reflected on students’ skills from the perspective of text types, as follows:

"There is a lot to practice. Many of them [the students] consider tabloids credible because they are read frequently. We have, for instance, interpreted the ads—health ads—during the lesson. In a way, the lack of criticality is clearly the prevailing thing for students. In a sense, they do not necessarily understand that those ads are just advertising phrases to arouse the need for that product. In my opinion, it [interpreting different types of texts] is pretty weak."

Although digitalization makes it possible to diversify teaching and has made information sources easily available, the limitless materials and information it provides pose challenges to information seeking and evaluation (Tanhua-Piiroinen et al., 2020). According to the teachers, secondary students’ skills in evaluating the credibility of information and thinking critically are uneven; some students are naturally adept at these, but others need more teacher support and guidance. The teachers considered it crucial to promote these skills in secondary school so that students would acquire the necessary skills for their further studies and futures in general. However, the interviews encouraged the teachers to reflect on the teaching they implemented, which caused tension between their instruction and the outcomes required. The need to transform teaching became apparent, for instance, by discussing more unreliable sources and delving into the credibility of health communication as the art of everyday classroom practices and routines (Kohnen & Mertens, 2019).

The study indicated the importance of teaching information seeking and evaluation extensively in health education. The ever-changing nature of information combined with well-designed scams or manipulative websites can confuse and even deceive experts, not to mention more inexperienced individuals such as students (Kohnen & Mertens, 2019). This point is particularly noteworthy, as previous studies (e.g., Castek et al., 2012; Coiro et al., 2015; Forzani, 2018; Hirvonen & Palmgren-Neuvonen, 2019; Kiili et al., 2019) found that students may not necessarily question the accuracy and credibility of the information retrieved online. People tend to find such health information credible, useful, and convincing
when it is in line with their beliefs, whether true or not (Meppelink, 2019). Because students often lack the skills to evaluate information and think critically (Coiro et al., 2015; Miller & Bartlett, 2012; Nygren & Guath, 2019), teachers’ roles and scaffolding in promoting these issues, especially for complex information such as health, are crucial (Kiili, Leu, Marttunen et al., 2018). Taking these perspectives into account, the teachers in this study recommended teaching methods that supported simultaneous reading and writing, information seeking and assessment, and the use of different texts. They had also found joint classroom discussions, and multiple modes of meaning-making—aural, visual, spatial, gestural, and kinesthetic—to be effective in teaching multiliteracy.
5 Synthesis of the results: There is a lot to practice

Chapter 4 presented the main results in each study and answered the research questions, illuminating the main features of the research topic from different perspectives. Nexus analysis (Scollon & Scollon, 2004) has guided the research as it has focused on circulating substantive discourses, social actors with their historical bodies, and the interaction generated by these actors. Here, I synthesize the results and discuss the general aim of the research to increase understanding of what is required to promote students’ information seeking and evaluation from the perspective of multiliteracy in health education at the secondary school level. The elements that play an important role in teaching students to seek and evaluate information, as well as to think critically, are illustrated in Figure 6.

Fig. 6. Key features identified in the results outline the elements that form the basis of social action to promote students’ information seeking and evaluation in health education.
The elements described (see Figure 6) form a multidimensional phenomenon consisting, firstly, of the complexity of modern health communication and media environments (see Sub-chapter 5.4.1); secondly, the choice of credible information sources with multimodal and different types of content (see Sub-chapter 5.4.2); and thirdly, teachers’ roles as information facilitators, sources, and guides (see Sub-chapter 5.4.3). The following sub-chapters discuss these dimensions and offer some conclusions in terms of implementing multiliteracy in health education.

5.1 Health communication and media environments

The results of this research highlight the central role of digital media environments as information providers when students seek health information in their school assignments and group work. Even though more traditional information sources, such as health education textbooks and teacher-provided learning materials, as well as a local library, were readily available to them, the students preferred to seek information on the internet, with teachers also directing them to do so. This course of action follows the practices they have in their lives outside of school (see also Burnett & Merchant, 2015; Ilomäki et al., 2012; Kalantzis et al., 2010; Li, 2017; Lindberg et al., 2017; Palmgren-Neuvonen, 2016; Pyo, 2016): When the need for information arises, information can be sought quickly and conveniently by using online search engines on smartphones. Hence, the internet is for them the most natural place to look for information, and digital devices are the most functional tools for this action, which certainly applies to most people today. But amid all this ease, convenience, and functionality, the diversity of information in terms of content, mode, and provider has become a great challenge.

Understanding and interpreting ambiguous and complex health information requires skills and practices to evaluate the credibility and suitability of information in different contexts, and to think critically about facts and modern health-related phenomena. Understanding health information has traditionally been hampered by subject-specific terminology and concepts, contradictions, and interpretability (Palmgren-Neuvonen et al., 2021). In addition to these, the challenge today, especially in uncontrollable online environments, has become intentionally and unintentionally inaccurate information—dis- and misinformation—to which one may be exposed when evaluation skills are deficient (Walsh-Moorman & Hovick, 2021). Due to the various online platforms where anyone can share any information, information seekers cannot, as in the past, rely on the intentions of the information provider, but must make their own judgments each time they acquire information.
Moreover, the multimodality inherent in digital content requires more diverse literacy skills, such as multiliteracy, but also basic literacy skills, such as reading and writing. This is because, as Coiro (2011) pointed out, new media environments require online reading processes and skills that simultaneously overlap but are also more complex than offline reading. In other words, basic literacy skills are essential for interpreting, understanding, and producing information, but they are no longer enough. Multiliteracy skills are also needed because of the increasing multimodal and multicultural content.

Based on the findings of this research, I would argue that, given the contemporary media environments and the complexity of health communication, students should be encouraged rather than restricted to seek information on the internet in school assignments. Already a decade ago, Brown and colleagues (2007) similarly suggested that teachers must teach students to make more effective use of unconventional health information sources, such as the internet, parents, and medical professionals. Despite the increasing use of the internet to seek information in school assignments, the information sources that Finnish students use are still quite traditional, such as the websites of authorities known to be trustworthy (Mikkonen, 2015). Although efforts have been made to expand the use of sources, work is ongoing.

In Finland, the curriculum determines the educational content and objectives, but teachers are free to make their own pedagogical decisions and choose which sources of information, for example, are used in assignments. Undoubtedly, the information in textbooks and other information sources chosen by the teacher has been curated and thus can be imagined to be credible, but the use of these sources does not promote students’ ability to critically evaluate health information (Hirvonen & Palmgren-Neuvonen, 2019). On the contrary, such blind trust in information evaluated by others can attract intellectual laziness and a lack of critical thinking, and ultimately lead to an inability but also a reluctance to evaluate the credibility of the information, as if satisfied with information that is “good enough” to meet basic needs or provides the first possible answer or solution to a problem (Cooke, 2017). Eventually, it may even lead to a lack of identification of the need for information evaluation. Nevertheless, concurring with previous studies (e.g., Castek et al., 2012; Coiro et al., 2015), teacher’s well-timed guidance would support students’ processes in determining the credibility of websites and the information they contain, negotiating the accuracy and relevance of the texts, and synthesizing their prior knowledge into the key points across multiple texts.
The digital world with social media is an integral part of modern human life, especially for children and young people, and therefore, they need all possible support to operate there and make rational use of it (Kiili et al., 2019). The key question, then, is not whether to utilize the internet for information seeking, but how best to scaffold students to seek credible information on the internet. Promoting these practices within subject content, for example, in health education, would deepen students’ understanding of the thematic evaluation criteria, and even promote the comprehension of texts (Coiro et al., 2015; Kohnen & Mertens, 2019).

5.2 Choosing credible information sources

Another key feature in promoting students’ information seeking and evaluation skills is linked to the processes of choosing information sources. This involves interpreting, understanding, and assessing different forms of texts that include a wide range of modalities, such as written and oral language, audiovisual, tactile, gestural, and spatial representations, or a combination of the above (FNBE, 2016; Kalantzis et al., 2010; New London Group, 1996; Palsa & Ruokamo, 2015). In line with the PISA 2018 Reading Assessment Framework (OECD, 2019), I would argue that when selecting information sources, the aim is not only to find out what information they contain but also how credible the information provided by the source is. According to the results of this research, school assignments emphasize the first, which is reflected in how certain information providers are recommended to be used, and others, in turn, are represented as undesirable. On the one hand, this procedure leads students toward credible information sources; on the other hand, they lose the opportunity to practice and develop their own skills in the assessment of information. In addition, the results indicated that although teachers suggested that students use information sources, for example, in graphic form, they still relied almost exclusively on written text. This is problematic because, in addition to the limited comparison of sources and the critical evaluation of content, the use of information sources focuses primarily on written language, which does not support the development of evaluation practices in other forms of texts.

This research highlights the need to scrutinize information seeking and evaluation from the perspective of multiliteracy and to integrate these skills more closely into multiliteracy instruction. Multiliterate people can better evaluate the credibility of multimodal and multicultural texts that can be quickly disseminated across national and cultural borders through videos, images, and visual stories on Internet platforms such as YouTube, Instagram, Snap Chat, and TikTok, which are
popular with young people. People tend to trust their cognitive authorities (Wilson, 1983), and the information they mediate thus appears to be reliable and credible, allowing, for example, social media influencers to gain a position of cognitive authority (Multas & Hirvonen, 2021). As children and young people frequently view digital content produced by those, they follow on social media, promoting critical evaluation and thinking would guide them to reflect on the information shared by their favorites, its accuracy, and what is behind the information; what is the purpose of this published content.

For example, during the COVID-19 pandemic, a variety of health-related information has widely been produced and shared on the internet (e.g., Eysenbach, 2020; Germani & Biller-Andorno, 2021; Solomon et al., 2020), including audiovisual expression. This is an important viewpoint to consider because previous studies have shown that students often do not question the accuracy and credibility of information retrieved from the internet (e.g., Castek et al., 2012; Coiro et al., 2015; Forzani, 2018; Hirvonen & Palmgren-Neuvonen, 2019; Kiili et al., 2019). It is not new that charismatic people and good performers have a large number of followers and supporters, but digitalization has made it possible to attract admirers much more widely than before, globally. Concurring with Yelland (2018), digitality itself is not the challenge but multimodality in digital environments requires transforming literacy practices. Therefore, multiliteracy instruction should also focus on assessing the credibility of audiovisual information shared on the internet and distinguishing someone’s opinions from facts or scientific knowledge (Suarez-Alvarez, 2021). Moreover, scientific knowledge has a contested, tentative, and changing character (e.g., Prachagool & Nuangchalerm, 2019), which may be among the reasons why supporting and guiding students to critically evaluate scientific knowledge is a real challenge for teachers.

5.3 Teachers as information facilitators, sources, and guides

The third emerging feature emphasizes a teacher’s role as a promoter of the skills of information seeking and evaluation. Sub-chapters 5.4.1 and 5.4.2 describe the operational environment in which children and young people circulate, interact, seek, and use information, and what information sources are like today. These factors provide a framework for teachers’ work, how information seeking and assessment are taught in school and health education, and how they should be taught. The curriculum is an official document that defines the objectives of teaching in each subject and has included multiliteracy as a transversal competence
for basic education since 2016 (FNBE, 2016). With this research, it needs to be considered whether it is an adequate investment in the promotion of multiliteracy or whether other actions are needed.

The teachers who participated in this research were concerned about young people’s ability to function in the digital world, evaluate different forms and types of information sources, make choices between those sources, and act self-directed in the modern media world. Interestingly, a growing key concern was the declining and polarized literacy skills of children and young people, as they reduce opportunities to study and settle in society and thus increase the risk of exclusion (OECD, 2019).

Proper reading and writing skills are the foundation on which learning is built, but if teachers’ time even in secondary school, is spent practicing these basic skills, it is out of something else, such as subject content and multiliteracy. Nevertheless, these different learning objectives are not separate and mutually exclusive but are part of a larger set of competencies. A combination of modes promotes learning, as it considers various learning styles and supports the development of the parallel use of different modes (Cloonan, 2015; Kalantzis et al., 2010). Engaging in a pedagogy of multiliteracies is crucial in literacy instruction, as it contributes to interpreting, understanding, and producing a variety of textual resources and all kinds of modes. It also transforms and promotes students’ reading and writing skills (Cope & Kalantzis, 2009; Jewitt, 2008; Paesani, 2016).

In line with previous studies (Kiili et al., 2019; Kiili, Leu, Marttunen et al., 2018), I argue that teachers play a significant role in facilitating students’ information seeking and evaluation practices, as well as guiding them toward credible information sources. The results of this research indicate that teachers too see this guiding and scaffolding approach as important in their work. Furthermore, some of the teachers in this research were clearly students’ cognitive authorities, as students relied on their teachers’ knowledge with a low threshold. In health education, the role of the teacher as a cognitive authority is defined by the community (Neal et al., 2011; Oliphant, 2009). In this case, both the identification of the teacher as an expert in health-related information and the discourses in place and interactions during lessons were central (Huviila, 2013; McKenzie, 2003; Rieh, 2010).

Although previous research (e.g., Browner & Press, 1996; McKenzie, 2003) has shown that in situations of structural inequality, such as school, it is often easier to acquire a position of authority based on subject knowledge, this is not self-evident. As illustrated by Fischer and Frey (2019), teachers’ high credibility is
based on characteristics such as plausibility, expertise, trustworthiness, and commitment to the subject content and students. As the results of this research showed, a highly trusted teacher can transfer or lend their cognitive authority to some other, even surprising, information source by recommending it to students (Sundin & Francke, 2009). These teacher roles as students’ informational authorities underscore the importance of teachers being able to assess the credibility of health information, knowing how to identify misinformation and disinformation, and how to integrate information seeking and evaluation as part of multiliteracy instruction into everyday schoolwork. In summary, there is a lot to practice for students, but also for teachers.
6 Zooming out toward future considerations

The aim of my research was to construct an understanding of the complex phenomenon of promoting information seeking and evaluation in health education from a multiliteracy perspective. The research provided a multidisciplinary window on this topic, as information behaviors and practices have traditionally been part of the research field of information studies to characterize the ways in which people generally process information (Savolainen, 2007). Bringing the perspectives of information studies into this research in the field of education enabled me to map out the key features of the phenomenon and to consider the general aim of the thesis as presented in the previous Chapter 5. Moreover, I have utilized the nexus analytical approach throughout the research in connection with other central concepts, such as multiliteracy and teacher roles and identities. This kind of research design allowed me to study the phenomenon from multiple novel perspectives, which initially challenged me and forced me to expand and deepen my thinking. On this basis, in this chapter, I will discuss some of the limitations, future paths, and practical implications for research that are worth considering.

Multiliteracy is included in the curriculum for basic education (FNBE, 2016) as a transversal competence, but its implementation in everyday teaching in every subject is not an easy task. The results of this research highlighted that the teachers knew what the concept of multiliteracy means, but how multiliteracy can be promoted in all subjects is limited by various factors. Teachers are concerned about the decline in students’ reading and writing, and they fear that as this trend continues, people in Finland will also become increasingly divided into the literate and the illiterate. I agree that this concern is real, and I understand that it has an impact on how (multi)literacy is promoted in schools. However, teaching reading and writing is not separate from multiliteracy, but they are all part of the same phenomenon of meaning-making, and they develop in parallel (Burnett & Merchant, 2018). Hence, it is not appropriate to simply replace previous learning goals with new ones or to focus predominantly on skills development, but rather to consider diverse modes of communication practices in literacy instruction (Burnett & Merchant, 2018; Towndrow & Pereira, 2018).

The results of this research showed that contemporary health information challenges even teachers and health professionals, creating moments of perplexity. Information is easier to access than ever, but its evaluation has become increasingly difficult for several reasons. A multiliteracy perspective to study information seeking and evaluation in the context of health education is essential because
contemporary health communication is multimodal and culturally and linguistically diverse. As above, in relation to information seeking and evaluation, how is in the center: How can students’ information seeking, and evaluation be promoted through multiliteracy? Despite the diversity of definitions of multiliteracy, teachers, policy makers, and researchers know, at least on a general level, what multiliteracy means and how to define it, but I would claim that its importance in information seeking, and evaluation is not yet sufficiently acknowledged. Critical evaluation of information is one of the challenges of 21st-century, not just in terms of credibility but also including elements such as quality and validity of different modes of texts, author’s purposes and viewpoints, and the inconsistencies of texts (OECD, 2021). Furthermore, societal challenges place limits on where resources are used, and this is also reflected in education. In the worst-case scenario, the unequal distribution of resources creates educational inequalities and raises the question of who has the opportunity to become multiliterate in the future.

To this day, the teacher is still a key facilitator and enabler of learning. In Finland, teachers are highly educated and professional, and despite growing demands, teaching is of high quality. Indeed, teachers are burdened by factors beyond their control, such as increased group sizes, students’ diverse support needs, and lack of resources, which have regularly been publicly discussed (see also Lerkkanen et al., 2020). Curriculum reforms and changes in pedagogical practices without appropriate help and support contribute to teachers’ work-related stress (Ilomäki et al., 2012). Teaching is changing; new learning environments, including digital ones, are becoming more common, and teaching methods are diversifying. Alongside these issues, there is still a need for traditional teacher-led instruction, and teachers play an important role in both learning and social interactions in the school community.

In the future, my goal is to further investigate social action in classrooms in the context of seeking and evaluating health information. I would argue that students’ information seeking and evaluation practices, as well as teachers’ ways of promoting these skills, need to be scrutinized at different school levels, for example, in upper secondary and vocational education, and across Finland. This would also allow for an examination of the interesting socio-economic, regional, cultural, and linguistic differences that were left out of this research due to the homogenous population in the area, as is common in most schools in Finland. Therefore, research in other countries and cultures would broaden the perspective on students’ health information seeking and evaluation. In addition, as health communication is a challenging field for all of us, it would be important to focus research on
information seeking and evaluation from the multiliteracy perspective of the adult population in their non-formal environments. It would also be advisable to take a closer look at the role of other factors in promoting multiliteracy, for example, school policies, classroom layout, and the affordances of the particular online sites.

This thesis describes the phenomenon of promoting information seeking and evaluation in secondary school health education in Finland on the basis of the key characteristics of the contexts examined in this research. Considering the research, I agree with Brown et al. (2007) and suggest that teachers in school assignments could encourage students to seek information modally, culturally, and linguistically more broadly than before, outside of the established information sources. This would force students to evaluate the credibility, accuracy, and quality of the content, and to think critically about the possible inconsistencies and distortions in the texts, as well as the intentions of the author and publisher. A wide variety of different information sources will bring extra work to the teacher as well, but such a change in multiliteracy instruction in every school subject would not only benefit the promotion of information seeking and evaluation but also reading and writing. As Coiro (2011) stated, reading online requires similar but also more complex reading processes than reading offline. Because contemporary communication and the channels and environments mediating it are uncontrollable, an individual necessarily needs the skills, means, and tools to function in this information jungle.

The significant disconnect between students’ everyday information seeking and evaluation practices and those conducted at school—relying on specific, “trusted” information sources assessed by school sanctioned devices—should be considered in future teacher training (see also Cloonan, 2015; Kalantzis et al., 2010; Paatsch et al., 2019; Wimmer & Draper, 2019). Given recent trends of user-generated content and health communication becoming mediatized, I suggest, based on this research and supported by Palmgren-Neuvonen (2016) and Pyo (2016), that engaging in the production of student-generated digital content in school assignments would promote multiliteracy. Emphasizing the production aspect of multiliteracy would not only build a bridge between in-and out-of-school multiliteracy, but it would also strengthen students’ agency in meaning making, as well as in constructing, interpreting, and using health information (Cope & Kalantzis, 2009).

In November 2021, the National Literacy Strategy 2030 (Finnish National Agency for Education [EDUFi], 2021) was made public in Finland. The ambitious goal of the strategy is to make Finland the most literate country in the world by 2030. The strategy for developing literacy has three strands: creating and
strengthening structures for literacy work, strengthening multiliteracy, and encouraging reading and diversifying literacy (EDUFI, 2021). In light of this research, it appears that teachers need thorough and long-term support to be able to implement the actions proposed by the strategy. In addition, the implementation of the literacy strategy requires additional funding to be directed to all levels of education, as well as to liberal adult education. Resources are needed because, as noted above, some teachers are already on the brink of coping, and new demands can become overwhelming to implement without adequate support. If all teachers are expected to be multiliteracy teachers, this must also be taken into account in the training of both classroom and subject teachers. In conclusion, policy makers and practitioners who are deciding on future national and local curricula are faced with tough questions. There is a need to seriously consider whether the status of transversal competence is sufficient to promote multiliteracy or whether it should be strengthened at all educational levels, from early childhood education onwards.
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Appendices

Appendix 1. A mind map of screen time by students in School B
Appendix 2. The description of the nexus of practice in three schools
Appendix 3. Teachers’ consent form
Appendix 4. Teachers’ educational and professional backgrounds
Appendix 1. A mind map of screen time by students in School B
Appendix 2. The description of the nexus of practice in three schools

In School A, both Classes 1 and 2 worked most of the time in the rather traditional learning environments, where the teacher’s desk was at the front of the classroom and the students sat in rows alone or the desks pulled together (see Article I). Such an environment supported a fairly peaceful work atmosphere, with students discussing with each other and with teachers, but no major disruptions occurred. Moreover, Class 1 worked in the computer classroom during some of the lessons, which shaped the interaction order to some extent. The students (and groups of students) sat side by side with their computers at long tables. In this setting, the conversations were occasionally loud, and the activity was a bit restless. The teachers in these two classes mostly mingled with the students, helped, and guided when asked.

In School B, the group work began and ended in one’s own home class; this classroom arrangement is common in primary school in Finland. After the teachers instructed the students, they were allowed to choose a free space, such as an empty classroom, corridor, or storage room, to do their group work. The work started with the creation of mind maps (see Appendix 1), in which the students reflected on and outlined their views about screen time on paper. Because the final outputs of this class were made for the Sway storytelling application, in addition to the mind maps, all the other products, such as videos and digital stories, were in digital form. According to the teachers’ instructions, the students were quite free to choose their way of working and the products, if the content was suitable for the sixth graders and promoted learning in some way. The teachers and a school attendance assistant moved between the spaces and the student groups, supervising and helping as requested. Some of the students worked all the time in the same desk group, especially if the final product was done entirely on a tablet or computer. Those students who made a video that included acting moved between the learning spaces, and took advantage of the school environment more widely. From the eyes of the observer, the students working in the classroom were lively but behaved well and performed the task as required. The interaction order varied according to the working space; the students’ actions in the round table group created different social arrangements when compared to, for example, working in a storage room without desks and chairs for all members of the group.

In School C, the group work began and ended in a traditional classroom, where students sat in rows and a teacher’s desk was placed in the front. After the researchers had presented the main goals of the data collection and the teacher had
given instructions for the work, during the planning phase of the group work, the students were allowed to choose their work environment quite freely. Consequently, the students chose locations for the video design, such as a table tennis table, a silent workspace, a beanbag group, and other study spaces in the school hallways. These choices were rather interesting, and in some cases, the resulting interaction order may not have been the best possible way to promote the work. For instance, the silent workspace was located next to the hall where the matriculation examinations were underway at the time, so silence was required. That, in turn, was not optimal, since the students needed to plan and negotiate together. The beanbags can be associated with relaxation and informal interaction, and this also seemed to be the case here. The group who worked in the beanbags discussed briskly off-topic and the topic itself only when the researchers urged them to do so. In the next phase of the video production, the students video recorded interviews in the school area and produced other content through videos and photographs. In these two phases, the students worked independently, and teacher guidance was limited. The final stage of video production, video editing, took place in the classroom and in the hallway just outside the classroom. A media teacher at the Cultural Center, with the help of the researchers, taught the students how to make videos.

The students in the two classes in School A studied with music emphasis, so they had three hours more music education weekly compared to the regular eighth graders. In this way, the students did not represent a cross-section of Finnish students, but musically talented young people who had been selected for a special class through an entrance examination. In contrast, the students in Schools B and C studied at their local schools without a special subject-specific emphasis. The students included in this research can be considered homogenous regarding their ethnic backgrounds; they were native Finns whose mother tongue was Finnish, and the differences in learning were small.
Appendix 3. Teachers’ consent form

Hyvät opettajat,


Täytättehän ystävällisesti alla olevan tutkimusluvan mahdollisimman pian. Lähimääräinen yhteistyö kanssanne on vääristutkimuksen kannalta arvokasta ja toivon teidän vastaavan alla olevaan kysymykseen myönteisesti.

Yhteistyöstänne kiitän,
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Osallistun tutkimukseen ja annan luvan tutkimusaineiston käyttöön yllä kuvatulla tavalla.

Kyllä       Ei

___________________________ ___________________________
Paikka ja päivämäärä     Allekirjoitus ja nimenselvennys

_________________________________  ___________________________
## Appendix 4. Teachers’ educational and professional backgrounds (Modified from Article II)

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Subject</th>
<th>Teaching years</th>
<th>Former profession</th>
<th>HE qualification</th>
<th>Further studies</th>
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<td>Licentiate degree</td>
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<td>Health education</td>
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*Note. Primary teaching subjects are indicated in bold.*
Original publications


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Original publications are not included in the electronic version of the dissertation.
195. Kiema-Junes, Heli (2020) Associations of social skills and social support with well-being-related outcomes at work and in higher education: heart rate variability, engagement, and burnout

196. Viitasaari, Markku (2020) How to deal with the syntonic comma in music education? : recognition, preferences of usage, and utility

197. Matengu, Marika (2020) Towards just pre-primary education in rural Namibia


199. Sobocinski, Márcia (2021) Patterns of adaptive regulation in collaborative learning: a multimodal methodological approach


201. Pellikkä, Anne (2021) Pre-service primary school teachers’ teacher identity development in the context of science education

202. Koivunen, Marika (2021) Student interpretations of their self-regulated learning in individual and collaborative learning situations


204. Saari, Maria Helena (2021) Animais as stakeholders in education: towards an educational reform for interspecies sustainability

205. Mäenpää, Kati (2021) Motivation regulation and study well-being during nurse education studies


207. Kekki, Minna-Kerttu (2022) Educational possibilities of media-based public discussion: a phenomenological-philosophical analysis of the givenness of others

208. Kauppi, Veli-Mikko (2022) Education and intelligence: reconstructing John Dewey’s theory of intelligence from an educational perspective


210. Petäjäniemi, Maria (2022) (Un)becoming an asylum seeker: nomadic research with men awaiting an asylum decision
Tuula Nygård

“THERE IS A LOT TO PRACTICE”

A NEXUS ANALYTICAL STUDY ON PROMOTING MULTILITERACY IN HEALTH EDUCATION