Sustainability education in progress:
Practices and pedagogies in Finnish early childhood education and care teaching practice settings

Ann-Christin Furu
Åbo Akademi University, Finland

Cecilia Heilala
University of Helsinki, Finland

ABSTRACT

The purpose of this article is to report on a study exploring the sustainability work (i.e., practices and pedagogies related to sustainability education) of Finnish early childhood education and care (ECEC) teaching practice settings. Recently, the early years and ECEC have gained increasing attention in sustainability education matters. Educational policy for ECEC has been developed through legislation and renewed curricula for the early years. Research on how sustainability is implemented in ECEC settings as well as in Finnish teacher education is still sparse, but indicates there is a policy-practice gap. The study was conducted in collaboration with municipal ECEC teams (n=34) in teaching practice settings (n=11) in the Helsinki metropolitan area. Data was collected using the *Assessment Tool for Promoting Sustainability in ECEC* (PROSUS) by Furu & Valkonen (2020). The results show that there is great variability in terms of extent and depth in how sustainability work is carried out by the settings. In general, social-cultural issues are addressed at greater depth than ecological and economic issues. The study implies that there is a need to intensify professional development activities that support the capacities for sustainability work in ECEC teaching practice settings in order for teacher education to be effective in the realm of sustainability.

The early years are important for the development of basic values, attitudes, knowledge, and skills in general, but specifically in relation to sustainability. The role of young children in the pursuit of sustainability and their overall civic participation in environmental matters has increasingly been acknowledged during the past few decades, often times inspired by Hart (1997). Current international agreements, such as the Agenda 2030 (United Nations, 2015), emphasize that children and young people are key agents in creating a better future. Children have also been increasingly given a voice in international research (Ärlemalm-Hagsér & Elliott, 2020).

For change to come about, education is of utmost importance. Early childhood education and care (ECEC) has increasingly been recognized as a valuable arena for sustainability education (Davis, 2015; Ärlemalm-Hagsér & Pramling Samuelsson, 2018). This emphasizes the importance of high quality education and care in the early years as well as the role of well-educated staff in the ECEC settings. However, according to Pramling Samuelsson and Park (2017), children do not always experience quality education from educated staff. In order to apply sustainability throughout the ECEC field, we need to promote approaches that mainstream change across both the education system and individual settings (Ferreira & Davis, 2015). Further, incorporating the principles of sustainability into ECEC must be built on robust research. During the last decade there has been a rapid increase in research concerning sustainability in the ECEC context (Ferreira & Davis, 2015; Ärlemalm-Hagsér & Pramling Samuelsson, 2018).

Ärlemalm-Hagsér and Elliot (2017) underline that further research is needed to explore how sustainability is understood and enacted in the daily activities in ECEC. There is also a need for research that explores how sustainability is approached both in theory and practice in teacher education, in order to support future teachers´ engagement in sustainability education. A recently published research volume by Elliott, Ärlemalm-Hagsér and Davis (2020) gives voice to approaches that challenge the dominant narratives around sustainability within ECEC and pedagogically engage adults along with children in transformation.

In recent years, sustainability has been increasingly addressed in Finnish ECEC teacher education, but there is still a considerable gap between policy and implementation (Wolff & Furu, 2018). For student teachers, teaching practice (or student practicum) offers a possibility to contest, integrate and develop theoretical understandings in living practice. Student teachers develop their professionalism in collaboration with staff in the teaching practice settings. Thus, these settings are important arenas supporting student teachers in their development of capacities for sustainability education. Hence, how sustainability is understood and addressed by staff in teaching practice settings is of special importance for the overall implementation of sustainability in ECEC.

Reports by The Finnish Education Evaluation Centre (FINEEC) indicate that the staff is unsure of how to work with sustainability in daily practice (Repo et al., 2018), and that sustainability is even seen by some as an alternative pedagogy (Repo et al., 2019). According to FINEEC reports, staff desire a clear pattern for the principles of developing a sustainable organizational culture and wish to have more concrete examples of how to implement policy on sustainability education into practice. These reports raise questions about the implementation of sustainability education in teaching practice settings and their readiness to enhance student teachers´ capacities in this urgent matter.

Thus, the aim of the current study was to explore the sustainability work of Finnish ECEC teaching practice settings. The study was guided by the following research question: How is sustainability currently addressed within the settings? More specifically, we studied what practices and pedagogies the teams reported to adopt in their daily work. The research phenomenon was explored from a staff perspective in partner settings of University of Helsinki during early Spring 2020.

Theoretical framework

In this section, we first address some of the core concepts of this study. We then give an overview of previous research in the realm of the study and present some of the central theoretical perspectives that underpin our research.

Conceptual cornerstones: Sustainability and sustainability education

Lately, the concept *sustainability* has increasingly been used in both science and policy. In this article, we use the concept to refer to a condition where human life does not hurt any life (human or non-human) on Earth today or in the future (Wolff & Furu, 2018). Sustainability thereby includes the protection of ecological diversity as well as a fair distribution of resources among people. However, the concept *sustainable development* is still widely used in both policy and research. Although widespread, the concept has been criticized for its association with a neoliberalistic paradigm based on economic growth (e.g. Wolff, Sjöblom, Hofman-Bergholm & Palmberg, 2017; Ideland, 2019). The concept stems from the Brundtland Report *Our Common Future* (WCED, 1987) which states that a sustainable development must guarantee a good life also for future generations. The concept sustainable development is also used in the *The Agenda 2030* (United Nations, 2015), which is currently the main international agreement aiming concerning global sustainable development. During the past few years, this agreement has increasingly been addressed in sustainability education as well as ECEC policy (e.g. Corcoran, Weakland & Wals, 2017; Siraj-Blatchford, Mogharreban & Park, 2016).

In the research literature, two main definitions of *sustainability education* can be found (Hedefalk, Almqvist & Östman, 2015; Wolff, Skarstein & Skarstein, 2020). Firstly, it is defined based on three interrelated dimensions i.e.

education *about*, *in* and *for* the environment. The word 'about' emphasizes cognitive aspects of education; 'in' highlights the educational experiences taking place in the environment; and 'for' recognizes the need for action and for developing environmentally friendly or sustainable behavior. Secondly, sustainability education is defined according to three interrelated dimensions of sustainable development: the ecological, the social/cultural, and the economic. However, the division of sustainability into separate dimensions have also met critique, especially that the economic dimension is separated as its own dimension, which according to Sauvé (2002) signals that economic interests dominate our world. In this article, we use the expression sustainability education in a broad sense, including the entity of educational practices that make transformation of values, attitudes, knowledge and skills related to sustainability possible.

In their review of previous research Wolff, Skarstein and Skarstein (2020) distinguish four ideas on what sustainability education in the early years might focus on. The *outdoor play and learning* idea emphasizes children´s opportunities to become familiar and build meaningful relationships with nature through sensory rich exploration and self-directed play. It also promotes children's agency in learning and give adults an important role as role models in showing their interest, knowledge and appreciation for nature. In the *competent child and agency* idea children are viewed as active participants with their own rights and their own views of the world. The idea of *practice architecture* emphasizes that ECEC settings should be places that practice sustainability with the adults as role models working together with children. The *posthumanistic approaches* counters the deeply entrenched notion of human exceptionalism.

Finnish ECEC at glance

Finnish ECEC is part of the Nordic tradition and builds on core values such as democracy, caring, and competence (Einarsdottir et al., 2015). The basic values in the national core curricula for ECEC are based on international and national agreements (Finnish National Agency for Education, 2020). Finnish ECEC adopts an integrated approach to care, education and teaching, with a particular emphasis on pedagogy. It aims at promoting children's holistic growth, development and learning and ECEC settings work in tight collaboration with the caregivers. Children are viewed as active participants and the pedagogy is driven by playful learning. The ECEC setting is understood as a community where children and staff learn together and from each other. Education for children aged 0-5 yrs (day care) and for children aged 6 yrs (pre-primary) are integrated parts of the educational system. ECEC is mainly provided by municipalities in day care centers, along with a relatively small number of private providers. The Act on Early Childhood Education and Care (2018) states that staff teams consist of either two teachers in early childhood education and care and one child carer or one teacher, one social pedagogue and one child carer. Lack of educated staff is however a challenge in many settings.

Although ECEC inherently addresses many sustainability related issues (Ärlemalm-Hagsér & Pramling Samuelsson, 2018) and environmental issues have been part of the framework for Finnish ECEC since the 1980s, sustainability is a relatively new concept in Finnish curricula for the early years. It was introduced in the *Act on Early Childhood Education and Care* in 2015 and in the *National Core Curriculum for Early Childhood Education and Care* in 2016 and the *National Core Curriculum for Pre-primary Education* in 2014. The Act states that every child has the right to develop versatile skills, which lay the foundation for a sustainable lifestyle. The national core curricula highlight sustainability in four dimensions (ecological, social, cultural, and economic) and the organizational culture is supposed to build upon the principle of sustainability (Finnish National Agency for Education, 2014; 2018). When it comes to how these principles and objectives are to be realized in daily work, however, few specific instructions are given. It is therefore assumed that sustainability education follows the overall pedagogical approaches in contemporary Finnish ECEC.

Previous research into sustainability in ECEC and ECEC teacher training

Research on sustainability in ECEC has increased in recent years (Elliott, Ärelmalm-Hagsér & Davis, 2020; Hedefalk, Almqvist & Östman, 2015; Somerville & Williams, 2015). Most studies have targeted the ecological dimension through various environmental aspects of sustainability education in the early years. To a lesser extent, studies have

addressed the economic and social/cultural dimensions of sustainability education in the early years (Ärlemalm-Hagsér, Berg & Sandberg, 2018). A general shift towards promoting children's agency for change and civic participation can be seen (Huggins & Evans, 2018) as well as a turn towards building on relational worldviews (Weldemariam & Wals, 2020).

However, available research indicates that both ECEC student teachers and staff are unsure of what sustainability means and how sustainability education for children can be realized (Dyment et al., 2014, Huggins & Evans, 2018; Wolff & Furu, 2018). According to Ärlemalm-Hagsér and Elliott (2017) there is a need for studies of transformational pedagogies that promote sustainability among educators, especially in pre-service teacher education, and support staff to be "leaders for culture change" (Ferreira, Ryan & Davis, 2015). Moreover, as Huckle and Wals (2015) argue, it must be considered that research and literature so far seem to have failed to acknowledge or challenge neoliberalism as a hegemonic force blocking transitions towards genuine sustainability.

Previous research on sustainability in the ECEC context shows that sustainability education is a multifaceted issue. Research on environmental behavior has shown that sharing knowledge alone is not enough to change behavior (Kollmus & Agyeman, 2002). Individuals need to become engaged in questions that mean something to them, that is, knowledge has to be grounded in their own bodies and feelings (Emilson & Johansson, 2017). Children, as well as staff and students, need opportunities to make meaning of their own experiences (Furu & Kaihovirta, 2020; Furu, 2019). When children can create their own meaning, knowledge becomes integrated with their emotions and children own that knowledge (Pramling Samuelsson & Park, 2017). Taylor (2017) and Wals (2017) underline that a shift is needed in terms of supporting an understanding of humans as part of nature, capable of caring and supporting the web of life. In this sense, nature contact is at the core (Beery et al., 2020).

In Finland, research on sustainability education in the context of ECEC is sparse. To date, there are no studies on sustainability in ECEC teaching practice settings and only a few studies on how staff and/or student teachers understand and/or address sustainability issues (Reunamo & Suomela, 2013; Salonen & Tast, 2013; Salonen & Hakari, 2018; Wolff & Furu, 2018; Furu, Wolff & Suomela, 2018). Reunamo and Suomela (2013) set out to study how staff valued and approached "extended environmental education" in ECEC in the light of the extended Palmer´s model of environmental education (Palmer, 1998). The results showed that staff focused mainly on learning aspects and social relations, while ethical and participatory aspects of environmental education were not as highly valued in the daily work. The studies by Salonen & Tast (2013) and Salonen & Hakari (2018) reveal a gap between attitudes and actions among ECEC staff in their daily lives. Albeit good intentions, the educators in the study did not adopt a sustainable lifestyle due to lack of time and resources are perceived as obstacles. Interestingly, age was a defining factor, as older educators were more prone to live sustainably than young educators. The results of the three above mentioned studies raise questions both on how staff in ECEC approach sustainability issues in their work and on how their personal attitudes, awareness, and knowledge might impact their work as educators. They are however based on empirical research which was conducted already in 2012. This means that the results might not be valid in the current situation, as the societal context and our collective understanding of sustainability issues have changed and rapidly in the past few years and become more visible both in the child culture and within the ECEC context. Studies by Wolff and Furu (2018) and Furu, Wolff and Suomela (2018) show that the understanding of sustainability issues among student teachers varies considerably and that most students have a limited understanding of how the concept can be interpreted in the realm of ECEC. Studies by Furu (forthcoming) and Furu and Kaihovirta (in progress) show that sustainability issues are addressed with great variability in ECEC settings. Sustainability education is currently not addressed systematically due to knowledge gaps among staff and organizational challenges (e.g. lack of leadership). Another potential cause is the lack of professional language for these matters among staff.

Methodology

The research reported in this article is based on a study where the sustainability work was explored through ECEC staff´s descriptions and self-ratings of their daily practices and pedagogies. An understanding of the research phenomenon was developed on basis of analysis and interpretation of the responses to a tool including quantitative

as well as qualitative data. As such, the study is methodologically a form of *bricolage* (Denzin & Lincoln, 2018) or a quilt of data that provides different perspectives on the research phenomenon.

Data collection tool

The *Assessment Tool for Promoting Sustainability in ECEC* (PROSUS) by Furu & Valkonen (2020) was used as data collection tool. PROSUS is an adapted version of the OMEP Environmental Rating Scale for Sustainable Development in Early Childhood (ESD Rating Scale). The OMEP ESD Rating Scale was originally developed as a tool for enhancing ECEC quality with special focus on sustainability issues (Siraj-Blatchford, Mogharreban & Park, 2016). It has been translated to several languages and adopted globally during the past years.

Based upon experiences from previous research utilizing the Swedish version of ESD Rating Scale in Finnish context (Furu, forthcoming; Furu & Kaihovirta, in progress), a translation and major adaptation was made in order to better fit the Finnish legislation and national core curricula for the early years as well as contemporary research on sustainability education in ECEC. Therefore, PROSUS builds on five aspects in each dimension of sustainability (see Table 1).

Table 1
The three dimensions and respective five aspects (A-E)

1 Ecological sustainability

1A To understand oneself as part of the ecosystem
1B To have a respectful relationship with nature
1C To enjoy, play and learn in nature
1D To take responsibility for the environment
1E To prevent and mitigate environmental problems

2 Social and cultural sustainability

2A To develop social and emotional skills and prevent bullying
2B To promote equality and address individual needs
2C To respect multiculturality
2D To promote gender equality and to conduct gender sensitive education
2E To address the diversity of families

3 Economic sustainability

3A To learn modesty and economy
3B To make responsible acquisitions and use materials and resources in a
     sustainable manner
3C To use energy and water in a sustainable way
3D To develop a conscious approach to food
3E To develop a healthy life style and physical and mental health

PROSUS contains one open question for each aspect, all following the same model: "In what ways do you currently address (…) in your daily practice?" and a 7-point rating scale for each aspect with descriptive indicators based on general principles as follows:

> 1 (inadequate) indicates that the issue is not addressed or only sporadically or seldom

> 3 (minimal) indicates that the issue is addressed to some extent, but mainly from a teacher perspective

> 5 (good) indicates that the issue is explored and discussed on a regular basis in versatile ways where children are active participants engaging in playful and arts-based learning and critical reflection

> 7 (excellent) indicates that the issue is addressed systematically in a goal-oriented manner that involves external actors from the local community and pays regard to global perspectives

For every dimension, there is also an open-ended question, following the model: "What ideas do you have for developing (…) sustainability in your daily practice?" where teams can put forth any suggestions and ideas. The scoring system consists of a 7-point scale (see above) but the respondents also used interim points of 2, 4, and 6. These interim points were recoded according to the following: 2=1, 4=3, 6=5. Each team is also given the possibility to describe any ideas or reflections they have about how they could address each dimension of sustainability in their future work. In the current study, the tool was materialized as a paper questionnaire, but the tool was digitalized in January 2021[1].

Context

The study was conducted in Spring 2020 in collaboration with partner settings (day care centers and pre-primary schools) of the Swedish ECEC teacher education at the Faculty of Education at the University of Helsinki, Finland. Of the 18 partner settings, five settings had completed the questionnaire previously and where therefore excluded from this study. The questionnaires were sent to all remaining partner settings (n=13) and of these 11 settings participated in the study. All settings are municipal and located in the Helsinki metropolitan area. Altogether, 34 teams participated in the study. 6 teams were working with children 1-3 years, 10 teams with children aged 3-5 years, 2 teams with children aged 1-5 years, and 4 teams with mixed ages. Twelve teams worked with children aged 6 yrs (pre-primary schools). The participating teams consisted of both educated staff with appropriate education for ECEC and un-educated staff. According to current legislation, Finnish ECEC teams consist of a minimum of tree staff members, preferably one teacher in ECEC (who is also the team leader), one social pedagogue in ECEC, and one childcarer. All pre-primary school teams included a teacher in ECEC, but nearly half (n=11) of the teams in day-care centers did not include a teacher in ECEC. This reflects the national shortage of teachers in ECEC. The teams lacking a teacher in ECEC were commonly led by a social pedagogue who has basic studies in early childhood education (60 ECTS or higher education credits[2]).

The teams were asked to work with the questionnaire in three steps. First, each team member was asked to individually reflect on and describe the sustainability practices aligned to each aspect on the rating scale. Second, teams were asked to gather for common reflection and discussion around each aspect on the scale and to rate their

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[1] Link to information in English about the PROSUS tool as well as versions in Swedish and Finnish: https://blogs2.abo.fi/prosus-projektet/the-tool/

[2] Finnish higher education institutions use the ECTS system (European Credit Transfer and Accumulation System) in measuring a student's workload. In this system one full-time academic year is equivalent to 60 higher education credits.

work according to the scoring system. They were also instructed to collaboratively bring up and describe any ideas around future work on each dimension. Third, all team leaders filled out the PROSUS questionnaire that was sent back to the researcher as well as a form with background data concerning staff composition and educational background, number and ages of children in the group, as well as special interests and/or knowledge in terms of sustainability.

Analysis and interpretation

The study is based on a qualitative analysis of the written data obtained in the PROSUS questionnaire from all teams (n=34). Initially, a descriptive content analysis was adopted within each aspect and each dimension. The analysis was guided by giving attention to content and form of sustainability engagement in the descriptions staff had provided. In the following stage, recurrent themes and patterns across the data were identified in search for narratives that reflect how staff understand and address sustainability issues in ECEC. Thereafter, data was analyzed critically with focus on silences and exceptions in order to identify possible counter-narratives within data in order to understand the issues in sustainability education that are currently not addressed and that are under-developed. A quantitative analysis of the collected numerical data obtained in the PROSUS provides an illustration in the form of descriptive statistics (mean, median and standard deviation) (Table 2). Two questionnaires were excluded from the quantitative analysis due to too much missing data. The sample used in the quantitative analysis thus consisted of 32 teams. IBM SPSS Statistics 24 was used to analyze the data. Lastly, the analysis of both quantitative and qualitative data was reflexively interpreted and scrutinized in the light of prior research.

Ethical considerations

The study follows the ethical principles of research issued by the Finnish National Board on Research Integrity (TENK, 2012). The leaders of Swedish ECEC in the municipalities with partner settings were informed about the research project and research permissions were obtained. The ECEC settings were contacted by phone and e-mail and questionnaires were sent to the center directors of the participating settings. All responses were given a numerical code (municipality, day care unit, and team) in order to guarantee confidentiality during the process of reporting of results.

Results

The analysis of the answers to the open questions in the PROSUS tool shows that sustainability is addressed in all ECEC teaching practice settings that took part in this study, but with great variability in terms of extent and depth in how each of the three sustainability dimensions are implemented by the teams. While some settings do not give any answers to some of the questions posed, others provide rich descriptions with many examples of their current practices and pedagogies. Below, we first present metanarratives of how each dimension of sustainability is addressed by the participating teams in the ECEC teaching practice settings. We describe the daily practices, and pedagogical approaches made visible in the written responses and the values and pedagogical foundation they rely on. Thereafter we present how these metanarratives correspond with numerical assessment of sustainability work.

Ecological sustainability work as connecting to nature, but not worrying children

Ecological sustainability is addressed by the teams mainly through promoting children´s nature contact and by supporting pro-environmental behavior. Nature contact is supported in versatile ways and affordances for children to *enjoy, play, rest* and *marvel* are provided. Spending time outdoors and/or in nature every week or even daily is a prominent element in this narrative. Seasonal changes in nature are noted and discussed. Children and staff observe nature together and use specific vocabulary for plants, birds and animals. Emphasis is put on respecting and caring about all forms of life. Altogether, the dominant worldview that emerges from this narrative is anthropocentric, i.e., humans are predominantly described as separated from Nature. Interestingly, there are traces of a more ecocentric view of humans as connected to the entire web of life in that stories and picture books are mentioned as materials

that support the understanding of oneself as part of the ecosystem. Only one team addresses the importance of biodiversity explicitly as they state *"We are all dependent on each other. Even humans."* (team no 23).

A prominent feature of ecological sustainability work is the focus on litter. Children and staff collect litter during walks and trips, and sorting rubbish is part of the daily practice. Some teams mention that lack of separate dustbins for paper, glass, carbon, plastic, and compost prevent them from addressing the "reduce, reuse, recycle" approach fully. This follows the tradition of environmental education that has long been part of Finnish ECEC. However, taking a broad responsibility for the environment as well as preventing or mitigating environmental problems is a delicate topic. Some teams point out that, depending on the age of the children, this is a balancing act and they avoid the topics altogether in order not to create worries or anxiety among children and only suggest these issues be addressed if children initiate the discussion and/or in collaboration with the parents. At the same time, other teams say that children do bring up questions and discussions on these topics, as they encounter them in media and in their families. Altogether, the narrative about current sustainability work in the ecological dimension reflects the tradition of focusing on nature in early years education since its beginning as well as the emphasis on environmental education that was evident before the turn of the millennium (Ärlemalm-Hagsér & Elliott, 2020). In this sense, although the practices and pedagogies are implicitly in some settings in transition towards more biocentric or ecocentric worldviews, the broad picture is one of teaching practice settings not explicitly addressing the worldviews and values underlying sustainability education in the ecological dimension.

Social and cultural sustainability work is to respect each other

Social and cultural sustainability is a commonly addressed topic in all teams. In general, teams have formal plans for promotion of equality and prevention of bullying. Fostering social skills among the children through for example *friendship rules*, *being a good friend*, *active involvement in solving conflicts* is mentioned as a core of the pedagogical work. This dimension is approached from a basic values perspective where *equality* is key. All children´s participation regardless of age, gender, ethnicity, language or ability is underlined. Some teams explicitly stress that they strive to *see and hear all children in the group* and to *meet their individual needs*.

Multicultural education is mainly implemented through stories and toys that reflect diversity. Some groups also celebrate the feasts of several cultures. A general pattern is that language, culture, and religion is discussed according to what is represented in the group of children. Gender is mainly addressed through fostering an *attitude of openness* and critique towards stereotyped play or clothing. Some teams mention gender sensitivity and gender education as their approaches. The diversity of families is mostly addressed by means of a *respectful atmosphere* and the explicit support of respectful approaches. Some teams describe that they bring up discussions concerning the fact that families are different or live differently but still have the same value. This dimension of sustainability education is in general approached thoroughly and with reference to specific underlying values, which implies that ECEC teaching practice settings are well equipped to support student teachers in working in this field.

Economic sustainability work is to take responsibility for the use of resources

The teams address economic sustainability mainly as a matter of being mindful and modest in use of resources. Teams involve children in discussions about being grateful and understanding the economic value of for example toys and materials. Co-use of toys and tools between several teams within one setting is widespread. Teams mention that they foster children to be careful with toys and books and that they strive to repair broken items. Arts and crafts are arenas for re-use of all sorts of materials and for use of materials from nature. Recycling and sorting of materials are also mentioned. Some teams describe how organizational structures hinder a more active sustainability education. Municipal bureaucracy is perceived as an obstacle that limit their influence when toys, tools or materials are to be bought.

Food is a prominent issue within this dimension and most teams aim at reducing leftovers by letting children help themselves at the table. As children learn to take responsibility for their own hunger/satiety they also learn to estimate what amount of food is suitable at each meal. Many settings occasionally serve vegetarian food and some

serve locally produced or organic food. Health is an issue that is actively addressed by many teams through the daily routines of movement, food, play, and rest. Several teams mention the importance of discussing with children on why these habits support wellbeing and why they are an important part of sustainability at the individual level. Overall, this dimension of sustainability work is focused on the daily life of the setting, rather than understanding the life of the setting as related to a broader picture of economic sustainability on the municipal or even national or global level.

Quantitative data illustrate qualitative data

The results from the quantitative data are in line with results from the qualitative data. However, whilst the metanarratives are composed of content from all teams, some of the variation between teams is made visible by the quantitative data. Descriptive statistics illustrate that the scores on all dimensions and aspects are between 'minimal' and 'good' (Table 2) and that there is considerable variation between teams and between aspects as individual teams may score higher or lower on specific aspects. In the ecological dimension the median is 'good' for 1A (To understand oneself as part of the ecosystem), 1B (To have a respectful relationship with nature) and 1C (To enjoy, play and learn in nature), but lower on the rest. The medians of the social and cultural dimension vary with slightly higher scores on subscales 2A (To develop social and emotional skills and prevent bullying) and 2B (To promote equality and address individual needs) and lower on the rest. The medians are lower for the economic dimension than for the other two dimensions, except for the subscale 3E (To develop a healthy lifestyle and physical and mental health) where the score is 'good'.

Table 2
Dimensions and aspects of sustainability (*n*=32)

Dimensions and aspects	*Md (M)*	*SD*	Min-Max	Levels
Ecological (sum)	4.0 (4.0)	.97	1.00-5.80	minimal
1A	5.0 (4.2)	1.50	1-7	good
1B	5.0 (4.7)	1.35	1-7	good
1C	5.0 (4.4)	1.48	1-7	good
1D	3.0 (3.8)	1.32	1-5	minimal
1E	3.0 (2.7)	1.35	1-5	minimal
Social and cultural (sum)	4.1 (4.2)	1.00	2.20-6.60	minimal
2A	5.0 (5.5)	1.24	3-7	good
2B	5.0 (4.6)	1.07	3-7	good
2C	3.0 (3.6)	1.63	1-7	minimal
2D	3.0 (4.0)	1.25	3-7	minimal
2E	3.0 (3.5)	1.76	1-7	minimal
Economic (sum)	3.4 (3.4)	1.01	1.00-5.00	minimal
3A	3.0 (3.0)	1.52	1-5	minimal
3B	3.0 (3.3)	1.69	1-7	minimal
3C	3.0 (3.0)	1.17	1-5	minimal
3D	3.0 (3.4)	1.32	1-7	minimal
3E	5.0 (4.4)	1.39	1-7	good

To sum up, the results show that sustainability is understood and implemented variably by the participating teams. Both quantitative and qualitative data show that sustainability work is generally implemented predominantly in a teacher-dominated way. Both scores and answers to open questions indicate that most settings perceive their sustainability work in terms of levels `minimal´ to `good`. As a consequence, student teachers in ECEC teaching practice are encountering highly variable pedagogies and practices in terms of sustainability work.

While some teams explicitly mention their basic values or pedagogical goals, others just briefly mention specific activities that they include in their daily practice such as outdoor education, collecting waste, using recycled materials, or supporting gender neutral play with toys. Although there are some examples of teams with integrated and systematic approaches from values to practices, most teams address sustainability item by item. By and large, the teams rely on practical and pedagogical approaches that express sustainability as a matter of individual choices (in line with the prevailing consumer culture) rather than a matter of integrated values or global citizenship. This is in line with recent research Ginsburg & Audley (2020) on sustainability education in early childhood in the US.

Further, the three dimensions of sustainability are addressed as separate entities. Although some teams are working actively with several aspects of all three dimensions of sustainability, a general pattern is that the social/cultural dimension is addressed more in depth than the ecological and economic dimensions respectively. These findings are in line with Ärlemalm-Hagsér, Berg and Sandberg (2018).

With respect to prevailing worldviews, anthropocentrism is far more common than a biocentrism although there are some traces of post-humanistic perspectives (e.g. Taylor, 2017; Weldemariam & Wals, 2020). Teams describe their approach to sustainability by referring to contents and materials, while descriptions of pedagogical thinking are less common. Six teams report that at least one member of their staff is a certified eco-supporter[3], who has been educated to promote ecological awareness in the workplace. Two teams report that they implement the Swedish Skogsmulle approach[4] and hence also work intentionally on several aspects of ecological sustainability. In the data, there are no visible common pedagogical practices to implement sustainability. Examples of what values, attitudes, knowledge, or skills staff strive to support among children are scarce. Only a few teams explicitly describe their practice in terms of their view of both children and early learning. However, some teams use verbs such as *teach, tell, discuss, reflect* or *listen to children* in order to support sustainability to describe sustainability related activities. Some teams underline that they *play* or *create* together with the children. Others *observe, explore, investigate, experiment.* These differences in descriptions reflect the varying child views and possibilities of children to actively participate in and influence how sustainability issues are addressed (Pramling Samuelsson & Park, 2017).

Generally, staff emphasize themselves as role models, which indicates that the shift towards a sustainability education where children´s active participation is still under way (Huggins & Evans, 2018). The results indicate that the overall pedagogical pattern is still one where staff initiate actions or routines that make it possible for children to develop habits related to sustainability issues. However, some teams have integrated themes and approaches into both their daily practice and their pedagogy. They create opportunities for children´s learning related to specific contexts (place-based or time-based). There are some instances of how staff support children´s play-based or arts-based paths to exploration of sustainability matters. This enables various forms of experiential learning which include bodily and emotional aspects in line with (Emilson & Johansson, 2017). There are occasional instances of reflection and discussion, but these are not described as preferred pedagogical approaches to sustainability education.

In conclusion, the results from this study are in line with previous research which show that uncertainty prevails in terms of how sustainability education can be turned into a living practice in early years education (Huggins & Evans, 2018). Values and attitudes are in general not explicitly expressed by the teams and sustainability work is only occasionally described as integrated into a pedagogical framework around contemporary views of children,

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[3] The eco-support system was developed in the city of Helsinki in 2006 and has since then spread to other municipalities in the Helsinki Metropolitan area. More information about the can be found at https://www.ekotuki.fi/en/activity.

[4] This approach to outdoor education for the early years which was developed in Sweden in the 1950ies by Gösta Frohm. It is currently practiced in all parts of Scandinavia. The aim of the approach is to support children´s nature connectedness and pro-environmental behavior through outdoor education. The approach has some similarities with Forest kindergartens and it is described in English by Rose Joyce in her (2012) *Outdoor Learning: Past and Present*.

knowledge, and learning. Neither is children´s agency stated as part of the sustainability work in the participating teaching practice settings. This is in sharp contradiction to contemporary theoretical foundation of sustainability education in the early years (Elliott, Ärlemalm-Hagsér & Davis, 2020; Huggins & Evans, 2018; Somerville & Williams, 2015).

Discussion

This study has directed focus towards the sustainability work of ECEC teams in teaching practice settings in Finland. Based upon the findings of the study, student teachers are not in an equal position when it comes to developing their capacities for sustainability work during their practice. There is considerable variability among teaching practice settings regarding how sustainability is understood and addressed. The study indicates that there is currently no common knowledge basis or praxis in terms of how sustainability could be addressed pedagogically in the early years. These results are in line with the results of the national evaluation of ECEC settings by Repo et al. (2018; 2019) and previous studies of how sustainability education policy is implemented in practice in Finnish ECEC (Furu, forthcoming). It can also be understood as a knowledge-practice or rhetoric-reality gap among practitioners (Ärlemalm-Hagsér & Elliott, 2020). Further, there seems to be a lack of vocabulary related to sustainability issues among staff in ECEC settings. As language and communicative practices are vital parts of the organizational culture and crucial in all educational processes, these silences in the data are troublesome with respect to further development of sustainability within ECEC settings. Although tacit knowledge is valuable, the development of a professional language for sustainability education in the early years might be one of the keys to promoting sustainability work in ECEC.

The findings of the study also raise questions about the need for opportunities for both staff and student teachers to develop their capacities for transformative sustainability education. Most settings are not yet fully integrating sustainability into their daily practices and their pedagogy. To some extent, this might be related to the fact that part of the staff is either un-educated or not pedagogically educated. This highlights the importance of professional development for entire teams, independently of background education or role in the team. According to Tomas et al. (2017) the attitudes of student teachers to sustainability education are of importance and that praxis-oriented forms of education are perceived to contribute to the overall capacity to engage in sustainability education. Another issue that is raised by the results of the study is the crucial role of both leaders and center directors as they are in a key position in promoting educational transformation. Furthermore, attention needs to be directed to what resources settings can utilize when turning (new) policy into practice. These aspects become even more urgent in the teaching practice settings as there is overall uncertainty prevailing in the field and new teachers might be a driving force in strengthening sustainability work as they enter their first workplace.

There are some methodological issues that need to be commented upon here. Naturally, the PROSUS cannot fully represent how sustainability is understood or addressed, as some aspects of it might be a form of tacit knowledge. Further, the procedure of responding to the PROSUS may have varied slightly between settings and across teams and it is not possible to determine if – and to what extent – all members of staff have been involved in the process. Comparisons between qualitative and quantitative data indicate that there might be tendencies to underrate/overrate when scoring sustainability work in the team. Furthermore, the sample of this study is limited and cannot be generalized. Thus, further studies are needed to confirm these findings and explore this issue in more detail.

Altogether, we argue that in order to genuinely promote ECEC student teachers' learning in terms of sustainability issues, sustainability work needs to be an integrated aspect of the daily practices and the pedagogy in ECEC teaching practice settings. To this end, it should be a both visible and verbalized aspect of the working culture. It still remains unclear whether or not sustainability is an established part of collegial reflection and discussion and to what extent municipal leadership in ECEC and center directors support bringing sustainability issues to the fore. In this respect, tools like the PROSUS might encourage both leaders in ECEC as well as center directors to promote reflection and discussion among staff.

The findings of this study indicate that the learning environment as a whole as well as the pedagogical atmosphere in ECEC teacher training settings are not yet permeated by sustainability and that sustainability education for staff and student teachers is urgently needed. There is no doubt about the magnitude of the sustainability crisis and the need for rapid transformation. Further research is needed to deepen our understanding of how different aspects – from values to daily habits – of the working culture in ECEC teaching practice settings can enhance sustainability work and education among young children and thus support transformation towards a sustainable world.

Disclosure statement
No potential conflict of interest was reported by the authors.

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Ann-Christin Furu is a project researcher at Åbo Akademi University in Finland. She can be contacted at christin.furu@abo.fi.

Cecilia Heilala is a lecturer at University of Helsinki in Finland. She can be contacted at cecilia.heilala@helsinki.fi.