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Experiences with organizing school food programs in Norwegian Lower Secondary Schools

– a qualitative study

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Preface

This paper concludes my formal education, connecting my pedagogical background with my specialization in public health nutrition. The thesis is written in collaboration with The Norwegian Institute of Public Health and is part of the institute's pilot study: "Development of a national model for school meals". When I was offered a chance to join the project, the political debate concerning school meals was running hot in Norway, as it usually does around the time of elections. In addition, the multiple benefits of school meals were receiving attention globally because of their ability to target several of the Sustainable Development Goals at the same time. These aspects combined led me to the decision to devote my final year as a master's student to this exiting field. I would like to thank the project leader, Elling T. Bere, senior scientist and Dr. Philos for allowing me the chance to join the project and for supervising my work. I would also like to thank Laura Terragni, associate professor at Oslo Metropolitan University, for her methodological supervision and good advice. The University library, section Kjeller, has also been very supportive throughout this process, and a special thanks goes out to Klaus Jøran Tollan, Section chief and Elisabeth Karlsen, Main librarian. I would also like to thank Anders, who was forced to share the home-office facilities with his heavily pregnant fiancé during this period, due to the pandemic during the spring of 2020. He offered both patience, academic support and his best ergonomic office chair during this process, and for this I am forever grateful. I would also like to thank Malin for supporting me in the early steps of the planning process. Finally, I would like to thank the informants who participated in this study. Without you, this project would not have been possible.

Lysaker, May 2020

SUMMARY

Background: The organization of school meals is of importance for adolescent dietary health and psychosocial learning environment, for the sustainable development of food systems and for reducing social inequities. In Norway, there is no mandatory provision of food in schools at the state level. However, local programs are common, differing in content and organization. As debates concerning a potential mandatory implementation reoccur regularly on the political agenda, knowing more about the experiences of schools could provide valuable information for policymakers.

Objectives: This thesis has been part of the Norwegian Institute of Public Health project "Development of a national model for school meals". The purpose has been to explore the experiences of staff involved in organizing school food programs in Norwegian lower secondary schools in a systematic way.

Design: Basic qualitative method. Personal interviews with strategically chosen key informants (n=14). A semi-structured interview guide was the main instrument and thematic analysis was applied for analysis.

Results: Some key elements are emphasized by informants as essential for successfully organizing programs, such as enough resources, physical facilities, adapting to the local context, the right staff, student involvement and student acceptance. Nutrition and sustainability strategies applied by informants have also been identified. Commonly perceived benefits of programs were positive impacts on the psychosocial learning environment and social inequity. Environmental sustainability and long-term health were less in focus.

Conclusions: Providing school meals is highly dependent on local context and available resources. Plans for the implementation of a state-wide school food program ought to consider these local variations. Greater alignment of the program's content would be beneficial, in order to provide an adequate meal that is both nutritious and sustainable and responds to the students social, cultural, and religious needs.

Keywords: School Food Programs, Schools, Nutrition, Sustainability, Psycho-social learning environment, Social inequity

SAMMENDRAG

Bakgrunn: Organiseringen av mat og måltider i skolen er av betydning for ungdommers kosthold, helse og psyko-sosiale læringsmiljø, for bærekraftig utvikling av matsystemer, samt for sosial utjevning. I Norge er det ingen statlig skolematordning men mange lokalt arrangerte ordninger med ulikt innhold og organisering. Grunnet stadige politiske debatter vedrørende eventuell innføring av en statlig ordning, ville det være gunstig å lære mer om skolenes erfaringer med ulike skolematprogrammer.

Hensikt: Denne oppgaven har vært en del av Folkehelseinstituttets prosjekt «Utvikling av en nasjonal modell for skolemåltidet» og tar sikte på å undersøke erfaringene til ansatte ved norske ungdomskoler med ansvar for organisering av skolemåltider på en systematisk måte.

Metode og utvalg: Grunnleggende kvalitativ metode. Personlige intervjuer med strategiske utvalgte nøkkelinformanter (n=14). Semistrukturert intervjuguide anvendt som hovedinstrument. Tematisk analyse ble benyttet i analysearbeidet.

Resultater: Informantene i denne studien fremhever enkelte nøkkelelementer som særlig viktige for vellykket organisering av skolematordninger; nok ressurser, fysiske forutsetninger, tilpasning etter lokale forhold, rett bemanning, elevinvolvering og elevenes aksept av maten som serveres. I tillegg har strategier anvendt i møte med ulike ernæringsrelaterte og bærekraftsrelaterte utfordringer blitt identifisert. Vanlige oppfatninger av skolemåltidets potensielle ringvirkninger var positiv innvirkning på elevenes psyko-sosiale læringsmiljø og på utjevning av sosial ulikhet. Innvirkning på bærekraft og langvarige helseeffekter var mindre i fokus.

Konklusjon: Organiseringen av skolematprogrammer er sterkt avhengig av lokale forutsetninger og tilgjengelige ressurser. Planer om en eventuell statlig implementering bør ta hensyn til lokale variasjoner. Større likhet i innholdet i skolematordningene hadde likevel vært fordelaktig for å sikre elevene et adekvat måltid som ivaretar ernæring og bærekraft på en god måte, og som ivaretar sosiale, kulturelle og religiøse hensyn.

Nøkkelord: Skolematprogrammer, Skoler, Ernæring, Bærekraft, Psykososialt læringsmiljø, Sosial utjevning

CONTENT

LIST OF APPENDICES

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVATIONS

CAQDAS = Computer assisted qualitative data analysis software

LS = Lower secondary

NCDs = Non-communicable diseases

SES = Socio-economic status

SDGs = Sustainable development goals

SFPs = School food programs

TA = Thematic analysis

DEFINITIONS

FOOD WASTE = According to the F.A.O, food waste can be defined as "*wholesome edible material intended for human consumption, arising at any point in the food supply chain that is instead discarded, lost, degraded or consumed by pests*"(Food and Agriculture Organization of the United Nations, 1981)

SCHOOL FOOD PROGRAM = In a global context, school feeding can be defined as "*the provision of food to school children*" (Gelli, 2010; W.F.P, 2013). For the purpose of this thesis, school food programs (abbreviated as SFPs) are understood as the provision of food to students in a school setting, free of charge or by payment, in the form of a complete meal, served either as breakfast, lunch or both, organized and/or administered by the school directly, or through the engagement of external partners.

SOCIAL HEALTH INEQUITIES = According to the W. H.O, health inequities are unfair, systemic differences in the health status of individuals belonging to different social groups (W.H.O, 2017). The lower the socio-economic status, the higher their risk of poor health.

SUSTAINABLE DEVELOPMENT = According to the Brundtland Report definition, "*sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs*"(World Commission on Environment and Development, 1987)

PSYCHO-SOCIAL LEARNING ENVIRONMENT = According to The Knowledge Centre for Education at The University of Stavanger, the psychosocial learning environment consists of several factors related to the schoolwork, the class and the school, relations between students and teachers and interaction between students (Manger, 2014). The Education Act § 9a–1 gives students the right to a good psychosocial environment: "*All students in primary and secondary schools have the right to a good physical and psychosocial environment that promotes health, wellbeing and learning*"(Utdanningsdirektoratet, 2015).

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1 INTRODUCTION

School meals are served to children and adolescents on a daily basis, in nearly every country in the world (W.F.P, 2013).Though content and organization vary, the provision of food and meals in schools may have multiple benefits (Development Initiatives, 2017; United Nations Standing Committee on Nutrition, 2017). Measures that are made to target children and adolescents in a school setting might reach them in a critical phase of their development, potentially transmitting healthy habits in to their adult lives (Helse og Omsorgsdepartementet, 2017; Norwegian Ministry of Health and Care Services, 2013). Public health interventions that targets individuals at this age, may therefore be effective in preventing the development of overweight and non-communicable diseases (NCDs), which are public health challenges that currently pose a major threat to global health (Helse og Omsorgsdepartementet, 2017, 2019). Food served in a school setting might also have implications for the development of environmentally sustainable food systems, as sustainable diets and consumption patterns might help bring emissions from the agricultural sector down (Ranganathan, Waite, Searchinger, & Hanson, 2018). School meals may benefit the student's psychosocial learning environment and wellbeing, and if provided to all, reduce social inequities, as structural measures that target everyone equally prevents the exclusion of children from lower socio-economic groups (Arntzen et al., 2018; Helsedirektoratet, 2015). In Norway, there is no legislation for mandatory school food provision and the form and content of locally organized school food programs (SFPs) vary from school to school (Kainulainen, Benn, Fjellström, & Palojoki, 2012; Waling et al., 2016). Debates concerning implementation of a national provision reoccur regularly on the political agenda (Dahl & Jensberg, 2011). Knowing more about the experiences of the people involved in organizing school food programs (SFPs) could provide valuable information for policy makers.

1.1.1 Aims

The Norwegian Institute of Public Health wants to investigate the potential effect of a national SFP based on local resources and student involvement. The hope is that such a program may contribute to better diets, better learning and better psycho-social learning environments, while being sustainable, cost-effective and socially cohesive. Such a study requires thorough piloting, and this thesis has been part of the preparations for the pilot study "Development of a national model for school meals". However, thus far in Norway, the experiences of the persons involved in serving school meals have not been systematically explored. The aim of this thesis has therefore been to explore lower secondary school staff experiences with organizational, social, nutritional and sustainability related aspects of SFPs in a systematic way. To shed light upon these aspects, the following research questions were addressed:

- *How do Norwegian lower secondary schools organize school food programs?*
- *Which key elements can be emphasized as important for a successful organization?*
- *What kind of challenges can arise when organizing school food programs?*
- *What strategies do schools apply to face challenges related to organizing school food programs?*
- *What strategies do schools apply to face challenges related to nutrition and sustainability?*
- *What sort of wider impacts of school meals do staff emphasize when it comes to sustainability, nutrition, social inequity and the student's psychosocial learning environment?*

The thesis is structured into several parts; a wider theoretical framework, a research paper and an elaboration on the research paper. The primary focus of the research paper has been organizational, nutritional and sustainability related aspects of SFPs. In the elaboration section, discussions of aspects related to social inequity and the student's psycho-social learning environment is in focus, as well as methodological considerations not mentioned in the article.

The manuscript for the research article is attached along with submission guidelines from Appetite Journal (See Appendix 5). The research paper is written by the student, under supervision from Elling T. Bere, senior scientist and Dr. Philos, The Norwegian Institute of Public Health, and Laura Terragni, associate professor, Oslo Metropolitan University. As the research paper is finalized for publication, they will be included as co-authors.

2 THEORETICAL BACKGROUND

This section establishes the theoretical background and framework of the thesis and the research paper. It focuses on explaining relevant concepts, overviews the nutritional status of Norwegian adolescents and presents school meals in an international, a Nordic, and a Norwegian context.

2.1.1 Dietary behaviour and consumption

This chapter first presents the various factors that may influence our dietary behaviour. Then, the concept of sustainable diet and consumption is presented, and briefly overviewed.

2.1.2 Food systems, food environments and dietary choices

Dietary choices are dynamic, situational and complex processes, determined by a variety of factors (Connors, Bisogni, Sobal, & Devine, 2001). Our taste preferences and prior experience with food are biological factors that may influence the food choices we make (Contento, 2016; Shepherd, 1999). However, social and cultural factors may be just as influential in the food choice process, and environmental factors such as the external physical environment, determine what sort of food choices are available and accessible (Contento, 2016). Food systems are modifiable, and may be altered through the power of consumer demand (Furst, Connors, Bisogni, Sobal, & Falk, 1996). In order to realize the 17 Sustainable Development Goals (SDGs), food systems ought to be reshaped to be more nutrition-sensitive, making the food choices that are consistent with a healthy, sustainable diet both available, affordable, acceptable and of adequate quantity and quality (Food and Agriculture Organization of the United Nations, 2016). According to the F.A.O, food systems

> Encompass the entire range of actors and their interlinked value-adding activities involved in the production, aggregation, processing, distribution, consumption and disposal of food products that originate from agriculture, forestry or fisheries, and parts of the broader economic, societal and natural environments in which they are embedded (Food and Agriculture Organization of the United Nations, 2018, p.1).

Because food systems are part of peoples wider environmental settings, they interact with our health, with equity issues and sustainability outcomes, in addition to having wider economic consequences (Swinburn et al., 2013). Food systems influence what sort of food environment people experience, which may or may not be consistent with a healthy diet (Food and

Agriculture Organization of the United Nations, 2016). The International Network for Food and Obesity/NCD Research, Monitoring and Action Support (INFORMAS) describes food environments as*" the collective physical, economic, policy and sociocultural surroundings, opportunities and conditions that influence people's food choices and nutritional status*" (Swinburn et al., 2013). To work towards achieving the SDGs, the High Level Panel of Experts on Food Security and Nutrition urges states to improve the quality of their food environments (The High Level Panel of Experts, 2017). By making healthy food more available in public arenas such as schools, greater dietary diversity and quality may be achieved.

2.1.3 Sustainable diet and consumption

What we eat not only have personal and societal consequences, but may also impact planetary health (Willett, 2019). Agriculture is by far the largest emitter of methane (C04) and nitrous oxide (N20) in Norway, with 8,7 % of the climate gas emissions (The Ministry of Climate and Environment, 2018). Climate gas emissions from food waste is estimated to 978 000 tons of CO2-equivalents, with consumers throwing away the most (The Norwegian Ministry of Climate and Environment, 2017). Eating sustainable diets and reducing food waste might help bring emissions from the agricultural sector down (Ranganathan et al., 2018). When the National Council of Nutrition evaluated the official nutritional recommendations in light of environmentally sustainable development, the conclusion was that a diet in accordance with the guidelines is not only a healthy diet, but also a sustainable one (Nasjonalt råd for ernæring, 2017). The UN defines a sustainable diet as one that protects and respects biodiversity, optimizes human health and natural resources, and has low environmental effects (Burlingame, 2010). Further, such diets are "*culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy*" and should *"contribute to food and nutrition security and to healthy life for present and future generations"* (Burlingame, 2010). The Rome Declaration on Nutrition (ICN2) further recognizes that "*food losses and waste throughout the food chain should be reduced in order to contribute to food security, nutrition and sustainable development*" (W. H. O. F.A.O, 2014). Public services, such as the school system, specifically target the next generation (Morgan & Sonnino, 2008). If integrated into the education system, the school meal setting has the potential to educate students about healthy, sustainable food behaviours (Oostindjer et al., 2017). In 2015, the Norwegian Directorate of Health published a renewed set of Guidelines for Food and Meals in Schools, which offer recommendations for the organization and content of food and meals served in a

school setting (Helsedirektoratet, 2015). The guidelines state that school meals should be in accordance with the official nutritional recommendations, which restrict the intake of red meat, promote the intake of plant-based foods such as vegetables, fruits, pulses, nuts and whole grains, as well as sustainably produced fish from farms and wild stocks (Helsedirektoratet, 2015). According to a report that was launched by the Norwegian National Council for Nutrition, these recommendations are also the trademarks of a sustainable diet (Nasjonalt råd for ernæring, 2017). However, the average Norwegian currently consume too much saturated fat, sugar, salt and too little dietary fibre (Helsedirektoratet, 2019). The school-food-guidelines further emphasize that waste should be limited trough recycling, adaption of portion sizes and planning of purchases, storage, durability and utilization of foods (Helsedirektoratet, 2015). They also encourage schools to choose environmentally labelled products and seasonal food.

2.1.4 Nutrition, health and inequities among Norwegian adolescents

This chapter first gives a brief overview over the nutritional status and dietary behaviour of Norwegian adolescents. Then, the potential of the school as an arena for health promotion is presented, as well as some governmental strategies that are currently in place to target the age group. Because a socio-economic gradient in the eating habits of Norwegian adolescents has been identified in recent studies, the chapter ends with a brief presentation of the situation, which will be further discussed in the second part of the thesis.

2.1.5 Nutritional status and dietary behaviour

Dietary habits influence cardio-metabolic risk factors such as obesity, low density lipo-protein (LDL) cholesterol and glucose-insulin homeostasis (Mozaffarian, 2016). To prevent the development of NCDs that may be caused by these risk factors, dietary habits must be improved (Popkin, Adair, & Ng, 2012). The global expansion of NCDs, such as cardiovascular disease, cancer, chronic respiratory diseases and diabetes, currently poses a major threat to public health, contributing to over half of all deaths worldwide (WHO GCM/NCD Working Group, 2018). Global efforts such as the nine voluntary targets of the Global NCD Action Plan and the 2030 agenda for Sustainable Development targets on NCD prevention, has been introduced as a global response (United Nations, 2015; WHO, 2013). In order to reduce the risk of disease and meet the goal of 25 % reduction in NCDs by 2025, overweight and obesity trends must be reversed (Helsedirektoratet, 2010). Unfortunately, the younger population adds to the numbers, as the global prevalence of overweight and obesity in children has increased rapidly the past three decades (Lobstein et al., 2015). In fact, the

prevalence of overweight children and adolescents has increased from 4-5 % in 1975 to 18 % in 2016 (WHO, 2018). An increase in body mass index during adolescence that is not associated with natural growth patterns, might have dire consequences for adult health and so preventive measures should be implemented at an early stage (Rangul, 2020). Though numbers now seem to have stabilized, Norway saw an increase in the prevalence of overweight adolescents in the years from 1994-95 to 2017-19 (Norwegian Institute of Public Health, 2018; Sund, Rangul, & Krokstad, 2019). The share of overweight boys increased from 16 % to 23 %, while the share overweight girls increased from 16 % to 24 % (Sund et al., 2019). In general, the need for energy, protein and nutrients such as vitamin D and calcium, is high in the pubertal growth period, due to rapid skeleton growth and brain development (Skreden, 2019). The most recent national surveys of Norwegian 4th and 8th graders show that the intake of both vitamin D and iron were below the recommended level for the age groups (Hansen, Borch Myhre, Wetting Johansen, Mohn Paulsen, & Frost Andersen, 2015). For 13-year old girls, the calcium intake was below the recommendations but results might be biased due to underreporting (Helsedirektoratet, 2019). The same survey suggests that Norwegian 8th graders only eat about half of the amount of fruits and vegetables that is recommended by the health authorities, and have a sub-optimal intake of fibre and fish (Hansen et al., 2015). Additionally, they seem to consume too much saturated fat and sugar, which they mainly get from meat, dairy products, sugar-sweetened beverages and candy. While the intake of sugar has declined compared to former surveys, the intake of saturated fat remains stable.

2.1.6 Schools as health promoting arenas

Health promoting efforts that target children and adolescents may triple in outcome in the future (United Nations Standing Committee on Nutrition, 2017). Not only might the targeted individuals gain better health today, essential for their cognitive and social development, but healthy habits may be transmitted to adult life, which in turn may be protective of later NCDs (Norwegian Ministry of Health and Care Services, 2013). The general health status, weight and nutritional status of adolescents is directly tied to the future health and development of their potential offspring (De-Regil, Harding, & Roche, 2016). Immediate measures that are made to reach this group may therefore even benefit the next generation, and the economic development of societies (United Nations Standing Committee on Nutrition, 2017). Since 91 % of Norwegian children attend public school, it is a unique arena for health promotion and for social inequity-preventive measures (Helland, 2019). The nutrition-related health behaviour of adolescents are influenced by people in their environment, such as their parents,

teachers and peers (The Ministry of Health and Care Services, 2017). In the governmental National Action Plan for Better Nutrition, school staff are especially highlighted as important stakeholders when it comes to creating the conditions for a healthy diet for this group. The action plan aims for a set of goals for 15$^{\text{-year}}$ old's to be accomplished by 2021, including a reduction of intake of candy and sugar, an increase of fruits, vegetables and fish, more 15 years old eating breakfast daily, as well as zero increase in overweight. Another strategy plan from the Norwegian government is called #adolescenthealth (Helse- og omsorgsdepartementet, 2016). This strategy targets the following goals to be achieved by 2021: I) increase the share of youth that has food and meal habits according to the recommendations, II) make it easier for youth to make healthy food choices and enjoy meals in arenas where youth are located, III) strengthen their knowledge of nutrition (and physical activity) so that they are secure in their own choices and are able to withstand unhealthy diet and exercise regimes, and IV) are able to critically consider blogs, trends and fashion diets and withstand bodily pressure. Finally, the most recent governmental white paper on public health emphasizes the importance of early interventions for children and adolescents, and highlight school meals as an important social arena with the potential to benefit safety and wellbeing (Helse og omsorgsdepartementet, 2019). While emphasizing that SFPs are highly voluntary, school owners are encouraged to engage both staff, local businesses and non-governmental organizations (NGOs) in establishing an offer. It is further emphasized that the needs of families with low-incomes should be considered, if pay-per subscription options are chosen.

2.1.7 Social health inequities among Norwegian adolescents

The socioeconomic conditions in which a child grows up affects the health of the child and even later health habits in life (Arntzen et al., 2018). The Strategy Plan for Norwegian Youth (2016-2021), states that "*adolescents generally have a healthy diet, but there are social differences"* (Helse- og omsorgsdepartementet, 2016). Children and adolescents from homes of a low socio-economic status (SES) report that they eat less fruit and vegetables and have higher intakes of candy and sugary beverages than children and adolescents of a higher SES. Additionally, it is more common for families with poor economy to be skipping meals. More than 10 % of Norwegian children grow up in families with sustained low incomes and the numbers are increasing (Epland, 2018). Due to unrecorded cases, it is assumed that the group may be significantly larger. The Health Behaviour in School-aged Children Study has also shown a socio-economic gradient in the eating habits of Norwegian children and adolescents,

as those with parents belonging to a higher SES reported having healthier nutritional habits such as regular eating patterns, higher intake of vegetables and fish and a lower intake of sweets and sugary beverages (Fismen, Samdal, & Torsheim, 2012). A cross-sectional study published in 2014, adds that parents of a higher SES had more knowledge of dietary recommendations than parents of a lower SES (Skårdal, Western, Ask, & Øverby, 2014). According to the working group behind a government initiated report investigating benefits and costs of different school meal models, experiences with payment-based SFPs have been shown to segment social differences (Kunnskapsdepartementet, 2006). In comparison, structural measures such as free SFPs may prevent the exclusion of children from lower socio-economic groups, because everyone is treated the same. The report further emphasizes that if a national SFP were to be implemented, payment-based programs should be avoided, in order to reduce social inequities, but also because the right to a public, primary education, provided free of charge, demands it.

2.2 School food programs (SFPs)

This chapter will first explore the expansion of SFPs around the world, before studies on Nordic school meals are overviewed. Then, the current school meal situation in Norway is presented.

2.2.1 SFPs around the world: from commercial services to welfare measures

Students are provided with school lunches in about 1/3 of primary and lower year secondary schools worldwide (United Nations Standing Committee on Nutrition, 2017). School lunches are therefore an important element in the nutrition of the world's growing adolescent population. In the least developed countries, SFPs has primarily been an important long-term investment in the fight for poverty reduction and food security, aimed at preventing undernutrition among the students (Morgan & Sonnino, 2008; Oostindjer et al., 2017). Globally, the World Food Programme (WFP) has been the largest provider of SFPs, offering students both in-school feeding and take-home rations (Morgan & Sonnino, 2008). Initiatives such as the government-led Home-Grown School Feeding programs (HGSF) aims to stimulate local production by sourcing food for SFPs from local agriculture sources, thereby strengthening local food systems and economies in a sustainable way (W. F. P. F.A.O, 2018). The UN considers the HGSF approach to be a key strategy for the achievement of several SDGs, as it may improve children`s access to meals, maximize education investment returns and reduce poverty in a long-term perspective. Across the world, SFPs vary from being highly commercialised businesses to fully state-funded social measures (Morgan & Sonnino, 2008).

In Europe, the SFPs of the various countries are quite diverse in form and content, despite members of the European Union (EU) and the European Economic Area (EEA) being bound to the same framework and tendering rules. In Italy, the SFPs are strongly grounded in the nation's food culture, and the limitations of the tendering rules have been solved by emphasizing the use of fresh, organic ingredients, which often benefits local producers. The cost of the programs is subsidized for low income families. Similarly, in France, regional cuisine and local food production is promoted through SFPs, and low-income families are subsidized discreetly, so all may afford the same school lunch (Moffat & Gendron, 2018). In the United Kingdom (UK), commercialization of SFPs has left the country with a notorious reputation for bad quality school food (Morgan & Sonnino, 2008). Similar to the UK, the school food provisioning in the United States (US) has been strongly commercialized since its original introduction as a welfare measure in the 19th century, and has received a lot of critique for its supposedly lack of nutritional quality, fast-food focus and outreached vending machine- soda sales. Like the UK, school food provisioning in the US is more of a privatized business than a responsibility of the public sector. In the Nordic countries, however, the situation is quite different, with Finland and Sweden providing rare, global examples of nations that offer universal school meals to all, free of charge (Waling et al., 2016). Finland has been providing hot meals for all school children since 1948, while Sweden has been serving free school meals for students up to the age of fifteen since the seventies. The provision is funded by the government and managed by the municipality (school owner). Scientists from Uppsala University argues that that the free school meal can be viewed as a phenomenon rooted in the Swedish culture of the welfare state, representing values such as universality and equality in benefits (Osowski, Göranzon, & Fjellström, 2010). In Iceland, students also have the right to receive a meal, and the bill is split between the parents and the school owner (Helland, 2019). Students may still bring a packed lunch if desired, and school meals are served by canteen staff (Juniusdottir et al., 2018). As in Norway, there is no mandatory legislation for SFPs in Denmark. Schools that do choose to serve school meals may find guidance in the official nutritional guidelines supplied by the government since 2017, which gives recommendations for age appropriate portion sizes, how often different food groups should be served, and what sorts of ingredients should be limited (Miljø og Fødevareministeriet, 2018).

2.2.2 Studies on Nordic school meals

A knowledge review published by the Nordic Ministry in 2011 looked into implications of nourishment in schools and kindergartens on health and learning in the Nordic countries (Dahl & Jensberg, 2011). The systematic review did not find evidence that school meals or nutritional supplements had any effect on learning, cognition or weight control in school children. However, the review emphasizes that offering healthy food while restricting the availability of unhealthy food can be helpful in modifying school children's diets. The review further enhances the potential role of the school meal itself, and the effect it might have on the same parameters, and so studies that highlight the role of school meals as a learning arena was requested by the authors of the report. In addition, the Ministry recommended comparison-studies of the different Nordic models. Upon this request, the Nordic "ProMeal" study (Prospects for promoting health and performance by school meals in Nordic countries) was later performed on 837 Nordic students from Finland, Iceland, Norway and Sweden, born in 2003 (Waling et al., 2016). The study benefits from comparing the effect that different models for school lunches have on total dietary intake, behaviour and cognitive function. Because the Nordic countries have similar cultures, dietary habits and diet-related diseases, this study provides a unique opportunity for comparison, as requested by the Ministry. One paper based on this study, looks at the composition of school meals in Sweden, Finland and Iceland, which are the Nordic countries that do have official SFPs (Juniusdottir et al., 2018). The paper concludes that official nutrition guidelines are followed, but that meals needs to be standardized, as the energy and nutrient content of school meals varies largely from day to day. The authors recommend that guidelines should be clearly phrased and easy to follow. To ensure that the school meals are adequate in terms of nutrition, they further recommend that canteen staff should be educated in nutrition to some degree, and that the energy content and the nutritional value of the food served should be calculated.

2.2.3 School meals in Norway

The provision of school lunches in Norway is not an official school responsibility and the form and content of the locally organized SFPs vary from school to school (Kainulainen et al., 2012; Waling et al., 2016). The Public Health Law delegates the responsibility of health promotion to municipalities, counties and the state (Folkehelseloven, 2012). Locally organized SFPs are further regulated by the Norwegian Food Control authorities, and by the legislation act Regulations for Environmental Health Care in Schools and Kindergartens (Forskr. om miljørettet helsevern i skoler, 1995). Paragraph *§ 11* in the act states that "*there*

shall be suitable opportunities for dining that also safeguard the social functions of the meal"(Forskr. om miljørettet helsevern i skoler, 1995). Schools must also abide to Framework for the School Environment as explained in *§ 9a* in the Education act (The Education Act, 1998). The paragraph gives students in primary, upper and lower secondary schools "*the right to a good physical and psychosocial school environment conducive to health, well-being and learning"*. This further comprises communication and interaction between students and staff or other persons they might meet in the school setting (Utdanningsdirektoratet, 2015).

2.3 Development of school meals

School food servings in Norway has to some extent been in place since the 1890s and were originally a hot meal provided by voluntary forces in the municipalities (Andresen & Elvbakken, 2007; Kunnskapsdepartementet, 2006). In the 1920s, "the Schiøtz model" was introduced for testing in the cities of Oslo and Bergen (Andresen & Elvbakken, 2007). This was due to factors such as a shift to compulsory school attendance, high poverty rates and an intent to nourish the nations next generation to prime health and strength. In Oslo, the model was implemented free of charge, as a universal measure from 1935. It later became known as the "Oslo breakfast" and traded warm meals for a breakfast model that consisted of milk, a portion of fruit or vegetables, cod liver oil, a wholegrain cracker or slice of bread, as well as some margarine and whey cheese. An even simpler edition called the "Sigdal breakfast", was a similar arrangement, supplementing the nourishment of Norwegian school children around the middle of the century (Kunnskapsdepartementet, 2006). This meal composition has stood its ground ever since, both as the typical school lunch (paper-wrapped sandwiches brought from home) and in workplaces throughout the Norwegian society (Oostindjer et al., 2017). From the post-war period, the responsibility of providing food for school children and teaching them good nutrition habits, were surrendered to the housewives of the time (Andresen & Elvbakken, 2007). To this day, the responsibility of the packed school lunch rest with the parents and not with the government.

2.4 School meals today

The typical Norwegian school meal is brought from home, as a packed lunch, and eaten in the classroom (Kunnskapsdepartementet, 2006; Staib, 2013). However, a government initiated survey that aimed to investigate the offer of food and meals in Norwegian schools, saw a sharp decrease among 8^{th}-10^{th} graders who indeed brought a packed lunch to school, and the percentage seemed to drop dramatically as they moved up the school system (Staib, 2013). Lower secondary and secondary high school students are usually allowed to leave the

premises during their lunchbreak and therefore have the opportunity to purchase their lunch from nearby kiosks and supermarkets, when these offers are available (Kunnskapsdepartementet, 2006; Staib, 2013). In addition, lower-and secondary high schools often offer food and drinks for sale through their school canteens (Staib, 2013). According to the survey mentioned above, schools usually manage the canteens themselves (92 %) but some are also operated by the municipality, county or others. Schools primarily reported providing whole-grain sandwiches with cold cuts, fruit, yoghurt, juice and water. However, 1 out of 4 combined primary/ lower secondary schools also reported offering sodas and other sugar-sweetened beverages. While free school fruit in schools was provided by the government in the years between 2007 and 2014, a change of government had the implementation revoked (Helland, 2019). Nowadays, it is up to the different counties whether this arrangement is budgeted for or not. As a result, less than 10 % of the counties offers fruit in schools. However, it is possible to buy subsidized fruit through a website managed by the Directory of Health, but subscription numbers are low. Milk subscriptions, however, has been subsidized by the government since the 1960s (Waling et al., 2016). Few schools provide school meals free of charge (Berger, 2017). However, there are examples, such as Bykle in Aust-Agder, Vinje in Telemark and Lyngen in Troms, and discussions regarding a potential implementation of national SFPs has been going on since the 1980s (Kunnskapsdepartementet, 2006).

2.4.1 Studies on the school meal situation in Norway

National surveys of food and meals in schools have been administered since the early 1990s. The most recent public report on food and meals in schools was published by the Directory of Health in 2013 (Staib, 2013). For the report, a survey was sent per e-mail to 2892 primary schools, combined primary schools and lower secondary schools. The report concluded that the offer of food and meals in schools mainly follow the recommendations of the Directorate of Health (Staib, 2013). However, an area of concern identified, was that only 63 percent of 8-10th graders get at least 20 minutes to eat. For the survey, the informants were also asked what they thought were the most important factors for providing a healthy food and meal offer. While dialogue with parents and students and the student council were listed as the two most important factors for success, other aspects emphasized were inclusion of meals in the school framework, as well as financial support.

A Norwegian case study, involving three secondary schools participating in the intervention project “Physical activity and healthy school meals” has explored barriers to implementing

the Norwegian national guidelines in the school meal situation (Holthe, Larsen, & Samdal, 2011). The implications of this study were that measures that may facilitate improved implementations of the guidelines included increased availability of the school canteen (meaning: " canteen open every day and predictable opening hours") and increased accessibility of healthy food in the canteen (meaning: " taste, a wide selection, variety and predictability, hygienic and appealing presentation").

In 2012, a survey done in the North-Trøndelag area, found that 1 out of 5 schools provided school meals once a week or more, usually "buffet" style, putting out bread and spreads, cold cuts, milk or juice (A. S. Haugset & Nossum, 2012). While the principal's attitude was found to be an important factor for whether school meals were offered, other factors such as economic situation, staff situation and physical facilities were identified as significant perceived obstacles. Since then, the region has seen an increase in number of schools offering school meals.

A recent non-randomized study investigated the effect of serving a free, healthy school meal to Norwegian 10-12 year olds (Vik, Van Lippevelde, & Øverby, 2019). The intervention group (55 children) received the meal every day for one school year, while a control group (102 children at baseline) did not. The intervention was associated with an increase in the intake of healthy foods at school among the children with lower SES, measured by an increase in Healthy Food Score, 5 and 12 months later. The researchers concluded that serving a free school meal for one-year increases intake of healthy foods among schoolchildren of a lower SES, thereby reducing health inequities between children. However, the non-randomized design of the study as well as the differences in age and group size, might limit the impact of the study. A response bias might also have been present, as the outcome is based on self-reported data. In the same intervention group, researchers looked at the overall meal frequency of the children at baseline and compared to follow up 1 and 2 years after the intervention. 1 year of serving a free school meal did not improve overall meal frequency nor improve dietary habits outside school. However, the study lacks statistical power, given the small sample size.

A publication on organisational factors and student experiences with four school meal pilots in Northern Trøndelag was published in 2013 (A. S. N. Haugset, Gunnar, 2013). The programs varied slightly in cost and content, and data was gathered by observation, photographs and interviews with 1st - 7th graders as well as staff responsible for- or involved in – school meal arrangements. The students reported tastiness to be the most important

success factor, as well as the social context in which the meal occurred. They also report that they would like to have hot meals and favourite foods served more often, and that they value variety and options. The school staff further reported concerns that school lunches would be too demanding, both on time and workload. However, these perceptions were documented in advance of the intervention. After the intervention, they reported that fewer student seemed tired and unconcentrated at the end of the school day and praised the opportunity of the school meal as an arena for social skills training. The data collected however, is not representative of other schools.

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3 THE RESEARCH PAPER

Experiences with organizing school food programs in Norwegian Lower Secondary Schools- a qualitative study

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Keywords:

School food programs

Adolescents

Abbreviations:

School food programs (SFPs)

Computer Assisted Qualitative Data Analysis Software (CAQDAS)

Thematic Analysis (TA)

Abstract:

Objective: To explore Norwegian lower secondary school staff experiences with organizational, nutritional and sustainability related aspects of school food programs (SFPs).

Design: The study has a qualitative research design.

Methods: Semi-structured interviews were conducted with principals (n=4), teachers (n=3), canteen leaders (n=4) and other staff (n=4) in charge of SFPs, in 10 Norwegian, lower secondary schools. Thematic analysis (TA) was applied to structure the informant's experiences, such as challenges and dilemmas experienced, perceptions of benefits of programs and thoughts about wider implications of programs. A set of strategies applied to meet organizational, nutritional and sustainability challenges where also identified.

Results: There is great variation in the organization and content of the various SFPs. Some mutual key elements to successfully organizing SFPs are emphasized by informants: I) having enough resources, II) having an adequate physical environment, III) traits and attitudes of the people involved in school food programs, IV) adaption to local context V) student involvement and VI) student acceptance. Common perceived benefits of programs were benefits to the student's psychosocial learning environment, as well as the potential to reduce social inequity. Wider impacts on long-term health and sustainability were less in focus. Further analysis suggests that the informants experience difficulties with balancing the organizational limitations of a tight budget with the wish to offer a healthy meal and the necessity to accommodate student preferences.

Implications for further research: Future studies should aim to gain a better understanding of

how SFPs are experienced by the recipients of the programs. In addition, lessons may be learnt from cases where local SFPs have been withdrawn, in order to better understand challenges and limitations that may occur.

3.1 Introduction

One of the main aims of public health nutrition is to create health promoting food environments that enables individuals to make healthy choices (Wiseman, 2017). By increasing the availability of healthy food in arenas where children and adolescents are gathered, the development of noncommunicable diseases and overweight might be prevented (United Nations Standing Committee on Nutrition, 2017; WHO GCM/NCD Working Group, 2018). School lunches are served across the world, with form and content varying from country to country (Development Initiatives, 2017; W.F.P, 2013). School lunches may have synergistic effects, as they have the potential to promote sustainable food chains, while contributing to the health and nutrition of its recipients in a critical phase of their development (Swinburn et al., 2019; United Nations Standing Committee on Nutrition, 2017). If provided free of charge, they may also decrease social inequity (Arntzen et al., 2018). In Norway, there is no legislation for mandatory school food provision (Helland, 2019; Waling et al., 2016). While the serving of food in Norwegian schools has to some extent been in place since the 1890s, school meals have always been a voluntary municipal responsibility (Andresen & Elvbakken, 2007; Kunnskapsdepartementet, 2006). A wish to nourish the nations next generation to prime health and strength, led to the implementation of various meal arrangements in the first half of the century. The program later known as the "Oslo breakfast" was implemented as a universal measure from 1935 (Andresen & Elvbakken, 2007). This meal consisted of milk, a portion of fruit or vegetables, cod liver oil, a wholegrain cracker or slice of bread, as well as some margarine and whey cheese. An even simpler edition, "The Sigdal breakfast" was a similar arrangement, supplementing the nourishment of Norwegian school children around the middle of the century. This bread-based meal composition has stood its ground ever since and the tradition of bringing packed lunches (paper-wrapped sandwiches) prepared either by the parents or the students themselves, has become the norm. However, the percentage of students bringing a packed lunch from home drops dramatically with their ascending age, and a sharp decrease has been seen among 8^{th}-10^{th} graders specifically (Staib, 2013). As a supplement to the packed lunch, many secondary and lower secondary schools offer food and drinks for sale through their school canteens or organize local SFPs (Haugset & Nossum, 2012). In 2015, a set of national, but voluntary Guidelines

for Food and Meals in a Schools were published by the Directorate of Health (Helsedirektoratet, 2015). A diet that is in accordance with the official national guidelines are recommended, which restricts the intake of red meat, promotes the intake of plant-based foods such as vegetables, fruits, pulses, nuts and whole grains, as well as sustainably produced fish from farms and wild stocks (Helsedirektoratet, 2015). The health promoting potential of schools are emphasized in the guidelines. As is an encouragement to stimulate environmental sustainability through selective purchasing, and by limiting food waste. Debates concerning the potential implementation of a universal, mandatory SFP tend to re-occur around the time of elections. In 2005, a workgroup was put together with the aim to assess and review five, different SFP models with the potential to replace todays packed lunch (Kunnskapsdepartementet, 2006). The report stated that, in order to accommodate goals of reducing social inequity, any potentially implemented model should be free of charge, because structural measures such as free school lunches prevents the exclusion of children from lower socio-economic groups. A model that included free milk and a fruit or a vegetable, were recommended implemented in primary schools (1^{st}-10^{th} grade). The work group further highlighted that a widening of this model should be considered, giving the lower secondary students (8^{th} to 10^{th} graders), if not all primary school students, access to a complete bread-based meal, free of charge. Although their recommendations were mainly disregarded, students in lower secondary schools did receive free school fruit for a period of seven years, until this arrangement was revoked in 2014, after a change of government (Helland, 2019). To this date, very few schools provide free school meals, but in 2019, the city council in Oslo announced that they will implement free, plant based school meals for all the 28 secondary high schools of the region from 2020-2021, which comprises 16 500 students (Oslo Kommune).

3.1.1 Aims

The provision of food to students in the Norwegian, public school system is not mandatory, and the form and content of the locally organized SFPs vary from school to school (Kainulainen, Benn, Fjellström, & Palojoki, 2012; Staib, 2013; Waling et al., 2016). As debates concerning a potential implementation reoccur regularly on the political agenda, knowing more about the experiences of the people involved in organizing school meal programs could provide valuable information for policy makers. The aim of this study has therefore been to explore lower secondary school staff experiences with organizational, nutritional and sustainability related aspects of their SFPs.

3.2 Methods

The study adopted a basic, qualitative research design (Merriam, 2009). This approach is suited for research projects where the constructionist characteristics and epistemological paradigm of a qualitative study is underlined but no specific framework is applied (Merriam, 2009). The purpose of qualitative studies in nutrition research is to gain new perspectives and insights on relevant topics we have limited knowledge about (Bisogni, Jastran, Seligson, & Thompson, 2012). Results in this study are based on interviews with key informants with first-hand experience of SFP organization and a semi-structured interview guide was applied as the main data collection instrument. The interview setting was chosen for the data collection because it can be a way of gaining access to the subjective experiences of individuals (Kvale & Brinkmann, 2015). Interviews lasted about one hour, and every informant was interviewed once.

3.2.1 Study design and sample

Informants were selected purposively. In such strategic selection processes, informants that might have particular experiences or knowledges concerning the research topic, are recruited (Thagaard, 2013). The main inclusion criteria for participants was positive experiences with organizing SFPs. Potential candidates were identified by browsing school websites, municipality websites and other relevant sources describing different existing SFPs in Norwegian lower secondary schools. Ten, diverse schools that fitted the inclusion criteria were then recruited from six, different regions across the country, with a total of fourteen informants (See Table 1). Student-administrated programs, chef-administrated programs and other programs that differed from these in organization, were selected in order to ensure maximum diversity. Further, schools that explicitly stated in their websites that they had either a focus on nutritional aspects or sustainability aspects, or that offered free school meals, were prioritized, due to their relevance for the aim of the study. Another important aspect was whether the school had any reputation for successful organization of SFPs, for example by positive reviews in local newspapers or listing as an example of good practice in the web resource National Centre for Food, Health and Physical Activity (Nasjonalt senter for mat helse og fysisk aktivitet, 2019).

3.2.2 Data collection

The interview guide was formulated by the researcher and a set of research questions formed the basis. The guide was pretested, rephrased and modified several times. The first half of the guide was quite structured, with the purpose of gaining an overview of the school meal

situation, while the other half was oriented around open questions and flexibility in order and form. Probes were used to enlighten the different topics and to keep the flow of the conversation going. The semi-structured approach was chosen because of its flexible nature, which opens up for new topics to occur naturally (Malterud, 2017). While most of the interviews were performed on the school premises, some interviews were conducted over Skype or telephone. This was because some of the informants were located across the country and because the convenience of doing online-interviews made sense both from an economic and an environmental perspective. To make the material ready for analysis, the interviews were transcribed from verbal data to written text. This process is often referred to as verbatim transcription (Poland, 1995). An exact, word-for-word transcription is not necessarily the best method for capturing a conversation, especially when the purpose of the project is not one of language analysis but rather an interest for the content and meaning of what is being said (Kvale & Brinkmann, 2015). Recognising that the transcription process is an interpretative activity, a slightly modified verbatim mode was applied, which enables quotes to be presented in a meaningful way (Malterud, 2017). There is a chance that some elements can get lost, or even change its form, on the way, however, for example if the researcher misinterprets what is being said. It is therefore of uttermost importance that the researcher carefully demonstrates that the data analysis has been systematic and consistent enough to enable the reader to judge the thrust wordiness of the performance (Nowell, Norris, White, & Moules, 2017).

3.2.3 Analysis of the interviews

Data was analysed with NVivo 12, a computer assisted qualitative data analysis software (CAQDAS) which applies thematic analysis (TA) to organize and manage qualitative data (Mills, Durepos, & Wiebe, 2010). TA is an approach used across methods and paradigms in several academic fields (Mills et al., 2010). The purpose of this technique is to summarize key content in a large set of qualitative data by organizing the material in themes before analysis. Themes where identified by coding units of text from the interview transcripts. As a starting point, the research questions in the interview guide were applied deductively to form a first list of codes, such as aspects related to nutrition, sustainability and social inequity. Themes also emerged inductively from the data, with topics as “need for support”, “alternatives to school meal programs” and “solution-orientation” as examples. Main themes and sub-themes were later visualized in maps and charts in order to get an overview of the content, before looking into each theme more carefully. In the final analysis phase, quotes from the data

material was chosen to illustrate and visualize the results of the analysis in a meaningful way (Nowell et al., 2017).

3.3 Findings and results

3.3.1 Tables

Table 1: Case and participant characteristics

Table 1 Case and participant characteristics

Attribute		Number	Percentage
School	Urban	6	60 %
	Rural	4	40 %
County	Oslo	2	20 %
	Viken	4	40 %
	Vestland	1	10 %
	Nordland	1	10 %
	Troms & Finnmark	1	10 %
	Trøndelag	1	10 %
Meal	Breakfast	1	10 %
	Lunch	7	70 %
	Both	2	20 %
	Hot lunch	7	70 %
Model	Cold lunch	3	30 %
	Free of charge	3	30 %
Financing	Charge	6	60 %
School size	<100	1	10 %
	101 -299	3	30 %
	300-499	5	50 %
	>500	1	10 %
Participant	Men	6	60 %
Sex	Women	8	80 %
	Principal	4	40 %
Occupation	Chef/teacher	3	30 %
	Other	3	30 %
	Chef/Canteen leader	4	40 %

* all teachers had background as chefs or similar

Table 2: Cases

Table 2.	School 1	School 2	School 3	School 4	School 5	School 6	School 7	School 8	School 9	School 10
Charge for students	Free of charge	Charge (Low cost)	Charge	Free of charge	Charge	Charge	Free of charge	Charge	Free of charge	Charge
Meal	Breakfast	Lunch	Lunch	Lunch	Breakfast/Lunch	Lunch	Lunch	Lunch	Lunch	Breakfast + Lunch
Food offered	Mostly cold, breadbased	Mostly cold, breadbased	Hot meal	Hot meal + salad bar	Hot meal	Hot meal	Mostly cold, Breadbased	Hot meal	Hot meal	Hot meal
Model	Self-serving of sandwiches etc. under supervision	Self-serving of sandwiches etc. under supervision	Meals cooked by a chef in nearby industrial kitchen, students come over for lunch	Meals cooked by chef in nearby industrial kitchen, brought to school and served	Meals cooked in school by chef and assistant staff (in work training)	Meals cooked in school by chef and assistant staff	Self-serving of sandwiches under supervision	Meals cooked in school by chef + student assistants (in work training)	Meals cooked in school by volunteers from local church + student assistants	Meals cooked in school by chef + assistant staff (in work training)
Subsidies/ support	Support from the municipality	Receive no support	Ssupport from the municipality	Support from municipality, county + local seafood firm	NAV* supports those who can't afford it	Local NGO supports those who can't afford it	Support from the municipality	No information	No support. Thursday-meals can be received at the local church.	Support from the municipality
Student involvement	Yes, Elective course	Yes, Elective course	No	No	No	No	No	Yes	Yes	No
Reason for implementing school meal model	Free breakfast as a measure against social inequity (district with child poverty, behavioural and academic challenges)	Creating an arena for students to master practical skills, and gain confidence, while offering a reasonable and simple school meal	Political will and engagement in the municipality to provide a home cooked meal in the local school	Free school meals seen as a measure against social inequity and for improving the learning environment	A measure against social inequity an effort to keep students on the premises instead of going to local stores/hang around the local neighbourhood	Local pressure to offer a hot meal, like the Swedish model	Municipality wanted to implement measures for adolescents/local politicians sees the benefits of offering free meals	The school wanted to offer the students a hot meal for a reasonable price	High share of low-income families. School sees free school meals as a social mission and a way to optimize learning.	Kitchen facilities were already provided, principal wanted to start up with school meals and a pilot project was initiated
Thoughts about student benefits of the school meal offered	Providing nutrition, developing social skills and table manners, better concentration and a more tranquil learning environment, relation building	Learning benefits, arena for adapted education, contribute to well-being of students in general	Relation building with staff and other students, developing social skills and table manners, taste and flavour exposition	Creating harmonic meal situations, developing social skills and table manners, relation building, creating equality between students (no comparison of packed lunches)	Positive effect on the learning environment, relation building between students and staff, an arena where students can gather and be social without having to leave the premises	Kitchen staff can connect with students on a different level than teachers can and thereby contribute in creating a positive environment	Social skills and manners, avoid unhealthy options from home/ local store, overview over student's food intake (eating disorders), overview of social challenges (bullying, being left out)	Benefits to learning outcome, student relations, sense of achievement for student assistants involved in organization	Providing nutrition, creating a tranquil learning environment, optimize concentration and learning	Builds social relations, contributes to well-being, prevents bullying, being exposed to new tastes, less screen-time during recess and better concentration

Thoughts about challenges and limitations of the school meal offered	Might not reach intended target group, can only offer breakfast (not lunch) due to lack of cooling capacity	If school meals are too attractive, it might compete with packed lunches and lead to increased differences among students, 2-hour elective course limits ability to cook meals, students regularly miss out of parts of other classes	Lack of time leads to classes being cut short regularly	Time restriction leads to classes being split up, was originally supposed to use a nutrition calculator-tool in menu-planning but due to lack of resources this has been put on hold	If the food is too healthy, the demand goes down, which in the long run can be a challenge for budgets	Cannot offer vegan options due to time constraints, serving vegetarian options containing beans and lentils is challenging due to students' preferences and lead to food waste	Budgets are tight, therefore difficult to offer fruit every day. Due to limited physical resources, meals must be prepared in the back of the school kitchen at the same time as the home economics class is held	Some students can't afford the meals, but doesn't bring a packed lunch, would like to use more biodegradable packaging, but lacks the resources, due to time constraints, there is no time for the chef to have lunch with colleagues which can be lonely in the long run	Depends on volunteer workers and student volunteers, because they receive no support, they have to finance meals by selling sugar sweetened products as well as waffles every day, low budgets limit the food offered	Was originally a pilot project so is dependent on further support from the municipality and the politicians elected next, work force are people in job training and can be unstable, handheld meals are time-efficient, but creates a lot of waste
Advice for other schools, based on own experiences	Keep it simple, doing something is better than doing nothing	Focus on teambuilding and give the involved students responsibilities, get to know your students and identify their strengths, trying and failing is important for learning, figure out what kind of arrangement suits your specific context and your student group	Look for flexibility and willingness to adapt when engaging external partners, focus on clear school leadership, think things through and make plans, do expectation clarifications with all stakeholders, stand your ground	Make necessary preparations, involve and train the students in creating a positive meal culture (create ownership to agreed rules), keep staff motivated and committed and create a team-culture, include all stakeholders in the process, focus on cooperation and make plans together	When engaging external partners through procurement, don't focus solely on price and quality, but also on desirable outcomes on the psychosocial learning environment, keep local contexts in mind, adequate kitchen facilities must be planned for from the beginning (schools could cater to other schools lacking facilities)	Employ trained chefs, make sure schools are equipped with adequate kitchen facilities (or cooperate with someone who does), be professional about kitchen economics, focus on food variation and students' preferences, be resolute	Build a culture of solution-orientation, cooperation and willingness to work for the benefits of offering school meals, have enough adults present and a person in charge with continuity and the right background for the job (preferably with chef-training or similar)start small and adapt as you go and involve students in decision-making,	Adaptiveness is key. Make sure the person in charge is a trained chef and that kitchen facilities are adequate, and provide enough room for eating, don't be afraid to use spices and exotic flavours. Serve home-cooked food (if using processed products, make them taste like home-made)	Consider the local context and possible wider impacts of school meals (providing a meal might be a way to solve social issues or other challenges)	Engage trained chefs in order to safeguard hygiene and food safety standards, and keep everything professional, build enthusiasm among school staff and keep local contexts in mind. There is not one model that fits all, leaders must have good communication-skills

Strategies applied to limit food waste and disposable packaging	Offers food according to students' preferences to avoid food waste, has traded some of the disposable packaging for used stoneware and cutlery (donated from home-economics class)	Trains students to check dates and use products near expiration first	Substitutes individual milk cartons for milk dispensers to prevent both food- and disposable packaging waste, sends out menus in advance so students may bring packed lunches if they don't like what's offered	Trains students in serving themselves appropriate portion-sizes and lets students go twice if needed, surplus food can be donated to after school service or local institutions	Buys discarded commodities cheap from external partners, uses day-old fruit in cooking, uses the stalk of root vegetables in mashes and soups	Offers food according to students' preferences to avoid food waste, serves appropriate portion -sizes and lets students be served twice if needed	Continuity of the person in charge of purchases leads to experience with necessary amounts, which limits food waste, left over bread is given to a local horse-farm	Uses biodegradable glasses and soup bowls and reduces food waste by buying the right quantities- if they run out of food, they put out toast and "instant soups" instead	Leftover food is given to after-school study groups or to teachers.	Offers a school meal that student will eat, which reduces food waste and the amount of packed lunches that would have been thrown away
Strategies applied to meet diet and nutritional challenges	Uses " cheat" whole-grain bread with hidden grains	Offers whole-grain waffles on Fridays to make it less attractive for students to visit nearby stores/kiosks, offers whole-grain bread and limits the selection of sugar-containing products, limits SSBs to 0,33 sized containers	Procurement process: a focus on official dietary guidelines, exposes students to new tastes, adapts menus according to students' preferences	Cooks everything from scratch, mashes vegetables and integrates them in sauces, uses whole-grain products mixed into stews and limits pizza to twice a month, offers a salad bar	Substitutes some processed meat for beans in stews as source of healthy protein, substitutes sugar for day-old bananas in pancake batter, day-old apples and pears substitute sugar in spreads and jams	Uses root vegetables of all kinds in mashes and roasts them with potatoes, offers fish and vegetarian options weekly, makes sure quantities are appropriate	Offers dairy products, fish and vegetables everyday along with whole grain sandwiches	Chooses whole grain products, has a salad bar (occasionally), Established" red and green pricing" on healthy/ less healthy products in order to impact demand and has thereby reduced sales of SSB and SS-products, has cut SS-chocolate milk.	Serves no cakes or desserts. Serves mostly vegetarian options to keep meals healthy and cheap (soups, porridge, pasta with lentils etc.) uses a lot of vegetables and canned tomatoes in cooking	Follows official dietary recommendations, chooses whole-grain products, offers fish and vegetarian meals weekly, focuses on less salt. No additional product sales.

Table 3: Traits and attitudes of people involved in organizing school meals

Table 3 Traits and attitudes of people involved in organizing school meals

Communication & Cooperation	**Adaptability & solution-orientation**	**Motivation & Sense of purpose**	**Stability & continuity**	**Knowledge & competence**
"you have to play ball with those involved. And that includes students, parents, it includes teachers and those who are to run the canteen, cook the food and serve the food, cleaners"- School 4	*« the company has been so adaptable and made arrangements if something hasn't been working, even though there are negative feedback at times, they have dealt with it in a very good way and have been very cooperative"* – School 3	*« There must be somebody who wants to push it forward... who's motivated and inspired* - School 4	*"That one and the same person has overview and continuity in the job"* – School 7	*« if you are to be successful, you need to have a professional chef"* - School 6
"inform people, both parents and students and staff about how we might meet challenges as we go" –School 10	*« of course, you have to be agile about it, you have to be able to work together, to make it work…so, you have to accept that a trolley with cheese and sausages passes by the area where the cinnamon rolls are being made, to put it like that"* – School 7	*« there are people around the school who want to make it work. Many who wants to accomplish the same thing"* – School 5	*"many of the students have very marginal home environments, so that they meet safe adults at all stages is super important"* – School 5	*« if there is a foodborne disease or food related challenges, you have to be able to answer for the whole process"*– School 10
« it is important to have good teamwork and cooperation when you are to work together (..) teambuilding is important for this to succeed "–School 2	*« Yeah, we have adapted to what the students like. We have tested five different menus"* - School 8	*"If you have enthusiasm, it is easier to face the challenges with an open heart and be solution-oriented (..) create enthusiasm, both in school, at home with parents and with students"* –School 10	*"It is about seeing the students and also so that the student will feel safe, because of course it is a situation where you as a fresh 8th grader are eating at the same time as the scary 10th graders"* - School 7	*« it is expensive to buy food, now we are like a professional industrial kitchen and we have the right prices at all times, and I spend a lot of time on that... and that is why it works"* – School 6

3.3.2 Figures

Figure 1: Typology

Figure 1

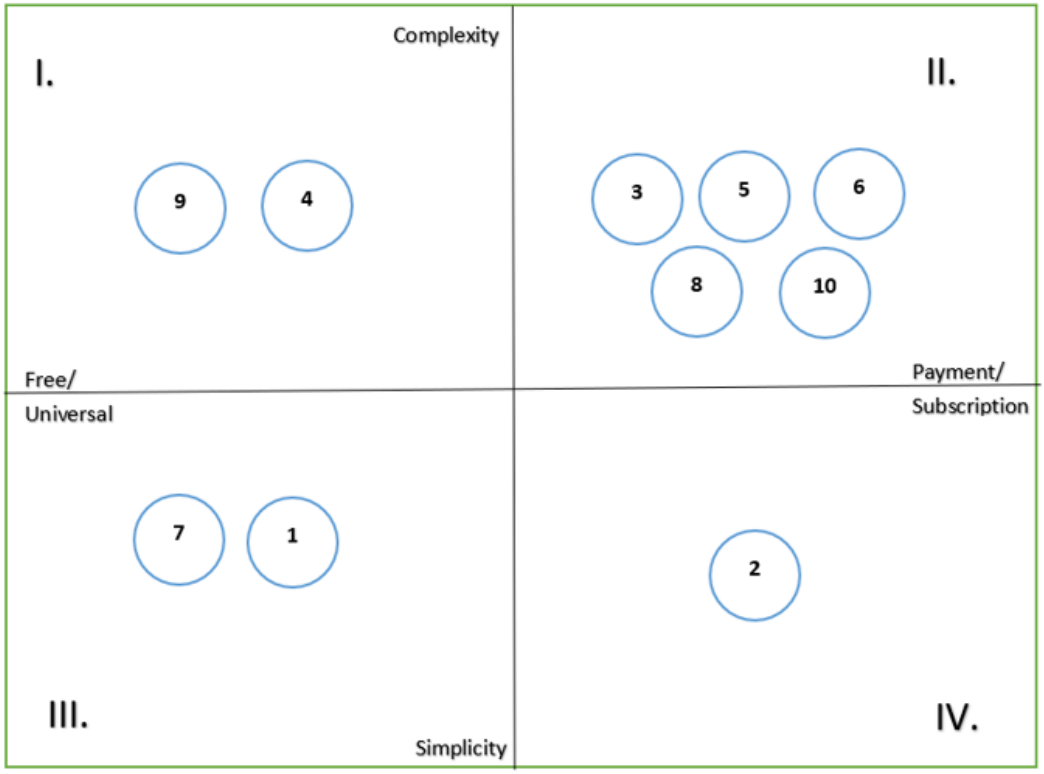

Figure 1 : Typology of school meal models investigated in study. The numbers in the circles relate to the different cases, Nr.1 to Case 1 and so on. The circles are randomly placed within the squares but indicate to which degree a school meal organization has high levels of complexity/high levels of simplicity and whether the offer is free of charge/ universal or requires payment/subscription.

3.3.3 An overview of the school food programs

The findings of this study are based on the researcher's interpretation of the information shared by informants in an interview setting. The focus of the interviews was the informant's experiences with organizing SFPs. Tough most of the schools served school lunches only, some also offered daily breakfasts, while one school served breakfast only (see Table 1). The different SFPs varied in degree of complexity, from simplistic, bread-based programs where students were expected to help themselves to slices of bread and cold cuts (much like the traditional packed lunch) to more complex programs where a variation of hot or cold meals, prepared in an industrial kitchen, were served in a cafeteria setting (see Figure 1). Programs also varied between free of charge-programs to high cost programs. Most of the programs that had high degree of complexity, were also medium-high cost models (see Figure 1). Though some of the schools were able to offer meals free of charge (n=4), most providers took a charge for its services (n=6). Most schools received financial support from their municipality or their county, while one school received support from a non-governmental organization. One school that offered free school meals, received no financial support at all, but had volunteers from a local church. There was high variation in between the programs when it came to organizational aspect such as student involvement. Informants generally emphasize the importance of involving students in the organization, and in 4 out of 10 schools, students could participate directly in the organization of the programs, either through elective courses or by voluntary, but random participation. A variety of reasons for implementing SFPs were emphasized in the interviews (see Table 2). Providing students with a daily breakfast or lunch (and thereby avoid students skipping meals) was emphasized as a reason for implementing SFPs by schools with free school meals. Preventing students from choosing less healthy alternatives from other sources, such as the local store, however, was in focus in all ten schools, but especially among schools that arranged SFPs for a charge. In addition, several informants mention social inequity as one of their main reasons for implementing meals and refer to the socio-economic status of their students and their families. In conversations with informants in this study, it was proposed that high quality school lunches may increase social differences among students due to high prices:

> *"if we, sort of, offer different kinds of large baguettes and everything looks really tempting and is really "stirred up", we fear that it might be troubling for all those who can't afford it"*
>
> — School 2.

Other motivations such as optimized learning and concentration and benefits to the student's psychosocial learning environment were strongly emphasized, especially the importance of providing a safe, tranquil eating environment with adult supervision for the students. Further, informants highlight the social aspects of the school meal arena and expect students to practice their social skills, participate in relation building and develop table manners:

> *"and it has a much bigger function than just getting enough nutrients into the body; they eat together, sit down at a table and eat together... you don't bully someone you've just eaten with"* -School 10.

Which challenges and limitations the different schools experience varies with the different contexts in which the SFPs were organized but balancing the organizational limitations of a limited budget with the intention of offering a nutritious meal, while accommodating student preferences, was a common dilemma (See Table 1). When considering the future of school meals, some informants indicate that the current economic situation may have consequences for further operations in the future:

> *"in the long term, we don't have a solid finance foundation, so either prices have to go up or we need a type of support, because the school is not able to put in more resources"* – School 5

Lastly, it should also be noted that the voluntary Guidelines for Food and Meals in a Schools, published by the Health Directorate in 2015 and available to schools online, were not mentioned by any of the informants during interviews. The informants were not specifically asked about whether they knew about the guidelines, or whether these were in use. The official governmental nutritional recommendations, however, were mentioned by several of the informants, but was generally given little attention in conversations.

3.3.4 Essentials of the school food program organization

By analysing the content of the interviews with the informants, some mutual key-elements to organizing SFPs successfully has come to light. First, there must be *enough resources.* This means having enough money to uphold budgets and buy commodities and it means having access to enough helping hands in the form of volunteering students and staff. Secondly, an *adequate physical environment* should be provided. This means having access to appropriate kitchen facilities, an adequate eating environment, functioning dishwashers and so on. Thirdly, the informants seem to agree on the importance of *traits and attitudes of the people involved in school food programs*. Ideally, they should be a stable, predictable workforce with the right competence, knowledge and mindset (See table 3). Lastly, there seem to be two aspects concerning the SFPs that are especially important, such as *adaption to local context*

and *student involvement and acceptance*. In the following section, the various components will be explained in more detail and illustrated with case examples.

3.3.5 Enough resources

Being able to uphold a healthy budget is one of the elements that the informants highlight as essential to organizing SFPs successfully. Another is having enough staff. However, the program doesn't necessarily have to be a big expense for the schools, seeing as most of them run models that are economically self-sustained and additional staff can be provided in the form of volunteering students. Still, most schools are dependent on some sort of additional funding, and having tight budgets will, in many cases, limit the food offer:

> *« The food is produced according to what we can afford, what sort of money we have* (..) *we have done some experiments with cooking different kinds of food and we see then, that it breaks budget at once..."* - School 9

To stretch budgets, the schools applies different strategies. One frequently applied strategy is hiring adolescents in work training, involving volunteering students or engaging local volunteers in operations to keep the cost of the workforce down:

> *"we have engaged students from the elective course "Volunteer effort", 2-3 students every morning who helps set it up and clean afterwards"* – School 1

Another strategy is keeping commodity costs down by carefully planning and limiting purchases and by limiting food waste. One of the chefs even bought left-over commodities cheaply from external partners to keep costs down:

> *"either we get the food for free or we pay for shipping and an administration fee and a small part of the sum, so that enables us to keep the commodity cost very low"* – School 5.

Lastly, some of the schools have chosen to sell popular food items such as waffles and sweetened dairy products and beverages in addition to their school meals, in order to help finance their SFPs.

3.3.6 Adequate physical environments

In practice, having an adequate physical environment means having enough room for the students to sit down for a meal (with chairs and tables provided), having access to modern kitchen facilities (with enough room for the kitchen staff to work) or alternatively, getting food delivered from someone with access to such facilities. One school solved the problem with lack of seating by choosing a strategy where meals were given as "hand-held" wraps or "on-the-go"-bowls:

« it is disposable bowls and spoons that you may bring with you and eat anywhere" –School 10.

Having an adequate physical environment also means having functional fridges and freezers, dishwashers, utensils and kitchen appliances. Keeping a long-time perspective helped this school achieve their goals:

> *"we were able to get several 100.000* kr*... because we had this canteen project... but additionally, we have used the school budget over several years, evenly distributed, since I began here, 8 or 9 years ago. For each year we have bought new equipment, new furniture and, so today we have a nearly perfect commercial kitchen with stoves and equipment and all we need"* –School 8.

3.3.7 A motivated, competent workforce

From school leaders to assistant workers, the SFPs depend on the people involved in its organization. The informants emphasized certain qualities to be ideal, such as the ability to communicate and cooperate well, being adaptable and being solution oriented (See table 3). In addition, they should be motivated for the job and experience a sense of purpose, show stability and continuity and possess a certain amount of knowledge and competence.

3.3.8 Adapting to local context

The importance of seeing the context in which a school is run was an aspect that was strongly emphasized by the informants. Adapting the organization of SFPs to the student's needs and considering the school's predispositions and economic framework, is how informants describe doing this. Adapting to local context might also mean finding creative solutions to local challenges, such as problems with logistics or funding. Some schools get their food delivered from local, industrial kitchens. The idea that well-equipped schools can solve local demand by catering to lesser equipped schools is a strategy that already has been applied by one school, and that some of the others mention as a possible future strategy:

> *"If we look at the funds available in the districts and what opportunities that might appear such as, food waste, maybe it might be able to make it [*the school food program*] predictable and financially stable... that must be the vision..."* – School 5

Overall, the main message seems to be that programs need to be adjusted locally:

> *"We are so different from Finnmark county to Akershus county, there are so many nooks and crannies and constellations and different schools and facilities that it is difficult to find <u>one</u>, common solution for everybody"*- School 10

3.3.9 Student involvement and acceptance

While most informants have experienced that involving students in organizing meals might benefit both school and students, involving the students doesn't have to mean letting them in on the cooking. It might be just as important to involve them in the assessment of meals or in creating the canteen rules:

> *« they have to be let in on it because then it is a lot easier to make them accept that these rules shall be followed, when they themselves have participated in creating them, instead of having them forced upon them"* - School 4

Student involvement may even be used to solve logistical problems. While some schools claim that having a salad bar is impossible due to the spillage, one school has made it work by involving students in the cleaning routine:

> *"We have salad bars on special days (..) those salad bars are placed out in the canteen so that people can walk around them- and then you get this circulation- and then I have three students that goes around with a cloth and a big sour cream-bucket and wipes off the bar, and the fourth student mops the floor. There you have that problem solved"* - School 8

Another essential of SFP organization is that the food served must be accepted by the students. The offer should match the student's meal preferences to such a degree that they aren't tempted to seek out other options or skip unappealing meals. For schools that sell school lunches, it is essential that students use the offer, or else it might bring financial problems. Finally, SFPs must be acceptable in terms of culture, religion and dietary needs. Halal options must be available where this is relevant, and allergies must be considered. Some strategies that are applied to increase acceptance among students are; keeping prices down, creating a sociable atmosphere with organized activities such as Bingo or Kahoot, and offering popular food items such as pizza and waffles:

> *« We have Friday waffles (…) Then there is a line all the way out to the hallway"* – School 2

3.3.10 Nutrition strategies

When asked about nutrition, informants emphasize limiting the use of processed foods, using whole-grains and vegetables and overall offering a varied, appealing, but not too nutritiously focused menu. Offering pizza, hamburgers and waffles from time to time (but rarely daily) seem to be acceptable practice among most of the informants:

> *"it must be acceptable to give them a hamburger on a Friday, or a pizza, or a lasagne or something. If not, it'll never work out"* – *School 6*

Despite an overall relaxed view on the nutritional quality of their programs, the informants agree that the food served shouldn't be too unhealthy. They apply similar strategies to make sure of this (see Table 2).

Home-cooked meals and unprocessed products are often emphasized to be of importance for the nutritional quality of the food:

> *"we use a lot of vegetables, a lot of unprocessed products, we do…it shall be healthy, what they consume»-* *School 9*

One of the most frequent strategies is limiting the offer of what they perceive to be less healthy food (sugar-sweetened dairy products and drinks, desserts and fast-food are emphasized). This is achieved by restricting or banning these items from the canteen and by keeping the students away from the local stores.

> *"We have, sort of, to make up for that 10th grade trip down to the store – Friday waffles, that are made with whole-grains"* – *School 2*

Economic incentives can also be a way of influencing consuming patterns. One school describes a system of "red and green pricing" that were implemented in order to influence the student's food choice and bring the demand for sugar-sweetened goods down:

> *"Four years ago, we sold way too much sugar-sweetened goods, so we re-arranged the whole menu with yogurts and iced teas and such, and reduced the price on the light-products and the ones without sugar, so today we sell 80 % without sugar"* – School 7

While none of the informants use any dietary assessment tools, they do make a point out of increasing the nutritional value of their meals. Substituting white flour for whole wheat or adding oats to food offered in the school canteen is a common strategy, incorporating mashed vegetables in stews and sauces another:

> *"we try to make up recipes that hides it a bit more, so they won't see, for example mash lots of vegetables in a tomato sauce, they don't know that there are 10 kg of vegetables in that sauce"-* School 4

3.3.11 Sustainability strategies

> *"When you look at how much food is thrown away and that most people pay for this food to be wasted, it is strange that we don't use it in school food programs"* – School 5

Unlike the chef giving this statement, few informants link their SFPs to environmental sustainability. In fact, the effort of limiting the amount of food waste generated by their SFPs that is described by several of the informants, is done because of a need to balance budgets, rather than out of concern for the climate:

> "*we try to avoid having to much leftovers because that is in a way, money out the window... and when we try to keep a low-cost model like we do, that is a consideration that we take"* –School 2**.**

The sort of food served seems to have consequences for how much food waste is generated:

> *"two slices of ham and cheese on bread creates a different sort of food waste than chicken and salad"*- *School 3.*

When food waste issues are brought up specifically in conversations, the strategies described by the informants, are of similar character (see Table 4). While the simpler, self-serve bread-based models seem to be ideal in terms of limiting food waste, informants emphasize that serving the students food according to their preferences, which they will consume, is of importance. Menus are advertised in advance, so that students might bring a packed lunch as an alternative, portion sizes are limited, and purchases are carefully planned. Leftover food is often donated to after-school groups or similar. Most of the schools' report using tableware instead of disposable packaging, and if they do use disposables, recycling systems are in place. One school even reported using bio-degradable packaging, but is not too optimistic about future use:

> *"they're pretty expensive, well see how long we 'll keep it up"* – *School 7.*

Another school argue that the wisest thing they've done to reduce waste was making a switch from individual milk cartons

for each student (through the milk subscription program) to dispensers. Now every student can serve themselves with milk if they'd like to, whether they subscribe or not:

> *"it has saved us a lot of hazzle with those milk cartons, I really recommend it"* – *School 2*

While several of the schools serve weekly vegetarian meals, or offer vegetarian options, this is done due to religious considerations or because plant-based meals are cheaper. In fact, some of the informants argue that serving all vegetarian school meals would have led to the creation of additional food waste, because their students simply won't eat the food if it contains too much vegetables or plant-based proteins:

> *"they hate beans and lentils and such items that vegan people love; they won't it eat it. Simple as that"* – *School 6*

Another school *has* found a way to increase the consumption of plant-based proteins, and describe substituting most of the meat with medium-cooked pulses, which is integrated in the sauce, along with as little as 20 grams of meat per person:

> *"nobody cares as long as you don't tell them its beans….it's about how you communicate it. If they ask; "is it meat in it?", the answer is "yes"- because it IS meat in it "-* *School 5*

3.4 Discussion

3.4.1 Experiences with school food programs

The main objective of this study has been to explore the informant's experiences with organizing SFPs in a systematic way. Unlike most other northern countries, the provision of school food in Norway is not mandatory (Waling et al., 2016). Offers are decided locally and vary between the schools (Kainulainen, Benn, Fjellström, & Palojoki, 2012).To systematize some of the differences seen between the schools in this study, a typology that visualizes the degree of complexity in programs was created (see Figure 1) and the various characteristics of the programs were described (see Table 2). Despite variation in organization and content, some key elements to successfully organizing SFPs were emphasized; along with having enough resources and physical predispositions, the ability to adapt to local context and having the right staff, informants emphasize the importance of student involvement and acceptance as essential. Analysis suggests that the informants experience difficulties with balancing the organizational limitations of a tight budget with the wish to offer a healthy meal and the need to accommodate student preferences. Another finding worth mentioning is that informants strongly emphasize impacts on students psychosocial learning environment and social inequities between the students, while wider impacts on long-term health and sustainability were less in focus.

3.4.2 Voluntary health promotion in a limited economic context

The Guidelines for Food and Meals in Schools produced by the Norwegian Directorate of Health offer guidance on form and content for SFPs (Helsedirektoratet, 2015). The guidelines are based on the documentation of the diet's importance for long-term health and potential disease reducing effect and emphasize the importance of the school as a health promoting arena. Recent population health studies has suggested that Norwegian 15 year olds consume too little fruit and vegetables and too much saturated fat, salt and sugar (Hansen, Borch Myhre, Wetting Johansen, Mohn Paulsen, & Frost Andersen, 2015). This was, however, *not* an aspect that were much in focus during interviews, nor were the school's potential role as health promoter. Instead, benefits of the programs on the students psychosocial learning environment and social inequities between the students were emphasized. Informants also emphasized the immediate health benefits of school meals. Schools with free of charge-programs typically emphasize the importance of being offered a daily breakfast or lunch (as opposed to skipping meals) and payment-schools emphasize the benefits of offering healthier options trough the programs, than what is available in the local store. By making healthy food more available in public arenas such as schools, greater dietary diversity and quality can be achieved (The High Level Panel of Experts, 2017). If provided to all, food and meals served in a school setting, may also reduce social inequity in health (Arntzen et al., 2018). However, families with low incomes may not be able to pay for costly SFP subscriptions (4 out of 10 programs were free of charge for students, but the provision of free school meals in Norway is rare, and not representative of national tendencies). Because some of the SFPs investigated in this study were rather expensive, the access to healthy foods for some of the students may be limited. In addition, informants emphasize lack of resources as a challenge that may lead to limited food offers and not being able to offer free meals. The economic context schools experience may therefore influence how SFPs influence social inequities between the students as well as their access to nutritious food. Regardless of whether programs were offered free of charge or not, informants emphasize that they mainly wish to offer healthy food through their SFPs. However, they also choose to offer popular food items such as pizzas and burgers from time to time, which they describe as less healthy options, in order to accommodate student preferences. A few of the schools sell waffles and sweetened dairy products, because this brings in extra income, or out of the need to compete with local offers that might tempt students to buy their lunch off the premises. This was especially the case when SFPs was offered to students for a charge, which illustrates the dilemma of balancing the organizational limitations of a tight budget with the wish to offer a healthy meal and the need to

accommodate student preferences. The food available to students through SFPs varies largely from school to school, and the menu is usually chosen by those in charge of SFPs. Some informants seemed to believe that by serving courses with a lot of vegetables, plant-based protein sources, fish and whole grains, students might eat less of the food served or choose to skip meals. This view is reflected in several of the strategies applied by schools to increase nutritional value, such as "hiding" vegetables in the sauce. Attempts at raising the acceptance of vegetables and other healthy ingredients was *not* a strategy described by the informants. As pointed out by Wiseman (2017) the creation of health promoting food environments may enable individuals to make healthy choices (Wiseman, 2017). Ameliorating the school lunch environment by making nutritious food more accessible, might even help tackle challenges such as the obesity crisis, improve academic scores and benefit student concentration (Golley et al., 2010; School Meals Review Panel, 2005). The relative passive view amongst informants regarding student preferences, suggests there may be need for support and guidance, as well as raised awareness about the SFPs role in the food environment, which may influence the dietary habits of students over time. As mentioned above, The Guidelines for Food and Meals in Schools is available as guidance. The informants in this study do, however, not mention the guidelines in interviews. This might as well be because the informants never received any specific questions related to them, but it might, perhaps, also indicate a lack of awareness of the existence of the guidelines. When barriers to implementing the guidelines were investigated in a case study from 2011, lack of resources and funding and access to unhealthy food outside school, were two of the elements that were emphasized (Holthe, Larsen, & Samdal, 2011). It is therefore interesting to note that in the current study too, resources and student acceptance (in the form of acceptance of school food as opposed to competing, unhealthy offers outside school) are elements that seem to influence the focus of SFPs to a large degree, regardless of whether the content of the guidelines are considered or not. Another interesting point is made in a publication from the Finnish National Agency for Education, which presents lessons learnt and best practices from 70 years of school feeding (Pellikka & Taivalmaa, 2019). One of their main successes, they claim, is that they have been able to provide balanced nutrition with tight funding. However, they regret to say that the tastiness of the food has been downgraded as a result, which has led to more students skipping meals. It is interesting to note that the findings in the Finnish study correspond with the experiences of informants in the current project. Alas, economic considerations might lead to the quality of the food being deprioritized, even in a context where SFPs are officially subsidized (Finland has been providing all school children with a hot meal, free of charge,

since 1948). In The ProMeal study, *prospects for promoting health and performance by school meals in Nordic countries*, Nordic experiences relevant for the importance of guidelines, have been gathered from 837 students from Finland, Iceland, Norway and Sweden, born in 2003 (Waling et al., 2016). One paper based on this study looks at the composition of school meals in Sweden, Finland and Iceland (Juniusdottir et al., 2018). The paper concludes that though the official nutrition guidelines are respected, meals still needs to be standardized, as the energy and nutrient content of school meals varies largely from day to day. To ensure that the school meals are nutritionally adequate, it is also recommended that canteen staff should be educated in nutrition to some degree, and that the energy and nutritional value of the food served should be calculated. They also highlight the importance of clearly phrased guidelines that are easy to follow. It can be argued that a more careful focus on the *content* of SFPs in the Norwegian context would have been ideal in order to avoid random differences in the quality of the food served and to ensure all students an adequate, health-promoting school meal, in line with the recommendations. However, as SFPs remain a voluntary, local responsibility, it seems that the economic limitations experienced by the schools will continue to limit the health promoting potential of SFPs and other potential benefits such programs might bring.

3.4.3 Environmental aspects - an issue of student preference?

The sustainability aspect of SFPs was not something the informants emphasized in interviews. With a few exceptions, informants seem to have relatively low awareness regarding the program's potential role in a sustainable food chain. However, because food systems are part of peoples wider environmental settings, they interact with our health, with equity issues and sustainability outcomes, in addition to having wider economic consequences (Swinburn et al., 2013). In the UK, for example, the potential for food procurement to schools was estimated to give a three-fold return on social, economic and environmental investment (Kersley, 2011). The Guidelines for Food and Meals in Schools points to the global agreement on the need for a more sustainable production and consumption of food, and recommend that food served in a school setting should restrict the intake of red meat and promote the intake of plant-based foods such as vegetables, fruits, pulses, nuts and whole grains, as well as sustainably produced fish from farms and wild stocks (Helsedirektoratet, 2015). The guidelines also state that disposable waste should be limited, waste recycled, and schools are encouraged to stimulate a sustainable development through their purchases. Though sustainability outcomes were not emphasized as a concern by most of the informants, a focus on limiting food waste

was common. It is interesting to note that efforts to reduce food waste was most often emphasized as an economic more than an environmental strategy. However, limiting the amount of food waste will have a positive impact on climate gas emissions (The Ministry of Climate and Environment, 2018). As stated above in the discussion related to the health promoting potential of schools, some informants describe that serving courses based on vegetables, plant-based protein sources, fish and whole grains might lead to the students eating less of the food served. This might also have implications on the amount of food waste, they argue. Support for this view is found in studies on plate waste in the national American school nutrition program, which found that approximately 12 % of all the calories on a school-food plate are wasted, especially the vegetables (Oostindjer et al., 2017). However, the belief that students simply will not eat the food if it contains too much vegetables or plant-based proteins is challenged by schools that apply strategies that enables them to do just that. One of the informants in the current study had solved the dilemma of accommodating student's preference for meat-based courses with a healthy, sustainable practice, by simply switching most of the meat in recipes for legumes, cooked al dente, mixed into the sauces. According to the informant, this was indeed compatible with the student's preferences. It is also interesting to note that the informants in general do not seem to link plant-based meals to environmental sustainability. However, the production of meat has a high carbon foot print and reducing the intake of red meat is recommended both for environmental and for health reasons (Nasjonalt råd for ernæring, 2017). Several schools describe serving vegetarian meals on a weekly basis, without complaint from the students (pancakes and tomato soup are especially popular choices). However, the vegetarian options are usually included in the menu because of religious considerations or because the ingredients are cheap, rather than out of health or environmental concerns. A plant-based school meal could be a way of reducing the amount of meat in adolescents' diet and increase the amount of vegetables and plant-based proteins, however low preference for the food groups might make this a challenge, if student preference indeed becomes a problem. This is of course, based on the notion that it is indeed so that plant-based meals can be a challenge for students taste preferences. Another possibility is that the vegetarian dishes itself are not the problem, but rather the presentation of them as plant-based meals, as one informant suggested. Because it was the adults involved in organizing school meals that where interviewed in this context, and not the students, one cannot be certain about the actual preference of the students or what their thoughts about plant-based meals are. However, a 2018- report on the dietary habits of Norwegian consumers found that younger age groups consumed more meat and had lower preference for fish and

vegetables, than the elderly age group they were compared with (Bugge & Alfnes, 2018). It is therefore interesting to note that the city council in Oslo has announced that they will implement free, plant based school meals for all the 28 secondary high schools of the region from 2020-2021 (Oslo Kommune). In the current study, motivation for the job and the feeling of purpose, was highlighted as beneficial traits in staff involved in the organization of SFPs. If the same is true for staff involved in organizing school meals in Oslo, it might be problematic if there are conflicting views on the benefits of plant-based school meals. This might suggest a need for knowledge and dialogue concerning attitudes of employees in the Oslo school on plant-based school meals and student's food preferences. In a 2013-publication on *Experiences with four school meal pilot schools in the Trøndelag-area*, the tastiness of meals and the social context of which the meal was served, were reported as the most important factors for students (Haugset, 2013). These experiences reflect the findings of the current study well. Either way, a healthy, sustainable practice should be aspired when organizing SFPs, whether this is accomplished by a reduction in food waste, or by emphasizing other measures, such as a plant-based diet.

3.4.4 Limitations of the study

The quality of qualitative research can be valued according to the criteria of validity (credibility), reliability (thrust wordiness) and reflexivity (Thagaard, 2013). The validity of methods may further be judged by the credibility and authenticity of the presented results. This study is based on qualitative interviews with staff involved in provision of school meals. Triangulating the findings by performing systematic observation of the programs or conducting interviews/ focus group interviews with students or other staff could have improved the credibility and authenticity of the findings (Thagaard, 2013). However, observation and focus group interview were not conducted, as interviews were partly held over Skype and telephone, and because the project had a very limited timeframe. Such additional input could, however, been useful to gain a deeper understanding of perspectives and experiences of informants and for highlighting similarities and differences between them (Doody, Slevin, & Taggart, 2013). In order for a scientist to be reflexive, she must acknowledge and consider her own point of view and how it may bias her research (Malterud, 2017). The researchers pedagogical background as well as her interest in environmental and nutrition-related questions may have influenced the research process on a subconscious level, as may her limited experience as a qualitative researcher and interviewer. Lastly, the reliability of the research process may be influenced by the selection of informants (Malterud,

2017). The type of purposive sampling that was chosen for this study, relies on the personal judgment of the researcher and may therefore be vulnerable to researcher bias (Maul, 2018). Because the study had the aim of enlightening factors of success, the sample was limited to teachers, school leaders, canteen leaders and other staff, with positive experiences concerning the organization of SFPs. None of the users of the programs where involved. However, schools that have tried but that gave up providing meals could have been included to add different perspectives.

3.4.5 Closing remarks and some implications

While it can be argued that the ideal SFP should be both tasty and nutritious, SFPs should also be economically viable and elements such as environmental sustainability, social inequity and the psychosocial learning environment should be considered. While the Guidelines for Food and Meals in Schools suggest a general framework for schools to follow, the lack of a national legislation on the content and organization of SFPs, has led to a variety of local solutions. Norwegian schools differ in geography, demography and size as well as financial and logistic context. As emphasized by informants in this study, there are good arguments as to why the organization of SFPs should remain a local responsibility, as the programs may be designed to specifically consider local conditions. However, if implications for environmental sustainability, long term health and social benefits are considered along with more immediate benefits, an economically viable SFP with the ability to solve several societal problems simultaneously might be within reach.

Implications:

1. A greater alignment of the content of SFPs would be beneficial, in order to avoid potential nutritional disparities between the students of different schools and areas, and to ensure that students are given an adequate meal, that is nutritious and sustainable, and meets their social, cultural and religious needs. Guidance can be found in the Guidelines for Food and Meals in Schools.
2. Schools are not necessarily conscious about the role of SFPs in a societal perspective, such as their relevance for health promotion, their potential to increase or decrease social inequity, or their relevance in sustainable food systems. Because SFPs have the potential to solve several societal problems simultaneously, higher awareness of these aspects would be optimal in the planning and implementation of SFPs.

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Ethical aspects

The study received research clearance from PVO at the Norwegian Institute of Public Health. The participants in the study were informed of their full anonymity and ability to withdraw from the study at any time. No sensitive information was gathered. However, because interviews were done using a voice recording device and voice recognition tools may identify a person, the sound files were treated with great carefulness, stored safely under password protection and deleted from recording devices after use.

Declaration of interest

None

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4 ELABORATION ON THE RESEARCH PAPER

This section of the thesis will further discuss methodological considerations of relevance to the project as well as findings that had to be limited in the research paper due to formal restrictions.

4.1 Methodological consideration

The study adopted a qualitative research design (Merriam, 2009). Qualitative studies are characterized by a plurality of theoretical approaches and research designs such as phenomenology, grounded theory and ethnographic studies (Creswell, 2013). However, as indicated by Merriam, in some instances it can be difficult to make research fit with a specific design (Merriam, 2009). Acknowledging this difficulty, Meriam has proposed to use the notion of "basic qualitative studies" to refer to qualitative studies not necessarily bound by the frames of a certain theoretical framework. She further states that "*I have come around to preferring labelling this type of study a basic qualitative study*" (Merriam, 2009). Tough not choosing a specific framework, this approach still maintains the overall paradigm of qualitative studies, underlining the constructionist characteristic of these types of studies, an epistemological view implying that knowledge is constructed, and not discovered.

4.1.1 Systematic literature search

Prior to the data collection, a systematic literature search was performed in the fall of 2019. The aim of the literature search was to review the existing literature concerning staff experiences with school meals in Norway, as well as in other countries, to help formulate the questions for the interview guide. With the help of a librarian, relevant search words were identified and applied to a selection of databases. At first, there were too many hits and too little relevance in the identified articles. This was due to limited experience with the practice of using the different databases. However, after adjusting the search words with the help of the head librarian, relevant sources were identified. Keywords were then applied to the databases Medline, Web of Science and Food Science Source. The systematic search made it clear that there is little academic literature concerning staff experiences with school meals, especially when geographically narrowed down to the Nordic countries. Therefore, ordinary Google searches as well as Google. Scholar searches were performed in addition to the

systematic search, in order to track down relevant documents outside academia, such as news stories, political programs, official state documents and similar.

4.1.2 Selection of key informants

As explained in the research article, candidates that fitted the inclusion criteria were identified by browsing school websites, municipality websites and other relevant sources describing different existing SFPs in Norwegian LS schools. A school meal seminar arranged by Friends of School Meals (a Norwegian lobbyist group) was also attended, as research for the selection of informants. Several candidates were also identified by browsing the website of the National Centre for Food, Health and Physical Activity by the University College of Vestlandet, which provides case-example descriptions of schools offering SFPs (Nasjonalt senter for mat helse og fysisk aktivitet, 2019). The lobbyist group was also invited to recommend potentially interesting school cases. This input was considered, but was not a deciding factor, when selecting cases. Their website, skolematensvenner.org, was however, an important source for researching the potential schools. To select and recruit the informants, a list was created in Microsoft Excel, with 31 potential cases, across the country, that fitted the inclusion criteria. Schools were then sorted according to type of SFP offered and selected out of an intention of maximum diversity. Preferred schools were given the priority number 1, backup candidates number 2, number 3 and so on. The top choice schools were contacted by e-mail, with a letter of invitation stating the purpose of the study. If the schools wanted more information, or if e-mails were left unanswered after a week or so, schools were telephoned. It was up to the school leaders to determine and recruit the best suited informant for the interview, which varied from principals, counsellors, chefs & cafeteria managers, teachers and environmental workers. All informants either directly oversaw the organization of SFPs or were involved in daily operations. In some cases, often upon the request of the schools themselves, additional staff involved in the programs were interviewed, for example both the principal and the canteen leader. Finally, ten quite diverse Norwegian LS schools where chosen from 6 different regions across the country, with a total of 14 responders. There was a small majority of female candidates and everyone was of Norwegian origin, except one Swede. The informants were informed of the intent of the study, and what sort of questions they would be asked.

4.1.3 Piloting

Prior to the pilot interview, the researcher volunteered to be interviewed herself, in a different academic project, in order to gain experience and insight about the interview situation. This

proved to be a helpful experience, shedding some light upon what it is like to be on the other end of the Dictaphone. A pilot interview was then performed. Because the pilot interview fitted the inclusion criteria and brought forth some interesting aspects, it was decided after a discussion with the methodological supervisor that also this interview could be included in the data material.

4.1.4 Handling of data material

Interviews were conducted with the Olympus Vn-541PC Digital Voice Recorder and deleted after transmission to encrypted files. A back up was recorded with the app « Dictaphone», which encrypts the sound file and sends it to a digital system (nettskjema.uio.no) where it is safely stored for a limited time under the same password protection system as digital banking systems use. No sound files were at any time saved on the phone, nor left on the digital voice recorder device. The benefit of using a recorder is that what is said can be transcribed and analysed at a later point (Thagaard, 2013). This makes it easier for the researcher to concentrate on what is being said to a larger degree than what is possible with note-based interview styles. Some notetaking was done during the interview however, to help the researcher structure the conversation.

4.1.5 Interview setting

Data was collected by interviews with selected key informants, between September and December 2019. All participants signed consent forms containing information about the aims of the study and their rights as informants, prior to interviews (See Appendix 2). The aim of the study was also briefly explained orally before the interviews and the informants were given a chance to ask clarifying questions before and after sessions. The setting of the interviews was somewhat informal, with small talk in advance, often followed up by a tour of the kitchen facilities and the school canteen area. While some of the informants had been preparing themselves to the interviews in advance, for example by closely reading the consent form, others seemed less prepared, unsure about the study objectives or had been instructed by the school leader to participate in the interviews shortly beforehand. Extra considerations were therefor given to make sure everyone involved had received the same information, signed the consent-sheet and participated out of their own free will.

4.1.6 Data analysis

As explained in the research article, thematic analysis was applied to organize and manage the data material. For this, NVivo 12, a computer assisted qualitative data analysis software (CAQDAS) was applied. Using a software program can be helpful in order to structure and

organize data and identify patterns (Thagaard, 2013). Themes where identified by coding units of text from the interview transcripts. Codes are building blocks for themes, which can be seen as the framework the researcher uses to make sense of her analytic observations (Clarke & Braun, 2017). When coding, text is examined very closely, in order to recognise themes, topics and even patterns and relationships that emerges from the material. As a starting point, the research questions in the interview guide were applied deductively to form a first list of codes, such as aspects related to nutrition, sustainability and social inequity (see Table 4). Themes also emerged inductively from further analyzation of the deductive codes, and main themes and sub-themes were categorized and visualized in maps and charts in order to get an overview of the content, before looking into each theme more carefully.

Table 4 : Coding examples

Examples of deductive codes	***Success criteria***	***Sustainability***	***Psycho-social learning environment***	***Food and Nutrition***	***Socio-economic aspects***	***Organizing school meals***
Examples of Inductive codes (derived from deductive codes)	*Positive attitudes of leaders and staff*	*Plant-based food*	*Meal environment*	*Preferences and dislikes*	*Food access and availability*	*Need for support*
	Enough resources and adequate physical environments	*Food waste*	*Well-being at school*	*Allergies, diet and special food*	*Socio-demographic background of students*	*Feedback*

Though CAQDAS programs are useful to organize research material, it is the researcher that must perform the analysis (Woolf, 2018). Microsoft Excel was used for practice, before attempting coding in the NVivo-software. Already from the data collection phase, reflections that emerged after the interviews, possible themes and relationships that could be investigated more closely, was written down. This process was helpful for later analysis. In the final analysis phase, quotes from the data material was chosen to illustrate and visualize the results of the analysis. Presenting carefully selected quotes from the material can be a way of describing the final results and interpretations in a meaningful way (Nowell, Norris, White, & Moules, 2017).

4.1.7 Role of the researcher - validity, reliability and reflexivity

In order for knowledge to be scientific, the criteria of validity (credibility), reliability (thrust wordiness) and reflexivity must be met (Malterud, 2017). Transparency is also a concept often applied in qualitative methods, that has to do with the specificity of the research process and to which detail it has been accounted for. It often overlaps with the concepts of reliability and

internal validity. In qualitative research, the validity of methods can be assessed by looking into whether the researcher's interpretation of findings are credible, and whether the results that are presented seem to be authentical (Thagaard, 2013). During interviews, efforts were regularly made to repeat explanations back to the informants, in order to double check whether the researcher's interpretation of their experiences had been understood correctly or not. A few misunderstandings were clarified by this approach. Finally, careful considerations should be made to ensure that the research process really reflects the research questions and the scope of the study, and whether the resulting data material is relevant. The external validity of qualitative methods can be assessed by judging whether the interpretation of results can be transferred to another situation (Thagaard, 2013). While the findings in this study are only representative of the ten, studied cases and their realities, other schools in similar situations may perhaps find inspiration and potential solutions to their own struggles when reading about the strategies applied by the people involved in this study. A selection bias might have been present, however, seeing as there was a slight surplus of urban schools, in Viken county, serving hot meals for a charge, in medium sized schools. However, being a basic qualitative study with the intent of maximum variation, the results are not supposed to be generalized and one must therefore look at each case individually. According to Nowell, the reliability in qualitative studies isn't weighed by its replicability, but rather to which extent the researcher has been able to account for the collection and handling of the data material (Nowell et al., 2017). What matters is whether the research is presented in a way that enables the readers to judge the thrust wordiness of the presentation. It should be mentioned that replication of the coding process with another researcher could have strengthened the reliability of the findings (Kurasaki, 2000). While this could not be done, the whole text material was, however, re-coded by the researcher in order to double check whether interpretations would vary as a result. New themes were then discovered. The reliability of the research process may also be influenced by which informants are chosen, and a natural saturation of informants should designate the number of participants, instead of a fixed number (Malterud, 2017). For this study, it was decided beforehand that ten schools were enough. However, a total of fourteen informants from the ten schools were recruited, as more detailed information on certain aspects was deemed necessary. The objectives of the study were explained to the informants beforehand in an informative letter and repeated before the interviews were conducted. They were also informed that they had been chosen because they had an interesting SFP that the project wanted to learn more about. This might have influenced the answers given, due to the Hawthorne effect: The fact that the informants were

aware of being in a research study might lead them to change their behaviour, by for example answering questions in a way they think would be favourable to the outcome of the study (Sedgwick, 2012). This effect could have been prevented if the true intent of the study had been hidden. Lastly, it should me mentioned that the inexperience and personal background of the researcher may have influenced the research on a subconscious level. While presumptions that are brought into the research can be subconscious and therefore quite natural, the researcher must actively seek to acknowledge these presumptions and be critical towards them (Malterud, 2017). With a background in pedagogy and a soon-to-be master's degree in public health nutrition, it is possible that presumptions about the field may have impacted the formulation of research questions, the questions in the interview guide and perhaps even how interviews were conducted and later analysed. It should also be mentioned that the interview guide did not include specific questions about staff familiarity with the Guidelines for Food and Meals in Schools, which in retrospect, would have been of relevance for the study.

4.2 Further discussion of findings

The main objective of this study has been to explore the experiences of staff involved in organizing SFPs in Norwegian LS schools in a systematic way**.** While the focus of the research paper has been on the organizational, nutritional and sustainability related aspects of SFPs, benefits to the student's psychosocial learning environment, as well as goals of reducing social inequity, were other aspects emphasized by the informants in this study. In this section, these aspects will be discussed to a further detail than what was possible within the scope of the research article.

4.2.1 Social functions of the school meal – beyond feeding

Benefits to the students psychosocial learning environment was a common perception of the ripple effect of SFPs, emphasized by the informants. They see the school meal setting as a social arena where students may practice their social skills, participate in relation building and develop table manners, and emphasize potential benefits of the programs on student concentration and learning outcome. Schools who offer SFPs are required to ensure that the school environment is promoting health, well-being, good social and environmental conditions for its students that "*safeguard the social functions of the meal*" (Forskr. om miljørettet helsevern i skoler, 1995). The social aspects of meals, as well as the food itself, are therefore also of importance for creating food environments that benefits the student's psychosocial environment and wellbeing. These aspects are generally considered as important

in an international school meal context, and are given a significant focus in the organization of SFPs in countries such as Italy, where the school meal itself, is strongly rooted in the country's rich food culture (Morgan & Sonnino, 2008). In Italy, meals typically consist of several courses and meals will usually last longer than in the Norwegian context, which arguably gives more opportunity for socializing. The students surveyed in a Norwegian school meal study from 2013, emphasized the social context in which the meals occurred, as well as the tastiness of meals, as the elements of greatest importance for school meals (Haugset, 2013). In the same study, school staff praised the opportunity of the school meal as an arena for social skills training. Likewise, the informants in the current study emphasize the importance of the social setting of the meal and emphasize the importance of the presence of adults during mealtime to ensure order and a calm atmosphere. Guidelines for Food and Meals in Schools states that students should be given at least 20 minutes of eating time. However, studies show that only 63 percent of 8-10th graders actually get this amount of time to eat their packed lunch (Staib, 2013). This might be transferable to the schools in the current study. When asked specifically about the amount of time given for socializing around meals, however, none of the informants reported concerns regarding the amount of time given for meals. On the contrary, many of the informants emphasized that the students usually finished their meals in an even shorter amount of time than the official recommendations give room for. Adult supervision and the physical environment, on the other hand, is something the informants regard as a more important factors than eating time in the organization of school meals. However, one might ask to which extent the social functions of the meal can be prioritized with potentially less than 20 minutes of school-meal socializing. If students indeed choose to spend less time on socializing around meals than the recommended 20 minutes, despite the fact that this is something they highlight as important, this might as well reflect the general tendency in the Norwegian population to downgrade time spent on meals (Vaage, 2005). The actual experiences, thoughts and opinions of the recipients of the school meals, however, was not collected in this study, which is a limitation that should be considered, and so future studies that investigates these aspects closer are required to shed further light upon these aspects.

4.2.2 Are school food programs increasing social inequity?

Goals of reducing social inequity was one of the potential benefits of SFPs emphasized by the informants in this study, and an important rationale for implementing free or low-cost lunch and/or breakfast programs. More than 10 % of Norwegian children grow up in families with

sustained low incomes and the numbers are increasing (Epland, 2018). Studies have shown that the socioeconomic conditions in which a child grows up affects the health of the child and their later health habits in life and that children in families of a low SES eat less fruit and vegetables and have higher intakes of candy and sugary beverages than comparable groups, and in addition, skips meals more often (Arntzen et al., 2018; Helse- og omsorgsdepartementet, 2016). Families with low incomes may not be able to pay for costly SFP subscriptions and some of the programs investigated in this study were rather expensive. Lack of resources is emphasized as a challenge, because it may lead to limitations in the food offer and not being able to offer free/cheaper meals. A systematic review published in 2020 found that accessibility of food items at home, food rules and parental modelling, self-efficacy, food preferences and knowledge were modifiable factors explaining socio-economic differences in dietary behaviours among youth (Mekonnen et al., 2020). Tough accessibility of food items in a school setting were not included in the review, it is worth mentioning that some informants in the current study made the argument that certain school meal payment systems may increase the accessibility of cost-based school meals to students of a lower SES. Using individualized electronic payment cards, like some schools in this study had chosen to do, gives the schools the opportunity to base payments on a family's income in a discreet manner, as an alternative to free school meals, they explain. Still, students and their families must actively seek out the support of the school if those in need are not identified by the schools directly, which arguably could lead to a feeling of stigmatization for those involved. Additional measures such as support programs refunding the schools of their expenses, were experienced as helpful by informants in this study, and can be a way of keeping programs financially viable, while decreasing differences between students. Careful considerations should be given in the early stages of planning SFPs, to make sure that schools are not increasing differences or contributing to stigmatization of students and their families. This, however, requires awareness of the issues amongst people involved in organizing SFPs, and tough some schools seem to have high awareness of these issues, this does not always seem to be the case. SFPs should ideally bee free of charge (Arntzen et al., 2018; Kunnskapsdepartementet, 2006). This, however, remains an impossibility for most school districts. Therefore, the organization of meals must consider the needs of low-income families. If meals cannot be provided free of charge, there are measures school might take to reduce this effect, such as sponsoring student meals in a discreet way, as described by some of the informants of this study. It is important that this is done discreetly, to avoid stigmatization of students and their families.

5 CONCLUSIONS AND SUGGESTIONS FOR FURTHER WORK

The provision of school meals in Norway is highly dependent on local context and the resources available. Plans for the implementation of a state-wide SFP ought to consider these local variations. However, a greater alignment of the programs content would be beneficial, to avoid potential nutritional disparities between the students of different schools and areas and to ensure that students are given an adequate meal, that is nutritious and sustainable, and meets their social, cultural and religious needs. Guidance can be found in the Guidelines for Food and Meals in Schools. While SFPs should ideally bee free of charge, this remains an impossibility for most school districts. Therefore, the organization of meals must consider the needs of low-income families and avoid stigmatization of students. Schools are not necessarily conscious about the role of SFPs in a societal perspective, such as its relevance for health promotion, social inequity or as part of a sustainable food systems. Because SFPs may have synergistic effects on such issues, increased awareness and consideration could benefit the organization of SFPs. Since only ten schools were selected and investigated for this study, results cannot be generalized. However, schools in similar situations or schools that consider arranging SFPs in the future, might find the study useful. Future studies should consider the perspective of the recipients of the SFPs. It would be interesting to investigate whether students experience that their psycho-social environment indeed "*safeguard the social functions of the meal*" and whether the 20 minutes of eating time given, is indeed enough to do so. It would also be interesting to further investigate aspects related to how students and their families experience potential difficulties with paying for medium-high cost programs. Additionally, a thorough exploration of the student's preferences for school food could be useful, to see what adjustments can be made without compromising the nutritional quality of the food served. The study also suggests a need to investigate whether schools with SFPs have knowledge about the existence and content of the Guidelines for Food and Meals in Schools and how these guidelines are applied. Lastly, a randomized controlled trial investigating the short-term effect of different SFPs with a follow-up cohort investigating the long-term associations, would be remarkable.

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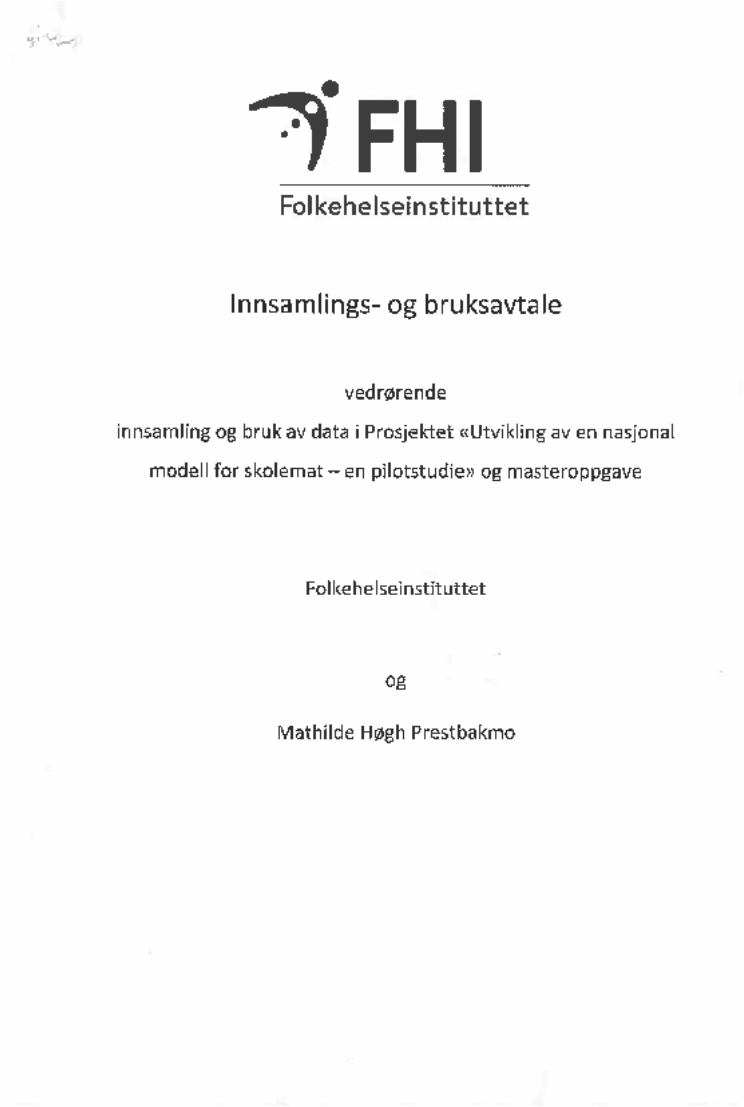
APPENDICES

Appendix 1: Research clearance from FHI



FHI
Folkehelseinstituttet

Innsamlings- og bruksavtale

vedrørende
innsamling og bruk av data i Prosjektet «Utvikling av en nasjonal modell for skolemat – en pilotstudie» og masteroppgave

Folkehelseinstituttet

og

Mathilde Høgh Prestbakmo

1. **Avtalens parter**

1. Folkehelseinstituttet, org. nr. 983 744 516, Lovisenberggata 8, 0456 Oslo.
2. Mathilde Høgh Prestbakmo, Oksenøyvelen 41 B, 1366 Lysaker

Hver for seg omtalt som «parten», og i fellesskap omtalt som «partene».

2. **Avtalens hensikt**

Avtalens hensikt er å regulere behandling av data samlet inn ved intervjuer og spørreundersøkelser utført av Prestbakmo i forbindelse med Prosjektet «Utvikling av en nasjonal modell for skolemat – en pilotstudie», heretter kalt Prosjektet.

3. **Definisjoner**

Personopplysning: enhver opplysning om en identifisert eller identifiserbar fysisk person. En identifiserbar fysisk person er en person som direkte eller indirekte kan identifiseres, særlig ved hjelp av en identifikator, f.eks. et navn, et identifikasjonsnummer, lokaliseringsopplysninger, en online-identifikator eller ett eller flere elementer som er spesifikke for nevnte fysiske persons fysiske, fysiologiske, genetiske, psykiske, økonomiske, kulturelle eller sosiale identitet.

Behandling av personopplysninger: enhver bruk av personopplysninger, enten automatisert eller ikke, f.eks. innsamling, registrering, organisering, strukturering, lagring, tilpasning eller endring, gjenfinning, oppslag, bruk, analyse, utlevering ved overføring, spredning eller alle andre former for tilgjengeliggjøring, sammenstilling eller samkjøring, begrensning, sletting eller tilintetgjøring.

Den registrerte: identifisert eller identifiserbar fysisk person som personopplysningen(e) kan knyttes til.

Resultater: All informasjon, fagkunnskap, resultater, oppfinnelser, programvare og annen immateriell eiendom som er identifisert eller først realisert eller fremsatt skriftlig i løpet av Prosjektet, med unntak av bakgrunn.

4. **Avtalens formål og rammer**

Prestbakmo skal i forbindelse med Prosjektet «Utvikling av en nasjonal modell for skolemat – en pilotstudie» utføre intervjuer og gjennomføre spørreundersøkelser rettet mot skoleledelsen ved 10 ulike skoler. Det foretas lydopptak av intervjuene, og benyttes spørreskjemaer. Spørsmålene er ikke av personlig karakter, men lydopptak av samtaler innebærer uavhengig av spørsmålenes karakter registrering og lagring av personopplysninger. Opptakene må derfor behandles i henhold til reglene som gjelder for behandling av personopplysninger. Prestbakmo skal benytte dataene til å utarbeide en masteroppgave og publisere Resultatet.

5. **Angivelse av behandlingsgrunnlag**

Behandlingsgrunnlaget for behandling av de aktuelle data er samtykke jf. GDPR artikkel 6 nr.1 bokstav a.

6. Generelle vilkår

Partene har et selvstendig ansvar for å påse at oppgavene utføres på en forsvarlig måte i overensstemmelse med den til enhver tid gjeldende lovgivning, offentlige påbud og anerkjente prinsipper for god vitenskapelig praksis.

Prestbakmo skal bearbeide data innhentet gjennom intervjuene og spørreskjemaene, benytte dette i masteroppgaven og dele dataene med FHI.

7. Behandling av forskningsmateriale

Partenes behandling av data skal være i samsvar med alle gjeldende lover, forskrifter, tillatelser og etiske krav.

Med behandling menes enhver bruk, som for eksempel innsamling, registrering, sammenstilling, lagring og utlevering eller en kombinasjon av slike bruksmåter.

Prestbakmo skal oppbevare data på en trygg og sikker måte og slette data etter at Masteroppgaven er ferdig.

Prestbakmo skal sikre at data ikke brukes urettmessig eller kommer uberettigede i hende.

Data kan ikke brukes på noen annen måte eller til noe annet formål enn det som uttrykkelig er bestemt i Avtalen.

8. Rettigheter

8.1. Eiendomsrett

Hver av partene beholder eiendomsrett til sin bakgrunnskunnskap.

8.2. Bruksrett

Partene har rett til å bruke Resultater skapt i Prosjektet så lenge Prosjektet varer.

FHI har rett til å beholde, bruke, mangfoldiggjøre og utlevere Resultater, helt eller delvis, til andre forskningsformål etter Prosjektets utløp.

9. Publisering

Prestbakmo har rett til å publisere Resultater generert fra data innhentet ved intervjuene og spørreskjemaene i sin masteroppgave. FHI har rett til å publisere Resultater i vitenskapelige artikler.

Ved publisering av Resultater skal det alltid fremkomme at det i denne avhandlingen benyttes opplysninger fra Prosjektet «Utvikling av en nasjonal skolemodell – pilotstudie» som forvaltes av Folkehelseinstituttet.

10. Konfidensialitet

Partene har taushetsplikt etter forvaltningsloven §§ 13-13f og relevant særlovgivning. Dette innebærer blant annet at Partene plikter å hindre at andre får adgang eller kjennskap til det vedkommende i forbindelse med Prosjektet får vite om noens personlige forhold.

Partene plikter også å bevare taushet om andre forhold Partene blir kjent med i forbindelse med Prosjektet, og som Partene forstår eller burde forstå at det er av betydning å bevare taushet om.

For helseopplysninger gjelder taushetsplikten etter helsepersonelloven § 21.

11. Avvik

Prestbakmo plikter å varsle FHI umiddelbart dersom innsamlet data er på avveie. Dette meldes til Elling Tufte Bere hos FHI.

12. Erstatningsansvar

Ingen av Partene er ansvarlig for indirekte skade, følgeskade eller lignende skade som en annen Part pådrar seg.

13. Force Majeure

Ingen av Partene skal anses for å ha brutt Avtalen dersom manglende eller forsinket oppfyllelse skyldes force majeure. I denne Avtalen betyr «force majeure» alle uforutsette hendelser som hindrer utførelse av Avtalen, og som skyldes handlinger, hendelser eller forhold som er utenfor den berørte Partens kontroll. Inkludert, men ikke begrenset til, krig, arbeidskonflikter, ulykker, brann, maskinelt sammenbrudd, handlinger av statlig myndighet, opptøyer eller sivile uroligheter

Partene har plikt til å begrense tap som kan oppstå som følge av en force majeure-hendelse.

14. Avtalens varighet

Avtalen trer i kraft ved signatur fra begge Parter. Avtalen utløper når masteroppgaven er innlevert, likevel senest 31/05/2020, med mindre den sies opp i henhold til punkt 15.

15. Oppsigelse

Avtalen kan sies opp skriftlig av begge parter med en gjensidig oppsigelsesfrist på 3 måneder.

16. Misligholdt

Hver av partene kan si opp avtalen med øyeblikkelig virkning med skriftlig varsel til den andre dersom den ene parten misligholder en bestemmelse i avtalen, og misligholdet ikke rettes opp innen 30 dager etter mottak av skriftlig varsel som spesifiserer misligholdet og krever at det rettes opp.

17. Meddelelser

Meddelelser etter denne avtalen skal sendes skriftlig til:

Hos FHI:	Masterstudenten:
Elling Tufte Bere	Mathilde Høgh Prestbakmo
Adresse: Postboks 222 Skøyen, 0213 Oslo	Øksenøyvelen 41 B, 1366 Lysaker
E-postadresse: ellingtufte.bere@fhi	s328024@oslomet.no

Appendix 2: Invitation to study participation/ consent sheet

FHI
Folkehelseinstituttet

Dato:

16.09.2019

FORESPØRSEL OM DELTAGELSE I FOLKEHELSEINSTITUTTETS FORSKNINGSPROSJEKT:
«UTVIKLING AV EN NASJONAL MODELL FOR SKOLEMAT - EN PILOTSTUDIE»

Vi ønsker vi å komme i kontakt med ungdomskoler som har gode erfaringer med servering og organisering av en skolemåltidsordning. Vi har valgt å kontakte deres skole fordi det virker som om erfaringene dere har gjort dere de siste årene kan være til nytte for å forstå hvordan man kan organisere skolemåltidet på en god måte. Vi ønsker å vite mer om hva som fungerer og hva som skal til for å tilby et måltidstilbud som passer med nåværende organisering av skolens hverdag.

Forskningsprosjektet utføres av Folkehelseinstituttet (FHI), *Senter for evaluering av folkehelsetiltak*, i samarbeid med OsloMet, *Institutt for Sykepleie og Helsefremmende arbeid, Avdeling Samfunnsernæring* og data som samles inn vil danne utgangspunktet for en masteroppgave i Samfunnsernæring ved OsloMet og inngå i FHI prosjektet «utvikling av en nasjonal modell for skolemat- en pilotstudie 2019-2020».

Hva innebærer deltagelse i prosjektet for skolen?
Hvis deres skole velger å delta i prosjektet, innebærer det at vi vil gjennomføre et intervju med den som har hovedansvaret for skolemåltidsordningen ved deres skole. Vi vil blant annet spørre dere til råds om hva dere oppfatter som viktige forutsetninger for å kunne lykkes med en skolemåltidsordning, hva slags utfordringer dere har hatt underveis, samt deres tanker om ringvirkningene av skolemåltidsordningen. Intervjuene kan gjennomføres på Skype eller telefon, eller ved besøk om ønskelig. Dato og tidspunkt bestemmer dere selv, men intervjuene bør finne sted i løpet av November eller senest i begynnelsen av Desember . Tidsrammen er på ca. 45 minutter. Intervjuene vil foregå med båndopptager og samtykkeerklæring må signeres og returneres per mail eller SMS/MMS før deltagelse (se nederst i skrivet).

Frivillig deltakelse
Det er frivillig å delta i prosjektet. Hvis deres skole velger å delta, kan dere når som helst trekke samtykke tilbake uten å oppgi noen grunn. Alle innsamlede opplysninger vil da bli slettet. Det vil ikke ha noen negative konsekvenser for din skole hvis dere ikke vil delta eller senere velger å trekke dere.

Deres rettigheter
Prosjektet avsluttes 15.Mai 2020 og vi vil innen denne datoen anonymisere datamaterialet (det vil si

Folkehelseinstituttet
Postboks 222 Skøyen
0213 OSLO

Telefon 21 07 70 00
Besøksadresse:

folkehelseinstituttet@fhi.no
www.fhi.no
NO 983 744 516

fjerne opplysninger som kan identifisere person eller skole). Vi vil bare bruke opplysningene vi innhenter til formålene vi har fortalt om i dette skrivet. I prosjektperioden vil masterstudent Mathilde Høgh Prestbakmo og prosjektansvarlig Elling Bere ved Folkehelseinstituttet ha tilgang til innsamlet data. Disse opplysningene blir erstattet med en kode som lagres på egen navneliste adskilt fra øvrige data. Det er kun masterstudent og prosjektleder fra Folkehelseinstituttet som vil ha tilgang til datamateriale. Lydfiler skal slettes etter transkribering.

Behandling av personopplysninger
Dersom personopplysninger skulle komme frem i forbindelse med prosjektet, vil disse anonymiseres. Vi behandler personopplysninger i samsvar med personvernregelverket.

Hvor kan jeg finne ut mer?

Hvis du har spørsmål til studien, eller ønsker å benytte deg av dine rettigheter, ta kontakt med:

- Masterstudent Mathilde Høgh Prestbakmo, s328024@oslomet.no , 994 27 979
- Folkehelseinstituttet ved prosjektleder Elling Tufte Bere, EllingTufte.Bere@fhi.no, *980 17 067*
- Personvernombud Folkehelseinstituttet Erlend Bakken Erlend.Bakken@fhi.no, 481 02 201
- OsloMet ved Laura Terragni, Førsteamanuensis, *lterragn@oslomet.no*

Med vennlig hilsen

Prosjektansvarlig Elling Tufte Bere Seniorforsker Folkehelseinstituttet	Masterstudent Mathilde Høgh Prestbakmo Avdeling Samfunnsernæring OsloMet

Samtykkeerklæring

Signeres av den som stiller til intervju. Signert kopi scannes og returneres. Alternativt kan du ta bilde av signert samtykkeerklæring og sende bildet på SMS til 994 27 979 eller mail: s328024@oslomet.no.

Jeg har mottatt og forstått informasjon om prosjektet «Utvikling av en nasjonal modell for skolemat - en pilotstudie» og har fått anledning til å stille spørsmål. Jeg samtykker til:

☐ å delta i *intervju*

Jeg samtykker til at mine opplysninger behandles frem til prosjektet er avsluttet, ca. *15.Mai 2020*

_____

(Signert av prosjektdeltaker, dato)

Appendix 3: Interview guide translated version

Semi structured interview guide

Thank you so much for taking this time. We will be spending approximately 45 minutes +/- and the interview will be recorded.
Do you understand the purpose of this interview?
The interview will be analysed as part of my master thesis about lower secondary high schools 'experiences with school meal arrangements. This is a part of a larger study, led by the Public Health Institute, which seeks to form a knowledge base concerning school meal arrangements in Secondary High schools.
Consent form signed, and information sheet understood?
The interview is anonymous. Things that are said that ties a certain person to a certain school will be anonymised.
I will not ask for personal information. Ready (sound on)?

1.Mapping

How long have you been offering this school meal arrangement?
How often do you offer this school meal arrangement?
How many students are there in this school?
Approximately how many of the students make use of/ subscribe to the school meal arrangement?
Do you know how many students does not use/subscribe to the school meal arrangement
(how do you gather this information? In what way are these students followed up?)
How much are students charged and how are payments organized?
How did you manage to serve a school meal free of charge/
how did you manage to offer a reasonably priced meal?
How much is the school meal arrangement per student? *(commodities, work resources.)*
How much is subsidized and by whom?
Who oversees serving, organizing and running school meals and who is otherwise involved?
What kind of school meal arrangement do you offer?
Does anybody bring a packed lunch? What kind of offers are there in the local community?
How are the social aspects when it comes to the eating situation?

2. Nutrition

What kind of thoughts have you had about nutrition when it comes to school meal arrangements?
(Inclusion of fish, whole-grains, fruits & veggies, planning, buying, marketing of healthier options, overweight and NCDs)
Have you any experience with adjusting the school meal offer according to the student's specific needs or preferences?
(Allergies, religion/culture, vegan/vegetarian)

3. Sustainability and climate

Do you have any thoughts about sustainability and climate when it comes to school meal arrangements?
Menu content/selection of produce/producer/supplier.
Ecology, food waste, disposable packaging, dishwashing, waste, plant-based?
In what way/can you think of an example that illustrates how your school meal arrangement influences sustainability and climate?

3. Psycho-social environment, learning and social cohesion

How do you experience that the school meal arrangement influences the psycho-social environment of the students?
Bullying, inclusion, well-being, good work environments.
Learning situations, concentration, relations between students and between students and adults.
In what way does the school meal arrangement lead to learning for the students?
Learning objectives, competences.
Do you experience that the school meal arrangement has any impact on social cohesion?
Parental income/education, school as counterweight, social differences.

4.Sucessfactors, challenges and experiences

Is there anything about this arrangement that you have experienced as challenging or demanding?
Can you say something about what you experience
as the most important reasons for your success in organizing a school meal?
Can you give some advice to other schools who would like to introduce a similar model?

Appendix 4: Interview guide original

Tusen takk for at du tar deg tid. Vi kommer til å bruke ca. 45 minutter +/-
- Intervjuet vil foregå med lydopptager- OK?
- Er du innforstått med formålet av intervjuet? *Intervjuet vil analyseres som en del av min masteroppgave om ungdomsskolers erfaringer med deres skolemåltidsordning. Oppgaven vil inngå i et større forskningsprosjekt, under ledelse av Folkehelseinstituttet der hensikten er å danne et kunnskapsgrunnlag om skolemåltidsordninger i ungdomsskolen*
- Samtykkeerklæring signert og informasjonsskriv forstått? Intervjuet er anonymt – ting som blir sagt som knytter person til skolen kan bli anonymisert. Jeg vil ikke spørre etter sensitive personopplysninger. KLAR? (lydopptaker aktiveres)

Kartlegging	Ernæring	Bærekraft og miljø	Psykososialt miljø, læring og sosial utjevning	Suksessfaktorer, utfordringer og erfaringer
Hvor lenge har dere tilbudt denne skolemåltidsordningen? Hvor ofte tilbyr dere skolemåltidsordningen Hvor mange elever er det på skolen? Omtrent hvor mange av elevene benytter seg av/ abonnerer på skolemåltidsordningen? Vet dere hvor mange elever som eventuelt står utenfor ordningen? (hvordan skaffer dere denne informasjonen? På hvilken måte blir elevene som faller utenfor oppfulgt?) Hvor mye må elevene betale og hvordan organiseres betalingen? Hvordan har dere fått til gratis måltid/ hvordan har dere fått til rimelig pris måltid? Hvor mye koster skolemåltidsordningen dere per elev? (lønner, arbeidstimer ...) Hvor mye subsidieres og av hvem? Hvem har hovedansvaret for serverbar, oppvask og drift av skolemåltidet og hvem er ellers involvert? Hva slags skolematordning tilbyr dere? Tar noen med matpakke? Hva slags tilbud finnes det i nærmiljøet? Hvordan foregår det sosiale rundt spisesituasjonen?	**Har dere gjort dere noen tanker om ernæring i forbindelse med skolemåltidsordningen?** Inkludering av fisk, grovt, frukt & grønt Planlegging, innkjøp, markedsføring av sunnere alternativer, overvekt & livsstilsykdommer **Har dere noe erfaring med tilpasning av tilbudet etter elevenes behov eller preferanser?** Allergi, religion, vegansk/vegetarisk	**Har dere gjort dere noen tanker om miljø og bærekraft i forbindelse med skolemåltidsordningen** Menyinnhold/utvalg råvarer/sesong valg av produsent/leverandør økologi matsvinn engangsemballasje eller oppvask av servise for hver gang? Avfall? plantebasert? **På hvilken måte/ Kan du komme på et eksempel som illustrerer betydningen skolemåltidet har å si for bærekraft og miljø hos dere?**	**Hvordan erfarer du at skolemåltidsordningen påvirker elevenes psyko-sosiale miljø?** Mobbing, inkludering, trivsel arbeidsro, læringssituasjon, konsentrasjon, relasjoner mellom elevene, mellom elever og voksne **På hvilken måte bidrar skolemåltidsordningen til læringsutbytte for elevene?** Læringsmål, kompetanse **Opplever du at skolemåltidsordningen har betydning for utjevning av forskjeller mellom elevene?** foreldrenes inntekt/utdanning, skolen som motvekt, sosial utjevning	**Er det noe ved ordningen du har opplevd som spesielt utfordrende eller strevsomt?** **Kan du si noe om hva du oppfatter som de viktigste årsakene til at dere har lykkes med organisering av skolemåltidsordningen** **Kan du gi noen råd til andre skoler som ønsker å innføre en lignende ordning?**

Appendix 5: Guide for authors

GUIDE FOR AUTHORS

INTRODUCTION

Types of article

Full length papers
Full length papers including empirical reports and theoretical reviews are published. Reviews may be of any length consistent with succinct presentation, subdivided as appropriate to the subject matter.

Special Sections or Issues
Proposals for a themed collection, symposium or commentary should be sent to the Contact Editor and appetite@elsevier.com, listing provisional authors, titles and lengths of papers and suggesting Executive, Advisory or Guest Editors with a timetable for recorded peer-reviewing, revision and transmittal in the format required for publication. The reviews or reports in a special section or issue will be subject to the normal process of peer-review.

Commentary sections
Commentary sections may include a keynote paper, brief comments and reply.

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Conference Abstracts in guest-edited sets from international multidisciplinary conferences are sometimes published. All the abstracts in a set must be limited to a total word count of no more than 300 (4 per page) and formatted as a single paragraph with no subheadings. The abstract starts with the title (mostly in lower case), name(s) of author(s) (upper case) and one postal address, complete with postcode and country, followed on the same line by one stand-alone e-mail address. Any acknowledgements or references are included within the paragraph: between the cited author(s) and year can be placed the abbreviated title of the journal, volume and pages. Tables, Figures and footnotes are not allowed. A published abstract should not promise findings or discussion, nor refer to presentation at the meeting. The title of the meeting as the main title, the location and dates as a sub-title must be provided to form the heading of the set of abstracts. Any session titles, special lectures or other material must fit into the format and word count for the abstracts in that set.

Please note that questionnaires and interview protocols (in Figure form) are not published.

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Authors should submit their articles electronically at: http://www.evise.com/evise/jrnl/APPETITE

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Ensure that the following items are present:

One author has been designated as the corresponding author with contact details:
- E-mail address
- Full postal address

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Manuscript:
- Include keywords
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- All tables (including titles, description, footnotes)
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Graphical Abstracts / Highlights files (where applicable)
Supplemental files (where applicable)

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Appendix 6: The Research article

THE RESEARCH PAPER

Experiences with organizing school food programs in Norwegian Lower Secondary Schools- a qualitative study

Mathilde Høgh Prestbakmo

Keywords:
School food programs
Adolescents

Abbreviations:
School food programs (SFPs)
Computer Assisted Qualitative Data Analysis Software (CAQDAS)
Thematic Analysis (TA)

Abstract:
Objective: To explore Norwegian lower secondary school staff experiences with organizational, nutritional and sustainability related aspects of school food programs (SFPs).
Design: The study has a qualitative research design.
Methods: Semi-structured interviews were conducted with principals (n=4), teachers (n=3), canteen leaders (n=4) and other staff (n=4) in charge of SFPs, in 10 Norwegian, lower secondary schools. Thematic analysis (TA) was applied to structure the informant's experiences, such as challenges and dilemmas experienced, perceptions of benefits of programs and thoughts about wider implications of programs. A set of strategies applied to meet organizational, nutritional and sustainability challenges where also identified.
Results: There is great variation in the organization and content of the various SFPs. Some mutual key elements to successfully organizing SFPs are emphasized by informants: I) having enough resources, II) having an adequate physical environment, III) traits and attitudes of the people involved in school food programs, IV) adaption to local context V) student involvement and VI) student acceptance. Common perceived benefits of programs were benefits to the student's psychosocial learning environment, as well as the potential to reduce social inequity. Wider impacts on long-term health and sustainability were less in focus. Further analysis suggests that the informants experience difficulties with balancing the organizational limitations of a tight budget with the wish to offer a healthy meal and the necessity to accommodate student preferences.
Implications for further research: Future studies should aim to gain a better understanding of

how SFPs are experienced by the recipients of the programs. In addition, lessons may be learnt from cases where local SFPs have been withdrawn, in order to better understand challenges and limitations that may occur.

Introduction

One of the main aims of public health nutrition is to create health promoting food environments that enables individuals to make healthy choices (Wiseman, 2017). By increasing the availability of healthy food in arenas where children and adolescents are gathered, the development of noncommunicable diseases and overweight might be prevented (United Nations Standing Committee on Nutrition, 2017; WHO GCM/NCD Working Group, 2018). School lunches are served across the world, with form and content varying from country to country (Development Initiatives, 2017; W.F.P, 2013). School lunches may have synergistic effects, as they have the potential to promote sustainable food chains, while contributing to the health and nutrition of its recipients in a critical phase of their development (Swinburn et al., 2019; United Nations Standing Committee on Nutrition, 2017). If provided free of charge, they may also decrease social inequity (Arntzen et al., 2018). In Norway, there is no legislations for mandatory school food provision (Helland, 2019; Waling et al., 2016). While the serving of food in Norwegian schools has to some extent been in place since the 1890s, school meals have always been a voluntary municipal responsibility (Andresen & Elvbakken, 2007; Kunnskapsdepartementet, 2006). A wish to nourish the nations next generation to prime health and strength, led to the implementation of various school food programs in the first half of the century. The program later known as the "Oslo breakfast" was implemented as a universal measure from 1935 (Andresen & Elvbakken, 2007). This meal consisted of milk, a portion of fruit or vegetables, cod liver oil, a wholegrain cracker or slice of bread, as well as some margarine and whey cheese. An even simpler edition, "The Sigdal breakfast" was a similar arrangement, supplementing the nourishment of Norwegian school children around the middle of the century. This bread-based meal composition has stood its ground ever since and the tradition of bringing packed lunches (paper-wrapped sandwiches) prepared either by the parents or the students themselves, has become the norm. However, the percentage of students bringing a packed lunch from home drops dramatically with their ascending age, and a sharp decrease has been seen among 8th-10th graders specifically (Staib, 2013). As a supplement to the packed lunch, many secondary and lower secondary schools offer food and drinks for sale through their school canteens or organize local SFPs (Haugset & Nossum, 2012). In 2015, a set of national, but voluntary Guidelines

for Food and Meals in a Schools were published by the Directorate of Health (Helsedirektoratet, 2015). A diet that is in accordance with the official national guidelines are recommended, which restricts the intake of red meat, promotes the intake of plant-based foods such as vegetables, fruits, pulses, nuts and whole grains, as well as sustainably produced fish from farms and wild stocks (Helsedirektoratet, 2015). The health promoting potential of schools are emphasized in the guidelines. As is an encouragement to stimulate environmental sustainability through selective purchasing, and by limiting food waste. Debates concerning the potential implementation of a universal, mandatory SFP tend to re-occur around the time of elections. In 2005, a workgroup was put together with the aim to assess and review five, different SFP models with the potential to replace todays packed lunch (Kunnskapsdepartementet, 2006). The report stated that, in order to accommodate goals of reducing social inequity, any potentially implemented model should be free of charge, because structural measures such as free school lunches prevents the exclusion of children from lower socio-economic groups. A model that included free milk and a fruit or a vegetable, were recommended implemented in primary schools (1st-10th grade). The work group further highlighted that a widening of this model should be considered, giving the lower secondary students (8th to 10th graders), if not all primary school students, access to a complete bread-based meal, free of charge. Although their recommendations were mainly disregarded, students in lower secondary schools did receive free school fruit for a period of seven years, until this arrangement was revoked in 2014, after a change of government (Helland, 2019). To this date, very few schools provide free school meals, but in 2019, the city council in Oslo announced that they will implement free, plant based school meals for all the 28 secondary high schools of the region from 2020-2021, which comprises 16 500 students (Oslo Kommune).

Aims

The provision of food to students in the Norwegian, public school system is not mandatory, and the form and content of the locally organized school food program (SFP) vary from school to school (Kainulainen, Benn, Fjellström, & Palojoki, 2012; Staib, 2013; Waling et al., 2016). As debates concerning a potential implementation reoccur regularly on the political agenda, knowing more about the experiences of the people involved in organizing school meal programs could provide valuable information for policy makers. The aim of this study has therefore been to explore lower secondary school staff experiences with organizational, nutritional and sustainability related aspects of their SFPs.

Methods

The study adopted a basic, qualitative research design (Merriam, 2009). This approach is suited for research projects where the constructionist characteristics and epistemological paradigm of a qualitative study is underlined but no specific framework is applied (Merriam, 2009). The purpose of qualitative studies in nutrition research is to gain new perspectives and insights on relevant topics we have limited knowledge about (Bisogni, Jastran, Seligson, & Thompson, 2012). Results in this study are based on interviews with key informants with first-hand experience of SFP organization and a semi-structured interview guide was applied as the main data collection instrument. The interview setting was chosen for the data collection because it can be a way of gaining access to the subjective experiences of individuals (Kvale & Brinkmann, 2015). Interviews lasted about one hour and every informant was interviewed once.

Study design and sample

Informants were selected purposively. In such strategic selection processes, informants that might have particular experiences or knowledges concerning the research topic, are recruited (Thagaard, 2013). The main inclusion criteria for participants was positive experiences with organizing a school food program. Potential candidates were identified by browsing school websites, municipality websites and other relevant sources describing different existing SFPs in Norwegian lower secondary schools. Ten, diverse schools that fitted the inclusion criteria were then recruited from six, different regions across the country, with a total of fourteen informants (See Table 1). Student-administrated programs, chef-administrated programs and other programs that differed from these in organization, were selected in order to ensure maximum diversity. Further, schools that explicitly stated in their websites that they had either a focus on nutritional aspects or sustainability aspects, or that offered free school meals, were prioritized, due to their relevance for the aim of the study. Another important aspect was whether the school had any reputation for successful organization of SFPs, for example by positive reviews in local newspapers or listing as an example of good practice in the web resource National Centre for Food, Health and Physical Activity (Nasjonalt senter for mat helse og fysisk aktivitet, 2019).

Data collection

The interview guide was formulated by the researcher and a set of research questions formed the basis. The guide was pretested, rephrased and modified several times. The first half of the guide was quite structured, with the purpose of gaining an overview of the school meal

situation, while the other half was oriented around open questions and flexibility in order and form. Probes were used to enlighten the different topics and to keep the flow of the conversation going. The semi-structured approach was chosen because of its flexible nature, which opens up for new topics to occur naturally (Malterud, 2017). While most of the interviews were performed on the school premises, some interviews were conducted over Skype or by telephone conversation. This was because some of the informants were located across the country and because the convenience of doing online-interviews made sense both from an economic and an environmental perspective. To make the material ready for analysis, the interviews were transcribed from verbal data to written text. This process is often referred to as verbatim transcription (Poland, 1995). An exact, word-for-word transcription is not necessarily the best method for capturing a conversation, especially when the purpose of the project is not one of language analysis but rather an interest for the content and meaning of what is being said (Kvale & Brinkmann, 2015). Recognising that the transcription process is an interpretative activity, a slightly modified verbatim mode was applied, which enables quotes to be presented in a meaningful way (Malterud, 2017). There is a chance that some elements can get lost, or even change its form, on the way, however, for example if the researcher misinterprets what is being said. It is therefore of uttermost importance that the researcher carefully demonstrates that the data analysis has been systematic and consistent enough to enable the reader to judge the thrust wordiness of the performance (Nowell, Norris, White, & Moules, 2017).

Analysis of the interviews

Data was analysed with NVivo 12, a computer assisted qualitative data analysis software (CAQDAS) which applies thematic analysis (TA) to organize and manage qualitative data (Mills, Durepos, & Wiebe, 2010). TA is an approach used across methods and paradigms in several academic fields (Mills et al., 2010). The purpose of this technique is to summarize key content in a large set of qualitative data by organizing the material in themes before analysis. Themes where identified by coding units of text from the interview transcripts. As a starting point, the research questions in the interview guide were applied deductively to form a first list of codes, such as aspects related to nutrition, sustainability and social inequity. Themes also emerged inductively from the data, with topics as “need for support”, “alternatives to school meal programs” and “solution-orientation” as examples. Main themes and sub-themes were later visualized in maps and charts in order to get an overview of the content, before looking into each theme more carefully. In the final analysis phase, quotes from the data

material was chosen to illustrate and visualize the results of the analysis in a meaningful way (Nowell et al., 2017).

Findings and results

Tables

Table 1: Case and participant characteristics

Table 1 Case and participant characteristics

Attribute		Number	Percentage
School	Urban	6	60 %
	Rural	4	40 %
County	Oslo	2	20 %
	Viken	4	40 %
	Vestland	1	10 %
	Nordland	1	10 %
	Troms & Finnmark	1	10 %
	Trøndelag	1	10 %
Meal	Breakfast	1	10 %
	Lunch	7	70 %
	Both	2	20 %
Model	Hot lunch	7	70 %
	Cold lunch	3	30 %
Financing	Free of charge	3	30 %
	Charge	6	60 %
School size	<100	1	10 %
	101-299	3	30 %
	300-499	5	50 %
	>500	1	10 %
Participant	Men	6	60 %
sex	Women	9	90 %
Occupation	Principal	4	40 %
	Chef/Teacher	3	30 %
	Other	3	30 %
	Chef/Canteen leader	1	10 %

* all teachers had background as chefs or similar

Table 2: Cases

Table 2.	School 1	School 2	School 3	School 4	School 5	School 6	School 7	School 8	School 9	School 10
Charge for students	Free of charge	Charge (Low cost)	Charge	Free of charge	Charge	Charge	Free of charge	Charge	Free of charge	Charge
Meal	Breakfast	Lunch	Lunch	Lunch	Breakfast/Lunch	Lunch	Lunch	Lunch	Lunch	Breakfast + Lunch
Food offered	Mostly cold, breadbased	Mostly cold, breadbased	Hot meal	Hot meal + salad bar	Hot meal	Hot meal	Mostly cold, Breadbased	Hot meal	Hot meal	Hot meal
Model	Self-serving of sandwiches etc. under supervision	Self-serving of sandwiches etc. under supervision	Mealk cooked by a chef in nearby industrial kitchen, students come over for lunch	Mealk cooked by chef in nearby industrial kitchen, brought to school and served	Mealk cooked in school by chef and assistent staff (in work training)	Mealk cooked in school by chef and assistent staff	Self-serving of sandwiches under supervision	Mealk cooked in school by chef+ student assistents (in work training)	Mealk cooked in school by volunteers from local church + student assistents	Mealk cooked in school by chef+ assistent staff (in work training)
Subsidies/ support	Support from the municipality	Receive no support	Support from the municipality	Support from municipality, county + local seafood firm	NAV* supports those who can't afford it	Local NGO supports those who can't afford it	Support from the municipality	No information	No support. Thursday-meals can be received at the local church.	Support from the municipality
Student involvement	Yes, Elective course	Yes, Elective course	No	No	No	No	No	Yes	Yes	No
Reason for implementing school meal model	Free breakfast as a measure against social inequity (district with child poverty, behavioural and academic challenges)	Creating an arena for students to master practical skills, and gain confidence, while offering a reasonable and simple school meal	Political will and engagement in the municipality to provide a home cooked meal in the local school	Free school meals seen as a measure against social inequity and for improving the learning environment	A measure against social inequity an effort to keep students on the premises instead of going to local stores/hang around the local neighbourhood	Local pressure to offer a hot meal, like the Swedish model	Municipality wanted to implement measures for adolescents/local politicians sees the benefits of offering free meals	The school wanted to offer the students a hot meal for a reasonable price	High share of low-income families. School sees free school meals as a social mission and a way to optimize learning.	Kitchen facilities were already provided, principal wanted to start up with school meals and a pilot project was initiated
Thoughts about student benefits of the school meal offered	Providing nutrition, developing social skills and table manners, better concentration and a more tranquil learning environment, relation building	Learning benefits, arena for adapted education, contribute to well-being of students in general	Relation building with staff and other students, developing social skills and table manners, taste and flavour exposition	Creating harmonic meal situations, developing social skills and table manners, relation building, creating equality between students (no comparison of packed lunches)	Positive effect on the learning environment, relation building between students and staff, an arena where students can gather and be social without having to leave the premises	Kitchen staff can connect with students on a different level than teachers can and thereby contribute in creating a positive environment	Social skills and manners, avoid unhealthy options from home/ local store, overview over student's food intake (eating disorders), overview of social challenges (bullying, being left out)	Benefits to learning outcome, student relations, sense of achievement for student assistents involved in organization	Providing nutrition, creating a tranquil learning environment, optimize concentration and learning	Builds social relations, contributes to well-being, prevents bullying, being exposed to new tastes, less screen-time during recess and better concentration

Thoughts about challenges and limitations of the school meal offered	Might not reach intended target group, can only offer breakfast (not lunch) due to lack of cooling capacity	If school meals are too attractive, it might compete with packed lunches and lead to increased differences among students, 2--hour elective course limits ability to cook meals, students regularly miss out of parts of other classes	Lack of time leads to classes being cut short regularly	Time restriction leads to classes being split up, was originally supposed to use a nutrition calculator-tool in meal-planning but due to lack of resources this has been put on hold	If the food is too healthy, the demand goes down, which in the long run can be a challenge for budgets	Cannot offer vegan options due to time constraints, serving vegetarian options containing beans and lentils is challenging due to students' preferences and lead to food waste	Budgets are tight, therefore difficult to offer fruit every day. Due to limited physical resources, meals must be prepared in the back of the school kitchen at the same time as the home economics class is held	Some students can't afford the meals, but doesn't bring a packed lunch, would like to use more biodegradable packaging, but lacks the resources, due to time constraints, there is no time for the chef to have lunch with colleagues which can be lonely in the long run	Depends on volunteer workers and student volunteers, because they receive no support, they have to finance meals by selling sugar sweetened products as well as waffles every day, low budgets limit the food offered	Was originally a pilot project so is dependent on further support from the municipality and the politicians elected next, work force are people in job training and can be unstable, handheld meals are time-efficient, but creates a lot of waste
Advice for other schools, based on own experiences	Keep it simple, doing something is better than doing nothing	Focus on teambuilding and give the involved students responsibilities, get to know your students and identify their strengths, trying and failing is important for learning, figure out what kind of arrangement suits your specific context and your student group	Look for flexibility and willingness to adapt when engaging external partners, focus on clear school leadership, think things through and make plans, do expectation clarifications with all stakeholders, stand your ground	Make necessary preparations, involve and train the students in creating a positive meal culture (create ownership to agreed rules), keep staff motivated and committed and create a team-culture, include all stakeholders in the process, focus on cooperation and make plans together	When engaging external partners through procurement, don't focus solely on price and quality, but also on desirable outcomes on the psychosocial learning environment, keep local contexts in mind, adequate kitchen facilities must be planned for from the beginning (schools could cater to other schools lacking facilities)	Employ trained chefs, make sure schools are equipped with adequate kitchen facilities (or cooperate with someone who does), be professional about kitchen economics, focus on food variation and students' preferences, be resolute	Build a culture of solution-orientation, cooperation and willingness to work for the benefits of offering school meals, have enough adults present and a person in charge with continuity and the right background for the job (preferably with chef-training or similar)start small and adapt as you go and involve students in decision-making,	Adaptiveness is key. Make sure the person in charge is a trained chef and that kitchen facilities are adequate, and provide enough room for eating, don't be afraid to use spices and exotic flavours. Serve home-cooked food (if using processed products, make them taste like home-made)	Consider the local context and possible wider impacts of school meals (providing a meal might be a way to solve social issues or other challenges)	Engage trained chefs in order to safeguard hygiene and food safety standards, and keep everything professional, build enthusiasm among school staff and keep local contexts in mind. There is not one model that fits all, leaders must have good communication-skills

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Table 3: Traits and attitudes of people involved in organizing school meals

Table 3 Traits and attitudes of people involved in organizing school meals				
Communication & Cooperation	**Adaptability & solution-orientation**	**Motivation & Sense of purpose**	**Stability & continuity**	**Knowledge & competence**
"you have to play ball with those involved. And that includes students, parents, it includes teachers and those who are to run the canteen, cook the food and serve the food, cleaners"- School 4	*« the company has been so adaptable and made arrangements if something hasn't been working, even though there are negative feedback at times, they have dealt with it in a very good way and have been very cooperative" – School 3*	*« There must be somebody who wants to push it forward... who's motivated and inspired - School 4*	*"That one and the same person has overview and continuity in the job" – School 7*	*« if you are to be successful, you need to have a professional chef" - School 6*
"Inform people, both parents and students and staff about how we might meet challenges as we go" –School 10	*« of course, you have to be agile about it, you have to be able to work together, to make it work…so, you have to accept that a trolley with cheese and sausages passes by the area where the cinnamon rolls are being made, to put it like that" –School 7*	*« there are people around the school who want to make it work. Many who wants to accomplish the same thing" – School 5*	*"many of the students have very marginal home environments, so that they meet safe adults at all stages is super important" – School 5*	*« if there is a foodborne disease or food related challenges, you have to be able to answer for the whole process"- School 10*
« it is important to have good teamwork and cooperation when you are to work together (..) team building is important for this to succeed "–School 2	*« Yeah, we have adapted to what the students like. We have tested five different menus" – School 8*	*"If you have enthusiasm, it is easier to face the challenges with an open heart and be solution-oriented (..) create enthusiasm, both in school, at home with parents and with students" –School 10*	*"It is about seeing the students and also so that the student will feel safe, because of course it is a situation where you as a fresh 8th grader are eating at the same time as the scary 10th graders" - School 7*	*« it is expensive to buy food, now we are like a professional industrial kitchen and we have the right prices at all times, and I spend a lot of time on that… and that is why it works" – School 6*

Figures

Figure 1: Typology

Figure 1

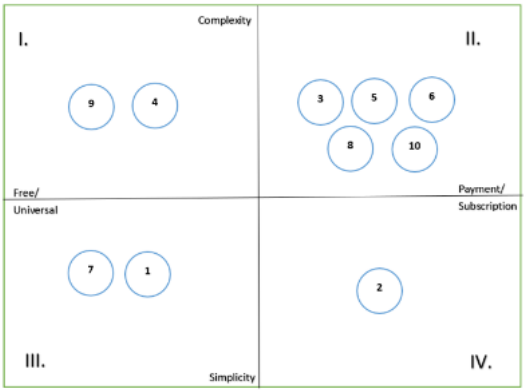

Figure 1 : Typology of school meal models investigated in study. The numbers in the circles relate to the different cases, Nr.1 to Case 1 and so on. The circles are randomly placed within the squares but indicate to which degree a school meal organization has high levels of complexity/high levels of simplicity and whether the offer is free of charge/ universal or requires payment/subscription.

An overview of the school food programs

The findings of this study are based on the researcher's interpretation of the information shared by informants in an interview setting. The focus of the interviews was the informant's experiences with organizing school food programs. Tough most of the schools served school lunches only, some also offered daily breakfasts, while one school served breakfast only (see Table 1). The different SFPs varied in degree of complexity, from simplistic, bread-based programs where students were expected to help themselves to slices of bread and cold cuts (much like the traditional packed lunch) to more complex programs where a variation of hot or cold meals, prepared in an industrial kitchen, were served in a cafeteria setting (see Figure 1). Programs also varied between free of charge-programs to high cost programs. Most of the programs that had high degree of complexity, were also medium-high cost models (see Figure 1). Though some of the schools were able to offer meals free of charge (n=4), most providers took a charge for its services (n=6). Most schools received financial support from their municipality or their county, while one school received support from a non-governmental organization. One school that offered free school meals, received no financial support at all, but had volunteers from a local church. There was high variation in between the programs when it came to organizational aspect such as student involvement. Informants generally emphasize the importance of involving students in the organization,

and in 4 out of 10 schools, students could participate directly in the organization of the programs, either through elective courses or by voluntary, but random participation. A variety of reasons for implementing SFPs were emphasized in the interviews (see Table 2). Providing students with a daily breakfast or lunch (and thereby avoid students skipping meals) was emphasized as a reason for implementing SFPs by schools with free school meals. Preventing students from choosing less healthy alternatives from other sources, such as the local store, however, was in focus in all ten schools, but especially among schools that arranged SFPs for a charge. In addition, several informants mention social inequity as one of their main reasons for implementing meals and refer to the socio-economic status of their students and their families. In conversations with informants in this study, it was proposed that high quality school lunches may increase social differences among students due to high prices:

> *"if we, sort of, offer different kinds of large baguettes and everything looks really tempting and is really "stirred up", we fear that it might be troubling for all those who can't afford it"*
>
> — School 2.

Other motivations such as optimized learning and concentration and benefits to the student's psychosocial learning environment were strongly emphasized, especially the importance of providing a safe, tranquil eating environment with adult supervision for the students. Further, informants highlight the social aspects of the school meal arena and expect students to practice their social skills, participate in relation building and develop table manners:

> *"and it has a much bigger function than just getting enough nutrients into the body; they eat together, sit down at a table and eat together... you don't bully someone you've just eaten with"* -School 10.

Which challenges and limitations the different schools experience varies with the different contexts in which the SFPs were organized but balancing the organizational limitations of a limited budget with the intention of offering a nutritious meal, while accommodating student preferences, was a common dilemma (See Table 1). When considering the future of school meals, some informants indicate that the current economic situation may have consequences for further operations in the future:

> *"in the long term, we don't have a solid finance foundation, so either prices have to go up or we need a type of support, because the school is not able to put in more resources"* – School 5

Lastly, it should also be noted that the voluntary Guidelines for Food and Meals in a Schools, published by the Health Directorate in 2015 and available to schools online, were not mentioned by any of the informants during interviews. The informants were not specifically asked about whether they knew about the guidelines, or whether these were in use. The official governmental nutritional recommendations, however, were mentioned by several of the informants, but was generally given little attention in conversations.

Essentials of the school food program organization

By analysing the content of the interviews with the informants, some mutual key-elements to organizing SFPs successfully has come to light. First, there must be *enough resources*. This means having enough money to uphold budgets and buy commodities and it means having access to enough helping hands in the form of volunteering students and staff. Secondly, an *adequate physical environment* should be provided. This means having access to appropriate kitchen facilities, an adequate eating environment, functioning dishwashers and so on. Thirdly, the informants seem to agree on the importance of *traits and attitudes of the people involved in school food programs*. Ideally, they should be a stable, predictable workforce with the right competence, knowledge and mindset (See table 3). Lastly, there seem to be two aspects concerning the SFPs that are especially important, such as *adaption to local context*

and *student involvement and acceptance*. In the following section, the various components will be explained in more detail and illustrated with case examples.

Enough resources

Being able to uphold a healthy budget is one of the elements that the informants highlight as essential to organizing SFPs successfully. Another is having enough staff. However, the program doesn't necessarily have to be a big expense for the schools, seeing as most of them run models that are economically self-sustained and additional staff can be provided in the form of volunteering students. Still, most schools are dependent on some sort of additional funding, and having tight budgets will, in many cases, limit the food offer:

> *« The food is produced according to what we can afford, what sort of money we have (..) we have done some experiments with cooking different kinds of food and we see then, that it breaks budget at once..."* - School 9

To stretch budgets, the schools applies different strategies. One frequently applied strategy is hiring adolescents in work training, involving volunteering students or engaging local volunteers in operations to keep the cost of the workforce down:

> *"we have engaged students from the elective course "Volunteer effort", 2-3 students every morning who helps set it up and clean afterwards"* – School 1

Another strategy is keeping commodity costs down by carefully planning and limiting purchases and by limiting food waste. One of the chefs even bought left-over commodities cheaply from external partners to keep costs down:

> *"either we get the food for free or we pay for shipping and an administration fee and a small part of the sum, so that enables us to keep the commodity cost very low"* – School 5.

Lastly, some of the schools have chosen to sell popular food items such as waffles and sweetened dairy products and beverages in addition to their school meals, in order to help finance their SFPs.

Adequate physical environments

In practice, having an adequate physical environment means having enough room for the students to sit down for a meal (with chairs and tables provided), having access to modern kitchen facilities (with enough room for the kitchen staff to work) or alternatively, getting food delivered from someone with access to such facilities. One school solved the problem with lack of seating by choosing a strategy where meals were given as "hand-held" wraps or "on-the-go"-bowls:

« it is disposable bowls and spoons that you may bring with you and eat anywhere" -School 10.

Having an adequate physical environment also means having functional fridges and freezers, dishwashers, utensils and kitchen appliances. Keeping a long-time perspective helped this school achieve their goals:

> *"we were able to get several 100.000 kr... because we had this canteen project... but additionally, we have used the school budget over several years, evenly distributed, since I began here, 8 or 9 years ago. For each year we have bought new equipment, new furniture and, so today we have a nearly perfect commercial kitchen with stoves and equipment and all we need"* -School 8.

A motivated, competent workforce

From school leaders to assistant workers, the SFPs depend on the people involved in its organization. The informants emphasized certain qualities to be ideal, such as the ability to communicate and cooperate well, being adaptable and being solution oriented (See table 3). In addition, they should be motivated for the job and experience a sense of purpose, show stability and continuity and possess a certain amount of knowledge and competence.

Adaption to local context

The importance of seeing the context in which a school is run was an aspect that was strongly emphasized by the informants. Adapting the organization of SFPs to the student's needs and considering the school's predispositions and economic framework, is how informants describe doing this. Adapting to local context might also mean finding creative solutions to local challenges, such as problems with logistics or funding. Some schools get their food delivered from local, industrial kitchens. The idea that well-equipped schools can solve local demand by catering to lesser equipped schools is a strategy that already has been applied by one school, and that some of the others mention as a possible future strategy:

> *"If we look at the funds available in the districts and what opportunities that might appear such as, food waste, maybe it might be able to make it [*the school food program*] predictable and financially stable... that must be the vision..."* - School 5

Overall, the main message seems to be that programs need to be adjusted locally:

> *"We are so different from Finnmark county to Akershus county, there are so many nooks and crannies and constellations and different schools and facilities that it is difficult to find one, common solution for everybody"* - School 10

Student involvement and acceptance

While most informants have experienced that involving students in organizing meals might benefit both school and students, involving the students doesn't have to mean letting them in on the cooking. It might be just as important to involve them in the assessment of meals or in creating the canteen rules:

> *« they have to be let in on it because then it is a lot easier to make them accept that these rules shall be followed, when they themselves have participated in creating them, instead of having them forced upon them"* - School 4

Student involvement may even be used to solve logistical problems. While some schools claim that having a salad bar is impossible due to the spillage, one school has made it work by involving students in the cleaning routine:

> *"We have salad bars on special days (..) those salad bars are placed out in the canteen so that people can walk around them- and then you get this circulation- and then I have three students that goes around with a cloth and a big sour cream-bucket and wipes off the bar, and the fourth student mops the floor. There you have that problem solved"* - School 8

Another essential of SFP organization is that the food served must be accepted by the students. The offer should match the student's meal preferences to such a degree that they aren't tempted to seek out other options or skip unappealing meals. For schools that sell school lunches, it is essential that students use the offer, or else it might bring financial problems. Finally, SFPs must be acceptable in terms of culture, religion and dietary needs. Halal options must be available where this is relevant, and allergies must be considered. Some strategies that are applied to increase acceptance among students are; keeping prices down, creating a sociable atmosphere with organized activities such as Bingo or Kahoot, and offering popular food items such as pizza and waffles:

> *« We have Friday waffles (...) Then there is a line all the way out to the hallway"* – School 2

Nutrition strategies

When asked about nutrition, informants emphasize limiting the use of processed foods, using whole-grains and vegetables and overall offering a varied, appealing, but not too nutritiously focused menu. Offering pizza, hamburgers and waffles from time to time (but rarely daily) seem to be acceptable practice among most of the informants:

> *"it must be acceptable to give them a hamburger on a Friday, or a pizza, or a lasagne or something. If not, it'll never work out"* – School 6

Despite an overall relaxed view on the nutritional quality of their programs, the informants agree that the food served shouldn't be too unhealthy. They apply similar strategies to make sure of this (see Table 2).

Home-cooked meals and unprocessed products are often emphasized to be of importance for the nutritional quality of the food:

> *"we use a lot of vegetables, a lot of unprocessed products, we do…it shall be healthy, what they consume»*– School 9

One of the most frequent strategies is limiting the offer of what they perceive to be less healthy food (sugar-sweetened dairy products and drinks, desserts and fast-food are emphasized). This is achieved by restricting or banning these items from the canteen and by keeping the students away from the local stores.

> *"We have, sort of, to make up for that 10th grade trip down to the store – Friday waffles, that are made with whole-grains"* – School 2

Economic incentives can also be a way of influencing consuming patterns. One school describes a system of "red and green pricing" that were implemented in order to influence the student's food choice and bring the demand for sugar-sweetened goods down:

> *"Four years ago, we sold way too much sugar-sweetened goods, so we re-arranged the whole menu with yogurts and iced teas and such, and reduced the price on the light-products and the ones without sugar, so today we sell 80 % without sugar"* – School 7

While none of the informants use any dietary assessment tools, they do make a point out of increasing the nutritional value of their meals. Substituting white flour for whole wheat or adding oats to food offered in the school canteen is a common strategy, incorporating mashed vegetables in stews and sauces another:

> *"we try to make up recipes that hides it a bit more, so they won't see, for example mash lots of vegetables in a tomato sauce, they don't know that there are 10 kg of vegetables in that sauce"*- School 4

Sustainability strategies

> *"When you look at how much food is thrown away and that most people pay for this food to be wasted, it is strange that we don't use it in school food programs"* – School 5

Unlike the chef giving this statement, few informants link their SFPs to environmental sustainability. In fact, the effort of limiting the amount of food waste generated by their SFPs that is described by several of the informants, is done because of a need to balance budgets, rather than out of concern for the climate:

> *"we try to avoid having to much leftovers because that is in a way, money out the window... and when we try to keep a low-cost model like we do, that is a consideration that we take"* –School 2.

The sort of food served seems to have consequences for how much food waste is generated:

> *"two slices of ham and cheese on bread creates a different sort of food waste than chicken and salad"* – School 3.

When food waste issues are brought up specifically in conversations, the strategies described by the informants, are of similar character (see Table 4). While the simpler, self-serve bread-based models seem to be ideal in terms of limiting food waste, informants emphasize that serving the students food according to their preferences, which they will consume, is of importance. Menus are advertised in advance, so that students might bring a packed lunch as an alternative, portion sizes are limited, and purchases are carefully planned. Leftover food is often donated to after-school groups or similar. Most of the schools' report using tableware instead of disposable packaging, and if they do use disposables, recycling systems are in place. One school even reported using bio-degradable packaging, but is not too optimistic about future use:

> *"they're pretty expensive, well see how long we 'll keep it up"* – School 7.

Another school argue that the wisest thing they've done to reduce waste was making a switch from individual milk cartons

for each student (through the milk subscription program) to dispensers. Now every student can serve themselves with milk if they'd like to, whether they subscribe or not:

> *"it has saved us a lot of hazzle with those milk cartons, I really recommend it"* – School 2

While several of the schools serve weekly vegetarian meals, or offer vegetarian options, this is done due to religious considerations or because plant-based meals are cheaper. In fact, some of the informants argue that serving all vegetarian school meals would have led to the creation of additional food waste, because their students simply won't eat the food if it contains too much vegetables or plant-based proteins:

> *"they hate beans and lentils and such items that vegan people love; they won't it eat it. Simple as that"* – School 6

Another school *has* found a way to increase the consumption of plant-based proteins, and describe substituting most of the meat with medium-cooked pulses, which is integrated in the sauce, along with as little as 20 grams of meat per person:

> *"nobody cares as long as you don't tell them its beans….it's about how you communicate it. If they ask; "is it meat in it?", the answer is "yes"- because it IS meat in it "*- School 5

Discussion

Experiences with school food programs

The main objective of this study has been to explore the informant's experiences with organizing SFPs in a systematic way. Unlike most other northern countries, the provision of school food in Norway is not mandatory (Waling et al., 2016). Offers are decided locally and vary between the schools (Kainulainen, Benn, Fjellström, & Palojoki, 2012).To systematize some of the differences seen between the schools in this study, a typology that visualizes the degree of complexity in programs was created (see Figure 1) and the various characteristics of the programs were described (see Table 2). Despite variation in organization and content, some key elements to successfully organizing SFPs were emphasized; along with having enough resources and physical predispositions, the ability to adapt to local context and having the right staff, informants emphasize the importance of student involvement and acceptance as essential. Analysis suggests that the informants experience difficulties with balancing the organizational limitations of a tight budget with the wish to offer a healthy meal and the need to accommodate student preferences. Another finding worth mentioning is that informants strongly emphasize impacts on students psychosocial learning environment and social inequities between the students, while wider impacts on long-term health and sustainability were less in focus.

Voluntary health promotion in a limited economic context

The Guidelines for Food and Meals in Schools produced by the Norwegian Directorate of Health offer guidance on form and content for SFPs (Helsedirektoratet, 2015). The guidelines are based on the documentation of the diet's importance for long-term health and potential disease reducing effect and emphasize the importance of the school as a health promoting arena. Recent population health studies has suggested that Norwegian 15 year olds consume too little fruit and vegetables and too much saturated fat, salt and sugar (Hansen, Borch Myhre, Wetting Johansen, Mohn Paulsen, & Frost Andersen, 2015). This was, however, *not* an aspect that were much in focus during interviews, nor were the school's potential role as health promoter. Instead, benefits of the programs on the students psychosocial learning environment and social inequities between the students were emphasized. Informants also emphasized the immediate health benefits of school meals. Schools with free of charge-programs typically emphasize the importance of being offered a daily breakfast or lunch (as opposed to skipping meals) and payment-schools emphasize the benefits of offering healthier options trough the programs, than what is available in the local store. By making healthy food more available in public arenas such as schools, greater dietary diversity and quality can be achieved (The High Level Panel of Experts, 2017). If provided to all, food and meals served in a school setting, may also reduce social inequity in health (Arntzen et al., 2018). However, families with low incomes may not be able to pay for costly SFP subscriptions (4 out of 10 programs were free of charge for students, but the provision of free school meals in Norway is rare, and not representative of national tendencies). Because some of the SFPs investigated in this study were rather expensive, the access to healthy foods for some of the students may be limited. In addition, informants emphasize lack of resources as a challenge that may lead to limited food offers and not being able to offer free meals. The economic context schools experience may therefore influence how SFPs influence social inequities between the students as well as their access to nutritious food. Regardless of whether programs were offered free of charge or not, informants emphasize that they mainly wish to offer healthy food through their SFPs. However, they also choose to offer popular food items such as pizzas and burgers from time to time, which they describe as less healthy options, in order to accommodate student preferences. A few of the schools sell waffles and sweetened dairy products, because this brings in extra income, or out of the need to compete with local offers that might tempt students to buy their lunch off the premises. This was especially the case when SFPs was offered to students for a charge, which illustrates the dilemma of balancing the organizational limitations of a tight budget with the wish to offer a healthy meal and the need to accommodate student preferences. The food available to

students through SFPs varies largely from school to school, and the menu is usually chosen by those in charge of SFPs. Some informants seemed to believe that by serving courses with a lot of vegetables, plant-based protein sources, fish and whole grains, students might eat less of the food served or choose to skip meals. This view is reflected in several of the strategies applied by schools to increase nutritional value, such as "hiding" vegetables in the sauce. Attempts at raising the acceptance of vegetables and other healthy ingredients was *not* a strategy described by the informants. As pointed out by Wiseman (2017) the creation of health promoting food environments may enable individuals to make healthy choices (Wiseman, 2017). Ameliorating the school lunch environment by making nutritious food more accessible, might even help tackle challenges such as the obesity crisis, improve academic scores and benefit student concentration (Golley et al., 2010; School Meals Review Panel, 2005). The relative passive view amongst informants regarding student preferences, suggests there may be need for support and guidance, as well as raised awareness about the SFPs role in the food environment, which may influence the dietary habits of students over time. As mentioned above, The Guidelines for Food and Meals in Schools is available as guidance. The informants in this study do, however, not mention the guidelines in interviews. This might as well be because the informants never received any specific questions related to them, but it might, perhaps, also indicate a lack of awareness of the existence of the guidelines. When barriers to implementing the guidelines were investigated in a case study from 2011, lack of resources and funding and access to unhealthy food outside school, were two of the elements that were emphasized (Holthe, Larsen, & Samdal, 2011). It is therefore interesting to note that in the current study too, resources and student acceptance (in the form of acceptance of school food as opposed to competing, unhealthy offers outside school) are elements that seem to influence the focus of SFPs to a large degree, regardless of whether the content of the guidelines are considered or not. Another interesting point is made in a publication from the Finnish National Agency for Education, which presents lessons learnt and best practices from 70 years of school feeding (Pellikka & Taivalmaa, 2019). One of their main successes, they claim, is that they have been able to provide balanced nutrition with tight funding. However, they regret to say that the tastiness of the food has been downgraded as a result, which has led to more students skipping meals. It is interesting to note that the findings in the Finnish study correspond with the experiences of informants in the current project. Alas, economic considerations might lead to the quality of the food being deprioritized, even in a context where SFPs are officially subsidized (Finland has been providing all school children with a hot meal, free of charge, since 1948). In The ProMeal study, *prospects for*

promoting health and performance by school meals in Nordic countries, Nordic experiences relevant for the importance of guidelines, have been gathered from 837 students from Finland, Iceland, Norway and Sweden, born in 2003 (Waling et al., 2016). One paper based on this study looks at the composition of school meals in Sweden, Finland and Iceland (Juniusdottir et al., 2018). The paper concludes that though the official nutrition guidelines are respected, meals still needs to be standardized, as the energy and nutrient content of school meals varies largely from day to day. To ensure that the school meals are nutritionally adequate, it is also recommended that canteen staff should be educated in nutrition to some degree, and that the energy and nutritional value of the food served should be calculated. They also highlight the importance of clearly phrased guidelines that are easy to follow. It can be argued that a more careful focus on the *content* of SFPs in the Norwegian context would have been ideal in order to avoid random differences in the quality of the food served and to ensure all students an adequate, health-promoting school meal, in line with the recommendations. However, as SFPs remain a voluntary, local responsibility, it seems that the economic limitations experienced by the schools will continue to limit the health promoting potential of SFPs and other potential benefits such programs might bring.

Environmental aspects - an issue of student preference?

SFPs have the potential to promote sustainable food chains that might reduce the effects of climate change (Development Initiatives, 2017). However, the sustainability aspect of SFPs was not something the informants emphasized in interviews. Guidelines for Food and Meals in Schools points to the global agreement on the need for a more sustainable production and consumption of food, and recommends a diet that is in accordance with the national guidelines (Helsedirektoratet, 2015). The diet recommended by the health authorities, is also a sustainable one, according to the report written by the National Council on Nutrition, reviewing the nutritional recommendations in a sustainability perspective (Nasjonalt råd for ernæring, 2017). Like the official recommendations, the guidelines recommend that food served in a school setting should restrict the intake of red meat and promote the intake of plant-based foods such as vegetables, fruits, pulses, nuts and whole grains, as well as sustainably produced fish from farms and wild stocks (Helsedirektoratet, 2015). The guidelines also state that disposable waste should be limited, and all waste recycled. Lastly, schools are encouraged to stimulate a sustainable development through their purchases, by choosing environmentally labelled products and seasonal food. With a few exceptions, informants seem to have relatively low awareness regarding the program's potential role in a

sustainable food chain. Though sustainability outcomes were not emphasized as a concern by most of the informants, a focus on limiting food waste was common. It is interesting to note that efforts to reduce food waste was most often emphasized as an economic more than an environmental strategy. However, limiting the amount of food waste will have a positive impact on climate gas emissions (The Ministry of Climate and Environment, 2018). As stated above in the discussion related to the health promoting potential of schools, some informants describe that serving courses based on vegetables, plant-based protein sources, fish and whole grains might lead to the students eating less of the food served. This might also have implications on the amount of food waste, they argue. Support for this view is found in studies on plate waste in the national American school nutrition program, which found that approximately 12 % of all the calories on a school-food plate are wasted, especially the vegetables (Oostindjer et al., 2017). However, the belief that students simply will not eat the food if it contains too much vegetables or plant-based proteins is challenged by schools that apply strategies that enables them to do just that. One of the informants in the current study had solved the dilemma of accommodating student's preference for meat-based courses with a healthy, sustainable practice, by simply switching most of the meat in recipes for legumes, cooked al dente, mixed into the sauces. According to the informant, this was indeed compatible with the student's preferences. It is also interesting to note that the informants in general do not seem to link plant-based meals to environmental sustainability. However, the production of meat has a high carbon foot print and reducing the intake of red meat is recommended both for environmental and for health reasons (Nasjonalt råd for ernæring, 2017). Several schools describe serving vegetarian meals on a weekly basis, without complaint from the students (pancakes and tomato soup are especially popular choices). However, the vegetarian options are usually included in the menu because of religious considerations or because the ingredients are cheap, rather than out of health or environmental concerns. A plant-based school meal could be a way of reducing the amount of meat in adolescents' diet and increase the amount of vegetables and plant-based proteins, however low preference for the food groups might make this a challenge, if student preference indeed becomes a problem. This is of course, based on the notion that it is indeed so that plant-based meals can be a challenge for students taste preferences. Another possibility is that the vegetarian dishes itself are not the problem, but rather the presentation of them as plant-based meals, as one informant suggested. Because it was the adults involved in organizing school meals that where interviewed in this context, and not the students, one cannot be certain about the actual preference of the students or what their thoughts about plant-based meals are.

However, a 2018- report on the dietary habits of Norwegian consumers found that younger age groups consumed more meat and had lower preference for fish and vegetables, than the elderly age group they were compared with (Bugge & Alfnes, 2018). It is therefore interesting to note that the city council in Oslo has announced that they will implement free, plant based school meals for all the 28 secondary high schools of the region from 2020-2021 (Oslo Kommune). In the current study, motivation for the job and the feeling of purpose, was highlighted as beneficial traits in staff involved in the organization of SFPs. If the same is true for staff involved in organizing school meals in Oslo, it might be problematic if there are conflicting views on the benefits of plant-based school meals. This might suggest a need for knowledge and dialogue concerning attitudes of employees in the Oslo school on plant-based school meals and student's food preferences. In a 2013-publication on *Experiences with four school meal pilot schools in the Trøndelag-area*, the tastiness of meals and the social context of which the meal was served, were reported as the most important factors for students (Haugset, 2013). These experiences reflect the findings of the current study well. Either way, a healthy, sustainable practice should be aspired when organizing SFPs, whether this is accomplished by a reduction in food waste, or by emphasizing other measures, such as a plant-based diet.

Limitations of the study

The quality of qualitative research can be valued according to the criteria of validity (credibility), reliability (thrust wordiness) and reflexivity (Thagaard, 2013). The validity of methods may further be judged by the credibility and authenticity of the presented results. This study is based on qualitative interviews with staff involved in provision of school meals. Triangulating the findings by performing systematic observation of the programs or conducting interviews/ focus group interviews with students or other staff could have improved the credibility and authenticity of the findings (Thagaard, 2013). However, observation and focus group interview were not conducted, as interviews were partly held over Skype and telephone, and because the project had a very limited timeframe. Such additional input could, however, been useful to gain a deeper understanding of perspectives and experiences of informants and for highlighting similarities and differences between them (Doody, Slevin, & Taggart, 2013). In order for a scientist to be reflexive, she must acknowledge and consider her own point of view and how it may bias her research (Malterud, 2017). The researchers pedagogical background as well as her interest in environmental and nutrition-related questions may have influenced the research process on a subconscious level,

as may her limited experience as a qualitative researcher and interviewer. Lastly, the reliability of the research process may be influenced by the selection of informants (Malterud, 2017). The type of purposive sampling that was chosen for this study, relies on the personal judgment of the researcher and may therefore be vulnerable to researcher bias (Maul, 2018). Because the study had the aim of enlightening factors of success, the sample was limited to teachers, school leaders, canteen leaders and other staff, with positive experiences concerning the organization of SFPs. None of the users of the programs where involved. However, schools that have tried but that gave up providing meals could have beem included to add different perspectives.

Closing remarks and some implications

While it can be argued that the ideal SFP should be both tasty and nutritious, SFPs should also be economically viable and elements such as environmental sustainability, social inequity and the psychosocial learning environment should be considered. While the Guidelines for Food and Meals in Schools suggest a general framework for schools to follow, the lack of a national legislation on the content and organization of SFPs, has led to a variety of local solutions. Norwegian schools differ in geography, demography and size as well as financial and logistic context. As emphasized by informants in this study, there are good arguments as to why the organization of SFPs should remain a local responsibility, as the program may be designed to specifically consider local conditions. However, if implications for environmental sustainability, long term health and social benefits are considered along with more immediate benefits, an economically viable SFP with the ability to solve several societal problems simultaneously might be within reach.

Implications:

1. A greater alignment of the content of SFPs would be beneficial, in order to avoid potential nutritional disparities between the students of different schools and areas, and to ensure that all students are given an adequate meal, responding to their nutritional, social, cultural and religious needs. Guidance can be found in the Guidelines for Food and Meals in Schools.
2. Schools are not necessarily conscious about the role of SFPs in a societal perspective, such as their relevance for health promotion, their potential to increase or decrease social inequity, or their relevance in sustainable food systems. Because SFPs have the potential to solve several societal problems simultaneously, higher awareness of these

aspects would be optimal in the planning and implementation of SFPs.

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Ethical aspects

The study received research clearance from PVO at the Norwegian Institute of Public Health. The participants in the study were informed of their full anonymity and ability to withdraw from the study at any time. No sensitive information was gathered. However, because interviews were done using a voice recording device and voice recognition tools may identify a person, the sound files were treated with great carefulness, stored safely under password protection and deleted from recording devices after use.

Declaration of interest

None

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