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# **FINNISH TEACHERS' CONCEPTIONS OF THEIR ROLES IN CLIMATE CHANGE EDUCATION AND STUDENT CLIMATE ACTION**

A phenomenographic study

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# ABSTRACT

Nick Haswell : Finnish teachers' conceptions of their roles in climate change education and student climate action: A phenomenographic study

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Climate education is considered to play a vital role in the global response to climate change because it can raise students' understanding of the phenomenon and encourage them to take action towards its mitigation. The 2018 IPCC Special Report gave a new urgency to the climate fight, warning that fundamental and sweeping changes need to occur in all aspects of society in the next decade to avoid the worst effects of climate change. This ominously short time frame raises important questions about the state and effectiveness of climate change education around the world, and about the role of teachers in engaging students in climate action.

Focusing on Finland, with its sustainability-oriented National Core Curriculum, this qualitative study investigates how Finnish school teachers conceive their roles in both school climate change education and in the 2019 Student Strike for Climate marches and how these roles are negotiated between teachers' personal attitudes towards the climate change phenomenon and the perceived expectations and responsibilities of their teaching practice. The study is guided by six research questions relating to: 1) subjects' personal conceptions of the climate change phenomenon; 2) subjects' conceptions of their personal lifestyle choices in relation to climate change; 3) subjects' conceptions of their roles in school climate change education; 4) subjects' conceptions of their roles in the 2019 Student Strike for Climate marches; 5) how subjects conceive the expectations of their teaching practice impacting on their roles in the 2019 Student Strike for Climate marches; and 6) how subjects' conceive their professional responsibilities impacting on their roles in the 2019 Student Strike for Climate marches. Data was collected from a series of eight semi-structured interviews with Finnish school teachers working in three schools in the Tampere area. The phenomenographic method is used to analyze subjects' conceptions and formulate sets of categories that describe them at a group level. One set of categories is formulated for each of the six research questions. A phenomenographic outcome space is then established to explore and clarify the relationships of the resulting categories.

Regarding research question 1, the study found that subjects conceive climate change as an important global issue, but base that conception on different sources of knowledge described by the following categories: (1) *Important global issue, scientific evidence-based view*; (2) *Important global issue, personal experience-based view*; (3) *Important global issue, media-based view*; (4) *Important global issue, teacher training/organization-based view*; and (5) *Important global issue, own upbringing/schooling*. Regarding research question 2, subjects conceived themselves making lifestyle choices that fell into one of the following two categories: (1) *Highly active lifestyle choices*; and (2) *Moderately active lifestyle choices*. Regarding research question 3, three categories emerged to describe how subjects conceived their role in climate change education: (1) *Activist role*; (2) *Passive Activist role*; and (3) *Neutral role*. Regarding research question 4, the study found that all

subjects conceived their role in the 2019 Student Strike for Climate marches in the same general way, described by the following category: (1) *Neutral guide*. Regarding research question 5, the study found that five main aspects of teacher practice were conceived by subjects as impacting on their role in the 2019 Student Strike for Climate marches. These aspects were categorized as: (1) *Teaching subject*; (2) *National Core Curriculum/school curriculum contents*; (3) *School management/culture*; (4) *Teacher autonomy*; and (5) *Level of teacher training in climate change education*. Regarding research question 6, the study found that five main aspects of teacher responsibility were conceived by subjects as impacting on their role in the 2019 Student Strike for Climate marches. These aspects were categorized as: (1) *Student physical welfare*; (2) *Student emotional welfare*; (3) *Student educational welfare*; (4) *Teacher neutrality*; and (5) *Student public reputation*.

The study suggests two actions which may increase Finnish teacher's efficacy in engaging students in climate action: (1) Increasing pre-service and in-service teacher training in climate change education; and (2) adding more explicitly action-oriented goals and objectives to the Finnish National Core Curriculum.

Keywords: climate change, teacher role, student strike, phenomenography, Finland

The originality of this thesis has been checked using the Turnitin Originality Check service.

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## 1. INTRODUCTION

Human-induced climate change is one of the key crises of the modern world, and is unfolding apace. Climate change-linked natural disasters and social upheavals now occur with alarming regularity, while warnings from climate scientists grow increasingly dire. Taking these warnings seriously, we have little more than a decade to make sweeping and fundamental changes to our society in order to avert the most catastrophic effects of climate change (Intergovernmental Panel on Climate Change, 2018a).

Education has an essential role to play in the global response to climate change (UNESCO, 2018), because it can teach young people to understand the complexity of the issue, as well as encouraging them to take action and make environmentally conscious changes in their attitudes and behaviours. Education, wielded effectively, has the possibility to produce active and responsible environmental citizens rather than passive consumers of nature (Aarnio-Linnanvuori, 2019).

A National Core Curriculum is in place in Finland which emphasises both environmental awareness and action (Finnish National Board of Education, 2016). The core values embedded in the curriculum – in particular those of ecosocial awareness and sustainable development- provide Finnish school teachers with a wide pedagogical space within which to engage students both theoretically and actively with the issue of climate change.

At present, however, the way the Core Curricular sustainability goals are interpreted, and the way environmental issues such as climate change are presented to students, depends a great deal on teachers' own understandings and attitudes towards them (Aarnio-Linnanvuori, 2019). Given the enormous influence school teachers' own attitudes have on the shaping of students attitudes to such issues as climate change (Davis, 2003), and because of the enormous impact the attitudes of students today will have on the present and future actions they take towards climate change mitigation, teachers' personal attitudes towards climate change may have a significant impact on the role teachers take in climate education.

Another complicating factor for school climate change education seems to be that, despite the openness of the National Core Curriculum to environmental concerns, teachers still need to operate within an existing educational system. For a teacher wishing to engage their students with direct social action to

bring about the rapid changes to society called for by climate scientists, conflicts may potentially arise between the goals of these social actions and the expectations and responsibilities of their professional teaching practice.

A great deal of research, in Finland and abroad, has been conducted into the nature of school climate education and on students and teachers' attitudes towards the climate change phenomenon (e.g. Bangay & Blum, 2010; Anderson, 2012; Chang, 2014; Hermans & Korhonen, 2017; Aarnio-Linnanvuori, 2019). No research, however, has yet been made into how Finnish school teachers conceive their role in climate change education, and how that role is negotiated between a teacher's personal attitudes about climate change and the perceived expectations of their professional practice. The present study attempts to fill that research gap.

The 2019 global School Strike for Climate marches provide a useful and timely context in which to explore the relationships between teachers' roles, attitudes and professional practice in relation to climate change education. The School Strike for Climate movement has, since emerging in 2018 through the activism of Swedish teenager Greta Thunberg, seen thousands of students in Finland and abroad leave school on pre-arranged days to march in public protest against climate change inaction (Koskinen, 2019b). Despite being organized independently of schools by students and environmental groups, and despite being ostensibly a strike *from* school, the marches also offered an opportunity for Finnish school teachers to engage in social climate action with their students and make the kinds of pedagogical links between direct climate action and school climate education encouraged by the National Core Curriculum (*ibid.*).

From a climate educational standpoint, the climate strike march phenomenon may be considered an intersection between the school educational domain (encompassing the expectations and responsibilities of professional teacher practice) and the social action domain (encompassing personal attitudes towards the climate change phenomenon and towards climate activism). This phenomenographic study sought to shed light on how Finnish teachers negotiated their role as a climate educator within this intersection. The following questions were considered:

1. How do Finnish school teachers conceive the climate change phenomenon itself as an environmental and social issue?

2. How do the teachers' own social actions and lifestyle choices reflect their attitudes towards climate change?
3. How do the teachers conceive their role as educators in the context of school climate change education?
4. How do the teachers conceive their role as educators in the context of the student climate marches?
5. Which elements of teachers' professional practice impacted on their roles in engaging with the student climate marches?
6. What aspects of teachers' professional responsibilities impacted on their engagement with the student climate marches?

## 2. LITERATURE REVIEW

In this chapter I will review the research literature on the four major themes connected to the current study. Firstly, a basic overview of the climate change phenomenon will be given, along with a brief description of the impacts the phenomenon has and may have on nature and society. Secondly, a general overview of climate change education will be given, focusing in on climate change education in the Finnish education system and the Finnish National Core Curriculum. Following this will be a discussion about teachers' attitudes towards climate change, and then teachers' professional practice in regards to climate change education. Teacher attitudes and professional teacher practice are vast topics in their own right, but for the sake of brevity and clarity I have limited the discussion to those themes as they relate to climate change and climate change education.

### *2.1 Climate change*

The term climate change refers to long-term changes in local, regional and global weather patterns. While the term broadly denotes all natural and human-activity induced changes in climate, it is commonly associated specifically with global warming, a marked rise in air and sea temperatures that has been observed since the beginning of the twentieth century and is attributed to human activity. While several natural processes are understood to contribute to the global warming form of climate change, the heating over the past century is understood to be caused mainly by the burning of fossil fuels by humans (United Nations Framework Convention on Climate Change, 2011). It is this current human activity-driven warming trend that is the focus of this study. The burning of fossil fuels has increased rapidly in the last half century due mainly to economic and population growth, causing changes to the climate which threaten both natural and human societal systems (Intergovernmental panel on Climate Change, 2014).

The negative impacts of climate change are varied, and the processes by which they occur are complex. While many impacts are predicted to occur at some point in the future, several have already begun to manifest in different parts of the world. The major negative impacts include a higher incidence of heatwaves and drought which have led to unprecedented bushfires around the world, increased sea-

level rise which threatens coastal habitats and more frequent and severe floods and tropical storms. These impacts on natural climatic and ecological systems in turn place increasing strains on human societies and economies (World Meteorological Organization, 2020).

The time frame for action against the threat of climate change is ominously short, and all discussion concerning the issue and actions towards its mitigation must be framed within that time frame. To avoid the most extreme impacts of climate change, fundamental and far-reaching changes need to occur in all aspects of society within the next ten years (Intergovernmental Panel on Climate Change, 2018a). This is because the greenhouse gases which, when released into the atmosphere fuel climate change, are to a great extent a by-product of our societies and our social and individual behaviour patterns.

The choices we as individuals and as a society make all have a bearing on the amount of greenhouse gas emissions and therefore on the degree of climate change impact. To mitigate the effects of climate change, therefore, we need to reconsider the way we eat, travel, heat our homes, dispose of waste, and what we buy. More than this, however, we need to pressure governments and fossil fuel companies to change the way societies consume energy and produce food and goods. With most of the worldwide greenhouse emissions coming from fewer than one hundred international companies (Griffin, 2017), co-ordinated public pressure on them, and political decision-makers choosing to deal with them, is an essential factor in climate change mitigation (Ockwell, Whitmarsh, & O'Neill, 2009; Skocpol, 2013; Nicholas, n.d.). This form of climate activism has indeed been developing apace around the world in response to the urgency of the climate crisis (e.g. Bomberg, 2012; 350.org; Greenpeace.org).

It is not enough, however, for adults alone to take action and make changes in society. The short time frame for climate action and the dangers posed by inaction require that all members of society take part in immediate action. It is especially important that children and youth are also actively primed to take immediate action towards climate change mitigation. As the inheritors of tomorrow's world and the bearers of the longer-term impacts of climate change, they will need to be equipped with the knowledge, understanding and skills to continue the fight against climate change when they become adults.

A climate change education is needed, in which children and youths are not only taught to understand the climate change issue but also actively engaged in climate change mitigation; that is, actions

undertaken to reduce greenhouse gas emissions, thereby reducing the severity of climate change impacts (Anderson, 2012).

## *2.2 Climate change education*

Much research has been conducted into the central role climate change education can play in climate change mediation (Bangay & Blum, 2010; Lehtonen & Cantell, 2015; UNESCO, 2018). By increasing young people's understanding of the climate change issue and the behavioural and consumption patterns that contribute to it, effective climate education can guide them to locate and change those patterns, and encourage, through civil action, wider social and economic systems to change. Education is also seen as a driver for climate adaptation, through the teaching of new practical and critical-thinking skills in preparedness for an unpredictable future. (Jensen, 2002; Anderson, 2012).

Climate change education is considered successful if it achieves not only an increased understanding of the climate change phenomenon, but also an increased willingness to take action towards climate change mitigation. Research has indicated that certain elements are critical for successful climate change education (Anderson, 2012; Siegner, 2018; Mcneal & Petcovic 2019). Firstly, climate change education should not be implemented as a stand-alone subject, but integrated across all subjects areas. Secondly, it seems to be more effective when linked with students' local environments and personal behaviours. Thirdly, engagement with climate change themes is more successful when the themes are framed in a positive way, emphasizing student efficacy and empowerment. Fourthly, student engagement with sustainability practices are more successful when students can see concrete results from their actions. Finally, persuasive texts and visual imagery are effective in engaging students with complex issues related to climate change.

Various models of climate change education have been developed (e.g. Chang, 2014; Cantell, Tolppanen, Aarnio-Linnanvuori, & Lehtonen, 2019) which incorporate some or all of these elements. For climate change education to be effectively implemented, however, teachers must be appropriately trained as climate change educators (Anderson, 2012; Värri, 2018). Without appropriate training teachers may lack important knowledge about the climate change phenomenon (Cantell, et. al., 2019) and lack competence and confidence to employ new methods, approaches and attitudes called for by

climate change educational goals (UNESCO, 2015). In the context of the narrow time span for climate action, a competent climate change educator may be seen as one who themselves understand the complexities of the climate change phenomenon and engages in direct action towards climate change mitigation while also actively engaging their students in climate change learning and direct action.

### *2.2.1 Climate change education in Finland*

Many climate change educational programs have been implemented in educational systems around the world (Chang, 2014; UNESCO, 2015), including those implemented by the UNESCO (2015) Climate change education for Sustainable Development program. Under the guidance and co-ordination of this international initiative, several countries have worked to re-orient their National curricula towards climate change educational aims.

In Finland, the ministry of education has similarly, though independently of the UNESCO program, integrated facets of climate change education into its National Core curriculum (FNBE, 2016). While a dedicated climate change educational program for Finnish schools is under development (Mäkelä, 2019), at present the goals of climate change education are embedded in the broader sustainable development values outlined in the Core Curriculum.

The Core Curriculum engages with the climate change issue through the values of sustainable development and ecosocial awareness. In the curriculum, sustainable development is defined as a core value of education, while ecosocial knowledge and ability are described as principles which strive to create an ethical and sustainable relationship between society, economy and natural ecosystems, and points specifically to the need to recognize the seriousness of climate change. (ibid., section 2).

These sustainability values and goals are broadly defined in the Core Curriculum text, finding expression in all subject areas and especially in environmental studies, the sciences, ethics and social studies. The wording of the Curriculum text also gives a wide scope for interpretation and implementation of the values and goals at the municipal, school and classroom levels (Aarnio-Linnanvuori, 2019).

One of the key changes in the 2014 National Core Curriculum supporting the promotion of environmental sustainability education is the emphasis on real-world phenomena and skills. This real-

world approach, as Halinen (in Symeonidis & Schwarz, 2016) stresses, is important for environmental sustainability education because, in a rapidly changing world threatened by environmental crises, students need to be equipped with new kinds of skills – thinking skills, social interaction, information processing skills and skills in producing information – in order to meet the challenges of the future. These new kinds of skills are defined in the National Core Curriculum as transversal competencies. Seven types of competency are described: thinking and learning to learn; cultural competence, interaction and self-expression; taking care of oneself and managing daily life; multiliteracy; ICT competence; working life competence and entrepreneurship; and participation, involvement and building a sustainable future. (FNBE, 2016, section 3.3). The seventh competency, *Participation, involvement and building a sustainable future*, is particularly relevant to environmental sustainability education, encouraging students to “develop capabilities for evaluating both their own and their community’s and society’s operating methods and structures and for changing them so that they contribute to a sustainable future” (ibid.).

The real-world approach of the National Core Curriculum is also reflected in the inclusion of mandatory phenomenon-based learning modules (FNBE, 2016). Also known as multidisciplinary learning, phenomenon-based learning is considered a unique pedagogical approach which revolutionizes the way students learn by dissolving boundaries between subjects and reformulating the traditional roles of teacher and student (Eskelinen, 2017). In this approach, real phenomena, such as climate change, are used as the starting point for student learning and are studied holistically, encouraging students to examine them from multiple perspectives across subject boundaries (Silander, 2015).

### *2.2.2 Justification for student climate action in the National Core Curriculum*

Although not explicitly linking it to climate change mitigation, the Finnish National Core Curriculum encourages student engagement in direct action in different ways. In a broad sense, it promotes action through its principle of *Participation and democratic action* (FNBE, 2016, section 4.2), which supports participation in democratic and sustainable development activities. More specifically, action is promoted through the T7 competency-related objectives of some subject areas, such as Grades 7-9

Biology, Geography and Social Studies, which includes support for student participation in out-of-school social activities and active involvement in building a sustainable future (ibid., sections 15.4.6, 15.4.6, 15.4.13).

Research has indicated, however, that at present the cognition-oriented approach to climate change education in the Core Curriculum fails to achieve the main goal of producing action towards climate change mitigation, and suggests a more explicitly action-oriented approach is required (Hermans & Korhonen, 2017). It is here where the role of the teacher becomes so important. Lacking specific curricular objectives towards action on climate change, teachers may choose whether to, and how to, engage their students with climate action based on their personal attitudes towards the climate change phenomenon and climate activism, and the perceived expectations of their professional practice.

### *2.3 Teacher attitudes towards climate change*

Teachers' attitudes - sets of beliefs connected with particular lines of behaviour and outcomes - have a major influence on their work as an educator, affecting both their planning and decision-making processes (Liu, Roehrig, Bhattacharya, & Varma, 2015). Teachers with a high level of concern about climate change, for example, tend to give more importance to increasing students' awareness of the climate change issue than less concerned teachers (Seroussi, Rothschild, Kurzbaum, Yaffe, & Hemo, 2019). Additionally, given that attitudes are considered determining factors for behaviour (Ajzen, 1985), and that teachers' attitudes have a strong impact on the shaping of student attitudes (Davis, 2003), teachers' attitudes towards the climate change issue are also a determining factor for students' attitudes and behaviour towards it.

The influence of teacher attitude is, however, complex. Research in the United States (Stevenson, Peterson, Bradshaw, & van Wouwe, 2016) suggests that, while teacher belief in the existence of climate change impacts positively on student belief in the phenomenon, teacher belief in the human causes of it has no impact on student belief in the same. In other words, if students are taught to believe that climate change is real, they will tend to also believe that it is caused by human activity whether the teacher believes it or not.

Teachers' attitudes also tend to be only weakly related to their knowledge about the climate change phenomenon or to their readiness to act. On the one hand, teachers may be actively engaged in climate action and climate change education despite their possessing incomplete, or indeed false knowledge about the climate change phenomenon (Karami, Shobeiri, & Jafari, 2017). Alternatively, teachers may possess detailed knowledge about the phenomenon, yet refrain from actively engaging in climate action and climate change education. The causes of this theory-action gap (Kretz, 2012; Hermans & Korhonen, 2017) remain elusive yet are undoubtedly complex and rooted in an individual's psychological, social and cultural context. As a wicked ghost of our times (Ropo & Värri, 2019), climate change may be seen and heard, yet be too complex and fearful to face.

The way that teachers' attitudes impact on their role as climate educators may also be influenced by what they conceive as the expectations and responsibilities of their professional practice. For example, while American teachers' ideological and political orientations have been noted as impacting on their climate teaching strategies (Plutzer & Hannah, 2018), the expectation of political neutrality normative to Finnish teachers' professional practice (FNBE, 2016 ; Raiker & Rautiainen, 2017) may neutralise or otherwise influence their ideological or political attitudes. This relationship between teacher attitude and professional practice in the context of Finnish climate change education has, however, been scarcely studied and it is therefore a key goal of the present study to shed light on it. Firstly though, a more detailed discussion on professional teaching practice is in order.

#### *2.4 Professional teaching practice*

A teacher's professional practice – the manner in which they translate curricular goals into student knowledge and action and create a harmonious learning environment - is also an important factor in the success of climate change education. Danielson's (2007) conceptualisation of teaching practice is useful for this discussion. He describes teaching practice as a series of components that relate to four domains of teaching performance. The first domain, *planning and preparation*, includes knowledge of content and pedagogy, setting instructional outcomes and designing coherent instruction and assessment. The second domain, *the classroom environment*, includes creating an atmosphere of respect, establishing a culture for learning, and managing student behaviour. The third domain, *instruction*, includes communicating with students, using questioning and discussion techniques, engaging students in

learning, and demonstrating flexibility and responsiveness. The fourth domain, *professional responsibilities*, includes reflecting on teaching, communicating with families, and showing professionalism.

While all aspects of teaching practice play important parts in climate change education, several components are particularly significant. Firstly, sufficient teacher training in climate change education increases teachers' understanding of the climate change phenomenon and improves their capacity and confidence to teach it (Oversby, 2015) while, as mentioned earlier, a lack of appropriate training may lead to reduced efficacy of climate change education and a lack of confidence, knowledge and skill in teachers (Anderson, 2012; Värri, 2018; Cantell, et. al., 2019). Secondly, approaching the subject of climate change in a positive and constructive manner with students has a positive influence on students' willingness to take action towards climate change mitigation (Ojala, 2015). Conversely, over-emphasizing the negative impacts of climate change without offering hope or constructive solutions may induce fear or anxiety in students. Thirdly, engaging students with climate impacts from their local environment increases student engagement in climate change issues and increases their willingness to take action (Mcneal & Petcovic, 2019).

One aspect of Finnish teachers' professional practice may be considered problematic when climate change education is considered in the context of the short time frame for climate action: the expectation - not mandatory but nevertheless normative in the Finnish education system - of teacher neutrality and political non-involvement. As mentioned earlier, this expectation may influence not only teachers' attitudes towards climate change education but also the way they conceive the expectations and responsibilities of their professional teaching practice. Because of the perceived politicization of the climate change issue both internationally and in Finland (Forest & Feder, 2011, Incoronato, 2019), teachers may feel hesitant to make definitive statements on the human causes of climate change or actively encourage students to engage in climate action. This may in turn lead to teachers assuming passive roles in their climate change teaching, preferring to allow students to voluntarily engage in the issue. While freedom of choice and voluntary participation are essential elements of democratic society and democratic education, a conflict may be seen to arise between the voluntary nature of student participation in climate action and the necessity of swift, fundamental changes to society called for by

climate scientists to avoid climate catastrophe. This conflict, it seems, lies at the heart of Finnish teachers' engagement with the 2019 Student Strike for Climate phenomenon.

### *2.5 The Student Strike For Climate movement*

Intersecting as it does between the school educational sphere and the social action sphere, the Student Strike For Climate movement offers a unique opportunity to explore the ways in which teachers' perceptions of their roles as climate educators are influenced by their personal attitudes towards climate change and the conceived expectations of their professional practice. The Student strike for Climate movement - an international mobilization of students and environmental groups organizing protests against inaction on climate change (350.org, n.d.; #FridaysForFuture, n.d) – began in 2018 with the school strike protests of Swedish teenager Greta Thunberg and soon grew into a global phenomenon (Thunberg, 2018; Crouch, 2018). In organization and goals, the movement shares similarities with previous student climate strike movements, such as the 2015 Climate Strike (Climate Strike, n.d.) which also co-ordinated an international mobilization of school students against climate change inaction.

In 2019, under the banner of the Student Strike For Climate movement, a series of global days of action were organized in which more than one million students from around the world walked out of school to take part in public climate marches (Carrington, 2019). Finnish student and environmental groups, such as Luonto Liito in Tampere and Fridays for Future Suomi in Helsinki took part in the organization of local marches in over twenty locations throughout Finland (Koskinen, 2019b; Onali, 2019).

In the first global Student Strike for Climate march held in March 2019, approximately three thousand students in over twenty locations around Finland took part (Onali, 2019). Similar numbers attended marches held later that year, in May (Siironen, 2019) and September (Koivisto & Nelskylä, 2019). I myself attended two of the marches in Tampere, Finland, both to support the students striking and to make general observations for the present study. What I personally witnessed were well organized rallies of mainly upper secondary and high school students actively engaged in peaceful protest actions in public spaces. The bulk of student protesters initially gathered in one of the large squares near the centre of Tampere, before embarking on a co-ordinated march through the city centre to the city's town

hall. There the gathering stayed for several hours, during which time students made speeches, read poetry and sang songs expressing their views, feelings, worries and hopes regarding the climate crisis, all of which were amplified with a public address system in order for passers-by to hear. While the students speeches were impassioned and at times anxious, the overall atmosphere of the protest was positive and respectful both to fellow students and to others in the surrounding environment. These personal observations echo the reports of most local news coverage of the events.

The Finnish National Board of Education reacted guardedly to the strikes, stressing that, while action against climate change is important, students must lawfully attend school. The decision on whether the climate strikes constituted a valid reason to be absent from school was, however, given to individual schools to make. (Liimatainen & Miettunen, 2019). School decisions regarding participation in the strikes varied widely according to media reports (e.g. Koskinen, 2019a), with some allowing whole class groups to attend with their teachers and others forbidding student attendance altogether. Other schools permitted attendance only with parental permission.

In my observations of the marches I noted the presence of Finnish teachers taking part in the marches with their student groups, some of who had prepared protest signs and speeches beforehand in their classrooms. It was from the presence of these teachers' that the focus of this study began to crystallize. While several news articles and teacher blogs have documented the planning and participation of some individual teacher-student groups in the marches (Koivisto & Nelskylä, 2019; Virtanen, n.d.; Koskinen, 2019b), I wished to gain a more comprehensive picture of what role these teachers, and those of all the other students who participated independently in the marches, played in their students' engagement and participation in the marches. In other words, I wished to investigate the roles these teachers had assumed as climate educators in engaging with these episodes of mass democratic climate action. The present study aimed to shed light on that role and how it was negotiated between teachers' personal attitudes towards climate change and the perceived expectations of their teaching practice.

### 3. METHODOLOGY

This chapter outlines the methodological approach used to gather and analyze data for the research study.

#### *3.1 Methodological approach*

The study was conducted through a qualitative lens because it seeks to understand people's subjective conceptions of phenomena rather than to 'objectively' measure or quantify phenomena – for which a quantitative perspective may be more appropriate (Nisbet, 2005). Because of its focus on the interaction of people and phenomena, a phenomenological methodological approach, phenomenography, was chosen. This particular approach was deemed most useful because, unlike other phenomenological approaches which aim to understand a phenomenon through the perspective of individual's conceptions and experiences of it, the phenomenographic approach focuses on conception itself at the group level (Åkerlind, 2012).

Conceptions, in the context of the phenomenographic approach, refer to ways of understanding and verbalizing perceptions (Harris, 2011). Perception in turn refers to the way in which a subject encounters and experiences reality through the senses, forming the basis of language, behaviour and action (Given, 2008). Perception, and therefore conception, is inherently subjective, however, and may be influenced by a subject's history and socio-cultural context (Merleau-Ponty, 1964). Because of this, the qualitative semi-structured interview was deemed the most appropriate method of data collection for this study because of its flexibility in incorporating unanticipated topics and probing deeper, through subjective 'how' and 'why' questions, into points of interest (Adams, 2015).

#### *3.2 Subjects of study*

Interview subject selection was carried out according to the following criteria:

*a. The subject is an in-service Finnish school teacher (primary, secondary or high school).*

- b. The subject actively deals with the topic of climate change in the classroom.*
- c. The subject engaged with their students in discussion and/or preparation for the Student Strike for Climate marches.*
- d. The subject teaches in the Tampere, Finland area.*
- e. The subject has a good command of English language.*

Criterion (a) was set because of the recency of the Student Strike for Climate phenomenon and because of the study's concern with teacher role and practice. Finnish teachers were selected because of the study's contextual placement within the Finnish educational system.

Criterion (b) was set because of the study's focus on climate change educational practices.

Criterion (c) was set because of the study's concern with teachers' roles in their students attending the marches.

Criterion (d) was set because, while a broader national-scale sample would add to the value and relevance of the study, the present sample was limited to the city of Tampere for three reasons: firstly because of the time restraints of a Master's-level research project; secondly because of the ease of access to Tampere teachers given that I live in the area; and thirdly because Tampere was the location of several of the larger Student Strike for Climate marches.

Criterion (e) was set because English is my native language and as such, could be used most effectively in the interview process. As I understand Finnish language well, however, interviewees were also given the choice to answer questions in Finnish language in order to achieve maximum clarity and understanding of subject responses during the interviews.

While much previous research on climate change education focuses on geography or science teaching, the present studies sample included classroom teachers as well as a range of subject teachers, recognizing that climate change education should be applied through the lenses of all school subject areas (Mckeown & Hopkins, 2010).

### *3.3 Recruitment of subjects*

In order to create an initial interview subject sample, an email was sent to the principals of all schools in the Tampere area introducing the research project and requesting permission and recommendations for teacher interviews. While the responses to the email were generally positive and encouraging, subject recommendations were extremely limited. This seemed to have been mainly due to teachers' reluctance to be interviewed in English language, but many principals also indicated that their schools were already engaged in other research projects or otherwise too busy. Nevertheless, an initial sample of twelve subjects was achieved.

I then contacted the teachers personally, either by email or in person, to discuss the project and their experiences with climate change education. Eight teachers, from three schools in Tampere city, agreed to participate in the study.

The teachers\* were:

- Sofia, a secondary grade home economics teacher
- Juha, a high school mathematics and physics teacher
- Stella, a primary grade classroom teacher
- Aaro, a primary grade music teacher
- Laura, a primary grade classroom teacher
- Matti, a primary grade biology and geography teacher
- Jade, a primary grade classroom teacher
- Anna, a secondary grade maths, physics and chemistry teacher

\* Pseudonyms have been used throughout this thesis in order to protect the privacy of the participating interview subjects.

### *3.4 Interviews and data collection*

A list of seventeen key interview questions was made, based on the aims of the study, and were approved for use by my thesis supervisor. The main themes covered by the questions were:

- *How the teachers conceive the climate change phenomenon itself as an environmental and social issue*
- *How the teachers conceive their role as educators in the context of climate change education and climate activism*
- *How the teachers conceive the relationship between their roles as educators and the goals of climate change activism*
- *How the teachers conceive climate change activism in relation to the National Core Curriculum values of sustainable development and ecosocial awareness.*

Face-to-face semi-structured interviews were conducted with all eight subjects at a time and location of their choosing. Given the busy schedule of the subjects, this meant just before or after the day's teaching in the classroom or staff room. Following Adams (2015) outline of good practice for semi-structured interviews, each interview lasted between half an hour and one hour, with the option to extend the time if the subjects felt inclined to speak longer. The interviews were audio-recorded for transcription purposes.

The interviews were conducted in conversational style, asking the key questions but letting the discussion meander into other areas deemed relevant by the subjects. This semi-structured interview method revealed links to interesting and unanticipated ideas which added depth and richness to the data. Because the subjects turned out to have had quite different teaching histories and attitudes, and conceived their teaching experiences in their own unique, subjective way, different questions and themes tended to be emphasized or brushed over in each interview.

### *3.5 Research Ethics*

To ensure that qualitative research is conducted ethically, several factors must be taken into account. These factors concern informed consent, anonymity and confidentiality, and risk and safety (Wiles, 2012). Following Wiles (ibid.) outline of qualitative research ethics, I undertook the following actions to ensure that the present study was conducted ethically.

Firstly, I sought and gained informed consent from all interview subjects as well as from the principals of their respective schools. This was done by providing clear information about the study's context as a Master's research project, about its research objectives, about what was required of participants and about how the interview data would be used and disseminated. Subjects were then given the opportunity to voluntarily participate in the study, or decline.

Full anonymity and confidentiality was assured to participants, and was maintained throughout the entire research process. Participants' real names were excluded from all parts of the study, replaced by pseudonyms. Also, utmost care was taken to exclude all information identifying participants' schools, students and any other personal details irrelevant to the study from the thesis text.

Before the interview stage began, the study was assessed for potential risks or safety issues. I concluded that, as data was being collected through interviews with adults in their workplaces, there was minimal risks to anyone's physical, emotional or psychological safety. The only potential risk area that I identified was reputational in that participants may reveal personal views that are at odds with their school's policies or values. This risk, however, was neutralized by the above-mentioned maintenance of anonymity and confidentiality.

### *3.6 Methods for data analysis*

A phenomenographic approach was used to analyze the data. As mentioned at the beginning of this chapter, the phenomenographic approach was deemed most useful because of its focus on identifying both similarities and variations in a subject group's conceptions of a phenomenon, rather than dealing with individual conceptions or phenomena themselves (Åkerlind, 2012).

The data analysis followed the phenomenographic analysis procedure outlined by Åkerlind (2012). Firstly the audio recordings of each interview were carefully transcribed verbatim. I then read through the transcripts several times to become more familiar with them. After this, using the Atlas.ti data analysis program, I began coding all of the utterances that seemed relevant to the research question. Quite often an utterance's meaning were inherent in the utterance itself, and when not it was deduced from the context in which the utterance was made. I examined the appropriateness and accuracy of each code several times, adjusting and recoding when necessary. Similar codes were then clustered into larger code groups, giving clues to the larger themes emerging from the transcripts. At the end of the coding phase, I had the coding independently scrutinized by my thesis supervisor.

When the initial coding phase was completed and checked, I began the important task of grouping the codes into larger categories according to their similarities, referring constantly back to the transcripts to retain validity. The categories were formulated as answers to the six sub-questions of the research project.

In creating the categories, I aimed to meet Marton & Booth's (in Åkerlind, 2012) criteria for judging phenomenographic outcome spaces, that:

1. each category reveals something distinctive about a way of understanding the phenomenon;
2. the categories are logically related;
3. the critical variation in experience observed in the data be represented by a set of as few categories as possible.

After the category sets were finalized and scrutinized by my thesis supervisor, I began considering the relationships between the individual categories and between the category sets, with the aim of establishing a structured, logically inclusive set of relationships known as a phenomenographic outcome space (Åkerlind, 2015). Within this outcome space I could begin directly approaching the research topic, investigating what kind of relationships there were between teachers' attitudes towards climate change, their conceptions of their roles as climate educators, and their conceptions of their professional practice.

### *3.7 Quality and trustworthiness*

To ensure the quality, or in other words the trustworthiness, of the research study, a set of evaluative criteria - namely validity, reliability and neutrality, were applied during the entire research process. Recognizing the preference of many qualitative researchers to use the alternative concepts of credibility, transferability, dependability, and confirmability (Lincoln & Guba, 1985), I chose to follow Åkerlind's (2015) choice of these more traditional concepts because of their applicability to the phenomenographic approach.

#### *3.7.1 Validity*

Validity (corresponding to the alternative concept of credibility) usually refers to the extent to which research reflects the real phenomenon being studied (Sparkes, 2001). Åkerlind (2015) however recognizes that interpretive processes such as phenomenographic analysis can never be objective, and so the focus of validity in phenomenographic studies ought not to be on how well their results reflect 'objective' reality, but rather on how well the studies' research methods serve the research aims.

Åkerlind describes two forms of validity checks that are commonly used in phenomenographic studies: communicative and pragmatic. Communicative validity checks involve the researcher collecting feedback from the research community or from other relevant groups such as the intended audience of the study about the methods and interpretations used. In Pragmatic validity checks involve judging how useful and meaningful the research outcomes are for the study's intended audience.

Both communicative and pragmatic checks were employed in the present study. Communicative validity was sought from my thesis supervisor, who checked that the methods used and interpretations made were indeed appropriate for the research aims. Pragmatic validity was also considered throughout the research process to ensure that the study outcomes would be of a kind that may be useful and meaningful to other Finnish school teachers engaged in climate change education.

### *3.7.2 Reliability*

The reliability of qualitative research may be judged by how appropriately and consistently its methodological procedures were applied in the analysis and interpretation of data. Reliability checks are an important factor of research quality because they ensure that the researcher's own perspective on the research topic does not influence the research outcomes. (Åkerlind, 2015). Åkerlind describes two primary form of reliability checks used in qualitative, interview-based research – coder reliability check and dialogic check – which involve other researchers independently coding the data or discussing interpretations together.

Åkerlind (2015), however, describes an alternative type of reliability check commonly used in phenomenographic studies, which is to provide, along with the results themselves, a step-by-step account of how the research data was interpreted. Importantly, the account is supported with illustrative examples from the data set. This third type of reliability check was employed in the present study because of the clarity it gives to the interpretive process used, and also because the ability to apply it without recourse to other researchers made it a more practically feasible option in the context of a Master's-level research project. The account of the interpretive process, along with illustrative examples in the form of quotations taken verbatim from the interview transcripts, is presented in the Results section of this study.

### *3.7.3 Reflexivity and researcher bias*

Another important factor in ensuring validity and reliability in qualitative research is the minimization of researcher bias (Cypress, 2017). Researcher bias occurs when the researcher's own conceptions, beliefs and attitudes influence the way in which they conduct research and interpret data. This was a critical factor to consider in conducting the present study because of the politicized nature of both the climate change issue and of the Student Strike for Climate marches.

To minimize the impact of researcher bias, I used the strategy known as reflexivity (Cypress, 2017), by which I considered, through critical self-reflection, all of the beliefs and attitudes I held toward the research topics. By doing this regularly throughout the entire research process I was able to monitor them and guard against their influence on the research process.

For the record, my personal beliefs and attitudes towards these phenomena are as follows. The issue of climate change concerns me on both a personal and professional level and I consider it a global issue caused primarily by human activity. I believe the climate scientists who link climate change to the many unprecedented natural disasters occurring all over the world of late, and I believe in the veracity of the IPCC report that gives humanity little over a decade to save itself from climate disaster. On a personal level I feel anxious about climate change's effects on the world's natural ecosystems, having watched on as unprecedented, climate change-induced bushfires tore through vast swathes of forest in my home country of Australia while this study was being conducted. As an educator, I have a special interest in climate change education and student action, and I believe that we, as individuals and as societies, can and must take the actions needed to avoid the worst effects of the climate crisis.

### *3.8 Generalizability*

This study collected and analyzed data from a limited sample of Finnish school teachers engaged, in different ways, to climate change education and to the 2019 Tampere Student Strike for Climate marches. These teachers were therefore highly context-specific cases and so the results derived from their perceptions cannot be generalized. It is, however, possible that some aspects of their conceptions reflect those of other Finnish school teachers.

## 4. RESULTS

In this chapter, the results of the phenomenographic analysis will be detailed. The sets of categories that emerged from the analysis will be presented and discussed in reference to the research questions. For the purposes of reliability, each category will be supported by quotations taken verbatim from the interview transcripts.

Firstly the participating teachers' personal attitudes towards the climate change phenomenon will be presented by explaining the categories related to the first two research questions:

RQ1. How do Finnish school teachers conceive the climate change phenomenon itself as an environmental and social issue?

RQ2. How do the teachers' own social actions and lifestyle choices reflect their attitudes towards climate change?

Secondly the participating teachers' conceptions of their role in climate change education and climate action will be presented by explaining the categories related to the third and fourth research question:

RQ3. How do the teachers conceive their role as educators in the context of school climate change education?

RQ4. How do the teachers conceive their role as educators in the context of the student climate marches?

Lastly the participating teachers' conceptions of the expectations and responsibilities arising from their teaching practice will be presented by explaining the categories related to the last two research questions:

RQ5. Which elements of teachers' professional practice impacted on their roles in engaging with the student climate marches?

RQ6. What aspects of teachers' professional responsibilities impacted on their engagement with the student climate strike phenomenon?

The themes will be dealt with in this order so as to ensure a logical flow of concepts as the results are presented. In discussing teachers' conceptions of their roles in climate change education and climate action, it is useful to establish first how they personally conceive the climate change phenomenon, and what attitudes they have towards it. Similarly, it is most useful to discuss the ways professional practice and responsibilities impact on teacher role only once those roles, and teachers' conceptions of them, have been established.

A visual representation of the resulting phenomenographic outcome space - the structure of relationships between the categories and category sets – will be built up as each set of categories is explained, and presented along with a summary of results at the end of each section. For clarity and ease, the results will also be discussed in relation to previous research literature at the end of each section of this Results chapter, rather than as a separate chapter. At the end of the Results chapter, a complete representation of the entire phenomenographic outcome space will be presented along with a final overview of the discussion.

#### *4.1 Research Question 1: How do Finnish school teachers conceive the climate change phenomenon itself as an environmental and social issue?*

All of the participants conceived the climate change phenomenon as an important global issue and most (6/8) expressed personal concern and worry when describing the phenomenon (the remainder described it in more emotionally neutral terms).

*“Well, it’s a global crisis that needs to be taken into account. I’m worried for the future generations...I’m worried for the planet, I’m worried for animals, so this is why I do these things.” (Aaro)*

*“Well I think it’s the largest issue that we have right now. I’m quite concerned about it, I think about it all the time like in my daily life and I’m kind of scared of the future, what it’s going to be... and I’m concerned, even though we are really lucky that we live in Finland and I live in Finland and the things here don’t change that quickly right now, well I’m really concerned what’s happening around the world and I’m, well right people are suffering a lot and there is gonna be a lot of refugees and we should just right now start to build system that we’re ready for that. And also do as much as possible to prevent this temperature rising.” (Jade)*

*“What the facts are, it seems that its one of the most biggest existential issues, or, like, it’s the problem of our time. Well I guess that’s how I feel about it.” (Juha)*

*“Well of course I’m worried about it, like I think we all should be worried about it because it is something that is kind of known that it’s happening...” (Laura)*

*“So I’m very worried about it and I’ve been following what’s been going on for a long time... And of course I understand the emissions and heating and that all these things are, ok, are proven that this, we have to do something about this...” (Matti)*

Variation, however, was found in the type of knowledge these conceptions were based on. Five related categories were therefore created to reflect both the overall similarity and the variations in the participants' conceptions.

Category 1: Important global issue, scientific evidence-based view
Category 2: Important global issue, personal experience-based view
Category 3: Important global issue, media-based view
Category 4: Important global issue, teacher training-based view
Category 5: Important global issue, own upbringing/schooling

These categories will be presented and described individually in the following subsections, supported by direct quotes from the participant interviews. The participants' conceptions of the climate change issue will then be described in relation to how well informed they feel about the issue.

#### *4.1.1 RQ1 Category 1: Important global issue, scientific evidence-based view*

Several participants (5/8) drew on scientific evidence to support their view that climate change is an important global issue: *“I think that it’s quite obvious if you look at the average temperatures , that in our hemisphere there’s a clear trend , and I can’t figure out a better explanation than climate change, giving us warmer average temperatures...” (Juha)*. The 2018 Intergovernmental Panel on Climate Change report in particular was cited often and considered a reliable source of information about

climate change: *“I do believe the scientists who are telling that this is happening because of these reasons. I trust their expertise.” (Aaro).*

#### *4.1.2 RQ1 Category 2: Important global issue, personal experience-based view*

The majority of participants (5/8) drew on personal observations of local Finnish nature and weather to support their view that climate change is an important global issue. The unusually mild winter of 2019/2020, during which the participant interviews took place, was the main subject mentioned: *“Well if you look outside, we have had, well lately not that good weather, not the normal winter weather at all. A lot of raining, so that type of, kind of the four seasons that we have had, we do not have them in the same way that we used to have.” (Anna).* Several participants, however, did not feel fully confident that the unusual climatic events were proof of climate change, preferring to say that it supported their *“personal feeling” (Juha),* and belief that climate change is occurring. Some participants, while noting that warmer winters were occurring, were not convinced of their link to climate change: *“...maybe the winters are warmer, I mean there isn't that much snow, but I don't know if its just normal variation, cos sometimes winters are snowier than some other winters...” (Sofia).*

#### *4.1.3 RQ1 Category 3: Important global issue, media-based view*

All participants reported gaining information about climate change from media sources; in particular newspapers, internet and documentaries. Most (7/8) regarded it as one of the main sources. *“I guess the media is the place where you get, like which report has come out, or, stuff like this” (Juha).* This source of information, however, was not considered completely reliable, and several participants noted the need to follow *“all the news and everything very carefully... just listen to different kind of opinions, try to figure it out.” (Matti).* For internet sites, one needed *“to be skeptical about what information is... trustworthy” (Laura)* and not *“fake news” (Jade).* For similar reasons, one participant considered watching documentaries *“a hassle”* because of the need to *“get to the bottom of, do they like exaggerate some of the things [to] make it a little bit more dramatic” (Aaro).*

#### 4.1.4 RQ1 Category 4: Important global issue, teacher training/organization-based view

Participants drew on knowledge gained from various aspects of their teaching profession to support their view that climate change is an important global issue. To reflect this diversity, two subcategories were made:

##### (a) *Knowledge from teaching subject*

Some participants gained knowledge about climate change through the subject they teach:

*“I know quite a lot about [the climate change issue] because I’m...specialized in biology/geography...” (Matti)*

*“Especially as a Home Ec teacher...what I teach is how to cope [with] every day life, what kind of choices we make as consumers, so I think [climate change is] very strongly related to my subject.” (Sofia)*

##### (b) *Knowledge from teacher training*

Knowledge about climate change was gained through pre-service teacher training that included courses relating to environmental issues: *“...because of the studying that I did in Intercultural teacher education... I already kind of had to start to think about these things [like the climate change issue] which I maybe hadn’t thought so much before” (Laura).*

Another important source of knowledge were in-service teacher training courses on environmental education, which some participants completed. These included university courses such as basic studies in environmental protection [ympäristönsuojelun perusopinnot] (*Anna*), as well as shorter modules organised by teacher groups *“about global warming in general and how you can do something about it in your lessons” (Sofia).*

Knowledge about climate change was also gained through teacher organizations, such as teacher's associations, and educational courses offered by schools (*Anna*). These, and the others mentioned above, were all voluntary courses, completed in the participants' own time and out of their own interests in the subject.

#### 4.1.5 RQ1 Category 5: Important global issue, own upbringing/schooling

One participant, Stella, drew on knowledge gained from their own upbringing and schooling to support their view that climate change is an important global issue:

*“...mä oon itse nuoresta pitäen olen ikään kuin hyvin tietoinen, tai jotenkin ehkä isäni kautta, et oon joskus lukioiässä tai just enne lukioikää jotenkin heräsin siihen, että pitää kierättää, pitää niin kuin kulkea pyörällä ja jotenkin se oli mulle semmoinen sisäsyntynyt juttu” (Stella)*

Also influential for Stella's view on the importance of the climate change issue was a high school project she took part in, to translate the environmental activist text Agenda 2.1 from English into Finnish.

#### 4.1.6 Teachers' conceptions of climate change and how well informed they feel about it.

The majority of participants (7/8) considered themselves moderately to fairly well informed about the climate change issue. Most, however, felt that they lacked detailed and up-to-date information on the phenomenon:

*“I know that I have a lot of lack of information on some areas, like if we start to talk about all the different things that you can do to prevent this climate change, I know that I don't know everything about, for example... hiilinielut...” (Jade).*

*“I'm sure I could know more. Yeah it's not like even though you read about it or hear about it it's not, like, I don't know, I don't feel like I'm an expert on it anyway, so I'm.. in fact when we discussed about it I kind of had to study it a bit myself, it wasn't something that I knew too much about, you know, like factual...” (Laura)*

The need to self study about the climate change issue, mentioned above by Laura, was also raised by several other participants, as was the importance of *“gathering as much data [as one can] from different sources”* (Aaro) in order to find reliable information.

#### 4.1.7 Research question 1 summary and analysis of results

The results from Research Question 1 found in the subject group a generally similar conception of climate change which is based on multiple sources of knowledge. The results, however, did not establish any clear correlation between the conception of climate change and how well informed participant's considered themselves about the phenomenon. In other words, while some participants considered themselves quite well informed and others only moderately informed, they all conceived it as an important global issue. These results will be discussed further in the next section in relation to participants' lifestyle choices.

The results for research question 1 are tabulated below. Results from the following research questions will be progressively added to this table and displayed at the end of each results section. This is done for the purpose of establishing the phenomenographic outcome space, which will be presented below the tables in the following sections.

	Anna	Aaro	Jade	Juha	Laura	Matti	Stella	Sofia
RQ1: Personal perceptions of climate change  <i>(IGI: Important global issue)</i>	C1 IGI scientific view  C2 IGI experience view  C3 IGI media view  C4(B) IGI teacher training view	C1 IGI scientific view  C3 IGI media view	C2 IGI experience view  C3 IGI media view	C1 IGI scientific view  C2 IGI experience view  C3 IGI media view	C3 IGI media view  C4(B) IGI teacher training view	C1 IGI scientific view  C2 IGI experience view  C3 IGI media view  C4(A) IGI teacher training view	C3 IGI media view  C5 IGI upbringing view	C1 IGI scientific view  C2 IGI experience view  C3 IGI media view  C4(A) + (B) IGI teacher training view

Table 1. Summary of RQ1 results

#### 4.2 Research Question 2: How do Finnish school teachers' own lifestyle choices reflect their attitudes towards climate change?

Five out of the eight participants gave reference to their lifestyle choices in relation to climate change. In the context of climate change, one's lifestyle choices are an important reflection of one's overall attitude towards the issue and may be considered indicators of how willing one is to take action towards climate change mitigation. Two main categories were derived from the data concerning participants' lifestyle choices:

Category 1: Highly active lifestyle choices
Category 2: Moderately active lifestyle choices

These categories will be presented and described individually in the following subsections, supported by direct quotes from the participant interviews.

##### 4.2.1 RQ2 Category 1: Highly active lifestyle choices

Three of the participants were classified as making highly active lifestyle choices – that is, they have made choices that have led to substantial changes in their lifestyles. The main types of substantial lifestyle changes were the adoption of vegan/vegetarian diets and the reduction of high-emission activities such as car and plane travel.

An important characteristic of the *highly active lifestyle choices* category is that the choices are made pro-actively – that is, voluntarily and with the intention of mitigating climate change – as well as being made in tandem with other choices:

*“I’ve tried to take steps in my personal life to mitigate some of the impact we’re putting on the planet right now, yeah. I’m a vegan, I live in a city, don’t own a car, try to limit my*

*travelling to, like, using low emission, like ships and stuff like that, instead of planes...”*  
(Aaro)

*“...I've thought about lots of things that I can do to make the climate change go slower...like we... don't drink normal milk, we use kauramaito for example... And we've reduced the amount of meat that we eat. My daughter is vegetarian... Me and my husband have this hobby now, we try to eat very non-processed food and very pure...”* (Sofia)

Although Juha explicitly mentioned only one significant lifestyle choice related to climate change – his choice of career -, it was nevertheless regarded as highly active because of the extent to which it impacted on his life:

*“[Climate change] is one of the issues that made me want to think back and consider what else is there for a person to do besides producing stuff and being part of this cycle that's rolling this way, and education was the nearest answer for me... So in a way it kinda did impact my whole decision for the career [as a science teacher].”* (Juha)

#### 4.2.2 RQ2 Category 2: Moderately active lifestyle choices

Two of the participants were classified as making moderately active lifestyle choices – that is, they have made one or more choices that have led to limited changes in their lifestyles, still with the intention of mitigating climate change.

*“...I still eat meat and I drive an old car and, but, then again I recycle and so on, so I do a little bit... But I only drive my Volvo in the summer, and I'm starting to use, I just moved, I'm starting to use the train from (town) from now on... I eat meat, I sometimes am lazy with recycling and so on... I'm conscious of it, yes, but I guess I, everyone could do a little bit more.”* (Matti)

Stella, while mentioning her actions of recycling and travelling by bicycle, felt anxiety and guilt about lifestyle choices that run counter to climate change mitigation:

*“I have this huono ekologinen omatunto. I feel many many times bad , anxious, about going, returning every weekend to [my home town], by car, and actually I have noticed that before, travelling by plane was a great thing, you know, a cool thing. Nowadays... i don't enumerate the different places [i've flown to] with new groups, with new people... I know that i should do more but that's an insufficient... riittämättömyyden tunne, the feeling of not being, you know, doing enough.”* (Stella)

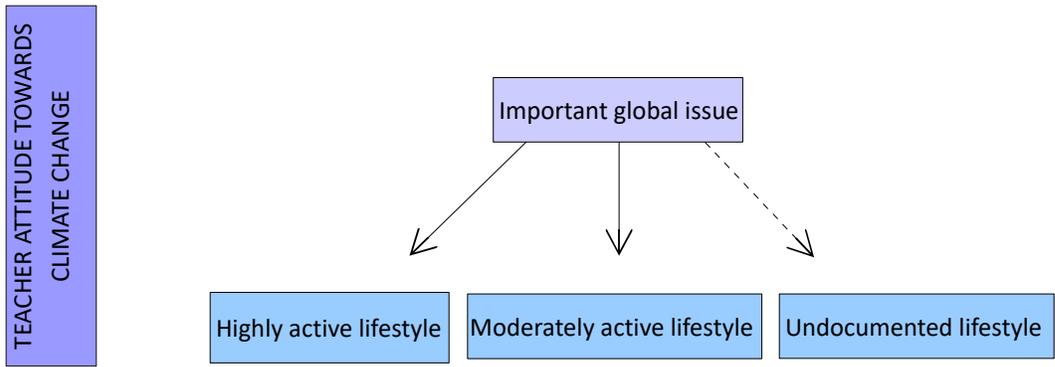
### 4.2.3 Research question 2 summary and analysis of results

Analysis of the research data did not find any clear correlation between participants' personal conceptions of climate change and their reported lifestyle choices. While all participants conceived climate change as an important global issue, some made highly active lifestyle changes while others only moderate. The number and variety of information sources about climate change also did not seem to impact on the type of lifestyle choices made by participants, nor did the extent to which participants felt informed about the issue, as discussed in the last section. These results reflect those of previous studies discussed in the literature review, which indicated that teachers' attitudes tend to be only weakly related to their knowledge about the climate change phenomenon or to their readiness to act (Karami, Shobeiri, & Jafari, 2017). In other words, teachers may be actively engaged in climate action and climate change education despite their possessing incomplete, or false knowledge about the climate change phenomenon. .

Below is a summary of results from Research questions 1 and 2, followed by a visual representation of the phenomenographic outcome space outlining the relationships between the sets of categories presented so far.

	Anna	Aaro	Jade	Juha	Laura	Matti	Stella	Sofia
RQ1: Personal perceptions of climate change  <i>(IGI: Important global issue)</i>	C1 IGI scientific view  C2 IGI experience view  C3 IGI media view  C4(B) IGI teacher training view	C1 IGI scientific view  C3 IGI media view	C2 IGI experience view  C3 IGI media view	C1 IGI scientific view  C2 IGI experience view  C3 IGI media view	C3 IGI media view  C4(B) IGI teacher training view	C1 IGI scientific view  C2 IGI experience view  C3 IGI media view  C4(A) IGI teacher training view	C3 IGI media view  C5 IGI upbringing view	C1 IGI scientific view  C2 IGI experience view  C3 IGI media view  C4(A) + (B) IGI teacher training view
RQ2: Lifestyle choices re: climate change		Highly active lifestyle		Highly active lifestyle		Moderately active lifestyle	Moderately active lifestyle	Highly active lifestyle

Table 2. Summary of RQ1 and RQ2 results



*Fig. 1 Phenomenographic outcome space: RQ1 and RQ2. The dotted line represents conceptions that were not reported in the interviews and are therefore labeled as undocumented. They are included in this way in the outcome space to indicate that other categories of lifestyle may be held by participants who did not report them in the interviews.*

*4.3 Research Question 3: How do Finnish school teachers conceive their role as educators in the context of school climate change education?*

As mentioned in previous chapters, the objectives of climate change education are to increase student understanding of the climate change phenomenon and also increase student willingness to take action towards climate change mitigation. The categorization of participants' conceptions of their roles in climate change education was therefore approached from the perspective of how active they believed they should be, and how active they considered themselves to be, in meeting those objectives.

Three final categories were derived from the data analysis:

Category 1: Activist role
Category 2: Passive activist role
Category 3: Neutral role

During the interviews, participants spoke of their role as teachers in both ideological and practical terms. In ideological terms, participants' beliefs about education's ultimate purpose and value were recounted, and the so-called socialization paradox – education for social maintenance versus education for social change – was often discussed. In practical terms, teacher roles were discussed in terms of the content and decision-making processes of their day to day teaching, as well as emotional support for students, thereby providing data on how participants' conceptions of their roles manifested in their actual lived experience of teaching. Both these ideological and practical aspects of teacher's role were considered in formulating the categories, and so they will both feature in the detailed discussions of categories that now follow.

#### 4.3.1 RQ3 Category 1: Activist role

A teacher's role was considered activist if it led to them: (a) pro-actively engaging students in climate change-related learning; (b) pro-actively engaging students in climate change-related action; and (c) consistently verbalizing to students the need for change and action for climate change mitigation. On this basis, two participants were categorized as having activist roles.

Sofia, a Home Economics teacher, saw her role as to “... *educate the future adults*” and strongly believed that “*what we say [in school] is very important.*” Sofia verbalized her role as a teacher as being “*empowered*” to do something towards climate change mitigation and pushing her teaching subject “*more towards being an active player in teaching them...skills to make ecological choices.*” Teachers, according to Sofia, “*can push kids in that direction*”.

Recognizing the diverse ways in which to teach Home Economics, Sofia pro-actively engaged students in climate change-related learning by consistently choosing to emphasise Home Economics knowledge and practices that stimulated student understanding of sustainability and climate change mitigation.

*“I teach them... how to save energy. how can we waste less energy, how can we waste less water...why should we buy fair-trade products? ... I talk about it during my lessons a lot. Like all the time, we talk about why to cut down on red meat eating, why should we choose organic and what can we do to reduce the consumption overall and stuff like that... I have lots of facts and slides about...how much we waste food, like, globally, yearly so yeah i have included lots of climate issues, or sustainability issues, in my teaching.” (Sofia)*

On a practical level Sofia made explicit references to the climate change issue through such activities as “*making climate friendly food*” in which students learn the benefits of using domestic rather than imported products. Sofia also pro-actively engaged students in climate change-related actions such as food recycling - “*if [students] have something that they can't eat... i always say let's save that, we can use this for making flatbreads, and then i scrape everything in a bag and put it in a freezer, and...they see that wasting food is not a good thing*” - and encouraging students towards vegetarian diets by offering an “*optional course for vegan vegetarian cooking*” for upper grades.

Sofia also consistently verbalized to students the need for change and action for climate change mitigation both through direct encouragement - “*...tell students that they have a significant role, that*

*they can do something. If everyone does something small, it can be a big thing”, - and by initiating discussion on taking action in conjunction with climate-related actions;*

*“[I encourage kids to] try to find the reason/link behind activities, conservation acts. Consequences. Kids accept these ideas. For homework, ask parents why they are not recycling. We went on a field trip to a kirppis, to the forest to pick berries, learn how to use own environment.” (Sofia)*

Importantly, Sofia shared her own personal concerns about the climate change issue with her students, feeling at times “*like peers*” with them. “*We think together about how to deal with climate change/sustainability. We share information and experiences, trade ideas. We are together struggling in this*”.

Jade, a primary grade classroom teacher whose role was categorized as activist, highlighted the importance of teachers being “*trusted...and responsible*” people, with who students can talk about issues such as climate change.

*“I don’t think it’s a solution not to talk about [climate change] because they are exposed to it every day, they hear the news and they hear people talking about it and someone should talk with them and hear what kind of concerns they have... I think teachers should do that, they can’t be just quiet.” (Jade)*

Acknowledging that sustainable development themes were part of her teaching “*all the time*”, Jade described a number of ways in which she pro-actively engaged students in climate change-related learning. Like Sofia, Jade consistently planned lessons which stimulated discussion and learning about climate change and sustainability; “*[we] talk about sustainable lifestyle and ways to do things a lot, and for example in my craft class, first we started the whole year by talking about where cotton comes from and how it’s made, how our clothes are made and things like that.*” Jade also engaged students in climate change issues by watching a weekly childrens' news program in which climate change issues were regularly featured.

As a teacher of younger students (grade 4), Jade stressed that the amount of climate action her students could be expected to take was “*quite little*”. Nevertheless, she described her role as a teacher as “*giv[ing] them some tools*” to do something about it, and pro-actively engaged students in small-scale climate change-related actions such as recycling and recycling art. Jade also designed art activities in which students considered the effects of consumerism and made 'anti-advertisements' for products, thus introducing students to rudimentary forms of activism. These activities were, according to Jade, “*good ways to handle [the climate change] issue with them, and at the same time talk about climate change and what it is and what we can do about it*”.

In verbalizing to her students the need for change and action for climate change mitigation, Jade emphasized the importance of engaging with the issue in positive ways; “*I choose my words in a way that I can kind of emphasise the things that we can do against climate change...I think the right thing is to handle it together, and not paint any really sad pictures about future. Give them hope*”.

#### *4.3.2 RQ3 Category 2: Passive Activist role*

A teacher's role was considered passive activist if it led to them: (a) pro-actively engaging students in climate change-related learning; (b) engaging students in climate change-related action only when initiated by students or curriculum; and (c) discussing the need for change and action for climate change mitigation in neutral terms – that is, encouraging students to think about the issues and make their own choices. On this basis, four participants were categorized as having passive activist roles.

Aaro, a primary grade classroom and music teacher, saw teachers playing a “*massive*” and “*vital*” role in climate change mitigation, because “*school teaches values, and then if we decide to leave these values related to environmentalism and such away, then the kids, well where do they learn it?*” School education, Aaro asserted, is “*a good platform to [learn about climate change] in a responsible way.*”

The passive activist nature of Aaro's teaching role, however, is highlighted in his description of “*the school's job*” which, he related,

*“is to make the kids aware of [issues such as climate change], present them as the facts that they are... guide them to think about it, and [ask], could you maybe do something about this? But then... when you create that kind of atmosphere then you're work is kind of done, you cannot like do more than what you can do during the [school] day”.*

Aaro referred to his role as “*a balancing act*”. While he is careful not to let students know his “*exact ideas about things*”, he nevertheless felt justified engaging students in issues such as climate change because “*we are supposed to cover human rights issues and such things...it's actually written in the core curriculum that we should like value the planet*”.

Aaro considered it important for teachers “*to mention that [climate change] is happening right now, so...it doesn't come as a surprise...*” and, like Jade in the previous subsection, he tries “*to avoid making the kids really worried or stressed out about [the climate change issue], but rather make [students] look for solutions that we are already trying to use...*”

Also, like Sofia in the previous subsection, Aaro felt it important to be open to his students about his choice to be vegan. As distinct from Sofia's activist role through which she encouraged her students to consider vegetarianism, however, Aaro's passive activist role led him to the approach of explaining his own reasons for being vegan, but always telling students to make their own choice; “*you... decide and your parents decide your diet and things such as this but [veganism is] worth considering if you want...*”

Anna, a secondary grade maths, physics and chemistry teacher, described her teaching role as preparing students for future climate action; “*[I] try to make them to be more aware and for example then late in their lives take, that they would be actively working on it. That's my purpose*”.

While she pro-actively engages her students in climate change- related topics, feeling it “essential” that she raise them, her reasons for doing so are verbalised mainly in reference to their relevance to her teaching subjects; “*I like to bring up things in which the school subject I'm teaching matters. So, in that way physics and chemistry... especially, are so much related to [the climate change topic]*”. School values are also mentioned as instigators of climate change-related discussion and activity; “*we have*

*certain central ideas [in the school]... and sustainability is one like that... Our principals bring [it] up and then we have to take care of that in the pedagogical way”.*

Anna 's role is considered passive activist because she engaged students with climate change-related action only when particular curricular activities such as multidisciplinary weeks presented the opportunity. While Anna often discussed climate change issues with her students, she did not engage students in activities related to climate change action in her subjects.

Like Aaro, Anna was hesitant to “*feed*” students with her personal attitude towards climate change. Rather, she chose to discuss it in terms of “*a problem [for which] we are to find a solution and we are going to find a solution*”. By emphasizing the necessity to, and possibility of, finding a solution to the problem, Anna's role may in this aspect be considered more activist than Aaro's. Overall, however, Anna's teaching role was considered passive activist because, as mentioned above, student engagement in climate change-related action occurred only when initiated by curricular activities.

Juha, a high school mathematics and physics teacher, was a borderline case between activist and passive activist. Juha conceived his teaching role as clearly activist, while the practical manifestation of that role, as evidenced from the interview data, was more passive activist.

In trying to describe his role as a teacher, Juha referred to the socialization paradox mentioned at the beginning of this section; “*So I think there's no right answer to it, and my interpretation has been that it's more important to try to facilitate the change for better. Yeah, even if its not aligned with some aspects of how things are right now*”. This perception of an activist teaching role was reinforced by Juha's description of the role of education, which he said needs “*to be some sort of change maker, in a way, that if you are looking how to make a big change, the kind of scale that it would need to solve [the climate change] issue, it should...be integrated in the education system*”.

Like Sofia and Jade in the previous subsection, Juha pro-actively engaged students in climate change-related learning by adapting his lesson content to stimulate engagement with, and understanding about, climate change-related issues; “*I'm a math teacher, so when we are making an example about functions or something,... maybe the book has an example about a function that gives the profits of a company or something, so...maybe my example is about emissions, so... simple stuff like this*”.

Juha's teaching role was categorised as passive activist, however, because he engaged students in climate change-related learning but not in climate action. Similarly, his teaching role was categorised as passive activist because he discussed the need for climate change action in neutral terms. While the fact that Juha was a new teacher in his first year may have played a part in this passivity, Juha himself linked it to the perceived expectation of political neutrality in teaching practice;

*“It’s a difficult issue because the first thing I have to keep...in my mind in all of the teaching I do is that it has to be really independent from any thing that can be considered political or religious or stuff like this... I can’t be telling people how to think about issues.”*  
(Juha)

Instead, Juha considered it his role to *“provoke [students] to think on their own....”* through regular classroom discussions about climate change-related issues.

Matti, a primary grade biology and geography teacher, saw his role in a similar way as Juha, describing it as being *“a teacher...not a preacher”*. This role, he said, reflected his *“attitude towards absolutely everything, more or less, in life... never [having] strong opinions about anything.”* Conceiving climate change as an important issue, Matti nevertheless chose a neutral stance towards it - preferring to *“just [follow] what’s going on, and [try] to keep an open mind on everything”*. For this reason, he reflected, *“I would not call myself an activist”*.

Matti's neutral attitude to the climate change issue also manifested in the way he engaged students in climate change-related learning, though in a rather complex way which led to his perception of teacher role in climate change education being categorized as passive activist. Rather than *“condemning and preaching, and telling people...they’re doing things wrong,”* Matti instead encouraged them to keep *“an open mind [so] you can make your own opinion”*. Alongside this neutral attitude, however, Matti emphasized the importance of students *“ understand[ing] the basis [of the climate change phenomenon], so [they] can actually get what’s going on,...especially concerning atmosphere and global warming and recycling”*. This understanding, Matti hoped, would lead students to adopt *“more self-guided solutions in everyday life”* leading them in the future to *“make things happen and use less and less resources”*.

Rather than actively encouraging students to take action on issues that they may not fully understand, Matti focused on developing in his students critical thinking skills and deeper understanding of the issue in order for them to make more informed decisions and actions towards it. For this reason, Matti's conception of his role was categorized as passive activist.

#### 4.3.3 RQ3 Category 3: Neutral role

A teacher's role was considered neutral if it led to them: (a) engaging students in climate change-related learning only when initiated by students or curriculum; (b) engaging students in climate change-related action only when initiated by students or curriculum; and (c) discussing the need for change and action for climate change mitigation in neutral terms – that is, encouraging students to think about the issues and make their own choices. On this basis, two participants were categorized as having neutral roles.

Laura, a primary grade classroom teacher, considered her role in terms of the socialization paradox, and perceived it, like Aaro in the previous subsection, as a kind of balancing act between protecting students' emotions and engaging them with the climate issue;

*“...you kind of don't want to make the kids feel like, oh you know there's not much we can do and kind of make them feel a lot of pressure about it... But, at the same time... maybe if they didn't already know ways of what they can do or how they can maybe talk about these things even at homes, you know, in some cases they can do changes with the family that can be a bit more of an impact than if the kid themselves, for example, doing some changes”. (Laura)*

Laura nevertheless believed that climate change is a topic that teachers should include in their teaching and stated that, in her own case, the topic was *“in everything that we do here in the classroom”*.

Despite this, Laura's role was considered neutral because she engaged students in climate change-related learning - through discussion, projects and activities - only occasionally, either in connection with particular subjects such as social studies, or when it *“came from the kids”*.

Laura regarded the climate actions her fourth grade students could take as *“more limited than maybe [what] adults can do”*, emphasizing that action at this level is *“small baby steps”*. Her role in this

regard was considered neutral because she engaged students in climate change-related action only when initiated by students or curriculum. For example, after a climate change-related discussion and writing activity, one of her students *“got an idea that let’s send [the students’ writings] to the president. So then we ended up doing that”*.

In discussing the need for change and action for climate change mitigation Laura also took on a neutral role. She felt it was a *“difficult”* subject to talk about, because *“yes it’s happening, but then at the same time some of the kids were really scared”*. For Laura, like other participants, it was important to present the issue in a positive manner, to *“talk about it in a way that... not all hope is gone [and to make students] feel like... ‘do the things that you can do’* rather than having *“the weight of the world on your shoulders”*. To this end, Laura discussed *“little steps”* that students could take, like *“com[ing] to school on a bus instead of getting a lift from their parents, or cycling or walking”*.

Stella, a primary grade classroom teacher, expressed similar concerns for students' anxiety as Laura. Stella described her teaching role as *“not to concern [students] too much”* but *“to make them aware of things... to keep calm and to give some facts as well”*. Stella believed that education should be *“mahdollisimman neutraali”* and so she did not bring up the subject of climate change in her teaching unless a student was expressing concerns about it. When the subject was raised in this way, Stella felt that *“you have to talk about it, like, away, you have to discuss about it”*.

In terms of engaging students with action towards climate change mitigation, Stella admitted that in her school *“it’s more an abstract thing. We haven’t done any concrete things”*. Despite this neutrality, Stella believed that *“the more you are discussing about [climate change] the more...the kids will give attention to it”* and she would occasionally engage students with news articles that looked at climate change from children's perspectives. Stella also occasionally engaged students in climate change-related discussions and activities in Finnish language and social studies subjects. In these lessons students would talk about ways in which they could influence society and take action towards climate mitigation.

#### *4.3.4 Research question 3 summary and analysis of results*

Analysis of the research data found a slight correlation between participants' personal attitude towards the climate change phenomenon (their personal perceptions of climate change and their lifestyle choices) and the type of role they perceive themselves playing in climate change education.

Participants who perceive the issue as important and make highly active lifestyle choices all perceived their role as activist or moderately activist, while those who perceive the issue as important and make moderately active lifestyle choices all perceived their role as moderately activist or neutral. Given the limited subject sample and the only partial data for lifestyle choice, this correlation is only tentative.

RQ2 Nevertheless, this correlation does generally concur with the findings of a previous study discussed in the literature review which indicates that teachers with a high level of concern about climate change tend to give more importance to increasing students' awareness of the climate change issue than less concerned teachers (Seroussi, Rothschild, Kurzbaum, Yaffe, & Hemo, 2019).

The variation found in the subject group's conceptions of their role in climate change education, as well as the possible correlation mentioned above, may be explained in part by the broadly defined values and goals of the National Core Curriculum which give a wide scope for interpretation and implementation at the municipal, school and classroom levels (Aarnio-Linnanvuori, 2019). As discussed in the literature review, without specific curricular objectives towards action on climate change, teachers may choose whether to, and how to, engage their students with climate action based on their personal attitudes towards the climate change phenomenon and climate activism.

Below is a summary of results from Research questions 1-3, followed by a visual representation of the phenomenographic outcome space outlining the relationships between the sets of categories presented so far.

	Anna	Aaro	Jade	Juha	Laura	Matti	Stella	Sofia
RQ1: Personal perceptions of climate change <i>(IGI: Important global issue)</i>	C1 IGI scientific view C2 IGI experience view C3 IGI media view C4(B) IGI teacher training view	C1 IGI scientific view C3 IGI media view	C2 IGI experience view C3 IGI media view	C1 IGI scientific view C2 IGI experience view C3 IGI media view	C3 IGI media view C4(B) IGI teacher training view	C1 IGI scientific view C2 IGI experience view C3 IGI media view C4(A) IGI teacher training view	C3 IGI media view C5 IGI upbringing view	C1 IGI scientific view C2 IGI experience view C3 IGI media view C4(A) + (B) IGI teacher training view
RQ2: Lifestyle choices re: climate change		Highly active lifestyle		Highly active lifestyle		Moderately active lifestyle	Moderately active lifestyle	Highly active lifestyle
RQ3: Role of teacher in climate change education	Passive activist role	Passive activist role	Activist role	Passive activist role	Neutral role	Passive activist role	Neutral role	Activist role

Table 3. Summary of RQ1 - RQ3 results

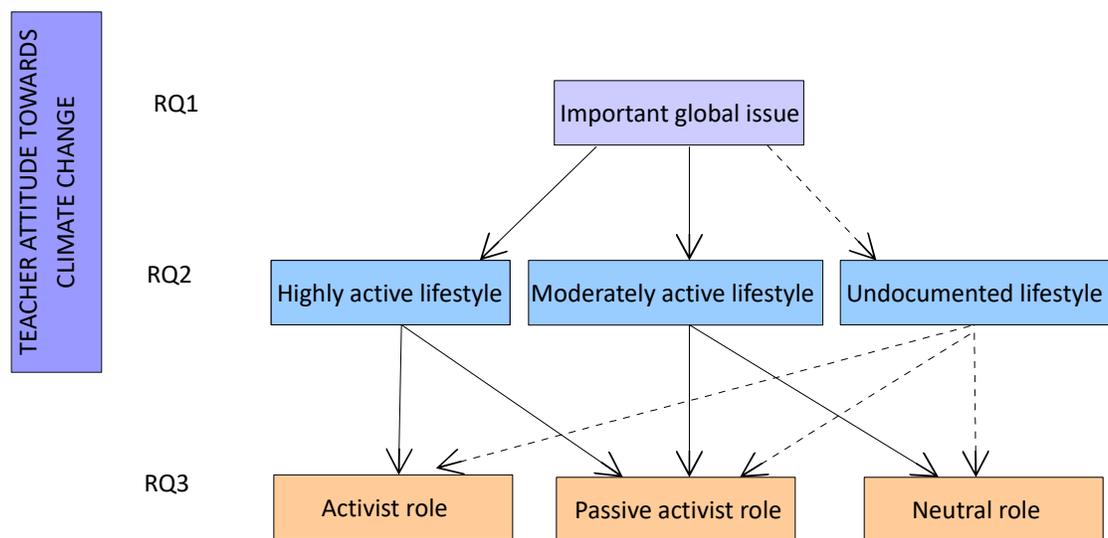


Fig. 2 Phenomenographic outcome space: RQ1-RQ3.

#### *4.4 Research Question 4: How do Finnish school teachers perceive their role as educators in the context of the student climate marches?*

As discussed in the literature review, the 2019 Finnish Student Strike For Climate marches were attended by thousands of school students and, in Tampere city as in other locations, also attended by school groups accompanied by teachers. This research question asked how strike-attending teachers, as well as teachers whose students independently attended the strikes, perceive their role as educators in the context of those marches.

The categorization of this study's participants' perceptions was approached in a similar way to that of the previous section, focusing on how active the participants believed they should be, and how active they considered themselves to be, in encouraging students to attend the strikes and therefore engage in climate change action. Data analysis showed that all of the participants in this study perceived their role as neutral guides in relation to their students attending the Student Strike for Climate marches. This is consistent with the news reports and teacher blogs discussed in the literature review that also reported neutral approaches of teachers to the marches. The final category was formulated as:

Category 1: Neutral guide
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##### *4.4.1 RQ4 Category 1: Neutral guide*

Participants perceived their role as neutral guides in the sense that they did not actively encourage student to attend the marches. Rather, they let the students themselves steer the discussions about them and let them decide whether or not to attend. Some variation was found in the manner by which the subject of the strikes was raised and dealt with pedagogically in the classroom, the level of direct teacher participation in the marches and in the teachers own views about the effectiveness and appropriateness of the marches.

For clarity, when talking about student attendance at the marches, teachers referred mainly to the first march that took place in March 2019 as this is the one that the majority of their students attended.

Most of the participants cited various expectations and responsibilities of their professional practice as factors impacting their role in the student climate strikes. While these factors will be noted below in the descriptions of each teacher's role, they will each be elaborated in the following two sections concerning Research questions 5 and 6.

In Sofia's classroom, the topic of the Student Strike for Climate marches was raised by the students themselves. The first march (in March 2019) had co-incidentally coincided with a sustainability-themed multidisciplinary week in the school, during which Sofia's class discussed, among other topics, the climate change issue. While she did not know from where students found out about the march, Sofia considered the multidisciplinary week as an inspiration for students to attend. From those lessons the students “*were really...into [the idea of participating in the climate strikes]*” and made their own decisions to attend.

For Sofia, who had herself heard about the marches before they were discussed in class, it was a conscious and deliberate decision to let students raise the topic and decide whether or not to attend;

*“I made kind of a clear tietoinen valinta, I...made the choice that I'm not saying them cos this is, it needs to be, like they're kids and Greta [Thunberg] is a child so it has to come from their heart to participate in that, not an adult says that participate in this. I don't think it works that way. So I didn't actually say anything about it... for them.” (Sofia)*

This reference to the Swedish teenager Greta Thunberg, whose activism inspired the Student Strike for Climate movement, was also cited by several other participants as a major factor in letting their students decide to attend.

Sofia did not have lessons coinciding with the march so the majority of her students attended it independently, while Sofia herself attended on her own, seeing many of her students there. While taking on the role of a neutral guide in her students' decision-making process, Sofia nevertheless considered her own presence at the march to be an important “*message*” for her students, that she personally shared their concerns.

For Sofia, the march was an important experience for the students and she saw no issue in them missing school to go on strike; *“It's very innocent, to skip one day of school [to] feel really empowered, like, we kids can also do something”*.

Aaro's students also found inspiration to attend the March 2019 march after a sustainability-themed multidisciplinary week that coincided with it. Like Sofia's students, Aaro's found out about the march by themselves and then *“were like, hey teacher we think this is important, can we go?”* Interestingly for Aaro, after discussing the climate strike movement and watching videos together about it, the students *“decided that they want to do it once... most of the pupils didn't want to redo the thing, [preferring to] just come to school”*. According to Aaro, approximately half of his students attended the March 2019 march, while a few attended the September 2019 march.

Like Sofia, Aaro saw no issue in students missing school to go on strike, arguing that those students wanting to attend the strikes were *“usually the active ones anyway, they will make up for the lost time.”*

Juha was also not actively encouraging students to attend, instead engaging with them in discussions about *“what's the point of a demonstration or why are they doing it, and what decision [they] make, go or not go?”* For Juha, of whose students only a few attended the Student Strike for Climate marches, it is *“ethical, as a teacher, to think what's best for the students and the young people, and for their future”* yet he didn't see himself as

*“encouraging some sort of action for example, but maybe sparking them to think for these things, and try to use the logic that I teach in my math lessons, to come to a conclusion that ... what needs to be done and what works and what doesn't.” (Juha)*

Jade, while not actively encouraging her students to attend the marches, nevertheless *“really wanted”* to take her students to the first march. She saw, however, two ethical issues in taking her whole class there. Firstly, she considered that participation in climate action must be voluntary; *“I can't...force all the students to be against climate change, so of course I would have needed to ask if they want to*

*attend or just watch*” and secondly teachers should not make students attend *“something that they don’t understand”*. Jade considered it important that teachers, as well as parents, who take students to the marches should *“really discuss”* the issues surrounding them and *“not just make it some exciting field trip”*. Jade considered taking her class to the march as a purely learning experience and not to take part in the strike itself, but in the end she could not take them at all because of lesson rescheduling.

Jade considered the marches *“a really important way to influence”*, yet she saw the knowledge and skills gained in the classroom as more important for students than attending strikes. *“I think it’s more important”* she asserted *“to learn different ways to [act] in your daily life [or] think about climate change”*.

Laura, from whose class three students attended the March 2019 march, also considered the Student Strike for Climate movement a *“good thing... something that the younger generation has decided to do and show... how they feel about [climate change inaction]”*. In Laura's classroom, discussion about the climate strikes came *“spontaneously”* from her students, after which several of them became interested in participating. Laura then opened up the discussion about the topic and engaged her students in a number of climate-change related activities.

In discussing her role in students decisions to participate in the marches, Laura mentioned the expectation of teacher neutrality in Finnish schools; *“the way it was now... as teachers we’re not really supposed to go like, yeah go, let’s all go...”*. Also, like Jade, Laura expressed concerns regarding the ethics of teachers taking an entire class to strike; *“...if I end up taking the whole class, is that something that all of them felt that we should have done?”* The issue was, however, *“tricky”* for Laura, who could also see benefits in taking a whole group; *“...at the same time maybe... we should’ve gone, so then... those that weren’t even thinking about it then they might feel like, oh, more ... we’re taking part in something”*.

Anna was the only participant to have initially raised the topic of the (March 2019) climate march with students, yet she did so in a neutral way, bringing it up and leaving it as *“a question there in the air for*

*them to answer to themselves*". After discussing the student strike movement and the march in the classroom, some of her ninth grade class decided to independently take part. Anna herself did not participate in the march because of other teaching commitments but felt that her students (seventh to ninth graders) *"are that big that they can go there by themselves"*.

Overall, Anna saw the Student Strike for Climate marches as an effective part of climate activism because, *"when people gather like that to demonstrate and tell about their opinions and thought, politicians can't ignore it. So the more there is the more effective it of course is"*. The only negative issue brought up by Anna in relation to the march was that of student behaviour there. While most of Anna's students *"were actually serious about [striking],...unfortunately some [others] weren't, [seeing the strike as] a chance to stay off from school"*.

Stella was also concerned about her students' behaviour at the marches and described how, during the March 2019 march some of her students (taught at the time by a fellow teacher), treated the strike as *"kind of a joke"*, and remained at home or in the school yard playing about. Stella felt that it was wrong for students to take advantage of the marches in this way; *"mä koen et se on ...ikävä et oppilaat hyödyntää tommoisen, ilmastokriisin nimissä, ne jäävät koulusta pois"*. For the September 2019 Student Strike for Climate march, the next to which her students were interested in participating, she spoke about the issue directly with them, saying that *"...ok you are doing... a really good thing and it's really important, but it doesn't mean that you should use that for something else. You have to be aware of what you are doing... that it's [a] serious thing"*.

In taking on a neutral role in her students' decisions whether or not to attend the September 2019 march, Stella felt like she needed to *"have some facts"* and *"prepare her lessons well"* in order to provide students with an opportunity to discuss their concerns about climate change. In this, however, Stella felt unsure how far she could let the discussion go before making students afraid. This concern about students' emotional wellbeing will also be elaborated in the following sections.

Matti, while taking on a neutral guide role regarding his students decisions to attend the Student Strike for Climate marches, was the only participant who explicitly criticized the appropriateness of the marches;

*“I don’t think it’s [the] correct way of getting the attention, to go on a strike in school because, to my opinion it’s against the whole idea of educating yourself, so that you can actually understand what’s going on. And I think it’s the opposite, that we should really educate ourselves...”*

Students, Matti argued, knew about climate mitigation actions that were taught to them, like recycling, but they lacked a deeper understanding about what those actions entail and why they are necessary. Matti, wanting to nevertheless remain neutral regarding his students decisions to attend the marches, *“didn’t let them know my opinion about striking”* and instead approached the subject by *“just ask[ing] questions... introduc[ing] a problem then... ask[ing] them, how do we solve this?”* This, as Matti described, followed his general teaching philosophy of *“not telling [students] what they should do and what they should not do, [but instead] pointing at a phenomenon, pointing at what’s happening”*.

After the topic of the student climate march was raised by students, Matti engaged them in a variety of climate change-related lessons to increase their understanding of the climate change phenomenon and the student climate strike movement. Then, after telling students they could attend the strikes with their parents' permission, Matti proposed that the entire class attend the (March 2019) march as a group. After a number of discussions, and with one student's parents giving permission only for attending the march but not participating in striking, the group (“we”, as expressed by Matti) concluded that, while they *“support the idea that something has to be done”*, they did not want *“to go on a strike from school”* and so they decided to attend the march together for only two hours and use it *“as a learning situation”*. While it is unclear from the data precisely how much influence Matti himself exerted during these discussions, he nevertheless asserted that everybody was satisfied with the arrangement of *“supporting by being there instead of striking at school”*.

#### *4.4.2 Research question 4 summary and analysis of results*

Analysis of the research data found no clear differences in the impact of the various types of teacher role in climate change education on teacher role in the Student Strike for Climate marches. That is, all participants, irrespective of whether they conceived themselves as having an activist, passive activist, or neutral role in climate change education, conceived themselves as playing the role of a neutral guide in regards to student involvement in the climate strikes. The uniformly neutral role conceived by the participants matches those of teachers interviewed in news reports mentioned in the literature review (Koskinen, 2019b; Onali, 2019), suggesting that it was a common role taken by Finnish school teachers in response to the student climate strikes.

The data analysis suggests that an important factor in the taking of a neutral role was participants' conceptions of the Student Strike for Climate movement as youth-led and therefore not for adults to be involved in. However other factors - involving the conceived expectations and responsibilities of participants' teaching practice – also emerged from the analysis as possible influences. These will be discussed in the following two sections.

Below is a summary of results from Research questions 1-4, followed by a visual representation of the phenomenographic outcome space outlining the relationships between the sets of categories presented so far.

	Anna	Aaro	Jade	Juha	Laura	Matti	Stella	Sofia
RQ1: Personal perceptions of climate change  <i>(IGI: Important global issue)</i>	C1 IGI scientific view  C2 IGI experience view  C3 IGI media view  C4(B) IGI teacher training view	C1 IGI scientific view  C3 IGI media view	C2 IGI experience view  C3 IGI media view	C1 IGI scientific view  C2 IGI experience view  C3 IGI media view	C3 IGI media view  C4(B) IGI teacher training view	C1 IGI scientific view  C2 IGI experience view  C3 IGI media view  C4(A) IGI teacher training view	C3 IGI media view  C5 IGI upbringing view	C1 IGI scientific view  C2 IGI experience view  C3 IGI media view  C4(A) + (B) IGI teacher training view
RQ2: Lifestyle choices re: climate change		Highly active lifestyle		Highly active lifestyle		Moderately active lifestyle	Moderately active lifestyle	Highly active lifestyle
RQ3: Role of teacher in climate change education	Passive activist role	Passive activist role	Activist role	Passive activist role	Neutral role	Passive activist role	Neutral role	Activist role
RQ4: Role of teacher in student Strike for Climate marches	Neutral guide	Neutral guide	Neutral guide	Neutral guide	Neutral guide	Neutral guide	Neutral guide	Neutral guide

Table 4. Summary of RQ1 - RQ4 results

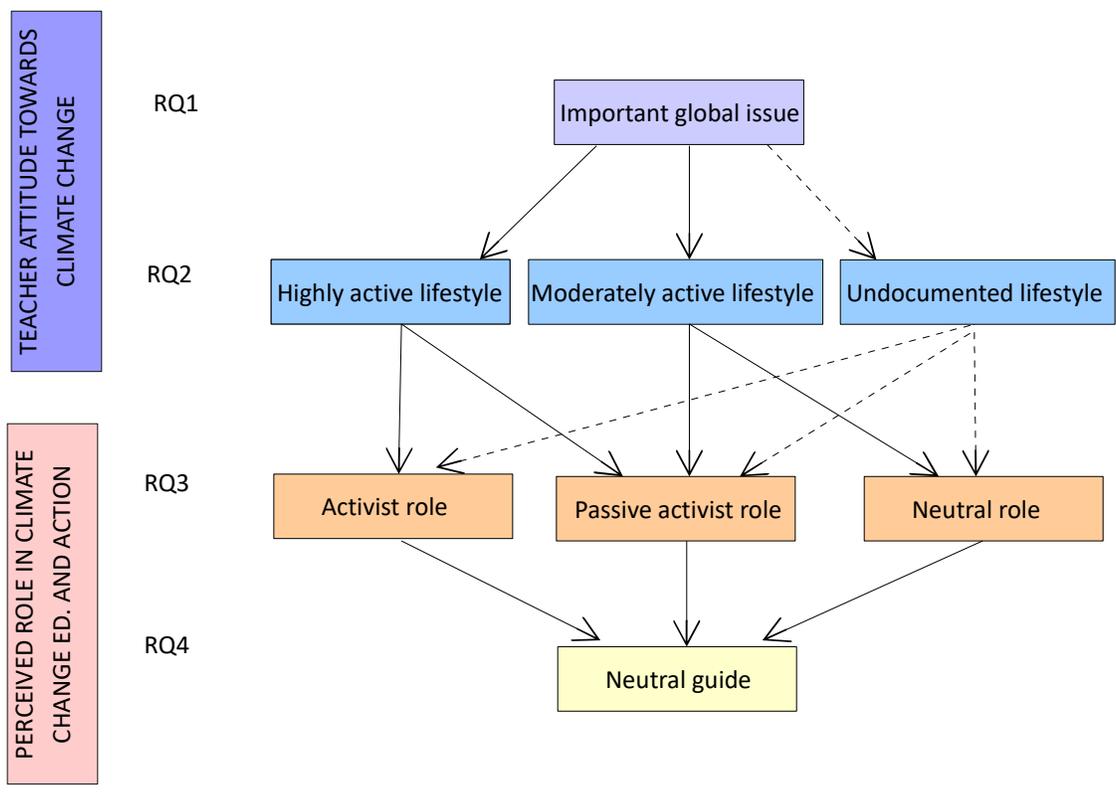


Fig. 3 Phenomenographic outcome space: RQ1-RQ4.

*4.5 Research Question 5: Which elements of teachers' professional practice impacted on their roles in engaging with the student climate marches?*

As discussed in the previous section, aspects of the conceived expectations and responsibilities of participants' teaching practice emerged from the analysis as influences participants' conceived roles in the Student Strike for Climate marches. In this section, the aspects relating to teachers' professional practice will be elaborated and explained. As much of participants' engagement with the student climate marches occurred through discussions with students and through climate change-related task-setting, some aspects of their teaching practice were considered as having a similar influence on their role in the climate marches and in climate change education generally. Where this occurs, the climate march context will be focused on.

The data analysis process generated five main categories describing particular facets of teaching practice that participants perceived as influencing their role in the climate strikes. The categories were formulated as:

Category 1: Teaching subject
Category 2: National Core Curriculum/school curriculum contents
Category 3: School management/culture
Category 4: Teacher autonomy
Category 5: Level of teacher training in climate change education.

While the first three categories were perceived by participants as directly influencing their role in the climate strike marches (as well as their role in general climate change education), the final two categories – teacher autonomy and level of teacher training in climate change education – were considered to be indirect influences on the participants' roles in the climate strikes, influencing more directly their role in climate change education generally.

#### 4.5.1 RQ5 Category 1: Teaching subject

Four participants perceived their teaching subjects to have had an impact on their role in engaging with the student climate marches. Three participants, Jade, Stella and Aaro, saw the climate change issue's relevance to their subject as justification for discussing or attending the climate marches.

*“This year I was thinking that we could go only watch [the Student Strike for Climate march], and not like actually... striking, just to see how it is, and we would have done that on my social studies class” (Jade)*

*“Yes, we have been talking about [the climate change issue] in Yhteiskunta oppitunti... about how you can [influence] yourself” (Stella)*

*“...we talked about [the climate strikes] during lessons because it was like part of the thing we were supposed to do... like during social studies we talked about the climate strikes and like how was this making a difference and how you can work as a citizen” (Aaro)*

Juha, on the other hand, saw his role in the climate strikes as restricted to the requirements of their teaching subject.

*“I don't see myself as encouraging some sort of action... [the students] have to do it themselves, and then I just try to teach them math as good as I get and then make sure that they are aware of the starting point really where we are now and then they have to do the calculation themselves” (Juha)*

#### 4.5.2 RQ5 Category 2: National Core Curriculum/school curriculum contents

Four participants perceived the National Core and school curricular contents to have had an impact on their role in engaging with the Student Strike for Climate marches.

All of these participants considered the Finnish National Core Curriculum as at least supportive of student participation in the marches, while some, such as Aaro and Sofia, viewed it as encouraging students to take part.

*“... the latest opetusuunnitelma... encourages us teachers to teach those kind of being-a-part-of-society issues, and isn't this a great thing, to be part of...society, as a young person that you can also affect what happens in the society?” (Sofia)*

Aaro and Matti also emphasized the benefits of the Core Curriculum's "flexibility", which meant that "...you don't even have to bend or kinda like stretch any of the limitations from [it]... to justify... taking a stand and putting some more effort into these climate issues" (Aaro) and that "the way that I want to get [to the Core Curricular goals] is up to me" (Matti). For Aaro, the "vagueness" of sustainability-related concepts in the Core Curriculum also meant that he could "interpret them a little bit more radically than some others".

Jade on the other hand felt that, while the National Core Curriculum allowed for students to attend the strikes, it "could be there a little bit stronger" in the sense that the sustainability themes such as climate change would, in addition to being in Core Curriculum as "a bigger theme" there would also be more "specific" objectives, on a "concrete level", for teachers to achieve.

As mentioned in the previous section, several teachers cited school curricular contents such as sustainability weeks as factors influencing their role in the climate strikes. While facilitating general classroom discussions and activities related to climate change, the coincidence of these multidisciplinary weeks with the climate marches also stimulated student interest and motivation to attend the marches.

*" [In] 7th grade the theme is... sustainability, and throughout the whole week we talk about housing... clothes production and food, what kinds of impacts do they have on sustainability and global warming and so on. And right after we had that week, came the first climate strike, so [the students] were really into it" (Sofia)*

#### 4.5.3 RQ5 Category 3: School management/culture

Three participants perceived their school's management/culture to have had an impact on their role in engaging with the student climate marches.

Some participants perceived their school management's general support for the strikes as being a positive influence on their role in the climate strikes, while others perceived the lack of specific guidance and direction from their school management as a negative influence.

Aaro, for example, perceived schools as being supportive of the student marches because they "wanna be progressive and the headmasters have the power to... let the kids go". Sofia shared similar views as

Aaro, that her school's management *“really agree... and they think that it is ok to go on a strike as a student”*. Aside from their general support, however, Sofia's school management assumed a neutral role in advising teachers how to engage with the strikes, leaving it to the teachers to decide how specifically to approach the subject. On this point, Sofia wished that her school's management had been more proactive and tell teachers *“that there is this thing, go there, and it's part of your work to know about these things”*.

Juha also saw his school's management as generally supportive, providing teachers with an *“official line”* by which students *“can go [to the strikes] if they got the permit from the parents, but that's it. As far as I'm aware there wasn't much discussion together about it”*. Jade also noted that she didn't receive any instructions regarding the climate strikes from her school management beyond permission to attend, and saw her school as not *“doing that much right now”* in regards to climate change education and action. Jade felt that the school management should *“encourage teachers more to talk about [climate change-related] issues and maybe... have some [more] projects about it... but they don't really encourage us to do anything”*.

#### 4.5.4 RQ5 Category 4: Teacher autonomy

Four participants perceived their autonomy as a teacher as having an impact on their role in engaging with the student climate marches, in the sense that neither the school nor the national or school curriculum placed any restrictions or limitations on how they could engage with the climate marches. Aaro. For example, believed that the Finnish school system *“place a lot of trust on the individual expertise of the teacher... which is like really nice. As a teacher in here you got a lot of freedom on how you do things”*.

Other participants, while recognizing the benefits of the high teacher autonomy in Finland, noted the downsides of it as well. Firstly, that while the National Core Curriculum *“gives the possibility”* to engage with climate change issues, *“it doesn't make you do it”* (Juha), and secondly that while teachers may *“...have all the freedom”* to engage in the issues as they see fit, they *“haven't gotten any advice [from the school management] to a way or to another”* (Jade). Sofia questioned the appropriateness of teacher autonomy in the context of climate change education, asserted that *“If i wasn't so interested*

*personally, no-one would push me (to teach about climate change/sustainability). It shouldn't be like that. It should be part of our education.”.*

#### *4.5.5 RQ5 Category 5: Level of teacher training in climate change education.*

Five participants perceived their level of teacher training in climate change education to have had an impact on their role in engaging with the student climate marches. Some participants, such as Anna and Laura, believed that their teacher training had adequately prepared them to deal with the issues relating to the climate strikes, while others believed that their teacher training had not prepared them well enough.

Laura for example saw her training - completed through an intercultural teacher education program and providing courses dealing specifically with climate change-related issues – as *“already at the very beginning of the process of becoming a teacher... influencing how I feel about things”* by making her confront *“many kinds of issues that I kind of maybe had chosen to ignore before or, sometimes I kind of even maybe didn't want to know because it was a little bit depressing”*. *Despite this preparedness, Laura still felt that climate change “wasn't something that I knew too much about... like factual”* and that she could *“know more”*.

Aaro also felt that his teacher training made him adequately prepared to deal with the climate change issue in the classroom by giving him *“the tools to discuss and kind of operate on a variety of different topics and... somehow be able to like make the kids understand how things go, even with these abstract concepts.”* While his training was *“really good”* for *“dealing with these kinds of... hard concepts [and giving] tools to children [to] learn about these harder concepts”* however, he felt that his training didn't give him *“emotional skills and special education”* needed to deal with students' emotional wellbeing when raising climate change issues. These skills Aaro *“had to learn by [him]self”*.

Juha, who entered his teacher training with *“a mindset that ok we are the future teachers, we are the ones making the change in the education system”* felt *“a bit disappointed”* that the climate change issue *“wasn't addressed by the studies that much at all”*. Juha felt that he was *“not very confident”* in dealing with the climate change issue with his students and believed that, rather than *“hav[ing] to do those studying on my own about this [climate change] subject”*, it would be *“nice to have it part of [his] real*

*studies to be a teacher*” in order to have *“the basic knowledge”* to answer students questions about climate change.

Jade, whose teacher training contained only one optional course about climate change, believed that *“in teacher education there should be some mandatory courses about climate change”* so that *“training teachers would be taught how to handle these things at school with students”*. Jade felt herself to be *“kind of self-educated about [climate change] issues”* and believed that teachers should have *“these same standards how to handle this issue and how to have like ways to talk with kids that they don’t become really depressed about it but they would have hope”*. More than this, Jade felt that working teachers should also:

*“have extra education about the whole issue [about ways in which] it would be good to talk about the climate change and what kind of activities they should do in their classes, and also what are the goals for their teaching, concerning about climate change”*. (Jade)

Similarly, Sofia believed that *“all the teachers should be forced to go some kind of education and learning workshops or something so that we should all have the same basic knowledge about it and everyone should kind of accept that”*. Climate change education, Sofia continued, *“should be part of our teaching education already at the university”* so that teachers could be *“given ways of how to... tell the message to the kids. So we should have, like, very clear kind of message, like, do this poster or do this workshop...”*.

#### 4.5.6 Research question 5 summary and analysis of results

The research question 5 results showed five aspects of teaching practice conceived as impacting teachers' roles in the Student Strike for Climate marches. These all have important implications on teacher involvement in student climate action.

The *school subject* category, which indicated that teachers were able to engage with their students in the climate marches through different subject areas, is significant because it supports the argument that climate change education should not be implemented as a stand-alone subject, but integrated across all subjects areas (Anderson, 2012; Siegner, 2018; Mcneal & Petcovic 2019).

The *National Core Curriculum/school curriculum contents* and *teacher autonomy* categories may partly explain the uniformly neutral role assumed by the participants in the student climate marches. The Core Curriculum, as conceived by participants, allowed for, and in some ways encouraged, students to be engaged in climate action. Some participants, however, viewed it as lacking concrete objectives, a conception that follows Hermans' & Korhonen's (2017) argument, discussed in the literature review, that the cognition-oriented approach to climate change education in the Finnish Core Curriculum fails to achieve the main goal of producing action towards climate change mitigation. Coupled with a high degree of teacher autonomy in the Finnish education system, this lack of concrete curricular objectives leaves it to teachers to choose whether to, and how to, engage their students with climate education and climate action. Similarly, participants' schools' management were conceived as being supportive of students attendance at the climate marches yet offered little or no concrete directions, leaving it up to the teacher on how to engage with it.

The *level of teacher training* category was considered an indirect but important influence on teacher role in the student climate marches. As mentioned in the literature review, without appropriate training teachers may lack important knowledge about the climate change phenomenon (Cantell, et. al., 2019) and lack competence and confidence to employ new methods, approaches and attitudes called for by climate change educational goals (UNESCO, 2015). This was reflected in the present study, in which several participants conceived their teacher training as inadequate, leading, for one, to a lack of confidence to deal with the subject with students.

Below is a summary of results from Research questions 1-5, followed by a visual representation of the phenomenographic outcome space outlining the relationships between the sets of categories presented so far.

	Anna	Aaro	Jade	Juha	Laura	Matti	Stella	Sofia
RQ1: Personal perceptions of climate change  <i>(IGI: Important global issue)</i>	C1 IGI scientific view  C2 IGI experience view  C3 IGI media view  C4(B) IGI teacher training view	C1 IGI scientific view  C3 IGI media view	C2 IGI experience view  C3 IGI media view	C1 IGI scientific view  C2 IGI experience view  C3 IGI media view	C3 IGI media view  C4(B) IGI teacher training view	C1 IGI scientific view  C2 IGI experience view  C3 IGI media view  C4(A) IGI teacher training view	C3 IGI media view  C5 IGI upbringing view	C1 IGI scientific view  C2 IGI experience view  C3 IGI media view  C4(A) + (B) IGI teacher training view
RQ2: Lifestyle choices re: climate change		C1 Highly active lifestyle		C1 Highly active lifestyle		C2 Moderately active lifestyle	C2 Moderately active lifestyle	C1 Highly active lifestyle
RQ3: Role of teacher in climate change education	Passive activist role	Passive activist role	Activist role	Passive activist role	Neutral role	Passive activist role	Neutral role	Activist role
RQ4: Role of teacher in student Strike for Climate marches	Neutral guide	Neutral guide	Neutral guide	Neutral guide	Neutral guide	Neutral guide	Neutral guide	Neutral guide
RQ5: Teaching practice impacts on climate march role	C5 Teacher training	C1 Teaching subject  C2 Curricular contents  C3 School management/culture  C4 Teacher autonomy  C5 Teacher training	C1 Teaching subject  C2 Curricular contents  C4 Teacher autonomy  C5 Teacher training	C1 Teaching subject  C3 School management/culture  C4 Teacher autonomy  C5 Teacher training	C5 Teacher training	C2 Curricular contents	C1 Teaching subject	C2 Curricular contents  C3 School management/culture  C4 Teacher autonomy  C5 Teacher training

Table 5. Summary of RQ1 - RQ5 results

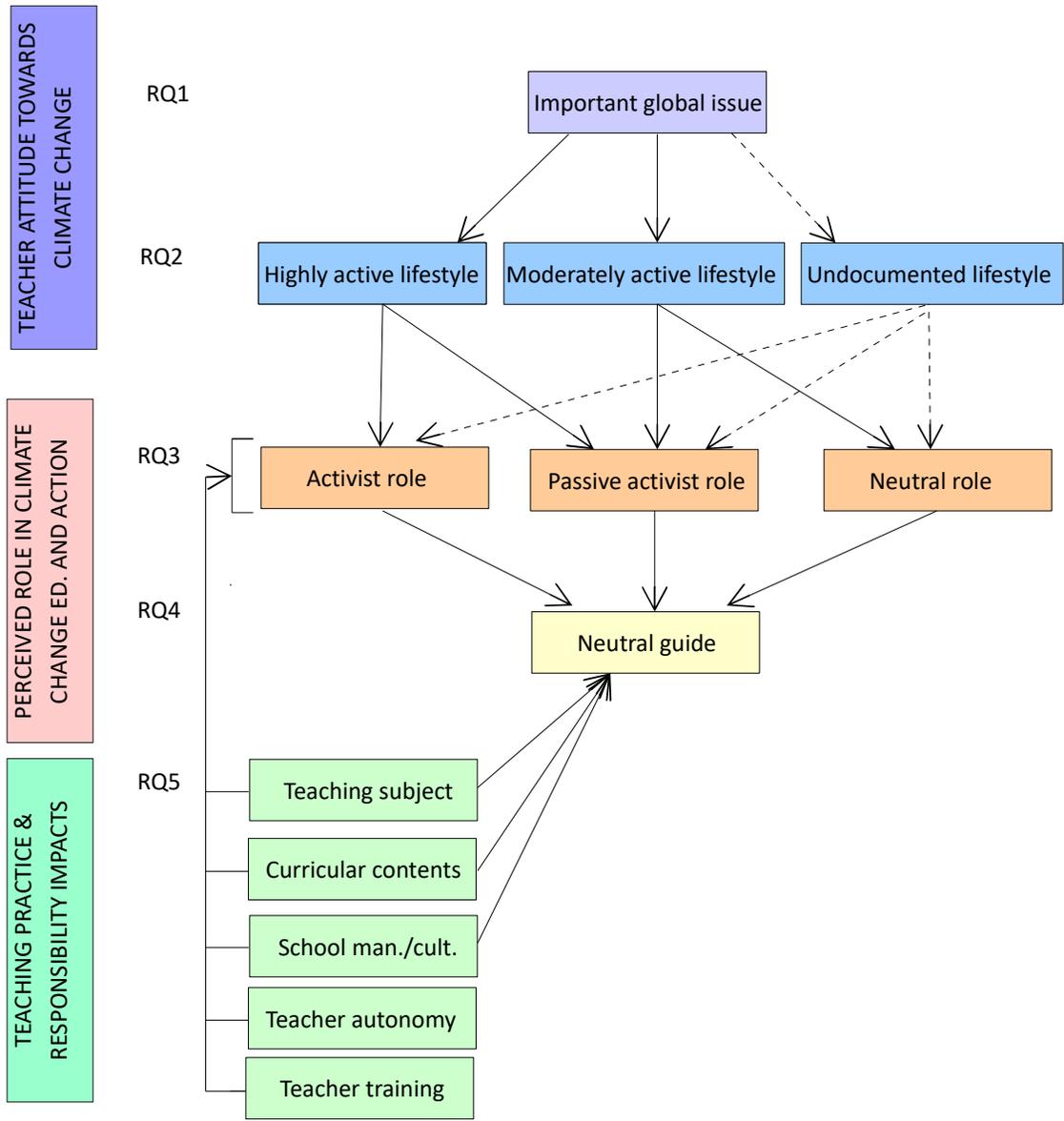


Fig. 4 Phenomenographic outcome space: RQ1-RQ5.

*4.6 Research Question 6: What aspects of teachers' professional responsibilities impacted on their engagement with the student climate strike phenomenon?*

As discussed in section 4.4, aspects of the conceived expectations and responsibilities of participants' teaching practice emerged from the analysis as influences participants' conceived roles in the Student Strike for Climate marches. In this section, the aspects relating to teachers' professional responsibilities will be elaborated and explained.

The data analysis process generated five main categories describing particular facets of teachers' professional responsibilities that participants perceived as influencing their role in the climate strikes. The categories were formulated as:

Category 1: Student physical welfare
Category 2: Student emotional welfare
Category 3: Student educational welfare
Category 4: Teacher neutrality
Category 5: Student public reputation.

*4.6.1 RQ6 Category 1: Student physical welfare*

This category comprises two main aspects of teacher responsibility: (a) teachers' duty of care towards students – that is, their responsibility for students' physical safety and well-being - and (b) school and parental permission which, in the context of the student climate marches, delineate the scope and limits of teacher's responsibilities for their students' physical welfare.

While all of the participants expressed high concern for the physical welfare of their students, none of them considered the student climate strikes taking place in Tampere city to be in any way physically dangerous for their students. Jade for example, who considered her “*number one duty... to keep these*

*kids safe*”, thought the climate strike marches were “*really safe*” and said she hadn't heard of any “*counter strikes happening, or anyone doing anything in those strikes*”. Aaro also did not feel concerned because he considered Tampere city, the site of the marches in question, was not “*dangerous*”.

While feeling concerned for their students' physical safety, no participants except Matti, who attended the strikes with his student group, felt directly responsible for their students physical welfare at the strikes because the students had both permission from their school and from their parents to attend. As Aaro asserted, “... *there was no ethical issue in letting the kids go there because their parents agreed that they can go*”. Laura felt that it was lucky that the schools were not “*saying that you cannot go, cos then that would have been a big issue*”. Rather, because the schools were saying that “*yeah that's nice, that's really good that you're doing this*”, the student and teacher engagement with the climate strikes “*wasn't as kind of tricky as it might have been*”.

In Matti's case the students did not need parental permission because they were attending the marches with their teacher, yet he nevertheless instructed students to get their parents permission. As mentioned in section 4.4, when one of the parents gave a conditional permission, saying that they “*wouldn't like to let my child go on a strike but if you find another way to go there, if you can do something else, then I can let them*”, Matti agreed with his students to attend the march as observers only, in keeping with the parents' wishes.

#### 4.6.2 RQ6 Category 2: Student emotional welfare

All eight participants perceived their professional responsibilities towards students' emotional welfare to have had an impact on their role in climate change education. However these professional concerns toward students emotional welfare, alluded to throughout earlier results sections, also impacted on the discussions participants had with their students regarding the climate strikes, and so this aspect of teacher responsibility was categorized here as an indirect influence on teacher role in the student climate strikes.

Participants perceived their professional responsibility towards students' emotional welfare mainly in terms of (a) mitigating the negative emotional impact of the climate change issue – such as fear,

anxiety and depression - on students, and (b) in presenting the climate change issue in an affirmative and constructive manner so as to encourage action. Thus, Aaro didn't "*paint the grimmest picture ever because the kids, they cannot really handle that*" and he tried "*to avoid making the kids really worried or stressed out about [the climate change issue]*". He instead tried to "*make them see what can be done instead of like oh, oh, everything is going to shit.*" Similarly, Stella held that her job "*is not to concern [students] too much. It's to make them aware of things, but... to keep calm and to give some facts as well.*" Stella, like several other participants, tried to avoid placing too much pressure on students by trying to make them understand that "*it's not their fault, and it's not only their fault... It's just so big, big big*". Rather than making students "*more scared than they are already*", Jade emphasized the importance of cultivating a communal response to the climate change issue, to "*handle it together, and not paint any really sad pictures about future*" but instead give students "*hope*".

#### 4.6.3 RQ6 Category 3: Student educational welfare

All eight participants perceived their professional responsibilities towards students' educational welfare to have had an impact on their role in the student climate strike marches. Participants expressed two main concerns regarding their students' educational welfare in the context of the climate strikes: (a) that students may miss important educational experiences by skipping school to attend the strikes; and (b) that students participating in the strikes may not fully understand what they are protesting about.

As outlined earlier in section 4.4, while most participants had a positive attitude towards the student climate strike marches, there was division as to whether it was more important for students to leave school to strike, or stay in school to learn. Anna did not feel that students missed too much because of the strikes because "*there aren't strikes too often that it would matter*" while in Aaro's group the striking students were "*usually the active ones anyway [so] they will make up for the lost time*". On the other hand, Jade felt that the skills and knowledge students received in school was "*more important than attending to strikes*" and Matti felt that striking from school was "*against the whole idea of educating yourself*".

The second main concern, that students participating in the strikes may not fully understand what they are protesting about, was also outlined in previous sections. While some participants felt a general

concern about this issue, it was mainly raised in relation to teachers bringing whole student groups to the strike. Jade, for example, felt that she couldn't "*force all the students to be against climate change*" and didn't "*think that it's good to just take them there and make them go just for something that they don't understand*". It was the teacher's responsibility, then, to "*really discuss about [climate change-related issues] and... not just make it some exciting field trip*".

Matti shared similar concerns with his students' level of understanding about the climate strikes and so, after exploring the issues surrounding the strikes through classroom activities, he attended the (March 2019) strike with his class as a "*learning experience*".

#### 4.6.4 RQ6 Category 4: Teacher neutrality

Teacher neutrality, as mentioned in section 4.4, was also perceived by some participants as having an impact on their role in engaging with the student climate marches. In the context of the student climate marches, teacher neutrality was perceived as an issue mainly in terms of teachers impressing their own attitudes and beliefs about climate change onto their students. Anna asserted that teachers "*aren't allowed to bring our political points of view here at school... though [climate change is] not a political party view*" while Juha stressed that his teaching must "*be really independent from any thing that can be considered political or religious*" and that he "*can't be telling people how to think about issues*".

Laura, as mentioned earlier, perceived teacher neutrality as an important issue in teachers taking whole student groups to the climate marches, asserting that "*the way it was now... as teachers we're not really supposed to go like, yeah go, let's all go...*" because she would therefore be impressing her own attitude towards the climate change issue on students who may not understand the issue or who may not want to strike; "*...if I end up taking the whole class, is that something that all of them felt that we should have done?*". The teacher's motivation for taking the whole group was thus a difficult issue for Laura to consider, whether it is "*doing that because that's what I feel that we should be doing, or [letting] them kind of think that is what they want to do and that's kind of the right thing to do for them*".

#### 4.6.5 RQ6 Category 5: Student public reputation.

Two participants perceived their responsibilities towards their students' public reputation to have had an impact on their role in engaging with the student climate marches. Participants' concerns towards their students' public reputation rested mainly on: (a) student behaviour at the climate marches and (b) students appearing in news and media reports about the marches.

While participants described student behaviour at the climate marches in a generally positive way, some participants reported seeing or hearing about instances of negative student behaviour, such as drinking beer at the marches, or remaining in the school yard playing about rather than attending the march. Stella, who had heard from a colleague about this type of behaviour during the March 2019 march, felt that it was her responsibility to discuss this issue of student behaviour when her students expressed interest in attending the September climate march. Stella perceived student's negative behaviour impacting on their public reputation because it showed them to be taking advantage of the opportunity to participate in the strikes. Students, asserted Stella, had *“to be aware of what [they] are doing... that it's [a] serious thing”*.

Matti also recognized the impact of negative student behaviour at the marches on students' public reputation. Observing *“young kids drinking beer, and running around and so on”* at the March 2019 march which he attended with his class, Matti reflected that *“these are the worst things... because if you see one or two kids sitting there drinking beer as you walk by, as an older person you will say, ah, I told you that's what it's all about. They're just having a time off from school”*.

For Aaro, the prospect of students appearing in media reports about the student climate marches and thereby impacting on their public image and reputation, prompted him to discuss the issue beforehand with his students. Aaro did not personally think that appearing in media reports *“would put them in a negative light”* and after talking about how there was *“probably going to be news reporters and cameras and that you might be seen on TV”* he felt that his students understood the situation and it therefore *“didn't pose like an ethical dilemma”*.

#### *4.6.6 Research question 6 summary and analysis of results*

The research question 6 results showed five aspects of teacher responsibility conceived as impacting teachers' roles in the Student Strike for Climate marches. While all of these aspects have implications on teacher involvement in student climate action, one in particular; participants' conceived professional responsibility for students' emotional well being, has important links to previous research.

As part of their conceived responsibility for students emotional well being, participants reported using positive and constructive language when engaging students with the topic of climate change both to avoid scaring or depressing them, and to inspire them to take climate actions. This positive framing of the climate change topic has been highlighted in previous studies (Ojala, 2015; Siegner, 2018) as an important element in effective climate change education because it positively influences students' willingness to take action towards climate change mitigation.

Below is a summary of results from Research questions 1-6, followed by a visual representation of the complete phenomenographic outcome space outlining the relationships between the sets of categories.

	Anna	Aaro	Jade	Juha	Laura	Matti	Stella	Sofia
RQ1: Personal perceptions of climate change  <i>(IGI: Important global issue)</i>	C1 IGI scientific view  C2 IGI experience view  C3 IGI media view  C4(B) IGI teacher training view	C1 IGI scientific view  C3 IGI media view	C2 IGI experience view  C3 IGI media view	C1 IGI scientific view  C2 IGI experience view  C3 IGI media view	C3 IGI media view  C4(B) IGI teacher training view	C1 IGI scientific view  C2 IGI experience view  C3 IGI media view  C4(A) IGI teacher training view	C3 IGI media view  C5 IGI upbringing view	C1 IGI scientific view  C2 IGI experience view  C3 IGI media view  C4(A) + (B) IGI teacher training view
RQ2: Lifestyle choices re: climate change		Highly active lifestyle		Highly active lifestyle		Moderately active lifestyle	Moderately active lifestyle	Highly active lifestyle
RQ3: Role of teacher in climate change education	Passive activist role	Passive activist role	Activist role	Passive activist role	Neutral role	Passive activist role	Neutral role	Activist role
RQ4: Role of teacher in student SFC marches	Neutral guide	Neutral guide	Neutral guide	Neutral guide	Neutral guide	Neutral guide	Neutral guide	Neutral guide
RQ5: Teaching practice impacts on climate march role	C5 Teacher training	C1 Teaching subject  C2 Curricular contents  C3 School management/culture  C4 Teacher autonomy  C5 Teacher training	C1 Teaching subject  C2 Curricular contents  C4 Teacher autonomy  C5 Teacher training	C1 Teaching subject  C3 School management/culture  C4 Teacher autonomy  C5 Teacher training	C5 Teacher training	C2 Curricular contents	C1 Teaching subject	C2 Curricular contents  C3 School management/culture  C4 Teacher autonomy  C5 Teacher training
RQ6: Teacher responsibility impacts on climate march role	C1 Student physical welfare  C2 Student emotional welfare  C3 Student educational welfare  C4 Teacher neutrality	C1 Student physical welfare  C2 Student emotional welfare  C3 Student educational welfare  C5 Sch./st. Reputation	C1 Student physical welfare  C2 Student emotional welfare  C3 Student educational welfare	C1 Student physical welfare  C2 Student emotional welfare  C3 Student educational welfare  C4 Teacher neutrality	C1 Student physical welfare  C2 Student emotional welfare  C3 Student educational welfare  C4 Teacher neutrality	C1 Student physical welfare  C2 Student emotional welfare  C3 Student educational welfare	C1 Student physical welfare  C2 Student emotional welfare  C3 Student educational welfare  C5 Sch./st. Reputation	C1 Student physical welfare  C2 Student emotional welfare  C3 Student educational welfare

Table 6. Summary of RQ1 - RQ6 results

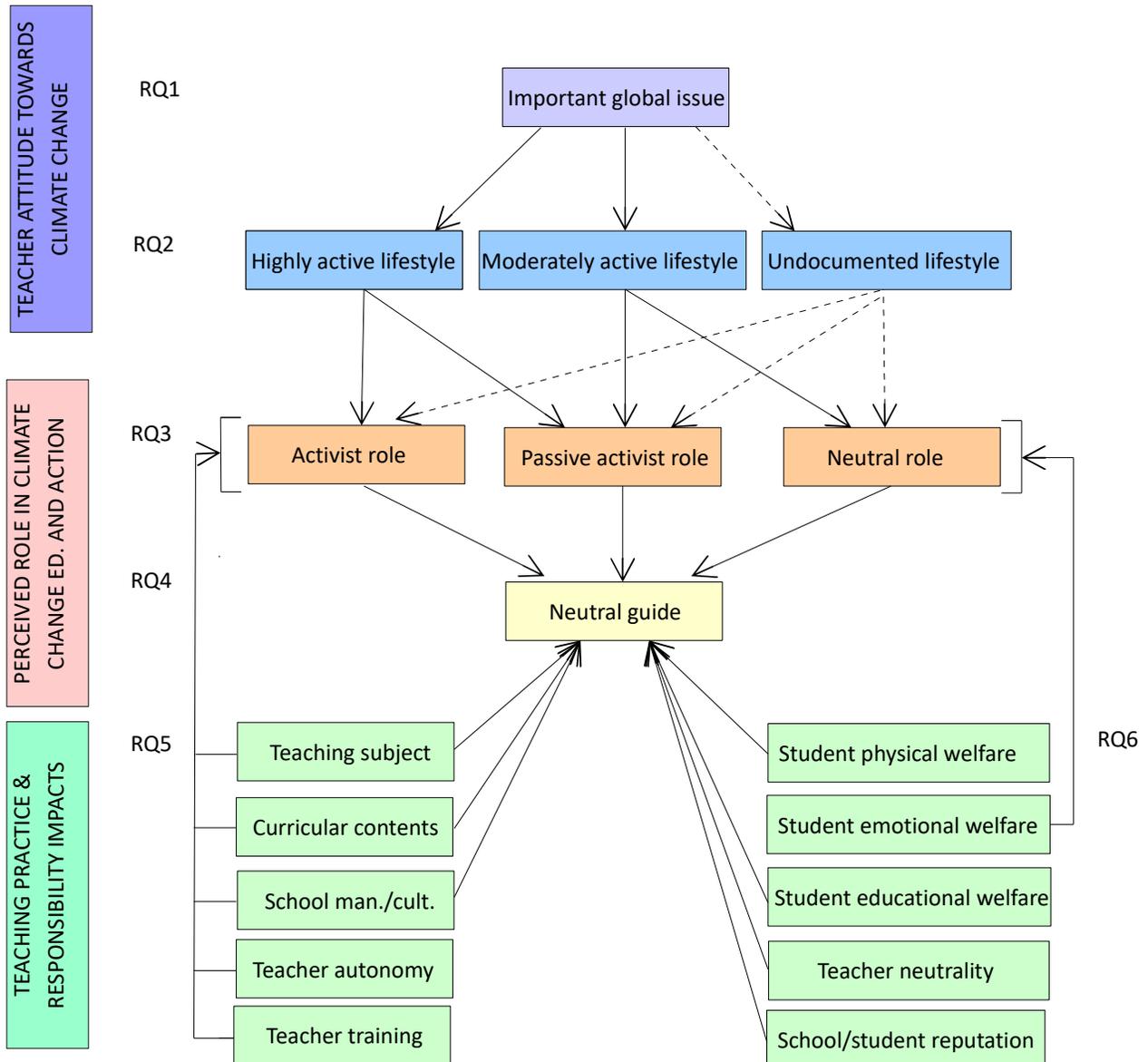


Fig. 5 Phenomenographic outcome space: RQ1-RQ6.

## 5. IMPLICATIONS FOR CLIMATE CHANGE MITIGATION

As mentioned earlier in the Literature Review, the time frame for action against the threat of climate change is ominously short, and all discussion concerning the issue and actions towards its mitigation must be framed within it. In this chapter, the results of this study, and their ramifications, will therefore be discussed in the context of that short time frame. In so doing, suggestions will be offered for possible changes in the Finnish education system to improve Finnish teachers' work as climate educators.

### *5.1 Teacher roles in relation to the short time frame for climate action*

The central issue arising from the present study's results concerns the roles that participants conceived themselves playing in climate change education and student climate action. Of particular concern are how those roles align with the objectives of climate change education and, most importantly, how they stand in relation to the short time frame for climate change mitigation.

As noted in the Literature Review, the climate crisis necessitates a climate change education in which children and youths are not only taught to understand the climate change issue but also actively engaged in climate change action (Anderson, 2012). The results of the present study, however, show participating teachers playing a variety of roles in climate change education, with only a minority actively engaging students in direct climate action. In terms of the Student Strike for Climate marches, no teachers actively engaged students to take action. These results are summarized in the phenomenographic outcome space in *Figure 5*. Participants' personal attitudes towards the climate change issue, as well as various conceived aspects of their teaching practice and responsibilities, were found to impact on the taking of those roles, yet it seems reasonable to question whether it is appropriate for teachers to play passive activist and neutral roles when such drastic and swift climate action is called for. This is by no means to say that participants are themselves in any way deficient in their work as teachers, merely that, taken together in the context of the climate emergency, these roles may not be sufficient in successfully acting towards climate change mitigation.

In terms of the Student Strike for Climate marches, the participants' *neutral guide* roles may similarly be questioned in relation to the short time frame for climate action, though not, perhaps, without encountering other ethical issues concerning voluntarism and democracy. As mentioned in the Results chapter, all participants conceived student climate action as important, and most considered the student climate strikes as appropriate and important ways for students to take action and be heard. Despite this, and despite the Finnish National Core Curriculum allowing for students to participate in this kind of direct civic action, no participants actively encouraged students to take part. Instead, all participants assumed neutral roles, letting students raise the topic and decide whether to attend or not. The justifications for participants taking on this role – that the strikes were student organized and led and attendance should therefore be left for students to decide; that teachers should remain politically neutral; that teachers should not encourage students to protest something they may not believe in or understand – may certainly be legitimate in the context of everyday teaching practice. In the context of the climate crisis, however, it seems reasonable to question whether a more activist approach should be taken by teachers.

## 5.2 Suggested areas for improvement

The results of the present study revealed aspects of participants' teaching practices that were conceived by participants as inhibiting or otherwise negatively impacting their roles as teachers in climate change education and student climate action. I suggest that two of these, *teacher training in climate change education* and *National Core Curricular contents*, may be considered areas for improvement for the purpose of encouraging teachers to take more activist roles and therefore increasing teachers' efficacy as climate change educators. Changes to the National Core Curricular contents would, presumably, then change the nature of the remaining three aspects of participants' teaching practices discussed in the results: teaching subject; school management and culture; and teacher autonomy.

The first area identified for improvement is teacher training in climate change education. As mentioned in the Literature Review chapter, for climate change education to be effectively implemented, teachers must be appropriately trained as climate change educators (Anderson, 2012; Värri, 2018) because without appropriate training teachers may lack important knowledge about the climate change

phenomenon (Cantell, et. al., 2019) and lack competence and confidence to employ new methods, approaches and attitudes called for by climate change educational goals (UNESCO, 2015). As reported in the Results chapter, several participants conceived their teacher training as inadequate, leading, for one, to a lack of confidence to deal with the subject with students. In discussing how well informed they felt about the climate change issue itself, most participants also saw themselves as lacking some factual or up-to-date knowledge about the subject. Several participants expressed disappointment in the lack of climate change-related content in their pre-service training and several also expressed a wish for mandatory and concrete in-service teacher climate change educational training. The provision of specific climate change education-related training for pre-service and in-service teachers is therefore the first suggestion for improvement.

The second area identified for improvement concern the the National Core Curricular contents. As mentioned in the Results chapter, participants conceived the Core Curriculum, as allowing, and in some ways encouraging, student engagement in climate action. However the Core Curriculum's lack of concrete objectives regarding climate change, coupled with a high degree of teacher autonomy in the Finnish education system, results in teachers themselves choosing whether to, and how to, engage their students with climate education and climate action. In light of the short time frame for climate mitigation, Hermans' & Korhonen's (2017) argument for the replacement of the current National Core Curriculum's cognition-oriented approach to climate change education with a more action-oriented approach seems entirely reasonable. An explicit, concrete and mandatory set of climate change mitigation-oriented goals in the National Core Curriculum would increase the possibilities for teachers to engage students in climate action through their teaching subject by providing concrete goals and strategies for teachers to use. It would also stimulate school managements to be more proactive in encouraging students to engage in climate action and therefore remove the normative expectation for teachers to be politically neutral. Lastly it may be seen to reduce teacher autonomy by providing more explicit and mandatory objectives, yet in the context of the climate crisis this may be seen as a positive step.

## 6. LIMITATIONS OF STUDY

The present study was limited in a number of ways. Firstly, as mentioned in the Methodology section, I collected and analyzed data from a limited sample of Finnish school teachers engaged, in different ways, to climate change education and to the 2019 Tampere Student Strike for Climate marches. These teachers were therefore highly context-specific cases and so the results derived from their perceptions cannot be generalized. While I attempted to include a broad and balanced sample of Finnish school teachers with a variety of student-climate-strike experiences, some imbalances did emerge. Most significantly, the final sample included only one teacher who physically attended a climate march with students, while the remainder engaged in the phenomenon with their students from the classroom only. Also, the final sample ended up including only one high school (lukio) teacher, while the remainder were primary and secondary grade teachers.

Another important limitation in the study was the language used in the interviews. While proficiency in English language was a criteria for sample selection, the selected participants were nevertheless all native Finnish language speakers and had a varied level of fluency in English, which was the main language used in the interviews. To ensure that the intended meaning of participants' statements matched those recorded in the interviews, I performed a number of checks, such as double checking meanings with participants during the interview and using the original Finnish version of statements in the thesis text.

## 7. CONCLUSION

As the window for effective action towards climate change mitigation closes, the expectation for all members of society, including teachers and students, to actively engage in the climate fight will undoubtedly increase. Students, the inheritors and guardians of tomorrow's world, are already expressing their worries and fears, and it is the role of adults to steer that fear into affirmative action. Teachers, sufficiently trained in climate change education, have the possibility to play a decisive role in the activation of students.

The present study sought to clarify the types of roles Finnish school teachers currently conceived themselves playing in climate change education and in the 2019 Tampere Student Strike for Climate marches. It explored how these roles were formed within the complex negotiations between teachers' personal attitudes towards the climate change phenomenon and the conceived expectations and responsibilities of their teaching practice. By focusing in on the student climate marches, the teachers' roles and the influences surrounding them could be considered in relation to the all important objective of stimulating students to take climate action. In this, the study was successful as it identified a set of roles which teachers assume in relation to climate change education and student climate action, and also clarified, in the form of a phenomenographic outcome space, the manner in which these roles are influenced by teachers' personal attitudes towards the climate change phenomenon and the conceived expectations and responsibilities of their teaching practice.

Despite its limitations and non-generalizability, this study clarified a number of areas related to teacher roles in climate change education that would benefit from further research. For example, a broader study, encompassing multiple cities and a larger sample of primary, secondary and high school teachers could clarify more fully the way teacher roles are formed in climate change education. This knowledge may then be applied to a series of action research studies aiming to facilitate teachers' engagement of students in climate mitigation activities.

This study also suggests that an increase in pre-service and in-service teacher training in climate change education, as well as the addition of more explicitly action-oriented goals and objectives to the Finnish National Core Curriculum, would increase Finnish teacher's efficacy in engaging students in

climate action. With these kinds of pro-active improvements to the Finnish education system, teachers may receive more of the vital support and encouragement the need to carry out this most urgent and vital task; educating and engaging students in the climate fight.

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