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## “Is there any sugar in bread?”: A qualitative video analysis of student-activating learning tasks in Home Economics

### **Abstract**

The Norwegian Food and Health (FH) school subject aims to develop students' ability to understand the association between diet and health. Research on FH in Norway indicates that the main focus today is on cooking and the development of practical cooking skills, leaving little emphasis on activities related to the more theoretical aspects of the curriculum. To increase students' knowledge and skills regarding nutrition and health, we aimed to evaluate three newly developed student-activating learning tasks. Three 6<sup>th</sup> grade FH classes in Southern Norway participated. Audio and video recording of the learning tasks were used to evaluate the activities. Also, data from focus group discussions with FH teachers and students, which were conducted afterwards, was included in the analysis. By emphasising sociocultural learning and using the skills highlighted as essential in social learning and development as basis for the activities, we found the activities valuable in working with FH. The students' learning process was stimulated while they engaged with the learning tasks by working in groups, by being active in interaction, dialogue, communication and collaboration, and by being given the opportunity to listen and argue. Language was used as a pedagogical tool and was central in the students' learning process. Both the students and their teachers valued the active and practical outline of the learning tasks. We propose a stronger emphasis on practical learning tasks in FH, to strengthen the students' social learning and thus the learning in the subject, by using this as a pedagogical approach in FH classrooms.

Keywords: Food and Health, Home Economics, social learning, sociocultural learning, learning tasks, video analysis

## «Er det sukker i brød?»: En kvalitativ videoanalyse av elevaktive læringsaktiviteter i Mat og Helse

### Sammendrag

Mat og Helse (MH) i skolen har som mål å utvikle elevenes evne til å forstå sammenhengen mellom kosthold og helse. Forskning på MH i Norge indikerer at hovedfokuset i dag er på matlaging og utvikling av praktiske matlagingsferdigheter, med mindre fokus på aktiviteter som retter seg mot det mer teoretiske innholdet i læreplanen. For å øke elevenes kunnskaper og ferdigheter relatert til ernæring og helse, ønsket vi å evaluere tre nyutviklede elevaktive læringsaktiviteter utviklet spesielt til MH-faget. Tre 6. klasser i Sør-Norge var med på utprøvingen av aktivitetene, og lyd- og videoopptak ble brukt til å evaluere aktivitetene. I tillegg ble data fra fokusgruppeintervjuer med MH-lærere og elever, som ble gjennomført i etterkant, inkludert i analysen. Aktivitetene viste seg å være nyttige i arbeidet med MH, ved å legge vekt på sosiokulturell læring og bruke ferdighetene som er trukket fram som essensielle i sosial læring og utvikling, som grunnlag for aktivitetene. Ved å tilrettelegge for at elevene kan jobbe i grupper og ved å oppfordre til interaksjon og dialog, kommunikasjon og samarbeid, og til å lytte og argumentere, ble deres læringsprosess stimulert i arbeidet med oppgavene. I et sosiokulturelt perspektiv er det nærliggende å anta at dette virker positivt på elevenes læringsprosess, siden språket er et sentralt pedagogisk verktøy. Under fokusgruppeintervjuene kom det fram at både elevene og lærerne verdsatte at aktivitetene var elevaktive og praktiske. Basert på dette foreslår vi et større fokus på praktiske læringsaktiviteter i MH for å styrke elevenes sosiale læring, og dermed læring i faget, ved bruke dette som en pedagogisk tilnærming.

Nøkkelord: Mat og Helse, sosial læring, sosiokulturell læring, læringsaktiviteter, videoanalyse

### Introduction

In Norway, Food and Health (FH) is a mandatory school subject, most often taught in 6<sup>th</sup> and 9<sup>th</sup> grade. Formally known internationally as Home Economics (HE), FH is one of four practical and aesthetic subjects (Borgen et al., 2020; Ministry of Education and Research, 2019, p. 8). Moving forward, the Norwegian government aims to increase the subject's status and strengthen the content of the practical and aesthetic subjects and teacher education by, e.g., offering continuing education and Master's degrees and facilitating more practical and explorative work (Ministry of Education and Research, 2019).

FH aims to develop students' understanding of the association between diet and health (Directorate for Education and Training, 2019b). Further, FH helps students develop critical thinking, ethical awareness, and a sense of responsibility, enabling them to choose health-promoting and sustainable foods. The students shall learn to plan, cook, and experience meals with their peers.

Norwegian school subjects are currently undergoing a renewal (Ministry of Education and Research, 2015), with the new curriculum being gradually

implemented by the year 2023 (Directorate for Education and Training, 2020). Teaching should develop students' critical thinking, ethical awareness, and in-depth learning (Directorate for Education and Training, 2019a, p. 7). The new core curriculum has maintained the five basic skills of reading, writing, numeracy, and oral and digital skills (Directorate for Education and Training, 2019a, p. 12) to be integrated across all subjects, some of which are also recommended by the European Commission (European Commission, n.d.). In FH, oral skills are described as the ability to participate in discussions regarding cooking, health, food consumption, and food security, to mention some (Directorate for Education and Training, 2019b).

Interaction and dialogue, communication and collaboration, and the ability to listen but also to argue for one's views are described as crucial in social learning and development (Directorate for Education and Training, 2019a). They are also important skills to be developed in the school of the future (Ministry of Education and Research, 2015). In working with the students' development of these skills in school, this can be used as a pedagogical approach in FH lessons. Within a socio-cultural view of learning, individual and social processes are dependent on each other (John-Steiner & Mahn, 1996; Säljö, 2001; Vygotsky, 1978). The distance between the challenges a student can solve by themselves and what they can solve with guidance from a teacher or in collaboration with peers, is what Vygotsky calls the zone of proximal development (ZPD) (Vygotsky, 1978, p. 86). In the ZPD, students who would not be able to solve a task by themselves can achieve so in collaboration with others. Language can thus be viewed as an important educational tool, which is also found at the core of collective thinking, i.e., using language as a tool for problem-solving among individuals (Mercer, 2013; Säljö, 2001). When students solve problems collaboratively, through discussions and argumentation, is what Mercer calls exploratory talk (Mercer, 2000). When students master this communication skill, it can positively impact student learning (Gillies, 2019).

In HE education, Taar (2017) found student interaction skills and group atmosphere important for students to attain the benefits of collaborative learning and also for reaching the ZPD. She argues for including more cognitive-oriented tasks into HE education where students can develop their interthinking skills, an advanced form of collective thinking. Lindblom et al. (2016a) studied group work interaction during students' food preparation. They found 15 out of 26 student groups categorised as integrated groups, which are similar to collaborative groups. These groups were regarded as the most beneficial in terms of learning outcome, since the students reflect, develop new ideas, and gain knowledge from each other. Thus, for students to achieve the desired learning outcome, teachers need to be aware of how they design lessons to achieve well-functioning group work.

Research in Norway indicates that the main focus in teaching FH is on cooking and developing cooking skills (Beinert, Øverby et al., 2020; Øvrebø, 2014; Veka et al., 2018). This leaves little time for and emphasis on activities focusing on the

more theoretically challenging aspects of the FH curriculum, like the ability to describe, discuss, reflect, and assess different nutrition and health-related topics (Directorate for Education and Training, 2006, 2019b). Student-activating learning tasks (Gogus, 2012), where students are involved in the learning activities, are generally regarded as effective in enhancing student learning (Nordenbo et al., 2008, p. 55). Learning strategies where students play an active role, such as collaborative learning (Udvari-Solner, 2012), problem-based learning (Jonassen & Hung, 2012), or experimental learning and class discussion can be valuable to use in FH lessons. One governmental initiative is to develop tools and resources for the FH subject to increase the population's knowledge of food, diet, and health as well as increase the competence among FH teachers (Ministry of Health and Care Services, 2017). The school and the FH subject are thus recognised as important arenas for health promotion among children and adolescents.

This study reports findings from the “LifeLab Food and Health” project (see also Beinert, Øverby et al., 2020; Beinert, Palojoki, et al., 2020). LifeLab aimed to develop and evaluate different student-activating learning tasks for the FH subject, aiming to increase students' knowledge and skills regarding the association between diet and health. Initially, in the LifeLab project, three primary and lower secondary schools were recruited, and focus group discussions (FGDs) were conducted with both students and FH teachers. These FGDs aimed to explore their experiences with current teaching practices and use this feedback to develop the LifeLab learning tasks. Eventually, six student-activating learning tasks were developed and tested in FH classes. For this, two of the three schools were again contacted, and their permission to collect the data was obtained.

This present study aims to explore how three of the learning tasks developed in the LifeLab project can contribute to active learning among students during FH lessons by taking a sociocultural approach to learning and building on skills important in social learning and development described in the core curriculum (Directorate for Education and Training, 2019a, p. 10). More specifically, there are three research questions to be answered:

1. How do the learning tasks support student interaction and dialogue?
2. How do the learning tasks create opportunities for communication and collaboration between students?
3. How do the learning tasks support students' abilities to listen and argue?

## Method

### **Developing LifeLab learning tasks**

The three developed learning tasks tested in this study had the overall theme of “food choices” (Table 1). The tasks were developed through three workshops led by the first author of this paper, consisting of six participants, two of whom were university students in their final year of teacher education with FH specialisation

and one FH teacher who recently graduated. Also, one research assistant and one graduate student working within the project attended. The learning tasks were developed based on the FGDs conducted with FH teachers and students, described previously. Also, both the current FH curriculum (Directorate for Education and Training, 2006), the white paper regarding the renewal of the curriculum (Ministry of Education and Research, 2016), and preliminary hearings and reports (Ministry of Education and Research, 2018, p. 8) regarding the new FH curriculum were taken into consideration in the development. A description of the learning tasks alongside competence aims is presented in Table 1. Each learning task lasted approximately 15–20 minutes.

**Table 1.** Overview of the competence aims, description of the learning tasks, and the pedagogical approach of the different learning tasks.

<b>Learning task</b>	<b>Competence aims in the subject, 5<sup>th</sup>–7<sup>th</sup> grade</b>	<b>Description</b>	<b>Pedagogical approaches</b>
1. Picture ranking	<p><i>Food and lifestyle:</i> – talk about guidelines for healthy eating from the health authorities, and provide examples of the relation between eating, health, and lifestyle.</p> <p><i>Food and culture:</i> – assess what good eating habits involve.</p>	<p>The students were handed 8 pictures of different food items, which they were asked to arrange from which they thought was the healthiest/most nutritious to the least healthy/least nutritious. These were pictures of a glass of orange juice, a glass of chocolate milk, a bowl of chocolate cereal, a bowl of whole-grain cereal, a slice of bread with chocolate spread, a slice of bread with brown cheese and tomatoes on the side, a fruit yoghurt, and a natural yoghurt with fresh berries, honey and granola on top.</p> <p>They were asked to discuss together in the group to come to an agreement and argue for their opinions.</p> <p>Afterwards, the research assistant led a discussion with the class by going through the pictures and collaboratively trying to arrange them.</p>	<p>Active learning (Gogus, 2012)</p> <p>Collaborative learning (Udvari-Solner, 2012)</p> <p>Problem-based learning (Jonassen &amp; Hung, 2012)</p> <p>Activating students through class discussion, reflection, and argumentation</p>
2. The hunt for “5 a day”	<p><i>Food and lifestyle:</i> – talk about guidelines for healthy eating from the health authorities, and provide examples of the relation between eating, health and lifestyle.</p> <p><i>Food and culture:</i> – assess what good eating habits involve.</p>	<p>The students were asked to collect the amount of fruit and vegetables they believed was the amount of “5 a day” from a selection available. After weighing it, they were asked to peel and weigh again.</p> <p>Then, if any had taken the potato, which is not included in the “5 a day”, they were asked to remove it to visualise the net amount.</p> <p>Finally, the research assistant talked about what is included in the “5 a day” with the students.</p>	<p>Explorative learning/ discovery learning</p>

<p>3. Line game (bread)</p>	<p><i>Food and lifestyle:</i> – talk about guidelines for healthy eating from the health authorities, and provide examples of the relation between eating, health and lifestyle.</p> <p><i>Food and culture:</i> – assess what good eating habits involve. – talk about industrially prepared food and food prepared in large-scale catering.</p> <p><i>Food and consumption:</i> – discuss product information and advertising for various foods.</p>	<p>The students were shown two types of bread, one wholemeal and one white bread. Then, the students were placing themselves on a line, from high to low level of wholemeal (based on the bread scale labelling (Norwegian: “Brødskalaen”)), based on where they believed the two types of bread belonged. Then they were presented with the actual wholemeal content of each bread by seeing the package labelling. Finally, the research assistant explained food labelling and the nutritional value of the bread in dialogue with the students.</p>	<p>Reflection and argumentation (Mercer, 2013)</p>
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### Recruitment and ethics

Since different FH students participated in this data collection phase, new information sheets and parental consent forms were sent electronically to the teachers, who printed and handed them out to the students. As the parents had given their consent, the students provided assent by participating. The FH teachers and assistants gave oral consent to participate in the study. Students who were not allowed to participate, were offered an alternative learning task arranged by the FH teacher in a separate room during data collection. The Norwegian Centre for Research Data assessed the project (ref. 59097), and the Ethics Committee of the Faculty of Health and Sport Sciences at the University of Agder provided research permission.

A short visit to the schools was made two weeks in advance of data collection to meet the students and teachers and briefly inform them about the study. The students were also reminded about having their parents sign the consent forms, which the FH teachers had previously handed out. The signed consent forms were collected at the time of data collection.

### Participants

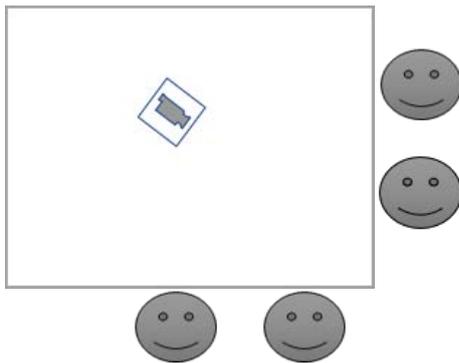
The first testing was conducted in March 2019 in one 6<sup>th</sup> grade class (students aged 11) consisting of 13 students at one school (group 1). Four weeks after this, the activities were carried out in two 6<sup>th</sup> grade classes at the second school, with 15 students in each class (groups 2 and 3). Only two minor corrections were made after the first testing regarding camera placement and student arrangement during the line game. Therefore, the videos from the first class are included in the analysis. However, most emphasis is placed on the second school due to better

sound quality, thus covering a higher percentage of the analysed data. A total of three classes and 43 students were included in the final analysis.

### **Data collection**

The Master's level student and the research assistant conducted the teaching in group 1, while the research assistant and one of the FH teacher-students taught in groups 2 and 3, now referred to as "assistants". To minimise the FH teachers' burden in the included schools, the assistants were responsible for carrying out the LifeLab tasks in the two schools. The FH teachers at the schools, now referred to as "FH teacher", received all information about the learning tasks in advance and were encouraged to participate as much as they wanted. The first author of this paper conducted a non-participatory observation, and field notes were written. Each lesson lasted for two school periods ( $2 \times 45$  minutes) and was held in a regular classroom (not a school kitchen) during the regular FH class time. The students were sitting in groups of three to four students, arranged by the respective FH teacher in the groups they were working in during regular FH lessons. These were both mixed and non-mixed gender groups.

Audio and video recordings from Garmin Virb 360-degree cameras and GoPro Hero 180-degree cameras were used to capture both verbal and non-verbal communication in the classrooms. One camera was placed on each desk, and one group of students were seated at a corner of the desk, with the camera placed on a small tripod in the centre (Figure 1). Hence, both student-student interaction and student-teacher/assistant interaction was captured in each group. Placing the cameras this way, the students were close to the camera and were able to work together simultaneously as they could see the assistant or whiteboard when necessary. In educational classroom research, video recording has been a widely used method for data collection (Derry et al., 2010; Erickson, 2006, p. 177; Melander & Sahlström, 2009). In Norway, the Linking Instruction and Student Achievement (LISA) study is the largest of its kind using videos from 50 schools in research on the effects of different classroom instructions on students learning in mathematics and Norwegian language arts (Department of Teacher Education and School Research, n.d.). In recent years, researchers in HE education in Sweden and Finland, which both have subjects similar to Norwegian FH, have also used a video-based approach when conducting classroom research (Bohm et al., 2015, 2016; Gelinder et al., 2020; Haapaniemi et al., 2019; Lindblom et al., 2016a, 2016b). Video recordings enable us to capture social interaction in detail, as it captures both verbal and non-verbal communication (Kristensen, 2018). In contrast to observation, videos can be viewed as needed for analysis and easily shown to members of a research group for collaborative work and discussion. Further, video recordings can be used for a variety of interests and analytic approaches (Heath et al., 2017). Hence, video recording was regarded as the most suitable approach for data collection.



**Figure 1.** Layout of student and camera placement.

Immediately after each class, short follow-up FGDs were conducted by the first author, with the FH teachers and assistants in one group and students in another. These are included in the results section for reference.

### **Data analysis**

Given the clear research questions which were based on socio-cultural learning theory, a deductive approach (Derry et al., 2010, p. 10) to data selection was conducted. The recorded material was watched several times by the first author of this paper to get an initial overview. After finding several episodes considered relevant for the research questions, some of the material was watched and discussed with the co-authors to help with episode selection. The field notes written during data collection were also reviewed. Both student-student interactions and student-teacher/assistant interactions were regarded as valuable since they capture social interaction and dialogue. Students' questioning and discussions within their groups were considered especially interesting, since this stimulates collaborative thinking. Hence, these aspects were included when analysing the episodes and presenting the data.

Quotations and drawings of still frames (to protect personal data) from the video recordings are included to illustrate findings where students and teachers work together and use language to bring the tasks further. Information added by the first author is inserted in brackets in the transcriptions for clarification.

## **Results**

### **First research question:**

#### **How do the learning tasks support student interaction and dialogue?**

In episode 1a, three students found it difficult placing the picture of the slice of bread with brown cheese (a traditional Norwegian cheese often made from a mix of goat's and cow's milk, whey, and cream) and tomatoes on the side. One of the students believed they should only look at the bread with brown cheese and not include the tomatoes when evaluating. This was easily clarified by asking the research assistant, who helped them along in their discussion (Table 2). One of

the students asked the others if there was any sugar in bread, whereby both classmates affirmed that there was. After student 3 mentioned that there was sugar in the cereal as well, the students finally agreed on how to arrange the two pictures.

**Table 2.** Findings and descriptions of the picture ranking learning task. (S = student, A = assistant)

Activity	Group	Quotes
Picture ranking	Episode 1a, group 2. Assistant standing second to the left in the picture. 	Three students are trying to agree on where to put the bread with brown cheese and whether the tomatoes in the picture also count.  <i>S1: I think they just mean the slice of bread with brown cheese.</i> <i>S2: But why would they put them [the tomatoes] there if not? [reaches out to the teacher] Do they mean just the slice with brown cheese or the tomatoes as well?</i> <i>A: It's everything in the picture.</i> <i>S1: Ah, okay ...</i> <i>S2: Yes, because that's just Havrefras [Norwegian wholemeal cereal] ... I don't think there is a lot of sugar in [points to the slice of bread]</i> <i>S3: There is sugar in that one. [bread]</i> <i>S2: Is there any sugar in bread?</i> <i>S1: Ahh ... yes, I think so.</i> <i>S3: There is sugar in bread.</i> <i>S1: White bread and stuff like that, they contain a lot of sugar.</i> <i>[Short pause]</i> <i>S3: But there is sugar in that one [Havrefras] also.</i> <i>S2: Okay, so should we put them like this, and then see?</i> <i>S3: Yes.</i> <i>S1: Okay.</i>
Picture ranking	Episode 1b, group 1. 	Student (in the middle of the picture, laying his head down onto the desk) getting bored at the end of the class discussion, which lasts for approximately 15 minutes. The aim of the review was to go through each picture and rank them in dialogue with the students.

All three students in episode 1a were involved in the task and attempted to solve the task through dialogue within the group and including the assistant where necessary. This interaction and dialogue helped the students to get further in their work with the task. However, in some groups, one or two students in the group were more dominating and took control of the activity, leaving the others more passive. Further, when an activity was finished fast, sometimes without any discussion between the students, the students began talking about off-topic matters until their attention was called again by the assistants or FH teacher.

In episode 2a (Table 3), the students were surprised by how much their selected fruits and vegetables weighed. This indicates that they knew that five portions should equal 500 grams (according to the dietary guidelines). As their FH teacher, by chance, approached at that time and heard the students wondering, she asked if they eat everything of what they had selected. One of the boys quickly realises that they do not eat the peel. This made it clear that the recommended amount is the actual consumed amount, not the total weight. Later, they were equally surprised to see how much peel there was. After removing the peel and the potato, which is not part of the “5 a day” recommendation, the students were eventually close to 500 g.

**Table 3.** Findings and descriptions of the “5 a day” learning task. (S = student, T = FH teacher)

Activity	Group	Quotes
5 a day	Episode 2a, group 3. Teacher standing to the right in the picture 	The students are surprised by how much their five fruits and vegetables weigh, indicating that they know it is supposed to be around 500 g.  <i>S1: How is that...?</i> <i>S2: 731 [grams]. Let us take them out and put them back in again.</i> <i>T: But now you must remember; do you eat everything on the fruits selected here?</i> <i>S2: Nooo!</i> <i>T: Right? So you might not be too far off ... some of it you need to peel off.</i>
5 a day	Episode 2b, group 3. 	Three students are playing with the scale and the fruits and vegetables during the review of the assignment with the teacher.

At the end of both learning tasks 1 and 2, some students found it difficult to concentrate during the class discussions where the assistant did the majority of the talking. This resulted in some students withdrawing from the activity (episode 1b), becoming distracted, and focusing on off-topic matters (episode 2b).

### **Second research question:**

#### **How do the learning tasks create opportunities for communication and collaboration between students?**

In learning tasks 1 and 2, the students were placed in small groups to facilitate communication and collaboration within each group. The teacher introduced and explained the activity before the students were encouraged to solve the task

collaboratively. In learning task 1, the students communicated and solved the task collaboratively. As the students worked, both the assistants and the FH teacher were always available to answer any questions the students might have. Also, the FH teachers and assistants occasionally listened to the conversations and asked follow-up questions to promote communication within the groups. At the beginning of learning task 2 (“5 a day”), the group as a whole was asked to get the amount they believed was the recommended amount, providing the opportunity to come to an agreement collaboratively.

However, not all students were always eager to talk and involve themselves in the different tasks. Further, if some of the groups finished the tasks too quickly due to little communication and collaboration, the students spent their collaboration time talking about off-topic matters, or the assistants talked more themselves. Hence, the activating learning task provided communication and collaboration opportunities, but the students were not utilising them to the fullest. This, in turn, can affect learning outcomes.

When different tools (fruits, vegetables, scales, markers, pictures, a calculator, etc.) were available to students, the tools quickly became a distraction. In episode 2b, the students focused on the fruit and scales rather than focusing on the teacher. This happened in most of the groups, both when they were working themselves and during the teacher-led class discussion. Hence, the teachers need to be aware of how this may affect students’ learning activities.

### **Third research question:**

#### **How do the learning tasks support students’ abilities to listen and argue?**

In learning task 1, the students were explicitly instructed to argue for their opinion about in which order the pictures should be placed. In episode 1a, the students listened to what each had to say without interrupting. They built on each other’s ideas, indicating that they listened and followed up on each other’s comments and opinions. Some of the students could give reasons and argue for their opinion based on their dietary knowledge about the different products, but many did not or could not. In most of the groups, the students seemed certain about their statements but struggled to explain why when asked to elaborate.

In episode 3a (Table 4), the students were asked to explain why they believed the bread presented was wholemeal or not (learning task 3). By purpose, the wholemeal bread was quite light in colour and contained no visible grains, whereas the white bread was covered in grains and was darker in colour than typical white bread. All students based their judgement on the bread appearance, and the assistant followed by asking for elaboration on in what way the bread looked healthy. The students did not know the two breads’ nutritional value, resulting in most students guessing wrong. The students were stunned to see the correct answer, as they were quite confident in their ability to recognise wholemeal bread by merely looking at it. Finally, the assistant explained why it is difficult to judge bread based on its look and why food labelling like the “bread

scale” (a labelling that shows the percentage of whole grains, wholemeal flour and bran in bread) can be a valuable tool when looking for the healthier option.

**Table 4.** Findings and descriptions of the line game learning task. (S = student, A = assistant)

Activity	Group	Quotes
Line game	Episode 3a, group 2. 	<p>The assistant asks the students to explain their reasoning for judging the bread as being whole grain:</p> <p>A: <i>The majority have placed themselves at whole grain. Why do you think it is whole grain?</i></p> <p>S1: <i>It [the bread] looks like it.</i></p> <p>A: <i>It looks like it. Yes, it has grains on top of it and ... mhm. you have placed yourselves at 50% whole grain?</i></p> <p>S2: <i>I think it looks a bit light/pale.</i></p> <p>A: <i>Yes. And you at the top [at extra whole grain]. What do you think?</i></p> <p>S3: <i>Ehm, it looks really healthy.</i></p> <p>A: <i>Mhm, it looks healthy. Lots of grains both inside and on top of it.</i></p>
Line game	Episode 3b, group 1. 	<p>Some students getting passive and unfocused (sitting or lying down on the desk) during the assignment with agree/disagree questions.</p>

Learning task 3 also included different statements, like “fresh vegetables are healthier than frozen vegetables”, where the students had to place themselves at a scale from agree to disagree, and then argue why they believe so before the assistant provided an answer with an explanation. The students needed to pay attention to the statement presented before thinking and deciding for themselves. If there were too many statements presented and the activity lasted too long, some students eventually lost interest (episode 3b).

During the FGDs with the students after the class, the overall feedback was that the students found the class engaging and fun. More specifically, they appreciated that the activities were practical, indicating that the learning tasks activated the students, as planned in the design. This was also supported by the FH teachers, who believed this is a good way to work with the theory. The FH teachers mentioned that these learning tasks were something they could easily use themselves in their teaching. The feedback from the FGDs with the teachers and assistants after the first testing (school 1), which resulted in minor adjustments regarding the line game, was not mentioned in school 2, indicating that it worked better.

## Discussion

This study aimed to explore how the three student-activating learning tasks developed in the LifeLab project can contribute to active learning among students during FH lessons by taking a sociocultural approach to learning and building on skills important in social learning and development (Directorate for Education and Training, 2019a, p. 10).

We found that the learning tasks facilitated various aspects relevant to social learning by adapting a sociocultural approach (John-Steiner & Mahn, 1996; Vygotsky, 1978). Through this approach, which emphasises social interaction and dialogue, the learning tasks can help students reach the different competence aims in FH listed in Table 1 and oral skills as described in the new FH curriculum (Directorate for Education and Training, 2019b).

The learning tasks required the students to interact and discuss with each other and be self-driven to complete the tasks successfully. However, when the students finished their tasks fast, some started talking about off-topic matters. Since language is an educational tool and a tool for problem-solving (Mercer, 2013; Säljö, 2001), the main challenge for teachers and teacher education is how to design and provide student-activating learning tasks, where dialogue, discussion, and constructive argumentation have a central role. One challenge here could have been that the assistants did not know the students beforehand and had a fixed schedule to adhere to. In any other classroom situation, the FH teachers could move along at a natural breaking point. Since there is no “one-size-fits-all” in education, with every student being unique, it could be beneficial for the FH teachers to be included in creating the tasks. In knowing the students, he/she would be able to tailor the tasks in order to meet the needs of the students better.

In these episodes, learning task 1 especially created opportunities for students to communicate and collaborate. When both the assistants and the FH teacher engaged in scaffolding by asking follow-up questions to the groups continuously during the class, it was valuable for engaging the students and getting them to talk, and clarifying possible misunderstandings that could limit their discussions. Hence, the scaffolding provided by interacting with the students helped the students in their ZPD, supporting them in their learning process and widening their body of knowledge (Vygotsky, 1978). This importance of talk and language for learning aligns with sociocultural learning and collective thinking (John-Steiner & Mahn, 1996; Mercer, 2013; Vygotsky, 1978). During the students' collaborative work and through the class discussion after students had ranked all the pictures, the assistant included all students in the collaborative process of arranging them on the whiteboard. Here, it was emphasised that there is not a simple right or wrong answer. By facilitating discussions regarding the nutritional content and value of each picture and relating this to the national guidelines, the FH curriculum's competence aims listed in Table 1 and the development of oral skills were targeted. Also, since there were differences in the students' nutritional

knowledge, this process most likely added to their understanding of the different items' nutritional value.

Although the students working with learning task 1 worked in groups and were explicitly told to listen, argue for their opinions, and discuss together to come to agreements, these activities were not evident in all groups. Some students only presented statements, such as “that one is healthier than that one” without giving a reason or discussing it with their peers. Further, in our study, few other students asked “why” one is more or less healthy than another one. Hence, the students could listen and argue, but not all students did so. In these cases, it was especially valuable to go through the pictures together with the whole class, so everyone was included in understanding the “why”. This phenomenon has also been discovered when analysing children's collaboration and argumentation skills in group discussions in a science class (Maloney & Simon, 2006). Here, the researchers found low levels of collective thinking during group discussions. The children merely took turns in talking, with low levels of argumentation, which is following our findings. Therefore, teachers need to help children learn how to work in a group and develop their cooperation and argumentation skills (Gillies, 2003; Maloney & Simon, 2006). Correspondingly, after studying interthinking among 7<sup>th</sup> graders in HE, Taar (2017) proposes that in order for students to interthink (Littleton & Mercer, 2013), teachers must remind the students to explain their understanding to each other.

One picture in learning task 1 showed fruit yoghurt, but some students believed it was ice cream. Although this was clarified during the task, either within the groups or telling the class aloud, the teacher could have clarified this in the very beginning. Also, the teachers did not clearly state each activity's learning goals, which could have helped the students understand the purpose, and hence impact their learning outcome.

In learning task 2, the students explored how much “5 a day” was by weighing their selected amount and reducing or adding to reach 500 grams. The different fruits and vegetables served as tools for learning (Vygotsky, 1978), by exemplifying the recommended amount. Through dialogue with the FH teacher, the students in episode 2a were able to clarify the confusion of the weight of what they had collected. This highlights the importance of teacher-student interaction in classrooms. Although the task did not require much dialogue, it provided students with a visual of the actual amount of fruit and vegetables recommended each day, maybe making the recommended amount of 500 grams seem less abstract. It was also a convenient chance to clarify the “5 a day” recommendation from the health authorities.

During the line game (learning task 3), the most successful task was the initial use of the two pieces of bread. Having the bread available for the students to examine seemed to engage the students to a greater extent compared to when only a statement was presented. Also, the students' reaction to seeing how difficult it was to judge a bread solely by appearance was noticeable. The bread could be

viewed as a pedagogical tool (Säljö, 2001; Vygotsky, 1978). However, as the students were examining the bread, the assistants could have encouraged them to examine its weight and taste before making their decision. Further, when the assistant described the two breads' look for the students, this worked counterproductively. Preferably, the descriptions should have been left to the students themselves. Despite this, the assistant might have served as an example of how one can describe thoughts. By discussing the bread scale examined here and including statements regarding fresh and frozen vegetables, the activities could target the competence aim relating to industrially processed food and product information as listed in table 1.

When working with food and health, there is a chance of becoming too normative as to what is the “right” or “wrong” thing to eat (Gelinder, 2020). Hayes-Conroy and Hayes-Conroy (2013) call this approach “hegemonic nutrition”, a reductionist and hierarchical way of looking at nutrition, leaving out essential diversities like food culture, preferences and ethics, to mention some. In the first testing, the assistants asked the students to rank the pictures from what they believed was the least to the most *healthy*. This was chosen because “healthy food” was regarded as something the students could easily relate to. However, this was changed to least to most *nutritious* in the second class. This was considered more appropriate, as it has a lower emphasis on “yes” and “no” food and focuses more on the complexity of food. Interestingly, although groups 2 and 3 were asked to rank the pictures based on most/least nutritious, many students consistently used the words healthy and unhealthy, indicating that this dichotomic phrasing comes naturally to the students when talking about food. Ultimately, the goal of the discussion with the assistants was for the students to see that there is no simple right or wrong way to rank the different dishes and food items.

The students had quite strong statements about whether something was healthy or not. However, few students explained why this was the case. Each item's sugar content was most often used as a premise for something being healthy or not. It is worth mentioning that in groups 1 and 2, some of the food items were included in a learning task where the students measured the sugar content. They also saw a short video clip about sugar in various beverages, which most likely guided their thinking. This narrow focus on sugar indicates a generally low level of nutritional knowledge among some of these students. In episode 1, the students focus on sugar content, but they do not distinguish between natural and added sugar, nor fibre, which is relevant to the pictures they are discussing. They only use the word “sugar”, not taking the discussion further by talking about different carbohydrates, indicating an inability to see food and nutrition complexities. It might have been better for the discussions if the students had more knowledge about the different food items before the task, so they had more knowledge to share within their group. The students' ability to discuss and argue may also not be adequately evolved, as this is something teachers need to help the students to develop (Gillies, 2003; Maloney & Simon, 2006). This makes the class discussion after the picture

ranking activity even more important, as it can add to the students' knowledge and understanding of the complexity of food.

## Methodological and ethical considerations

Several conditions may have affected how these learning tasks worked in the three classrooms explored in this study. Although the FH teacher was present during the class, the two assistants, who conducted the teaching, were new to the students, as was the researcher passively observing the classes. The assistants and the researcher had only greeted the students once when they made a short visit to the schools before data collection. Also, only one of the three assistants was a trained teacher, which can affect the classroom environment and management. Usually, there would also be only one teacher present, not three, as in this study.

If the FH teacher could have helped develop the activities or the activity developers had known the students before data collection, the activities could have been tailored to each class and each student's strengths and weaknesses, e.g. in nutritional knowledge and group dynamics. Still, the FH teachers placed the students in the same groups they are usually in during a regular FH class, so the students were comfortable working together. The learning tasks were also developed based on suggestions from both FH students and teachers who participated in the FGDs conducted earlier in the project.

Using video to collect and analyse data has its strengths and limitations. Having one wide-angled camera placed at each desk made it possible to see and hear each student. However, at school 1, the cameras were placed too far away, making it difficult and sometimes even impossible to hear what the students said. Consequently, these sections were impossible to analyse. Therefore, at school 2, the cameras were placed closer to the students, resulting in much better sound quality. Using video cameras to collect data from the classroom settings always includes the possibility of students not acting naturally because of the recording (Bloor & Wood, 2006). Despite the cameras being placed quite near the students, most students seemed not to be bothered or restricted by them. One reason for this might be that the cameras used in this study were quite small and were not moved around in the classroom. The students ignored them during the learning activities, except when one of the cameras stopped recording and it had to be turned on again. Even after this, the students quickly started working on the tasks again. Also, to increase the trustworthiness of the findings, the co-authors participated in the selection of episodes to be analysed.

To ensure data protection, we distributed and collected written parental consent from all participating students, according to the Norwegian Centre for Research Data. Also, permission to include quotes or still frames that were edited so that it would not be possible to recognise the students, was specified in the information sheets. Still, we only included drawings of still frames to protect

personal data, since there is a possibility to convert filtered or otherwise edited pictures back to the original form.

## Conclusion and further work

This study evaluated student-activating learning tasks developed in the LifeLab Food and Health project, relating to some theoretical aspects of the FH curriculum. By taking a sociocultural approach to learning and building on the skills related to social learning and development, the three student-activating learning tasks investigated here can be valuable in future work concerning the FH syllabus. Although the competence aims included here will change by the end of 2020, we believe that the activities are equally relevant for the new FH curriculum, valid as of autumn 2020. We found students enjoyed being active during class, and the FH teachers found the practical aspect of the LifeLab tasks beneficial. In today's FH classes, the emphasis is primarily on cooking and developing and mastering practical cooking skills. Although students can practice all skills related to social learning investigated in this study during cooking, these skills can also be valuable to incorporate when working with the subject's more theoretical content. We propose a need for more practical approaches to theory and more theoretical content linked to the practical work of cooking.

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