



Traces of Sustainability in Food Practices in a Norwegian Kindergarten

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Abstract

Food and meals in early childhood education and care (ECEC) settings play a vital role in health promotion and sustainable development because they constitute a significant part of the children's total diet and considerably influence their eating habits and preferences. This paper aims to find and identify traces of sustainability in food practices in a Norwegian kindergarten by analyzing each of the four dimensions of sustainability relevant to ECEC: ecological, economic, and social/cultural sustainability, and good governance. Primary data sources for this paper include interviews with kindergarten staff, supplemented with non-participatory observation during mealtime. By looking into how this kindergarten integrated sustainability thinking into their practices and organizational structures—from designing a menu to managing a meal and incorporating children's voices in the process—this study shows that purposefully designed food provision may promote sustainability in ECEC. In addition, it draws our attention to how the kindergarten environment can serve as an arena for children to act as change agents for sustainable food practices in kindergarten settings and beyond.

Keywords: *foods and meals; sustainability; early childhood education and care; sustainable healthy diet; children's agency; Norway*

Subject editor: Elin Kirsti Lie Reikerås

Introduction

This article presents a case study from the first author's PhD project on food policies and practices in Norwegian and Chinese kindergartens. The same data set has been used in a published article by the same authors (see Ciren et al., 2022). This current article takes a different stance in terms of research questions as well as results. The PhD project, which this research is part of, was funded by the Norges Forskningsråd, grant 275575.

Dietary practices can have substantial implications on sustainable development, due to its impact on the environment, individual and public health, and the economy (EAT-Lancet

Commission, 2019). It is increasingly recognized that a sustainable world will require a global shift in values and practices in order to change our increasingly unsustainable patterns of consumption (UNICEF, 2013). A sustainable healthy diet is promoted in global guiding documents, such as the Food and Agriculture Organization of the United Nations and World Health Organization's *Sustainable Healthy Diets: Guiding Principles* (2019). Various research has shown that a dietary pattern higher in plant-based foods (e.g. vegetables, fruits, legumes, and whole grains) and lower in animal-based foods (e.g. meat, poultry, fish, eggs, and dairy foods) is both healthier and associated with a lesser impact on the environment (Clark et al., 2019; Hemler & Hu, 2019; Nelson et al., 2016; Sabate & Soret, 2014). In line with previous studies, a report that assessed the Norwegian dietary guidelines in a sustainable perspective by the National Council for Nutrition also concluded that a plant-based diet is more sustainable in the Norwegian context (National Council for Nutrition, 2017).

The issues of a sustainable healthy diet are particularly critical for children, whose future health is significantly affected by their current food and dietary practices. Early childhood is an important phase for developing eating habits and food preferences, and the dietary behaviors acquired during the early years of life can extend to adulthood (De Cosmi et al., 2017; Nekitsing et al., 2018; Ventura & Worobey, 2013). A large body of evidence has shown that early childhood development lays the foundation for lifelong health and well-being (Britto et al., 2017; Center on the Developing Child at Harvard University, 2010; World Health Organization, 2018). What happens to children during these early childhood years can influence their lifetime, their future children and society as a whole (Clark et al., 2020).

During the last decades, early childhood education has emerged as an important actor for sustainable development (Davis, 2010; Samuelsson & Kaga, 2008), particularly "in equipping children as active and informed citizens now and in the future and who are capable of contributing to healthy and sustainable ways of living" (Davis, 2010, p. 1). With the implementation of the UN Convention on the Rights of the Child (UNCRC) (United Nations, 1989), the past decades have seen a growing recognition in Norway and internationally regarding children's rights to participate in all matters that affect their lives (Bae, 2010; Sargeant, 2018). A call for voice-inclusive practice for sustainability is advocated, also as a step towards the actualization of the convention in practice (Sargeant, 2018). Previous studies have highlighted children's influence on family food purchasing and consumption practices (Grønhoj & Gram, 2020; Nørgaard et al., 2007). Yet, their voices in food research outside the family and private sphere remain minimized. In this paper, we aim to identify traces of sustainability in the food practices in a Norwegian kindergarten by analyzing different dimensions of sustainability as described below, and we draw special attention to children's voices in the process.

The four dimensions of sustainability

It is customary to characterize sustainability in a typology comprising three pillars: environmental, economic, and social (or sociocultural) (Boström, 2012). Grindheim

et al. (2019) provide a conceptual perspective to a broader understanding of sustainability relevant to ECEC guided by including the fourth dimension of good governance suggested by United Nations (2013). The four dimensions are considered to overlap in respects (see Figure 1). The dimension of good governance, often referred to as the political dimension, is understood as the system that distributes power and accommodate diversity, subjectivity, and multiple perspectives (Grindheim et al., 2019). According to Grindheim et al., good governance is organized through rules, structures, and plans for the activities in the ECEC. Following the long Nordic tradition and pedagogical model, children's democratic involvement has been considered as one of the key elements of good governance. By including this political dimension, Grindheim et al. argue that "reflections regarding how to facilitate children's involvement in educational practices and cultures become of interest" (2019, p. 376). The term "sustainability" has its origin in ecological sciences, and this dimension has been one of the primary dimensions of sustainable development (Holden et al., 2014). This dimension involves the protection of ecosystems and the conservation of biological diversity. According to Grindheim et al. (2019), this dimension includes aspects from nature conservation education to environmental education relevant for ECEC. We intend to explore this dimension from a food-related perspective. For example, sustainable initiatives including using foods that are both healthier and associated with a lesser environmental impact. Social and cultural sustainability is characterized as an environment that ensures equity, safety, and social rights, as well as promoting a sense of community and a feeling of belonging in the context of ECEC (Grindheim et al., 2019). Education for economic sustainability is less developed of the dimensions in ECEC (Siraj-Blatchford & Pramling-Samuelsson, 2016). The economic dimension of sustainability concerns "the financial approach to resources where economic development affects humans and/or the environment in a positive way" (Hedefalk et al., 2015, p. 979). While acknowledging the individual level learning about economy, consumption and value as suggested by Grindheim et al. (2019), we focus on the institutional level financial management and budgeting in our study, and how this affect the sustainability of the everyday practices.

The concept of agency is brought about by the paradigmatic shift of the "new sociology of childhood." We follow the traditional discourse regarding children as competent social agents who participate in knowledge construction and are capable of making sense of and affecting the social worlds around them (Corsaro, 2017; James et al., 1998). Children's agency is often analyzed within or as part of social and cultural sustainability (Bergan et al., 2021; Borg & Gericke, 2021). Grindheim et al. (2019) identified the overlapping area as when real-life activities, such as activities, playing in nature, learning about nature, gardening and so forth relate to the four dimensions of sustainability. According to their conceptualization, ways of facilitating these real-life activities become highly relevant in making room for agents of change, especially children as active agents of change for greater sustainability.

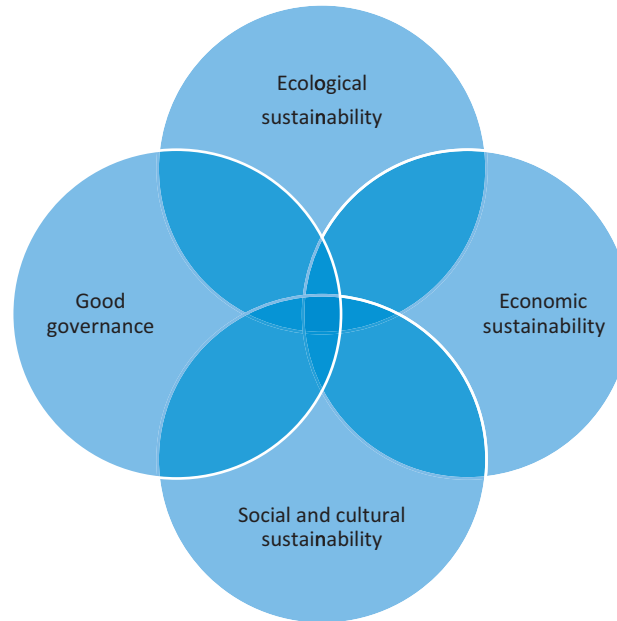


Figure 1. The four dimensions of sustainability (Grindheim et al., 2019)

Background and research context

In Norway, 93.4 percent of children aged between 1 and 5 years attend kindergarten (Statistics Norway, 2023). Children usually eat three meals daily in kindergartens. Typically, breakfast is brought from home by the children, while lunch and afternoon snacks are served by the kindergartens (Norwegian Directorate of Health, 2012). Although the practices vary in different kindergartens, especially between public and private kindergartens, in general, it is common for kindergartens to serve cold open sandwiches with toppings for lunch. According to a report from the Consumer Authority and The Norwegian Diet and Nutrition Association (2018), 37 percent of the Norwegian kindergartens served hot food twice a week or more often. The *National Guideline for Food and Meals in Kindergartens* provide knowledge-based recommendations (Norwegian Directorate of Health, 2018) for kindergartens on meal planning. Most Norwegian kindergartens do not have chefs or kitchen assistants, and the kindergarten staff usually prepare the meals.

In Norwegian ECEC, sustainability has been addressed explicitly in the curriculum framework (Weldemariam et al., 2017). *The Framework Plan for Kindergartens* states that, “kindergartens shall promote democracy, diversity and mutual respect, equality, sustainable development, life skills and good health” (p. 7), and further: “Kindergartens play an important role in promoting values, attitudes and practices for more sustainable communities” (Ministry of Education, 2017, p. 10). Besides, environmental concerns are particularly explicitly pointed out in the *National Guideline for Food and Meals in the Kindergartens*, which states that “kindergarten should have an environmentally friendly practice with little food waste and a food offering where plant-based foods and fish and seafood are central” (Norwegian Directorate of Health, 2018, p. 39).

Few studies to date have explored the extent to which Norwegian kindergartens integrate sustainability into their daily food practices (e.g. by providing food with lower environmental impacts or by offering opportunities to include children's voices). The present study therefore reports findings from a case study where a change of lunch practices from traditional cold sandwich meals to hot meals occurred, and emerged in response to the need for investigating traces of sustainability in their daily food practices by analyzing each of the dimensions of sustainability: ecological, economic and sociocultural, and good governance. The objectives of the present study were to explore how this case kindergarten of interest has embedded sustainability into their practices and organizational structures and inspire kindergarten-based actions towards promoting sustainable food practices.

Materials and methods

Research design

A case study methodology (Stake, 2005) was adopted because it allows an in-depth, multifaceted understanding of a complex issue in a particular real-world context (Crowe et al., 2011; Grauer, 2012). A qualitative case study approach enabled our purpose of understanding how the case kindergarten of interest embedded and incorporated ideas of sustainability in the change of lunch practices.

Research site and participants

This study was carried out in a public kindergarten in a large city in Norway. The kindergarten is in a neighborhood of households with modest (and higher) incomes. Most of the children are ethnic Norwegians. Children brought their own breakfast from home and ate together in the kindergarten. Lunch was provided in the kindergarten, and the afternoon snacks were usually yogurt (brought from home) with some fresh fruit cuts served in the kindergarten. This article presents a case study of a larger project on lunch practices in a cross-cultural context. Data were collected from the Blueberry and the Cranberry department with children aged from 3 to 5. In each department, there were around 18 children with 3 adults (1 pedagogical leader, 1 teacher and 1 assistant teacher). Study participants for interviews included six kindergarten staff members (see participants list in Table 1). The same data has been used in a published article by Ciren et al., (2022). After the sentence "This article presents a case study of a larger project on lunch practices in a cross-cultural context.

Data collection

This study's major data sources are interviews with kindergarten staff supplemented by non-participatory observational data. In total, six semi-structured interviews with kindergarten staff that lasted from 45 to 80 minutes were conducted in the kindergarten in

Table 1. Participants' demographic data

Participant	Position	Years of experience	Gender
Blueberry department Participant 1	Apprentice	1	Female
Participant 2	Pedagogical leader	13	Female
Cranberry department Participant 3	Assistant	8	Female
Participant 4	Pedagogical leader	8	Female
Participant 5	Headteacher	20+	Female
Participant 6	Chef	16 years as a restaurant chef 1 year in this kindergarten	Male

February 2020. The headteacher, the chef and the two pedagogical leaders were invited for interviews as key informants, while the other interviewees were recommended by their pedagogical leaders. The interviewees chose a time that was convenient for them. The interviews were based on a list of guiding questions with an open-ended structure and follow-up questions. The interview guide consisted of themes concerning lunch meal organization, lunch practices, and children's food consumption. The design of the questions was adapted further as the research proceeded, after two or three interviews, more probing questions regarding the thinking and rationale behind the practices were asked. All the interview data were audio-recorded. In addition, non-participatory observations for a week were conducted during the same period. Observation protocols were designed prior to the fieldwork and filled during the observation. The observation protocol includes three main parts: (1) the details of the dining environment; (2) mealtime organization and children's eating behaviors; and (3) mealtime socialization/ interaction. The observational data on mealtime organization, especially before and during mealtime activities, and children's consumption of the "new" foods and their mealtime interaction, were included for the purpose of this paper to supplement the interview data.

Data analysis

All interviews were transcribed verbatim. The interview data were analyzed deductively from the four dimensions of sustainability conceptualized by Grindheim et al. (2019), and inductively from the findings with new code emerged (Braun & Clarke, 2006). For the observational data analysis, we opted for a deductive-inductive approach where we began with a deductive coding system with the set of themes derived from the interview data, based on the aim of the research, and inductively with new codes emerged. The analysis of the observational data was conducted to validate and supplement the interview data and to help illuminate findings.

Ethical considerations

The research project was approved by Norwegian Centre for Research Data. Written consents were obtained from all the staff included in the study. In addition, written consents

for observation from children's parents and written/oral consents from everyone present during the observation was obtained.

Findings

With reference to the different dimensions of sustainability conceptualized by Grindheim et al. (2019), findings are presented as follows: (1) A goal-oriented action and an arena for participation; (2) Environmental considerations in menu development and waste management; (3) Economical and efficient budgeting and financial management; (4) Careful planning for sociocultural equality, relationships and well-being; (5) Children's agency for sustainable changes.

A goal-oriented action and an arena for participation

All the participants believed that the kindergarten should be an important arena for health promotion and acknowledged that the kindergarten played a vital role in providing healthy food for children. They perceived the hot lunch provided at their kindergarten as both healthy and tasty. The chef, who takes primary responsibility in food-related decision-making and food provision, shared his beliefs of healthy food and adequate nutrition as children's rights. In the interviews, the chef stated multiple times that, "I think that a healthy meal is supposed to be given to the children."

In addition, the participants talked about children's participation in the meal, both in the decision-making and the mealtime. A "mailbox" to the chef, where the children could suggest their favorite foods, either drawn by themselves or written down for them by their teachers, was made and attached outside the kitchen. As such, children can participate in the decision-making of the foods served to them. And children's voices are taken seriously, as one of the teachers shared: "Some dishes are replaced, and some stay on the menu, like the lasagna, children love it, and they wrote to the chef about it, so it is kept on the menu" (Participant 2).

According to the teacher, involving children as active participants in the process promotes the likelihood that they would accept the food provided to them, which sustains this engagement of children in the kindergarten.

Environmental considerations in menu development and waste reducing

The kindergarten in this case developed a menu based on odd and even week numbers (see Table 2): two dishes in the weekly menu were changed every two months. In general, they have soups served on Mondays, vegetarian dishes on Tuesdays, fish on Wednesdays, bread on Thursdays for children to bring along on outdoor trips, and children's favorite oatmeal

Table 2. Menu in the kindergarten

Weeks	Monday	Tuesday	Wednesday	Thursday	Friday
Odd weeks	Tomato soup with whole-grain rolls	Pasta with tomato sauce	<i>Plukkfish</i> (a traditional Norwegian fish dish)	Bread slices with toppings, eggs and milk	Oatmeal with homemade berry sauce
Even weeks	Potato soup with whole-grain rolls	Vegetable lasagna	<i>Fiskegrateng</i> (baked fish casserole) with cooked carrots	Bread slices with toppings, eggs and milk	Oatmeal with cinnamon, raisins and sugar

on Fridays. In the interviews, all staff in the kindergarten similarly stated that the goal of such a menu is to serve a healthy and varied diet to the children.

In the kindergarten, a meatless Tuesday was set. The chef advocated reducing meat consumption, especially red meat. He problematized the current food consumption pattern in society and highlighted the health benefits of eating vegetables.

We as humans eat a lot more meat than we need in general. And if we buy ground meat, they use a lot of water producing it ... and there's a lot of salt in it, and we eat a lot more salt than we need, it is not healthy ... We need to provide more vegetables to children. (Participant 6)

During our observations, we noticed that the food served in the kindergarten was according to the menus they had developed, with modest amounts of fish and meat. According to the teachers and the chef, instead of ordering from the grocery shops, they make their own bread and jam using fresh berries thus reducing processed and pre-packaged foods. This was also confirmed during our observation in the kindergarten, in which most of their food was freshly prepared.

Reducing food waste

In the kindergarten, the teachers noted that by distributing food to the children, they were able to reduce food waste. Leftovers can be stored in the fridge and served to the children who have a different, difficult time with the meal of the day, or for the adults in the kindergarten.

As per our observations, during mealtimes, teachers served a portion they think is appropriate for the children, based on their experiences. Once the children finish the food on their plates, the teacher would ask them if they wanted another serving, and then serve those who wanted more. According to the teachers, by serving children with appropriate portion sizes, they reduce food waste in the kindergarten also while ensuring that the children received enough food.

The teachers emphasized that it is bad to throw away food. By extending mealtime, the amount of food waste from the children's plates could be reduced. The guidelines for food and meals in kindergartens recommend allocating a minimum of 30 minutes for children to eat. In the kindergarten, an average of forty minutes is set for lunch. Besides, the

kindergarten also extended the time for meals for those who took longer to eat to ensure everyone had enough time to eat and finish.

Economical and efficient budgeting and financial management

The headteacher shared the importance of budgeting and financial management, healthy meal planning and targeting available money effectively. The headteacher further explained that although they had a limited budget, with better planning, they could sustain a healthy diet: “We have limited budget, but our chef is very economical. I think the food we make is of very good quality. And it stays within the budget ... I don’t see that as a challenge, our budget is enough” (Participant 5).

In the interview, the chef said that compared to other kindergartens, they were economical and efficient, both time- and money-wise: “We don’t use any more money for food than other kindergartens; and don’t use more time necessarily providing it. I take care of everything in the kitchen, so teachers have more time to be with the kids” (Participant 6).

In addition, the chef shared that by reducing the intake of red meat, they could afford better fish when they served fish meals.

As for the meatless Tuesday, it is also cheaper ... Therefore, if we don’t spend money on meat on daily basis, we can have better meat when we eat meat. So, the fish we use, for instance, is not the cheap fish we can use. It is the best fish we can use. (Participant 6)

Careful planning for sociocultural equality, relationships and well-being

The value of social equality is clearly expressed by our participants. They mentioned that a healthy meal is “supposed to be given to each child.” And they talked about how the cooked meal they provide in their kindergartens can contribute to level out the differences through food. One of the participants said that “For some low-income families, they know that if they are not able to provide good breakfast, the children would at least get good lunch in the kindergarten” (Participant 1).

As she said, for some children, the lunch meal is the “good meal” they receive during the day, implying that it guarantees a basic level of nutrition no matter what is served at home for those from economically disadvantaged families. In this regard, the meal provides opportunities for tackling social inequality. This is confirmed by other participants, such as this teacher: “It is very important that all children get the same offer. At home, there are many differences, some eat very good food, but some don’t.” (Participant 2).

The teacher explained that the meals children consumed at home regarding nutritional quality varies. Different individual factors and family food environments affect the meals offered at home. The teacher further explained that many families rely on (semi-) convenient meal ingredients than cooking from scratch with an example of making tomato soup with soup mix powder instead of fresh tomatoes in some of the children’s households.

According to her, the lunch meal provided at the kindergarten helps to reduce such diet disparities children experienced at home.

In addition, the teachers explicitly talked about the importance of creating an environment for children to establish skills for accepting new things for later social life that children will need. The teachers were concerned that most children were used to the traditional Norwegian bread lunch and were not exposed to many different food types at home. More importantly, the teachers believed that food acceptance in early life has long-lasting implications, while not being exposed to many foods may lead to a restriction of children's social life and well-being.

I think it is good for children that they can eat different food. It is good for them when they are getting older, like go to birthdays with friends, that they feel safe that they can eat the food served there ... It is good for them to have the experiences early from the kindergartens to like every meal that served them and help them get an easier everyday life. (Participant 2)

According to the teacher, exposing children early to various foods provides them a balanced and nutritious diet while also equipping them with the necessary skills to engage and participate in social life later. In addition, the teachers shared that the importance of developing a healthy relationship with food early in life: "To give children early a good relationship to what they eat and to create a positive setting where we can have a good talk and enjoy the food together is important" (Participant 5).

Besides developing a good relationship with food, the teachers also shared that encouraging the children to show gratitude towards those who prepared the food for them is important in order to help the children develop a good relationship with food.

Before the meal in the get together by the wardrobe, we always say to the children that the chef has prepared these foods for us today ... and during the meal, we also say to them that it is very nice that the chef always prepared good food for us. (Participant 4)

According to the teachers, one of the ways to promote the children's healthy relationships with food is to connect children to what they are eating and the people who prepare the food. This was confirmed by our observation notes. We observed that the teacher sometimes mentioned that the chef was so good at preparing healthy food for the children during mealtimes in the Cranberry department.

Children's agency for sustainable change

The teachers in our study expressed that children make their contribution to the new meal situation. According to the teachers, accepting new and unfamiliar foods was difficult for children in the beginning, especially younger ones. Through peer modelling, the older

children in the group acted on their behalf and serve as role models for the younger children in the same group. According to the teacher, the older children in the group positively influenced younger children's eating behaviors, and thus contributed to the meal situation by accepting and consuming new foods.

Some children are like "we don't want to try this," but when they eat with other children, they seem very glad, saying, "Maybe I should be like them ...". I think the 5-year-olds are very good at trying things, and they tell the 3-year-olds to taste it, it is very good. When I do it, they will be like you are an adult, and you do everything, but when 5-year-olds tell them that to taste it, they do it because they think they are big and very smart. (Participant 4)

As per our observation, children in the 3–5-year age range were mixed at the table where they engaged with each other, with the younger children observing and sometimes imitating the older ones. Moreover, observation data indicated that children contributed to the social setting by co-creating and engaging in a relaxing and happy atmosphere before, during and after mealtime. It is observed that sometimes children did small chores, such as pushing the food trolley from the kitchen to their department before the meal, and participated in routine activities, such as counting and singing. During mealtime, the children initiated different topics and talked to each other and in the group freely. When the teacher-initiated discussions regarding other topics such as weather and food, the children participated in the conversation. After the meal, all the children took their own utensils out and stacked their used plates back on the trolley.

It appears that children had a large say in how the mealtime should be in the kindergarten. It was observed that children always engaged their senses to touch and taste the food. In one of the meals, children initiated a game of "guess what's in my hand" and touched the food with their hands and played with their fingers. Using this strategy, children exercised their agency in controlling how they ate.

The children were able to not only practice their agency in kindergarten, but also seemed to exercise their agency at home. According to the teachers, they talked about healthy food in the kindergarten with the children, and the children were interested in such knowledge. Children brought the message they received from the kindergarten back home and requested their parents to prepare healthier food options for them.

There was one day, one parent picks up the child and said that today we are having pizza for dinner, the child was like pizza is not good for me, and he said it is not so good to eat pizza, maybe we can have fish instead, and the parent was like you like pizza, and he said, I like pizza, but I cannot eat it every time. (Participant 4)

Furthermore, a teacher shared how the children are empowered and can exercise their agency in family food-related decisions based on the discussions over healthy food in the kindergarten. She shared:

We talk a lot about food here in the kindergarten, about what is healthy, what is not, what we should eat more often, and what we should eat less often. The children remember a lot, and they take the message with them, and they tell their parents. And so maybe if the parents wanted some chocolate on Monday or Wednesday, they may stop that. (Participant 1)

Discussion

By analyzing each of the four dimensions of sustainability relevant to ECEC conceptualized by Grindheim et al. (2019), the findings of this study indicate that the case kindergarten has incorporated the four dimensions in their food practices. The four dimensions include (1) a good governance prioritizing children's rights to nutritious and healthy food, and emphasizing a participatory orientation toward a sustainable change; (2) an ecological pondering upon menu designing and reducing food waste; (3) an economic consideration on feasibility and sustainability; and (4) a sociocultural contemplation of equality, relationships and well-being. Although the dietary practices of providing a hot lunch in the kindergarten are not representative, we argue that this case study can serve as an example of how kindergartens can engage sustainable practices in food provision and facilitate the meal practices as an arena for children to act as change agents, by looking into how it has embedded sustainability throughout its carefully designed meal practices from designing a menu to managing a meal by incorporating children in the process. The findings suggest that the foundations for good governance in this kindergarten are the apparent interests and values for children's equal rights, health, and participation. The orientation towards such values contributed to the planning and organization of the kindergarten's food practices. While acknowledging that the personal beliefs of the headteacher and the chef were important drivers for the sustainable food practices in the kindergarten, we highlight the institutional level efforts that conditioned all parties involved to be able to act on the values that they hold. By giving room for participation and new ways of thinking, as pointed by Grindheim et al. (2019), the system changes, rather than the individual teacher or child.

The findings of our study suggest that the case kindergarten carefully considered ecological dimension of sustainability in their food practices. The design of the kindergarten menu corresponds to the strategies set out by EAT-Lancet Commission guidance for the necessary shift towards a sustainable diet, with more plant-based and fewer animal-sourced foods (EAT-Lancet Commission, 2019). The design is also in line with the recommendation from the *National Guideline for Food and Meals in Kindergartens* (Norwegian Directorate of Health, 2018), which recommends that kindergartens should have an environmentally friendly practice where plant-based foods, fish and seafood are central components. As indicated by previous research, some food practices, such as introducing appropriate portion sizes for children (Kairey et al., 2018), may increase food intake and enable children

to eat more healthily. In addition, the case kindergarten has reduced food waste with such practices of serving appropriate portion sizes, which is in line with the strategies recommended by other studies to reduce food waste and promote the achievement of healthy and sustainable eating patterns (Boschini et al., 2020; Steen et al., 2018). By incorporating such practices, this kindergarten has facilitated its food practice in a more environmentally sustainable way, which may also inspire other kindergartens to shift towards a more ecologically sustainable form of food provision.

As shown in the findings, this case kindergarten of interest has illustrated how they engaged in the economic sustainability by budgeting and planning for their daily food practices, which also adds some nuances to our knowledge of the role of economy in kindergarten food and meals. A report from the Directory of Health showed that the economy was one of the factors that headteachers believed played the most significant role in the foods and drinks offered in kindergartens (Norwegian Directorate of Health, 2012). In addition, another study indicated that the economic environment in kindergartens positively associated with the vegetables served in the kindergartens (Himberg-Sundet et al., 2018). However, our study shows that with better budget planning, kindergartens could serve healthy and sustainable meals with reasonable and limited economic resources, without increasing additional food payment, and thereby avoiding rising inequality in the long run in society. That is to say, the kindergartens' financial position was not necessarily a restricting factor for a sustainable healthy food provision. Instead, we highlight such practices as budgeting and financial management, which significantly influence the quality of food they supply and, therefore, contribute to the sustainability of their food practices.

In line with other studies where meals in public institutions are identified as an arena for health promotion as well as a way to achieve social equality (Höijer et al., 2020; Illøkken et al., 2021), our study confirmed that food practices in kindergartens could contribute to the sociocultural sustainability through food in ECEC. Building on the evidence that children's eating patterns and food preferences are established early in life (Birch & Fisher, 1998), and seeing as many eating behaviors (such as food variety and intake) are consistent over time (Nicklaus & Remy, 2013), the findings of our study suggest that kindergarten has the potential to facilitate an environment that helps children to develop long-lasting habits and skills, as well as good relationship with food. In addition, as an important socio-cultural arena, kindergarten can contribute to leveling out social differences through food and support children's social well-being that can strengthen their social capital.

Finally, children's agency has been respected, recognized and practiced in the process, and as indicated in the findings, children themselves act as agents for sustainable change in their kindergarten. Children's voices are complex and are constantly constrained and shaped by the adult's decisions on what children have access to. In this article, we highlighted children's voices in the decision-making of the menu, and their contribution to the new meal situation, both to the actual food consumption through positive peer modeling

(Salvy et al., 2012) and the co-creation of the social setting. A call to action to put children at the center of sustainable development was proposed by UNICEF, and it advocates empowering children to exercise their right to be heard and thereby “make sustainable choices and become effective future guardians of a sustainable world” (UNICEF, 2013, p. 14). In this kindergarten, the mailbox was an effective way to listen to children and support them to voice their viewpoints. Using this child-friendly technique, this kindergarten promotes children’s participation and thus creates an arena for communication and engagement that gives more agency to children as active participants in the process. This collaborative relationship empowers the children and shapes the agenda of the changing practices. In addition, the mailbox was complemented with the teachers’ direct observation of children’s consumption of the food in order to listen to children’s voices. As such, they make sure even the less active children’s voices that were passively expressed were also heard.

While acknowledging that our findings are derived from shared normative cultural values and discourses around food and health in the society which shape the framework for what the teachers consider as good practices, we argue that by promoting children’s agency through participation and creating a collaborative partnership, such purposefully designed food provision in the case kindergarten could promote sustainability. Our study shows that by giving children spaces for exploring and engaging with food, they are able to exercise their agency and power over how their mealtime should be, as well as playfully participating in the formation of their food consumption pattern and thus their own sustainable development as agentic individuals. This study also found that children could exercise their agency to create change in the family meal at home, and thereby act as change agents.

Final remark

As proposed by Davis and Cooke, education and schooling need to be positive contributors to sustainability, rather than “social forces that perpetuate unhealthy and unsustainable ways of living” (Davis & Cooke, 2007, p. 352). Despite the limitations, the findings of this study may provide useful implications. First, this study shows that by changing some routine practices, kindergartens can integrate sustainability in their daily food provision and thereby promote a change and a shift towards a more sustainable, healthier, and still affordable eating style. Second, this study highlights that kindergartens can develop child-friendly ways of listening to children, facilitating their participation in decision-making concerning their life in kindergarten, as well as supporting them to serve as change agents for sustainable practices. Third, for the kindergarten to purposely design and carry out such practices, we suggest that early childhood teacher education programs incorporate elements that cultivate kindergarten teachers’ competence in integrating different dimensions of sustainability and supporting children’s active participation in their daily practices

in the different courses offered to future and present kindergarten teachers. Finally, we believe this study can be an inspiration for future research on designing context-specific interventions to promote sustainability in the ECEC context and beyond.

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