

A prototype of a teaching support within personal finance

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Degree project 15 HE credits

Computer and Systems Sciences

Degree project at the bachelor level

Spring term 2019

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Abstract

In Swedish schools, the important subject of personal finance is a very small part of the curriculum within home and consumer economics. Previous research has shown that while children are capable of learning and understanding financial concepts, an important objective for the teachers is to connect this understanding to financial terms. However, the teachers feel that they both lack knowledge on the subject and need more support in their teaching role. This study examined how a digital tool can be designed to support Swedish teachers in home and consumer studies with lesson planning, sharing material, and pupil documentation specifically for personal finance. This was done by prototyping ideas and concepts with a focus on ease of access, multimodality, and adaptability. Within the design science framework, case studies were chosen as the main research strategy. Nine participants, all teachers of home and consumer studies in Sweden, were recruited to participate in the study. The five phases of design thinking were used as the framework for the design process, which reached four iterations. Data was collected through questionnaires, semi-structured interviews, and cooperative evaluations, and was analyzed with a thematic analysis. Findings indicated that a simplistic interface with few, but powerful, functions was desired. Participants wanted to share material with others, but not use others material as is but rather as a source of inspiration - one type of context or knowledge would not always be suitable for the current class of pupils due to cultural, societal, or other differences. Furthermore, the system should be able to work seamlessly with other tools and systems used today. Overall, the results confirm those found in previous research.

Keywords: Home and consumer studies, prototype, design thinking, personal finance

Synopsis

<i>BACKGROUND</i>	The Swedish research project <i>Children and Digital Finances</i> has shown that children can understand basic economic concepts. The children understood these concepts by articulating their understanding of value, resource, and time. By letting the children relate these concepts to their own experiences, they may more easily learn more advanced principles and connected terminology. As part of the project, a prototype was created and tested to explore how a digital tool for teaching could be designed
<i>PROBLEM</i>	The teachers themselves have expressed a need for support and the opportunity to develop their own knowledge and material. Previous work has established a foundation, which may be researched further.
<i>RESEARCH QUESTION</i>	<p>How can a digital tool for teaching personal finance within home and consumer studies be designed to support lesson planning, sharing material, and pupil documentation?</p> <p>The teachers responsible for teaching personal finance in the Swedish compulsory school lack expertise within the subject. In addition, they've expressed a need for support.</p>
<i>METHOD</i>	The research strategy for this study is case studies, the methods for data collection is questionnaire, semi-structured interviews, and cooperative evaluation. The collected data in this study is mainly qualitative but also quantitative. The gathered data was analyzed by a thematic analysis in order to find needs, requirements, frictions, and opportunities. Nine participants were recruited, with 2-3 participants evaluating each prototype iteration.
<i>RESULT</i>	The participants wanted a tool with a simplistic interface with few but powerful functions. The participants wanted to share material with others, but not use others material as is but rather as a source of inspiration. The feedback was focused on the functionalities but there was some feedback on the graphic design of the prototype regarding the choice of color and the meaning of icons.
<i>DISCUSSION</i>	The fidelity of the prototype was unintendedly perceived by the participants as near to finished and was thought to be the final look of a system, which raised some concern. The study also suffers from a low number of participants in one of the iterations which affects the ability to generalize the result. The prototype developed in the study is useful for teachers within home and consumer studies and can, with further development, be useful for the pupils they teach.

Acknowledgement

We want to thank Patrik Hernwall for his invaluable support and guidance with this thesis. We also want to thank all the teachers who participated in our study for taking time out of their already busy schedules to provide us with irreplaceable feedback and insights.

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List of Abbreviations

Home and consumer studies – HCS

Human-computer interaction - HCI

User-centered design - UCD

1 Introduction

Research shows that today's youth will likely face more financial risks than their parents during their lifetime (OECD 2012). Future generations will likely encounter more sophisticated and diverse financial products and bear more responsibility for the planning of their own healthcare needs, investments and retirement savings (ibid.). The importance of having a developed understanding of personal finance is growing. Still, there is not much mentioned about personal finance in the Swedish curriculum for the compulsory school (Hernwall, Hullgren & Söderberg 2018a). Economics is mentioned in the curriculum of a few subjects. Personal finance is however only mentioned in the curriculum for home and consumer studies (HCS), a subject that is supposed to cover a wide range of knowledge, from basic cooking and nutrition to personal finance and sustainable living. Despite this, it is the subject with the least number of guaranteed hours in the Swedish compulsory school (Skolverket 2018a).

A lack of expertise of personal finance has been observed for Swedish teachers in HCS, and the teachers themselves have expressed a need to develop their own knowledge and material (Hernwall, Hullgren & Söderberg 2018a) as well as a need for more support within the subject (Hernwall, Hullgren & Söderberg 2018b). The teacher's role is to teach the pupils about personal finance so that the pupils can reflect on personal finance for young people regarding both savings, loans, and credits (Skolverket 2018a).

A prototype of a digital teaching support for personal finance within HCS was developed in dialogue with teachers, subject educators and other experts within the area (Hernwall, Hullgren & Söderberg 2018b). The definition of a prototype, within the confines of the above-mentioned study, follows the definition by Houde and Hill (1997, p. 13) *any representation of a design idea, regardless of medium*. The prototype from the study by Hernwall, Hullgren, and Söderberg (2018b) supported teachers by providing them a learning trajectory (Swedish: *lärolinje*) with material for personal finance. The prototype wasn't finished and there is much left to develop, test and validate.

1.1 Problem and research question

The problem that is the foundation of this thesis is that the teachers responsible for teaching personal finance in the Swedish compulsory school lack expertise of the subject (Hernwall, Hullgren & Söderberg 2018a). The teachers themselves have expressed a need for support and the opportunity to develop their own knowledge and material (Hernwall, Hullgren & Söderberg 2018b). A prototype has been developed however, the prototype needs more development to further research on the users' concerns and needs. The prototype supported lesson planning, sharing of material and pupil documentation (ibid.). Previous research has begun to explore the use context and possible solutions however further research is needed. The research question in this consequently study is:

How can a digital tool for teaching personal finance within HCS be designed to support lesson planning, sharing of material, and pupil documentation?

1.2 Delimitations

The scope of this study will not include designing pedagogical material or texts. The pedagogical content in the prototype will be taken from the previous work done by Hernwall, Hullgren, & Söderberg (2018a). The intended users are teachers within HCS, not the children that they teach.

The prototype will be used for exploring and evaluating design ideas but will not be implemented on any public platforms. Prototype technical dimensions will not be tested.

2 Scientific base

The scientific base of this thesis relies on the research made by Hernwall, Hullgren and Söderberg (2017; 2018a; 2018b) about children and digital finances, the prototype from their research, human-computer interaction, user-centered design, and prototypes.

2.1 Children and digital finances

In recent years, the Swedish research project “Children and digital finances” (Swedish: *Barn och digital ekonomi*) has researched how children between the ages 10 to 12 learn and understand personal finance in an increasingly digital world. The project was founded by *Stiftelsen Sparbankernas Företagsinstitut*, a foundation with the purpose of furthering scientific research with a connection to banking savings activities (Hernwall, Hullgren, & Söderberg 2017). The starting point of their research was that international research showed that many adults today lack the required skills to understand financial literacy and numeracy. Lack of these skills has shown to increase the risk of people planning less for their retirement, saving less, paying higher fees for financial transactions, and not being able to manage their mortgage (Agarwal, Driscoll, Gabaix & Laibson 2009; Lusardi & Mitchell 2011; Gerardi, Goette & Meier 2013; Lusardi 2015).

Hernwall, Hullgren, and Söderberg (2018a) discovered that while children don’t necessarily recognize or understand advanced financial principles or terminology, they do have an understanding of the basic concepts of bartering, production, limited resources, etc., relating to the concepts named by the authors as *value*, *resource*, and *time*. Resource represents what someone has or does not have. To understand and reflect over what a resource is, who owns the resource and what (possible) value the resource has. Value represents what someone is willing to pay, but also the reflection of what value an item has to the individual. Time represents how someone can choose to spend their resource today or save it for the future, and how this can be done with the help of a bank (for loaning or saving), but also how resources value changes over time (Hernwall, Hullgren & Söderberg 2018a). Hernwall, Hullgren, and Söderberg (2018a) argued that individuals need to understand these fundamental concepts before he or she can learn about more advanced financial principles and numeracy. It was also observed that the teachers experienced a lack of expertise within the area of personal finance and that they didn’t have the material or knowledge required for teaching personal finance to their pupils. The results indicate the importance of understanding the financial capabilities of children, and how to further its development (*ibid.*).

2.1.1 The prototype

As part of the research project (Hernwall, Hullgren & Söderberg 2018a; 2018b) a prototype of a digital tool supporting teachers in HCS, specifically personal finance, was created by interaction designers Alestedt Finta and Westling. The intended users were HCS teachers and their students. The goal of the prototype was to explore how a digital tool could scaffold learning.

Their final prototype consisted of a learning trajectory (Swedish: *lärolinje*), where one trajectory was created for each class (Hernwall, Hullgren & Söderberg 2018b). When the user (the teacher) created a learning trajectory, he or she would choose an overarching theme and how many assignments the trajectory would contain (figure 1). The assignments were designed as scenarios, with a short background story explaining the context and a small number of questions the pupils were to discuss or answer. The assignments were based on the children's experiences and how they could relate to resource, value and time, without any explicit mentions of money or other traditional financial terms (*ibid.*). The trajectory generator in the prototype did not allow for choosing which assignments it would be populated with, or if the assignments had to be suited to any kind of learning disability or cultural context.

Figure 1. The dialogue box where the user entered information needed for the learning trajectory.

The functions in the Hernwall, Hullgren & Söderberg (2018b) prototype were:

- Generate a learning trajectory.
- View assignments in the learning trajectory.
- Mark an assignment as completed.

In addition, a number of functions were implied, but not finished:

- Create a lesson/scenario.
- View other teachers' scenarios.
- View the pupil's individual development and progress.
- Print out an assignment on paper.

The prototype in this study will include all functions from this prototype, including the ones that were only implied. However, the prototypes created for this study will focus on

information design - what functions the users need, when it should be visible, and how they will interact with the system - and not on the contents or design of the pedagogical material.

2.2 Human-computer interaction and user-centered design

Human-computer interaction (HCI) is the research on the design of, use of computers, and related technology (Benyon 2014). From its beginnings with 1960's computers used for science and accounting tasks, over the decades the focus of HCI has broadened and adapted to today's widespread use of information technology in almost all areas of life. Where the HCI expert in 1960 would research ways to make use of the time-shared, room-sized computer in a more efficient way, the theoretic and applied landscapes of HCI today are more complex. As ordinary people come in contact with information technology and computers in more ways than ever before, both for leisure and for work, a good design is critical both in regard to interface design as well as user flow and user experience (ibid.). But what is good design? Good design is hard to define, but a quote that frames it well is one by Jared Spool (2008):

Good design, when it's done well, becomes invisible. It's only when it's done poorly that we notice it. Think of it like a room's air conditioning. We only notice it when it's too hot, too cold, making too much noise, or the unit is dripping on us. Yet, if the air conditioning is perfect, nobody says anything and we focus, instead, on the task at hand.

System design in HCI is governed by three main principles: attention should be given to the users early in the design process, empirical measurement should be carried out, and the design process should be iterative (Benyon 2014). Numerous methodologies and tools have been developed over the years, one of the most widespread being User-Centered Design (UCD). UCD was first proposed by Norman (1986) as a new perspective on how to design technology for humans. UCD requires, not suggests, that users should take a central part when designing a system to ensure that their needs and requirements are met. This may be done for example through workshops, usability testing, or brainstorming activities. Most importantly the users should be included early in the process, and their needs mapped (ibid.). By involving the users, them being the experts on their own context, the designers gain insights that would be impossible or at least unwise to assume (Chammas, Quaresma & Mont'Alvão 2015).

2.3 Prototypes

Prototypes can be used for both exploring problems, understanding the users and testing new ideas and is, therefore, a very helpful tool to gain insights about the users (Deininger, Daly, Sienko & Lee 2017; Dam 2019a). It is a cheap and economical way to communicate and test your ideas before developing the final product compared to developing and implementing the system in its entirety (Dam 2019a). A prototype could be a part of a systems functionality, a sketch on a piece of paper, or a mock-up made of cardboard. The use of prototypes gives the designer a deeper understanding of the user's needs (Swedish Standards Institute 2010). A prototype may take many forms – from simple sketches on a piece of paper to clickable digital interfaces. The level of *fidelity* describes how advanced the prototype is as well as how much time and resources are generally needed to produce it (Dam 2019b). Low fidelity prototypes are quick and inexpensive. The drawbacks of low-fidelity prototypes are that they

can lack realism or remove control from the user, as he or she is not able to interact with the prototype in the same way he or she would interact with a finished system, making the generated data on its use less applicable. High fidelity prototypes, on the other hand, are usually engaging and generate valid and applicable data when tested. The more finished a prototype is, the more confident can the design team be that users' responses, interactions, and perceptions of the design would be similar to that of the finished product or system. However, high-fi prototypes take longer, are more expensive to create, and the users may be more inclined to focus on superficial details (ibid.).

It is important to focus on the purpose of the prototype, rather than the design of the prototype (Houde & Hill 1997). What design questions is the prototype supposed to answer, based on the assumptions made when creating it? The medium of the prototype can be deceiving unless the designer communicates what design questions the prototype is exploring and what it's not exploring. The model also makes it simpler to isolate certain aspects of the system and to categorize the design questions that arise. It can additionally give insights on which prototyping method may be the most suitable, and what level of fidelity can be needed (ibid.).

Houde and Hill (1997) have made a model to help designers understand how to filter their prototypes in order to solve specific design questions. The model is triangular shaped (figure 2) where every corner represents different dimensions (role, look and feel, and implementation). Every dimension has different design questions guiding the designer in their exploration (ibid.). A prototype that focuses on the role explores the functionality, how the artifact will serve the user in their life - how is it useful? A prototype that focuses on look and feel refers to questions of what the users hear, feel and see at while using the prototype. A prototype that focuses on the implementation explores which techniques and components are necessary for the prototype to function. A prototype doesn't have to solely focus on one dimension, it can focus on two or all of them (ibid.).

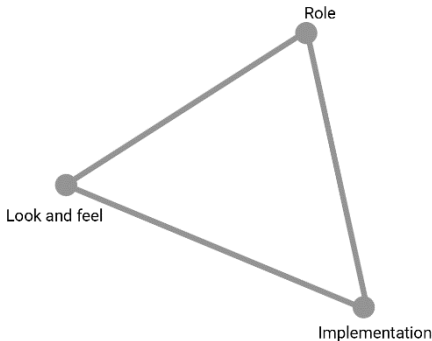


Figure 2. The model of what prototypes prototype (Houde & Hill 1997)

3 Research method

Taking the entire scope of the study into consideration, a number of different research methods and tools were considered. The chosen scientific base serving as a permeating method for this study was design science, as proposed by Johannesson and Perjons (2014). The main aim of the design science approach is to solve a practical problem of general interest and to generate knowledge about the artifact (artifact: an object made by humans with the intention to be used for a practical problem (Perjons 2014, p. 13)). Another possible approach would have been design-based research which also strives to develop an artifact (Brown 1992; Collins 1992). However, the goal of design-based research is to also develop new theories (Anderson & Shattuck 2012). This purpose, while not in any way insignificant, was deemed less suitable as the aim of this study was not to develop new theories but to generate a prototype customized for the target audience (teachers in HCS). In addition, design based research is more time-consuming than design science - an issue for this study which has a limited time frame.

3.1 Design science and case studies

One of the strategies within design science is case studies, a research strategy that offers rich in-depth insight and descriptions of one (or a few) instances of a phenomenon (Johannesson & Perjons 2014). In order to understand both what goes on in a setting and why those things occur, case studies focus on the processes and relationships within the setting. Case studies encourage the researcher to use several methods and a variety of types of data (ibid.).

The purpose of this study is to investigate how a digital system can support teachers of HCS in Swedish schools, specifically within personal finance. A possible disadvantage with case studies is the difficulty to generalize the result and apply it to other settings (Johannesson & Perjons 2014). However, case studies are well suited for small projects that focus on the implications that would not have been identified in a project that covers a wide range of instances. In addition, case studies are suitable for small-scale research as it allows the researcher to use several data collection methods (Denscombe 2014).

A possible alternative strategy within design science would have been action research, a strategy that focuses on the real world and practical problems that occur within it. Action research concentrates on practice and change of practice while having the participants actively contributing to the development. It is a popular strategy within social research in several areas where education is one of them (Denscombe 2014). Action research requires a higher degree of participation from stakeholders, which may present difficulties in recruiting participants with enough time to spare. Research results can be difficult to generalize due to the stakeholders being likely to inject their own subjective views and thereby affect the confirmability negatively (Johannesson & Perjons 2014). One of the goals within action research is, as mentioned before, to make a change in practice (Denscombe 2014) however, the goal in this study is not to make a change in practice but to develop a prototype. The fact that case studies support the use of several data collection methods is suitable for this study as it will help the design team in this study to gather varied data to use as a foundation

of the design of the prototype. Because of this, the design team decided to use case studies instead of action research.

3.2 Design thinking

The design process in this study was based on design thinking, a non-linear method with five different phases: *empathize*, *define*, *ideate*, *prototype*, and *test* (Interaction Design Foundation 2019). During the empathize phase the designer gathers information about the design problem in order to empathize with the users and their needs. The define phase defines the users' needs and problems by analyzing the material gathered during the empathize phase. The ideate phase generates ideas based on the knowledge from the previous two phases. The prototype phase concretizes representations of the produced ideas. The test phase is where the you test the created prototypes to test the design (Interaction Design Foundation 2019). The process is not linear, and the designer can switch from one phase to another (figure 3) (Interaction Design Foundation 2019).

Using design thinking as the design process framework for this study aligns well with the case study strategy, and especially well with user-centered design. Using design thinking also encourages testing out ideas and searching for alternative ways to support user concerns. All data collection and analysis methods are described further below. The empathize phase was conducted with questionnaires and interviews. The define phase was conducted by thematic analysis. The ideate, prototype, and test phases were conducted by evaluating a prototype built in Adobe XD¹ and tested in Canvasflip². The design process in this study consisted of four iterations. The prototype used in the first iteration was the prototype presented in chapter 2.1.1, in the second iteration a new prototype developed by the design team was tested, that later one got redefined and tested again in two additional iterations.

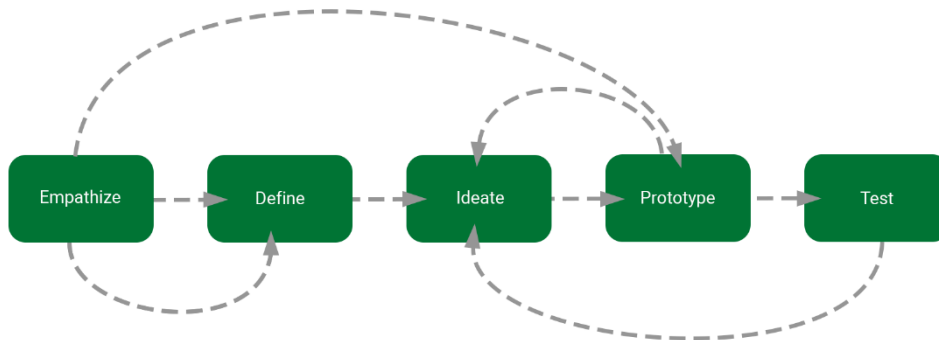


Figure 3. The design thinking process and its five phases (adapted from the Interaction Design Foundation 2019)

3.3 Data collection methods

Several methods have been included in the data collection in order to get a comprehensive view of the setting (Denscombe 2014). Questionnaire, semi-structured interview and

¹ <https://www.adobe.com/se/products/xd.html/>

² <https://www.canvasflip.com/>

cooperative evaluation were the chosen data collection methods for the study. All user sessions were recorded and transcribed.

3.3.1 Questionnaire

Questionnaire is an economic method that is well suited to gather large quantitative data quickly, although it is difficult for the researcher to ascertain the truthfulness in the answers (Denscombe 2014). In this study, the questionnaire was a part of the empathize phase to collect background information about the stakeholder group (HCS teachers). The results were not used for motivating the design choices in the prototype. Instead, the main use of the questionnaire was to find motivated and relevant participants for the other design activities. Questions included, among others, were which municipality the respondents worked in, pupil group size, and use of educational methods and materials. The questionnaire can be found in Appendix B.

The questionnaire was distributed online through Google Forms³ and consisted of both multiple choice and open questions. While there is still some risk that the data collected from the responses is invalid or incorrect (Denscombe 2014), the design team decided that using a questionnaire was worth the risk as the main purpose of the questionnaire was to find participants.

An alternative method for distributing the questionnaire, which would also have mitigated some of the issues with not reaching a representative group of users (further described in 3.4 Participant selection), would have been to mail the questionnaires to relevant teachers through their respective workplaces. This would, however, present some issues, mostly related to time constraints and to response rate. An online questionnaire is quicker to distribute, quicker to summarize, and does not require a lot of time or resources to post online (Denscombe 2014). Mailing a questionnaire by regular mail would have taken several days and would not guarantee that they would even reach the correct recipients. Mailing back the response would also require considerably more effort from the participants. The trade-off of possibly only reaching a small number of teachers in an already active community was, therefore, less severe than possibly receiving even fewer responses even if these responses may have included participants who were not active in any community for teachers within HCS.

3.3.2 Semi-structured interviews

Interviews are effective for collecting sensitive and complex data which can give the researcher valuable insight on the users and their context. Although time-consuming, it is a common method of gathering data and insights about users (Denscombe 2014). The interview method chosen for this study was the semi-structured approach. The main advantage of conducting semi-structured interviews rather than, for example, deploying a questionnaire is the possibility to ask what and why, and to go off script when needed. The questions in a semi-structured interview are open-ended and encourage the interviewee to elaborate their thoughts. This leads to a more natural dialogue between the interviewer and the participant, which can have a positive effect of making the participant feel more at ease and thus more likely to give truthful and useful answers (Rubin & Chisnell 2008). However, this effect is two-fold. Respondents may answer differently depending on how they perceive the

³ <https://www.google.com/intl/en-GB/forms/about/>

interviewer, and the answer could be affected both by personal attributes (e.g. sex, age, accent) but also by how the interviewer present themselves or react (ibid.).

A possible alternative interview method is a structured interview. While a structured interview has a higher dependability and transferability, it is less fitting for the case study method where focus lies on gathering as much detailed data as possible (Denscombe 2014) as it is highly unlikely that the design team would be able to pre-conceive all possible outcomes and questions required to write a comprehensive enough interview script. Because of this, the design team decided structured interviews would be too time-consuming and create a risk of asking incorrect or insufficient questions. In order to properly investigate the complexity of the setting, while not overwhelming to the participants with exhausting interviews, semi-structured interviews were chosen over a structured format.

The interviews conducted during the empathize stage of the study focused on understanding the current situation for the teachers. The interviews were conducted one-on-one by phone or in person, and the audio was recorded. The two members of the design team each acted as either note-taker or interviewer. Questions about lesson planning, pupil evaluation, and teaching materials were explored (the interview script is available in Appendix C). As well as being asked about their own experiences, the participants were shown the existing prototype (as described in 2.1.1) and were permitted to navigate around it themselves. Afterward, the participants were asked a few questions about the functions in the prototype and how they would be used in a real-world context. These questions aimed towards discerning how and why these functions could affect their own work routines as teachers.

3.3.3 Prototype evaluation method

The two prototype evaluation approaches considered for this study were expert evaluation and participant-based evaluation (Benyon 2014). The former consists of methods where no users partake in the evaluation and the latter may be done entirely by the users or in cooperation with the designers. While both have their strengths and drawbacks, participant-based evaluation is usually desired as it provides input that would be impossible to gather without their participation (Benyon 2014). In addition, as the design team had limited knowledge of the domain, participants would be crucial to create a design that would actually correspond to their needs. Lastly, participant-based evaluation activities align with the user-centered approach of this study, which requires users to be part of the evaluation as well as other parts of the design process (ibid.). Consequently, a participant-based evaluation was preferred over expert evaluations.

In this study, the method for participant-based evaluation was cooperative evaluation. Cooperative evaluation is a method where the participant performs a test with a set of given tasks and is encouraged to say their thoughts out loud during the test (Wright & Monk 1991). Afterward, a post-test interview is conducted focusing on the participant's experience with the prototype (Benyon 2014).

The design process in this study consisted of four iterations. The prototype used in the first iteration was the prototype presented in chapter 2.1.1, in the second iteration a new prototype developed by the design team was tested, which replaced the previous prototype as the base for the two remaining iterations. The tasks and interview scripts for the cooperative evaluations are found in Appendix D-G. 2-4 cooperative evaluations were conducted in each

iteration. The number of evaluations was based on Nielsen's recommendation that 3-5 participants are sufficient to gain enough understanding of the user context (Benyon 2014). However, in one of the iterations the number of participants was fewer than three due to difficulties with recruiting. The design team decided to move forward instead of postponing the next iteration, as the consequences of delaying the study would be larger than the contribution of one additional evaluation for this particular iteration. The cooperative evaluations were done both remotely and face-to-face, depending on which was most convenient for the participants. The prototypes were presented to the participants using Canvasflip, online software for user testing.

In each test, participants were given 2-3 tasks they were to perform. They were informed that the main purpose of the tasks was not to evaluate how fast or "good" they were at completing them but to be a guide to explore the prototype. This was to avoid performance anxiety (Rubin & Chisnell 2008). If the participants took too long to complete a task, they were asked to move onto the next one. No clues were given on how to proceed, and if the participants were unsure and asked what to do, they were simply encouraged to try and see what would happen. The design questions that the design team wanted to answer with the cooperative evaluation was how the prototype would serve the teachers in their work, but also what experience the teachers would have while interacting with it. Therefore, the design of the prototype focused on both role and look and feel (Houde & Hill 1997). The goal of the look and feel-prototyping was not to define the aesthetic detailing, but terminology, location of different elements, and the user flow. The post-test interview focused on how the participants related to the functions in the prototype, and how they would fit into their current work routine. They were asked to rate the usefulness and elaborate on when and why they would use it.

3.4 Participant selection

Participants in this study were sourced mainly from the questionnaire which was published in four different Facebook groups for teachers in HCS (*Hem-och konsumentkunskapslärare*, *HK-portalen lärarforum*, *Lärare i hem- och konsumentkunskap*, and *Hem- och konsumentkunskap*). However, it proved difficult to gather enough participants this way and the design team had to recruit participants through personal contacts as well. The participants were required to be a teaching HCS. Originally, the participants were required to live in Stockholm or Södertälje to facilitate face to face meetings. However, due to the difficulties of recruiting the design team decided to accept participants from other locations and instead conduct some interviews and evaluations remotely.

Teachers who are members of teacher network community may be more invested and interested in sharing and trying out new methods and tools than those who are not (Hernwall 2018). This means there is a risk that it is only a certain type of teacher who would be responding to the questionnaire and subsequently evaluating the prototype. This affects the credibility of the results, but the design team decided that the benefits would outweigh the risks.

3.5 Data analysis

A researcher may choose between a large number of methods to categorize, analyze, and make sense of the collected data. For this study, the design team chose to conduct a textual analysis of audio transcriptions. Content analysis is a method that aims to quantify large bodies of text to make sense of the contents and possibly uncover underlying meaning which may have unconsciously been conveyed by the source, and the underlying message may sometimes even differ from the intended message (Gerbner, Holsti, Krippendorf, Paisley & Stone 1969; Krippendorf 2013). The results from a content analysis produce easily replicable and comparable data (Denscombe 2014). A similar method is thematic analysis, a method that strives to find patterns in large bodies of text by classifying and categorizing words or whole sentences expressed by the participant to produce hierarchical maps of codes and categories (Braun & Clarke 2006). Thematic analysis is a flexible method that is useful for analyzing across a data set to find repeated patterns of meaning. Content analysis focuses more on the frequency by quantifying the data, while thematic analysis puts less focus on the frequency of words and more focus on the meaning of them (ibid.). For this reason, thematic analysis was chosen as the method of data analysis for this study.

To create a thematic analysis, the interview transcriptions were coded deductive, this means that the codes were generated by the design teams analytical interest rather than being generated without trying to fit it in a pre-existing coding frame (Braun & Clarke 2006). In this study, the gathered data was analyzed in the first iteration to identify the participants' needs and requirements, in the remaining iterations the data was analyzed to identify the perceived frictions and delighters as well as the participants' requests. The data gathered was summarized into tables by themes, categories, and codes. Codes could begin as being actual words or sentences said by the participants and could later be modified into more comprehensive codes.

The coding was done as close to the actual interview as possible to avoid losing any inherent meaning or adding new meaning where there earlier was none. Each interview was coded separately, as the results varied somewhat between each participant, but the overall results were combined and categorized to create the basis for the ideation stage. To ensure sufficient dependability of the data, each member of the design team made their own coding individually and then discussed their results together. The software used for the coding was Google Docs⁴, an online software that allows users to mark-up words and write comments.

3.6 Data quality

This study is based on qualitative research and will therefore not use validity and reliability as measurements for verification but instead credibility, dependability, transferability, and confirmability as suggested by Denscombe (2014). The reason for this is that the subjective and highly contextually dependent nature of qualitative data is very difficult to replicate (ibid.). Credibility measures if the qualitative data have been produced and checked in accord with good practice. Dependability measures how likely it is that another researcher would have come up with comparable findings using the same methods. Transferability measures

⁴ <https://www.google.com/docs/about/>

how likely it is that the findings could be transferred to other instances. Confirmability measures how much the findings are influenced by the researcher (Denscombe 2014).

Considering the low number of participants in one of the iterations but weighs it against the fact that the participants were representative users and that further validation was made in later iterations, transferability in this thesis is acceptable. However, in order to reassure a higher transferability and a more reliable result further testing should be made to validate the design of the prototype.

The dependability of this thesis is good, the implementation of the methods and strategies have been presented thoroughly and all of the interview scripts and tasks can be found in the Appendix. However, as in any qualitative study, there is no certain way of knowing if another researcher would have generated the same results and made the same conclusions (Denscombe 2014). The thesis credibility is also fair, as the data were analyzed independently by two researchers before any design decisions were made and the participants' answers were validated several times and could thereby be viewed as accurate and truthful. Lastly, research confirmability is deemed to be good, as the methods and techniques used were chosen partly to reduce personal interference in the data results.

3.7 Research ethical aspects

The methods and findings of this study were consciously reviewed and documented in an organized way. The methods and findings were presented in an open and truthful way. No laws were broken. This study complies with the guidelines for handling research material as proposed by Vetenskapsrådet (2017) by considering confidentiality, anonymizing of data, and professional secrecy. There was no unauthorized use of others' research results, and the judgment of others' research was fairly reviewed. All participants were handed a consent form that informed them about the study, and how their data would be used. All participants signed the consent form and participated voluntarily; they were informed that they could terminate their participation whenever they wanted. The participants and the information that they gave were handled anonymously. Before every interview, every participant was asked if it was okay that the interview was audio recorded.

Recordings and transcriptions were saved on Google Drive⁵, and are to be destroyed when the study is completed, as well as the questionnaire and its responses. Written communication with participants, including e-mail addresses and content, are to be deleted after the study.

⁵ <https://www.google.com/drive/>

4 Results and analysis

This chapter presents the result and analysis of each of the four iterations. As stated, the first iteration was based on a previously created prototype. The subsequent three iterations were based on an entirely new prototype, created by the design team. Each iteration resulted in a thematic analysis (found in Appendix M-P), and key takeaways that were used to iterate the prototype.

4.1 The first iteration

Design phases:	Empathize, Test
Participants:	3
Prototype version:	Alestedt Finta and Westling’s prototype (Hernwall, Hullgren & Söderberg 2018b)
Tasks included in the test:	Create a learning trajectory

The first iteration focused on empathizing with the users and testing the prototype made by Alestedt Finta and Westling (Hernwall, Hullgren & Söderberg 2018b). The first iteration gathered data through a questionnaire, interview, and cooperative evaluation.

The questionnaire gathered 114 responses, most of the respondents were teaching personal finance in the upper levels of compulsory education, grades 6-9. The respondents used several teaching aides such as the “regular” subject book, other books than the “regular” subject book, videos, quizzes, and material gathered from Swedish authorities. Only a few respondents shared that they used material they had created by themselves.

Three interviews and cooperative evaluation were conducted to inquire about the use context. The task in the first iteration was to create a learning trajectory. The interviews showed a few key issues concerning the state of teaching personal finance: the participants experienced that they needed more time for planning and documentation than they were scheduled. Finding good material within personal finance was something they experienced as hard and time-consuming. The participants felt a need to share their ideas and material within HCS. Some of the participants did this by participating in different networks while others did not. The reason for not sharing was because they hadn’t found a suitable network yet.



Figure 4. The learning trajectory in the prototype made by Alestedt Finta and Westling (Hernwall, Hullgren & Söderberg 2018b)

The learning trajectory (figure 4) was the only function in the prototype that was possible to test. Therefore, it was the only function that could be tested in order to identify frictions and delighters with the prototype. Other functions such as material sharing and pupil documentation were discussed, but not with the prototype as a point of reference. The cooperative evaluation showed that there was some confusion regarding the graphical presentation of the learning trajectory. The numbers made them believe that the assignments would become harder and harder, but the graphic form of the line made them think that maybe it didn't. The participants questioned why some bubbles were facing up from the line and some bubbles down from the line. The participants did not understand the meaning of the word learning trajectory, suggesting the word was easy to misinterpret.

One of the participants requested that she wanted to be able to share the material digitally and not just by printing. She had a budget on how many papers she was allowed to print and she felt a bit ashamed if she printed out too much; *Yes, one should be ashamed if one leads the league "has copied the most"* (translated from Swedish, original wording in Appendix L). The opportunity for the pupils to perform the assignments digitally were different at the participant's schools, two of the participants worked at schools who offered one laptop per pupil but the third participant worked at a school where she had to book and borrow laptops from the school, which was a very complicated and time-consuming process.

For more pictures and descriptions of the prototype see Appendix G.

4.1.1 Key takeaways iteration 1

- The participants spend a lot of time to find good material within personal finance, they want access to good material that they can modify to suit their pupils' needs and social context.
- The participants have a need for sharing and discussing their material with other HCS teachers.
- The word learning trajectory could perhaps be replaced with another word that speaks more directly to the users.

- Possible solutions of how to see one individual pupil’s development and how to share material with teachers and pupils should be explored.
- The participant experienced the prototype as confusing and therefore a complete rework of the design is necessary.

4.2 The second iteration

Design phases:	Define, Ideate, Prototype, Test
Participants:	2
Prototype version:	Ervasti and Nyström version 1.1, and Ervasti and Nyström version 1.2
Tasks included in the test:	Create a new learning trajectory, create a rough draft of a teaching plan, share own material with other users.
Major design changes:	Complete rework of the interface, including a new main menu and graphics. Redesign of the learning trajectory. Added a shared materials function.

The second iteration focused on define, ideate, prototype, and test. A new prototype had been made based on the insight from the first iteration. The tasks included in the iteration was: create a new learning trajectory, create a rough draft of a teaching plan and to share their own material with other users. Two participants were recruited for this test, of which one had been part of the testing of the previous prototype. Although two participants could arguably be too few for one iteration, a decision was made to continue to the next iteration regardless. The reason for this was to keep the projected schedule and that the two participants were considered as representative users (HCS teachers).

The new prototype focused on planning and sharing material with other teachers. The prototype had less focus on the graphic design of the look & feel of a potential finished product, focusing instead on layout and user flow. The new prototype utilized only one primary color (purple) and one secondary accent color (green). Buttons and graphical elements were designed specifically to look “unfinished”, and interactive elements were represented with a minimum level of detail. Colors were used mainly as visual guidelines.

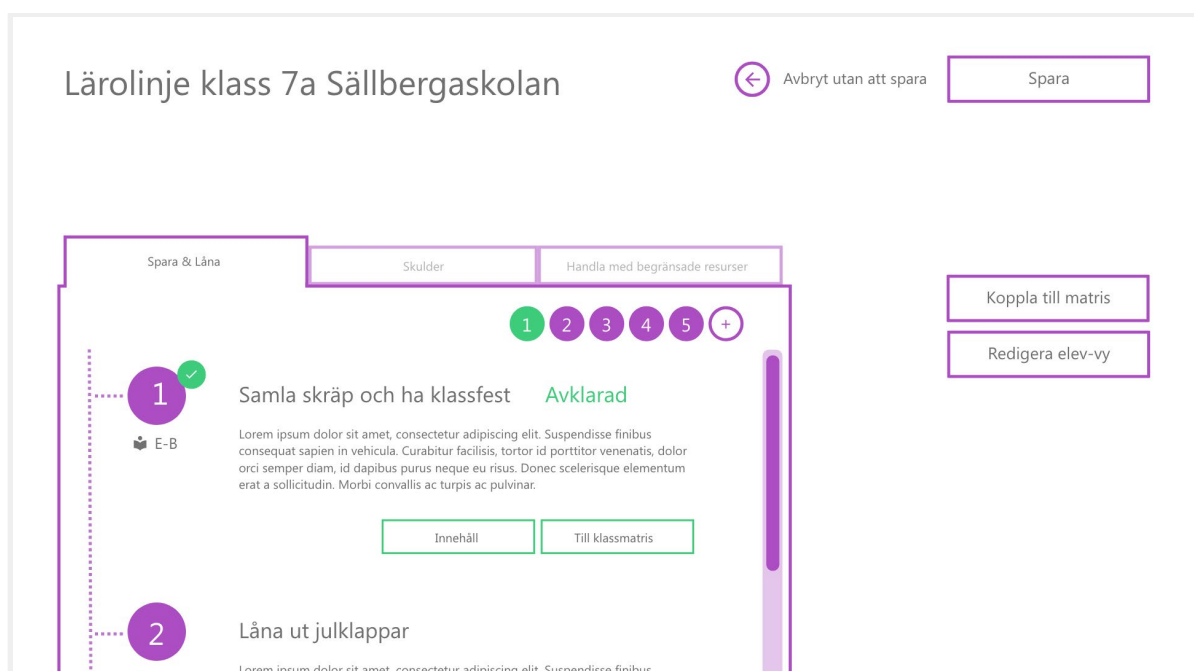


Figure 5. The overview of a learning trajectory

Due to the participants being confused by the word learning trajectory in the first iteration, two prototypes were tested in this iteration. One with the function to make a learning trajectory (figure 5) and share material with other teachers, and a second alternative prototype with the function to make a rough draft of a teaching plan (figure 6). There were slight similarities in visual design and wording between the two prototypes, but the purpose of the participants' tasks was the same: to create a plan of what assignments the pupils were supposed to do.

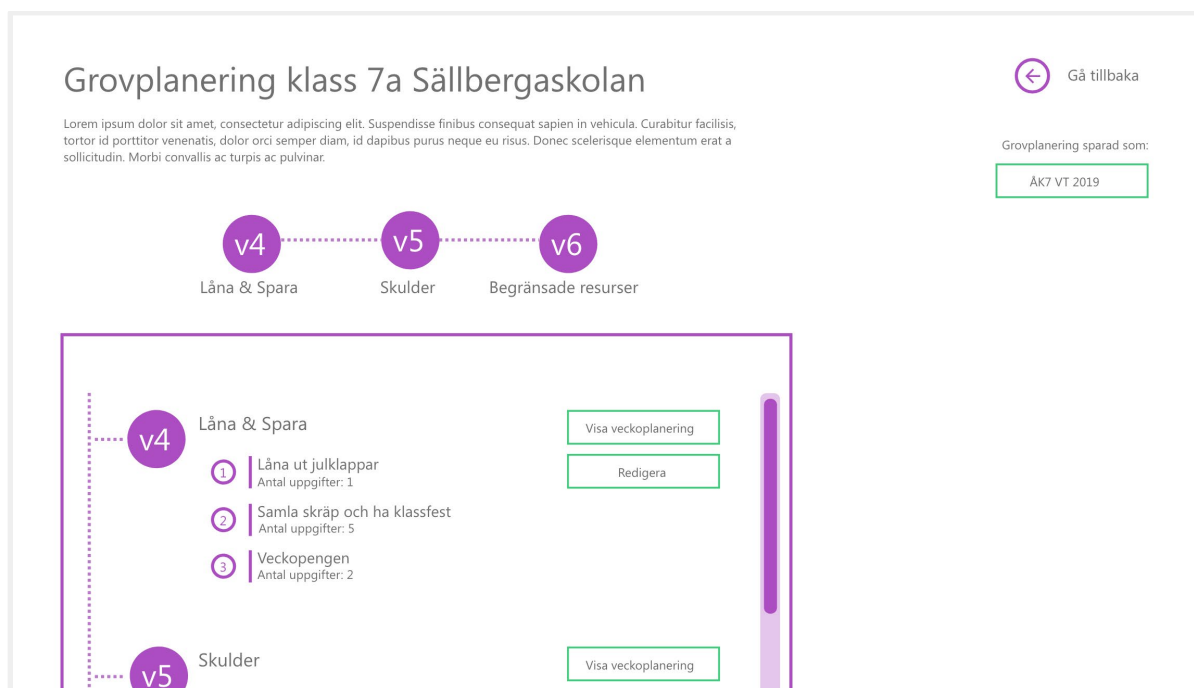


Figure 6. The overview of the rough draft of a teaching plan

The participants were overall successful in completing the tasks, although there were some issues with basic navigation. There was a header indicating where the user was in the system (figure 7), there was also a button to go back but other than that there wasn't anything guiding the users within the system. The terminology felt familiar, although some words had been matched with the wrong functions (such as *matrismål*).

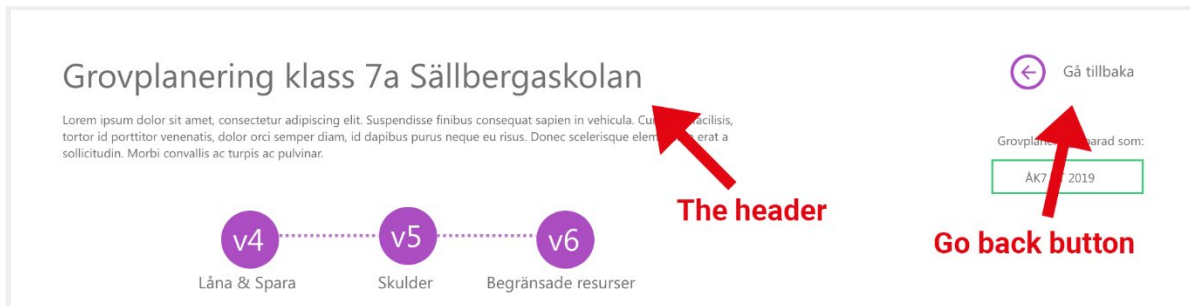


Figure 7. The header at the top of the screen to the left indicating where the user was in the system.

The participants felt that the rough draft of a teaching plan (Swedish: *grovplanering*) was more similar to their current workflow as they could create a weekly schedule, but also because they felt like the learning trajectory was static while the rough draft could be modified. In other words, the participants perceived the learning trajectory to be less modifiable than a rough draft of a teaching plan. They wanted the planning to be flexible and easy to overlook and consequently preferred the rough draft of a teaching plan. They also felt that the word for learning trajectory was easy to interpret the wrong way because they didn't use that word, while the word for the rough draft was something they understood and used in their work.

The participants liked the idea of sharing their material with other teachers but there were several icons in the design of sharing material that they didn't interpret the way the design team had intended. Therefore, the design of sharing material didn't communicate correctly with the users. For example, one of the participants thought that by pressing on the keynote (figure 8) she would see the audio files, however, the meaning of the icons was to indicate what kind of materials were included in the assignment. Another participant did not understand what the meaning of the cloud with the arrow (figure 8) was since she had never seen that icon before.

Furthermore, the participants pointed out that it would be unlikely for an assignment to be suitable for more than one grade, the pupils' reasoning ability in the sixth grade was a lot lower than their reasoning ability in the ninth grade. It could perhaps be more useful to only be able to set one grade as the target level or to describe how the assignment mapped towards the learning goals of HCS. It was possible to choose only one grade in the prototype, but there were examples in the prototype of assignments declared to be suitable for several grades.

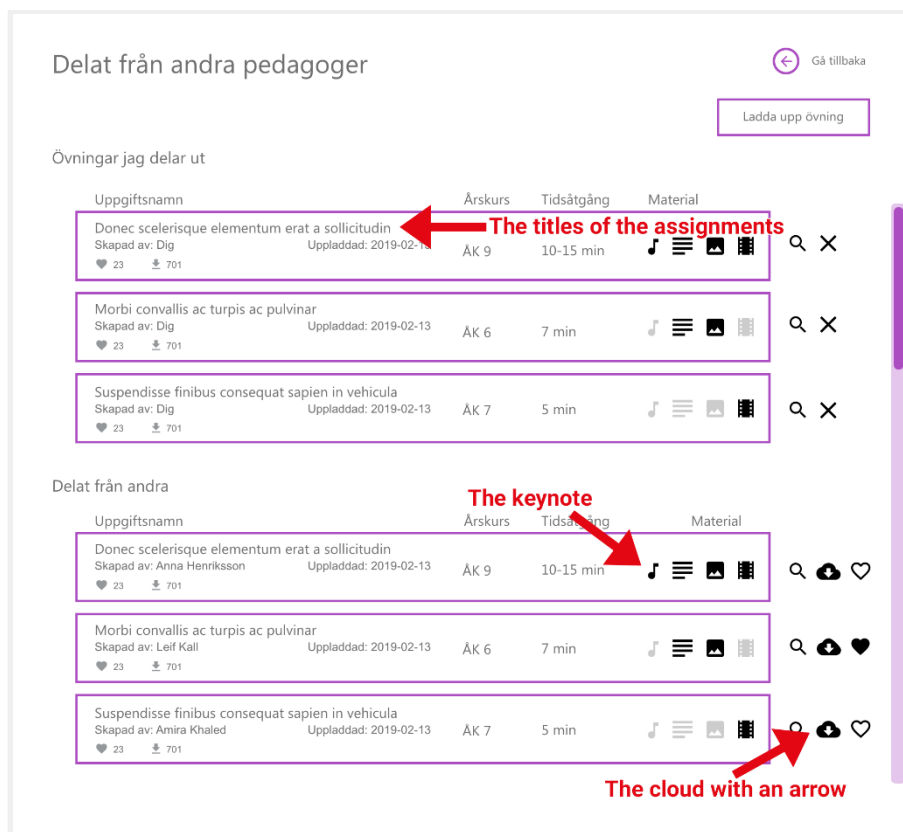


Figure 8. The interface of the part of the system where the user could see material that they shared to others but also material shared by other users.

The use of placeholder text was a point of confusion in some cases, as the participants relied on the text guiding their way forward. This created situations where they would read the text, which was illegible, and becoming frustrated simply because they couldn't understand it. An example of this is the list of shared assignments (figure 8; Delat från andra pedagoger), where the lorem ipsum placeholders were so disruptive in the user flow that participants would be unsure on what exactly the titles were meant to represent, and if they were important to contribute to their goal of adding an assignment to the rough draft. Even though the participants struggled a bit with the navigation they enjoyed that there were few options and choices to make. One of the participants said: *I liked that it was simple, it wasn't so difficult to see where to click. I like that there aren't so many things [on the screen]* (translated from Swedish, original wording in Appendix L). The participants experience the current systems (*Schoolsoft* and *Vclass*), at use at their workplaces as being too complicated with "too many buttons and levels".

For more pictures and descriptions of the prototype see Appendix H and I.

4.2.1 Key takeaways iteration 2

- The rough draft of a teaching plan was easier for the participants to relate to than the learning trajectory and therefore will the learning trajectory will be removed from the prototype.
- The function for sharing materials with other teachers was positively received but the design requires further development.
- The exact meaning and function of the icons was unclear for the participants, therefore, the icons will be redesigned or replaced.

- The participants struggled when they encountered the lorem ipsum placeholder text, they should be replaced with realistic example text.
- The participants had some issues knowing their location in the system and how they ended up there. Guiding navigation elements should be added to ease the navigation.

4.3 The third iteration

Design phases:	Define, Ideate, Prototype, Test
Participants:	4
Prototype version:	Ervasti and Nyström version 2
Tasks included in the test:	Change one pupil’s grade, share an assignment with the class, save material from other users.
Major design changes:	Added pupil documentation and assessment. Complete rework of the shared materials function. Replaced the learning trajectory with a rough draft of a teaching plan. Removal of lorem ipsum placeholder text replaced by example text. Added breadcrumbs for navigation.

The third iteration of the prototype explored the grading, sharing material with pupils, and shared teaching material functions. This iteration, only one version of the prototype was needed. Four evaluations were conducted, one of which involved participants who had seen the previous iteration. A function to grade pupils was added, a need that had been identified during previous iterations. All placeholder text was removed to reduce the risk of confusion and replaced by realistic titles and example text, although some of them duplicates. The screen with shared materials was reworked, with a clearer interface and fewer icons. Above the header breadcrumbs were added to improve navigation, the breadcrumbs consisted of the title of the current screen and the screens that the user had visited before (figure 9).



Figure 9. Breadcrumbs at the top of the screen to the left indicating where the user is and where it’s been.

The participants were less successful in completing the tasks during the third iteration. This was mostly due to the participants not finding the correct buttons as they were not always visible without scrolling. Apart from pure usability issues, the participants felt that the functions (documentation of the pupils’ grades, sharing material with other teachers and pupils) were useful and would be of value to their work routine overall, although they had some thoughts on how they could be better. The participants’ suggestions for improvement were: able to sort lists with material by the different categories (duration, grade, etc.), easier to see what grade a specific pupil had while looking at the list with the entire class, and a home button to quickly go back to the start screen. They also commented on the choice of color in

the prototype, and suggested that they would perhaps like another color better. The participants were still experiencing issues with the navigation, even though there were breadcrumbs added to this iteration. The breadcrumbs were meant to show the user where they were in the system, the participants in this study were however not used to breadcrumbs and therefore they asked for a home-button instead.

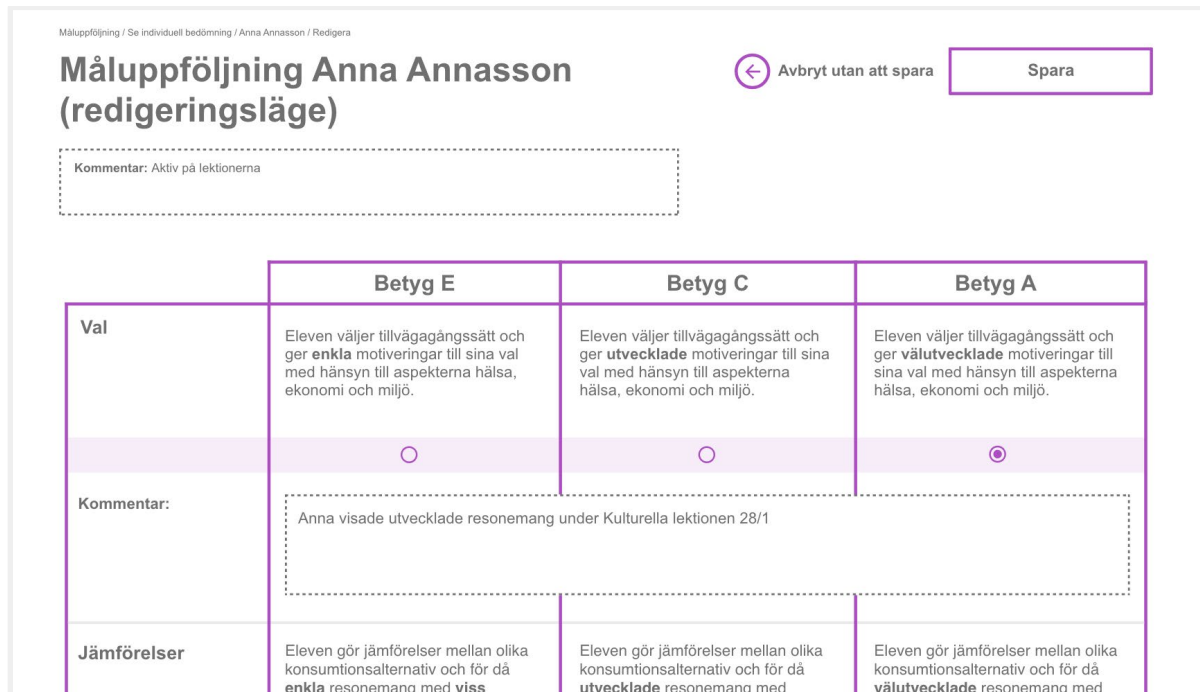


Figure 10. The grade overview in editing mode for one specific pupil

The functions to grade and comment on pupils in classes were deemed useful but were taking too long in their current form (figure 10). The participants preferred to write down quick notes after each class while their memory was still fresh instead of making more careful notes later. Some of them had concerns on whether the notes were going to be shown to someone else - there was a marked difference in the kind of comments a teacher might make for him- or herself, rather than one that the pupil or parents might see. It is worth noting that participants were careful to remark that this did not mean that the comments would be inappropriate, but rather that they would be written in a less abstract language and more relatable to the everyday reader. Some of the participants commented that the function would be ideal for pupils to have constant access to. In that case, they would use the comment function for describing what the pupil could do to better their grade. One participant commented that she wanted to be able to write her own grade criteria so that she could use a language more suitable for the pupils, she said: *I would like the opportunity to add my own grading criteria or choose to take one that is completed and directly mapped to Skolverkets knowledge requirements. If I can create one by myself, I can write what it actually means, not use the same stiff language as in Skolverkets knowledge requirements* (translated from Swedish, original wording in Appendix L).

Sharing with pupils, in this case an assignment (figure 11), was deemed to be either very much needed or not needed at all. Since the participants had very different teaching contexts and personal preferences, including access to digital technology, opinions were divided. The participants who felt they did want to share assignments with the pupils via the system

commented that they would especially use the function for sharing homework assignments. They expressed a need to share material with individual pupils, and to be able to share it by many different means when, for example, they were teaching a class in which some pupils required customized material (another language, dyslexia-appropriate, etc.). The participants who did not feel the need of a way to share material through the system preferred to guide their pupils by orally presenting the assignments themselves, as they experienced that it gave them more control on how the material was received by the group.



Figure 11. The dialogue box with different alternatives of how to share the assignment with the pupils.

In the third iteration, the design was completely remade from the earlier iteration, the new interface had a cleaner look with less distinct lines and fewer icons (figure 12). The participants still expressed confusion about the icons as they couldn't understand the visual difference between the icon states (saved – not saved, liked – not liked). Participants expressed that they would benefit from this function, although they perhaps wouldn't use the materials "straight off the shelf". Instead, they described that they would want to save an assignment, review its contents, and then modify it so that it would be more suitable for their own classes and context. This could include giving different examples to changing the theme of the assignment entirely and only keeping the pedagogical scaffolding.

A clear example of this is the assignment in the prototype called *Collect trash*, it was met with the reaction that *I would never encourage my pupils to go out and collect trash in the schoolyard, it's too dangerous*. So even though the pedagogical material in the assignment was deemed good the teacher did not want to use the assignment since she thought that her pupils would then want to collect trash which could put them (according to her) in danger. As in previous iterations, the participants mentioned that the share materials function itself was needed, and that they currently visited various web sites or reached out through various networks.

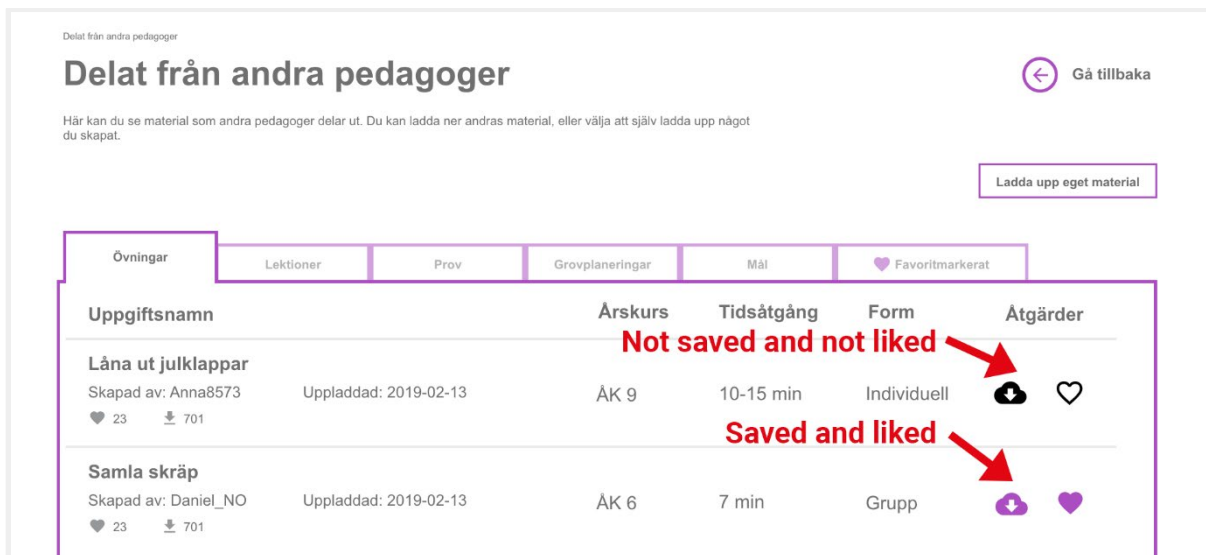


Figure 12. The new interface of the part of the system where the user could see material shared by other teachers.

For more pictures and descriptions of the prototype see appendix J.

4.3.1 Key takeaways iteration 3

- There needs to be a way to categorize the list of shared materials.
- The pupil grading and documentation is too slow, does not give enough information at a glance, and is cumbersome to use. Further research and development are required to complete the function.
- Sharing lesson assignments or other materials with a class is useful, but the users need to be able to choose which pupils to share the material as not all classes or pupils are alike.
- The states of the icons need to be reworked so that the participants understand the meaning of them.

4.4 The fourth iteration

Design phases:	Prototype, Test
Participants:	3
Prototype version:	Ervasti and Nyström version 3
Tasks included in the test:	Share lesson with pupils, change the grade of a pupil, add a comment about a pupils' grade, share their own material with other users.
Major design changes:	Redesign of pupil grading and documentation. Added a top navigation bar to all screens. Added sorting functionality and icon rework on shared materials. Added functionality to sharing material with pupils.

In the fourth and last iteration, the focus was on prototype and test. The tasks that were given to the participants were: share a lesson with pupils, change the grade of a pupil, add a comment about a pupil's grade and share one of their own assignments with other users.

Three evaluations were conducted, one of which involved a participant who had participated in all of the earlier iterations.

For this iteration, a top menu was added to the top of the prototype (figure 13), the menu was static and therefore a part of every screen in the prototype. Using the top menu, the user could change class, go back and go home. This replaced the breadcrumbs in an attempt to make it easier for the participants to navigate in the system and switch between classes. In this iteration the participants did not struggle with the navigation, they expressed that they felt that the home button made them feel comfortable since they could always go back to the first screen.

Betyg	Elev	Allmän kommentar												
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E	C	A												
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Figure 13. The grade overview of a class showing both the pupil's grade per goal but also the general comment.

The grading function received overall positive feedback, although one participant commented that having one comment per grade level would garner too much attention to the grade itself (figure 14), which was described as having a negative impact on the pupil. The participant felt that was important, as she would use the grading documentation as a tool for communicating with pupils and their parents. Another participant felt that the function would still take too long - she had made her work today more effective by creating "templates" of text which she could swiftly personalize when she pasted it into the grading sheets of her pupils. Two participants mentioned that they wanted to use the grading function as something that they could show to the pupil and their parents during their individual development session.

	Betyg E	Betyg C	Betyg A
Val	Eleven väljer tillvägagångssätt och ger enkla motiveringar till sina val med hänsyn till aspekterna hälsa, ekonomi och miljö.	Eleven väljer tillvägagångssätt och ger utvecklade motiveringar till sina val med hänsyn till aspekterna hälsa, ekonomi och miljö.	Eleven väljer tillvägagångssätt och ger välutvecklade motiveringar till sina val med hänsyn till aspekterna hälsa, ekonomi och miljö.
	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Kommentar:	Anna visade utvecklade resonemang under Kulturella lektionen 28/1		
Jämförelser	Eleven gör jämförelser mellan olika konsumtionsalternativ och för då enkla resonemang med viss koppling till konsekvenser för privatekonomi.	Eleven gör jämförelser mellan olika konsumtionsalternativ och för då utvecklade resonemang med relativt god koppling till konsekvenser för privatekonomi.	Eleven gör jämförelser mellan olika konsumtionsalternativ och för då välutvecklade resonemang med god koppling till konsekvenser för privatekonomi.
	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Kommentar:			

Figure 14. A table showing one specific pupil's grade and comments per requirement



Figure 15. The dialogue box showing alternatives for how to share the assignment with pupils.

In this iteration dialogue box for sharing with pupils was developed further adding the functionality to share material with specific pupils (figure 15). The function to share a classroom task with pupils was overall deemed to be useful. One participant remarked that it would be even better if the pupils could do the assignments or task directly in the system. Sharing materials with and from other teachers was, like previous iterations, something the participants wanted to do only to modify it and make it their own, one participant said:

Material shared from other teachers is awesome, otherwise you are searching by yourself a long time. It can be hard to find material of good quality. I often adjust the material, I take the idea and I adapt it for the pupils.

Translated from Swedish, original wording found in Appendix L. Two of the participants in this iteration commented on the color and advised the design team to choose another color than purple.

For more pictures and descriptions of the prototype see Appendix K.

4.4.1 Key takeaways iteration 4

- The breadcrumbs for navigation helped the users feel less lost in the system.
- Pupil documentation might be used both for personal use and for showing other stakeholders (eg. pupils and their parents).
- The grading function is still too slow and requires further development to ease the documentation of pupils
- The participants want to integrate the pupils in the system so that they can perform the assignments directly in the system.
- The function to share material with other users got the same feedback as in the third iteration. It is a sought-out function, but the participants want to modify the material so that it's more suitable for their pupils' context.
- The home button eased the participants experienced navigation in the prototype.

5 Discussion

This research has examined how a digital tool for personal finance within HCS can be designed to support activities such as lesson planning, sharing material, and pupil documentation. The results of the exploratory interviews echo those achieved in Hernwall, Hullgren, and Söderberg (2018a). In both studies, ease of access, multimodality, and adaptability were expressed as important aspects of a digital tool for personal finance within HCS. These aspects were taken into account during the design of the prototype. The prototype supported lesson planning, sharing material, and pupil documentation. The design process followed the design thinking and user-centered design approaches, including users early and often by interviews and cooperative evaluations.

5.1 Replacing the learning trajectory with a teaching plan rough draft

The digital tool as introduced and prototyped by Hernwall, Hullgren, and Söderberg (2018b) employed a learning trajectory as a way to structure the pedagogical planning for a class. The design team in this study quickly learned that this concept felt foreign to the teachers, and they were more comfortable with a rough draft similar to the way they worked today. They also felt that the learning trajectory was too static, and the rough draft was “up for change” if needed, feeling more dynamic. While the actual functionality of the system would not necessarily be any different whether the learning trajectory or rough draft were implemented in the final system, the main reason for replacing the trajectory is that of acceptability among its users. A system which does not gain a high enough level of acceptability is unlikely to be used no matter how otherwise well designed and useful it is (Rubin & Chisnell 2008). Other than acceptability, the learning trajectory was perceived as confusing in its design.

5.2 Sharing teaching materials

Participants expressed that the most time-consuming part of planning lessons within personal finance was finding suitable teaching material. Although the participants frequented several networks and sources online, they found it hard to find good quality material. The prototype was designed to both encourage sharing and downloading teaching material by giving the function a prominent place in the system as well as encouraging the use of many different technologies and modalities such as video, sound, and group discussions. This could make it easier for a teacher to find material which used a novel (for him or her) way of teaching. Most importantly, it could present teachers with a way to stay up to date with the latest trends and ideas of teaching about personal finance. It could also, although more research is required to say for certain, open up possibilities to collaborate between school subjects, something that is rarely done today although the subject of home- and consumer studies could easily facilitate this (Hernwall, Hullgren & Söderberg 2018b).

An important insight was that the teachers preferred not to use found material as is, instead they preferred to use the source material as inspiration and then create their own version by

modifying or rewriting it entirely. The reason for this was that the socio-cultural context and pedagogical challenges could differ, sometimes greatly, between one school or class to the next. This mirrors the findings made by Hernwall, Hullgren, and Söderberg (2018a), who found that children live in vastly different economic realities. The teachers in this study mentioned several times that this impacted their teaching practices. An assignment could be modified depending on the pupils, the participants in this study had pupils with both cognitive and language difficulties which made it important that one assignment could be adjusted for a specific pupil. This makes it quite a challenge to build a system which can support all these differing realities. While this was brought up during several iterations, the time scope of the study did not permit testing the actual user flow of modifying an assignment. This remains to be studied.

5.3 Grade documentation

The function to document a pupil's progress should be designed so that the users can show the material for both the pupils and the pupils' parents. Documenting pupil progress can be very time-consuming, and it's therefore important that the design supports doing these activities quickly. The documentation of grades is something that the participants in this study put a lot of time on, as well as planning the lessons. Hernwall, Söderberg, and Hullgren (2018b) found in their research that teachers needed a way to document pupil assignment progress. However, during the exploratory interviews and subsequent evaluations in this study, it became apparent that it was more pressing not to document assignment progress, but how the pupil progressed towards the subject grading criteria. Not all assignments would be done digitally - possibly not at all if the school did not have funding for one laptop per pupil. This would create a situation where some assignments would be documented in-system and some outside of it. Instead, the design team chose to create a grade-matrix where the teacher could design their own matrix or use pre-formatted ones. In addition, the matrix could be used as a way for the teachers to communicate pupil progress with both the pupils themselves but also their parents. This would solve two issues - interpreting and following abstract grading criteria and explaining the reasoning behind giving a pupil a certain grade.

5.4 High fidelity prototyping may have impacted the findings

The fidelity of the prototype was, unintendedly, perceived by the participants as near to finished and was thought to be the final look of a system which raised some concern. The prototypes created during this study used several shades of color, as well as an aesthetic level of detail which in retrospect could have been omitted.

Several comments were made on pure graphic design, even though the design team expressly stated that this was not currently under review. This is a common issue with high fidelity prototypes (Dam 2019b), a possible side-effect of this is that they may have been less inclined to discuss possible new ideas or criticize the existing solutions when they feel that the prototype is too "final" (Benyon 2012). Continued research should focus on validating the result of the functionality and the development of the user interface.

5.5 Prototyping system role with few participants

Another concern is the one of system role. The low number of participants (two) in the second iteration could mean that design decisions made in that iteration are based on vague generalizations rather than solid user research. An example is the major design decision made after the second iteration to change from a learning trajectory to a rough draft of a teaching plan. Looking at only the second iteration it's difficult to argue that this decision was based on enough data. However, this decision was also based on the results of the first iterations where participants had expressed confusion about the word learning trajectory and its usefulness in their work. To treat each iteration not as an isolated ecosystem, but as an iterative and dynamic process consequently doubled the number of feedback-sources for this decision from two to four participants. However, the second iteration was the only iteration which had fewer than Nielsen's recommendation of 3-5 participants (Benyon 2014). Care was taken to evaluate feedback from the participant who had taken part in all of the iterations differently than feedback from those who had seen the prototype for the first time - as a more "experienced" participant would likely have an easier time to finish tasks successfully, a post-test interview with them would be less focused on the actual task and more on discussing changes and additions made to the prototype.

5.6 Societal and ethical consequences

The results of this study have no apparent ethical or societal consequences. While teachers have a big role and responsibility in our society, the particular research conducted in this study is negligible. Instead, it could be argued that making visible their needs creates a positive impact on society as a whole. While some teachers parted possibly sensitive information on their pupils and described situations in which minors had acted in one way or another, care was taken not to let this affect the study. Nor did the design team explicitly ask for this kind of information. The teachers themselves are required to follow strict professional secrecy frameworks, adding an additional layer of integrity protection. No names, places, or other personal details regarding minors have been documented.

5.7 Future development

Further testing and development need to be done, specifically for the function regarding the pupils' grades. Also, more attention should be given to the prototypes look and feel by defining the interface of the prototype regarding both colors, the design of different elements (e.g. buttons, information boxes, and icons). The participants in this study expressed that they wanted the pupils to be able to make the assignments directly in the system, therefore future development should explore the possibilities of how to include the pupils as users.

This study has focused on a support system in personal finance for teachers in HCS and can therefore not comment if this prototype is suitable outside that context. It would however be interesting to see if the prototype can be applied to HCS as a whole or if it needs adjustments. Another interesting aspect is if HCS have different requirements for teacher support than other subjects within the Swedish compulsory school and if it's possible to design a prototype that could support more or maybe all subjects included in the Swedish compulsory school.

However, further research needs to be done both in HCS but also other subjects within the Swedish compulsory school in order to make any conclusions about that.

5.8 Conclusion

The result of this study is a conceptual view of a support system for HCS teachers in personal finance, with special attention given to sharing materials with pupils and other teachers, as well as documentation and planning. The participants, teachers in HCS in Sweden, have provided valuable insight through interviews and prototype evaluation sessions. The goal was to explore how a system could support them with the main issues found during previous research. The main takeaways are related to their professional duties - the requirement to work efficiently while deciphering abstract knowledge requirements, communicating these requirements to the pupils and their parents.

Findings show that a clean, simplistic interface with few, but powerful, functions are desired by the participants in this study. They want functions that help them with their planning and documentation. The function to share material with other users is very appreciated and longed for. However, the participants wanted to be able to modify the material so that it would be a better fit for their pupils' context. The function to document the pupils' development requires further development so that it will be easier and faster for the users to document the pupils' development. The system should also either entirely replace, or provide seamless integration with existing systems for grading, documentation, and lesson planning.

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Appendix A – Alestedt Finta and Westling prototype

Description and pictures of the prototype made by Alestedt Finta and Westling.

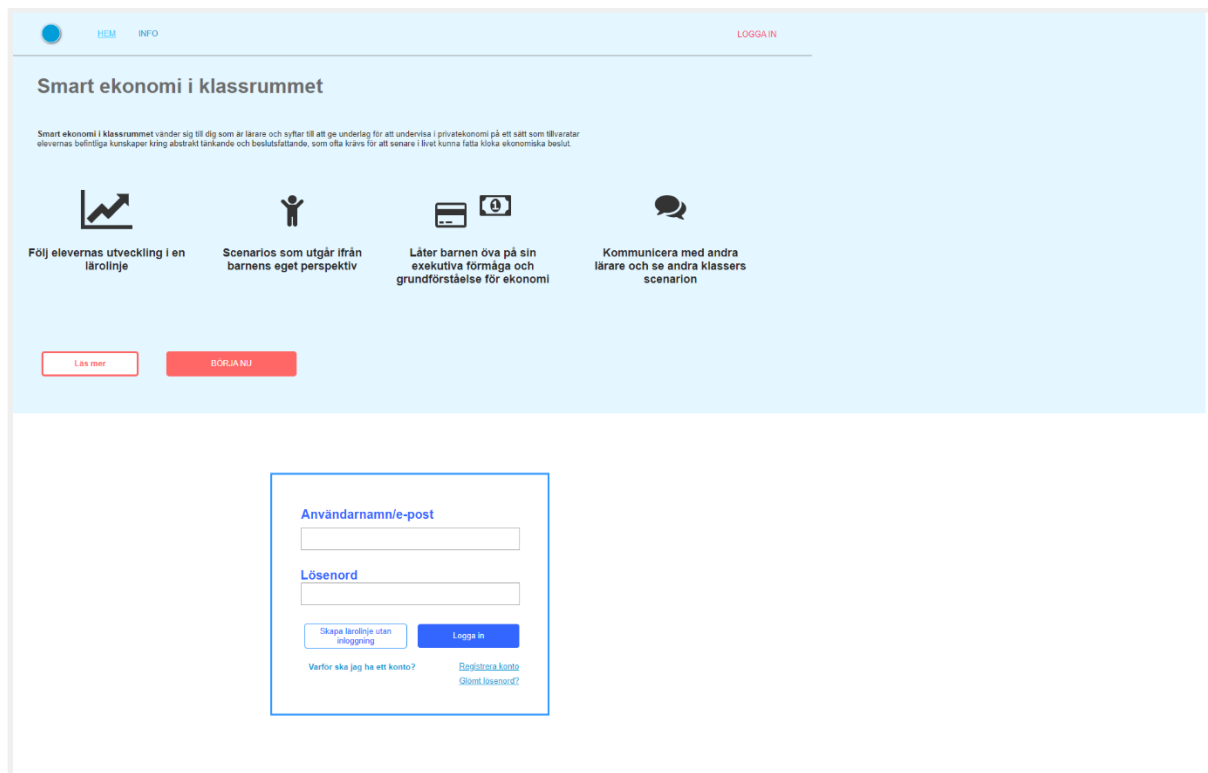


Figure 16. The first screen of the prototype made by Alestedt Finta and Westling.

At the top of the first screen of the prototype (figure 16) there is short explanations about what the prototype supports: to follow a pupils development within a learning trajectory, scenarios with the starting point of the children's perspective, gives children the opportunity to practice their ability and understanding of personal finance, communication with other teachers and the ability so others scenarios. Under the explanation is a login form.

The screenshot shows a web application interface with a dark grey background. At the top, there are navigation links for 'HEM' and 'INFO', and a 'LOGGA IN' button. The main heading is 'Smart ekonomi i klassrummet'. Below this, there is a paragraph of text explaining the concept of smart economics in the classroom. The central focus is a white modal window titled 'Skapa lärolinje' with a close button (X) in the top right corner. The modal contains the following elements:

- Namn på klass:** A text input field containing 'Sällbergaskolan 7a'.
- Välj antal uppgifter:** A dropdown menu showing the number '5'.
- Välj tema för lärolinjen:** Four red buttons with white text: 'Spara & Låna', 'Handla med begränsade resurser', 'Skulder', and 'Risker'.
- SKAPA LÄROLINJE:** A blue button at the bottom of the modal.

In the background, there are other UI elements: a line graph icon, the text 'Följ elevernas utveckling i en lärolinje', a 'Läs mer' button, a 'BÖRJA' button, a speech bubble icon, and the text 'Kommunicera med andra lärare och se andra klassers scenarion'. At the bottom of the page, there are links: 'Varför ska jag ha ett konto?' and 'Registrera konto', with a sub-link 'Glömt lösenord?' below it.

Figure 17. The form for creating a learning trajectory.

When a user wants to make a new learning trajectory they first have to put in data in a form (figure 17) with the name of the class, how many assignments they want and which themes the assignments should cover (save and loan, shop with limited resources, financial debts or financial risks).



Figure 18. The overview of the learning trajectory with the user hovering on the first assignment

The learning trajectory was presented for the user as a line with numbered bubbles (figure 18), when the user hovered with the cursor over the bubble a small explanation about the assignment within the bubble would appear.

Figure 19. The user's information about the assignment.

If the user clicked on the bubble the assignment would appear with an explanation of the assignment and what the pupils were practicing and how it related to the curriculum (figure 19). The users could go back to the learning trajectory by clicking on “*Tillbaka till Lärolinjen*” (English: back to the learning trajectory) placed in the top left, the user could also print the assignment by clicking on “*Skriv ut*” (English: Print) placed to the right of the assignment's title.

Scenario Del 1 - SPARA

"Det är en vecka kvar till Halloween och ni börjar bli sugna på att hålla en klassfest. Rektorn i er skola har föreslagit att ni kan få ha en klassfest i skolan förutsatt att ni hjälper till med en sak. På den senaste tiden har det blivit väldigt skräpigt på skolområdet och rektorn har därför kommit på att just er klass kan få ha en klassfest om ni plockar ihop allt skräp på skolområdet och samlar i kassar.

Rektorn säger att ni själva får bestämma hur stor klassfest ni vill ha men ju större fest ni vill ha, desto fler kassar med skräp behöver ni plocka. Räkna med att ni hinner plocka 1 kasse med skräp per person på 2 dagar."

Nedan visas alternativ eleverna kan välja mellan, visa de olika klassfesterna i klassrummet och be dem diskutera frågorna som följer i 5-10 minuter.



Lilla halloween-festen

- 2 godispåsar
- 2 popcornskålar

10 skräppåsar

Mellanstora halloween-festen

- 4 godispåsar
- 4 popcornskålar
- Läskande dryck
- Musik

20 skräppåsar

Stora halloween-festen

- Obegränsat med godis
- Obegränsat med popcorn
- Musik
- Dekoration

30 skräppåsar

1

Vilken klassfest väljer ni? Varför?

2

Kommer ni hinna plocka tillräckligt med skräp? Redovisa hur.

Förklara för eleverna:

Det som eleverna just har gjort är att välja något de vill konsumera och arbeta för att spara det som krävs för att de ska kunna konsumera. I detta fall handlade det om att samla skräp på skolgården för att kunna ha en klassfest, medan de när de blir äldre kanske kommer att behöva sommarjobb för att spara till en ny telefon, en semester eller för att ha råd att göra eller köpa något annat.

Figure 20. The pupils' information about the assignment

If the users would scroll further down several scenarios would appear (figure 20), in the same box as the scenario there would also be more explanatory text to the user about the assignment and how to present it to the pupils but also specific questions to ask the pupils.

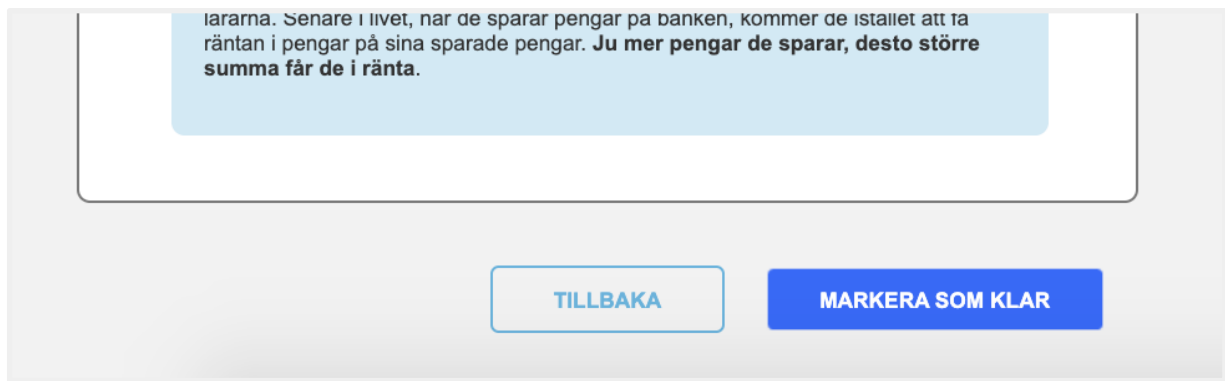


Figure 21. The buttons and the bottom of the assignment, the left button takes the user back and the right button marks the assignment as finished

Two buttons were placed at the bottom of the assignment, the left one with the label “*Tillbaka*” (English: go back) would take the users back to the learning trajectory and leave the assignment as not completed. The right button with the label “*Markera som klar*” (English: Mark as completed) would take the user back to the learning trajectory and show that the assignment was completed (figure 22).

The user could not mark just one scenario as completed but had to mark the entire assignment as completed.



Figure 22. The overview when an assignment was completed, the system indicated it by making the bubble green and switch the number towards a checkmark.

Appendix B – Screening questionnaire

1. Utöver hem- och konsumentkunskap (HKK), undervisar du i något annat ämne?
 - . Ja
 - . Nej
2. Om ja, vilket eller vilka andra ämnen undervisar du i?
3. Vilken kommun undervisar du HKK i?
4. På hur många skolor undervisar du i HKK?
 - . 1
 - . 2
 - . 3
 - . 4
 - . 5+
5. Hur många elever har du i genomsnitt per grupp i HKK?
 - . 8-12
 - . 13-16
 - . 17-20
 - . 21-24
 - . 25-28
 - . 29+
6. Vilka årskurser undervisar du privatekonomi i? (Flervalsfråga)
 - . 4
 - . 5
 - . 6
 - . 7
 - . 8
 - . 9
7. Vilka läromedel använder du under din undervisning i privatekonomi? (Flervalsfråga)
 - . Ordinarie lärobok
 - . Annan bok än ordinarie lärobok
 - . Videomaterial
 - . Quiz
 - . Spel
 - . Låtsaspengar
 - . Annat: (Fritext)
8. Vill du hjälpa till ytterligare?
 - . Ja
 - . Nej

Appendix C – Exploratory interview script

The script used for the exploratory interview (empathize phase).

Frågor om planering:

- Skulle du vilja beskriva ett vanligt lektionstillfälle med privatekonomi med dina elever?
 - Skiljer sig lektionstillfället från resterande lektioner i hem- och konsumentkunskap?
- Hur planerar du ett vanligt lektionstillfälle med privatekonomi med dina elever?
 - Varför?
- Har du en “bank” med övningar?
 - Hur dokumenterar du dina övningar?
 - Vart förvarar du denna dokumentation?
 - Hur presenterar du övningarna för dina elever?
- Brukar du inkludera privatekonomi i andra lektioner inom hem- och konsumentkunskap?
- Har dina elever olika förutsättningar som du måste anpassa undervisningsmaterialet för?
 - Hur tar du det i beaktning under planering?
 - Hur håller du koll på vilka barn som har olika förutsättningar?
- Hur mycket tid lägger du på att planera lektioner i privatekonomi?
 - Vad tar tid?
- Delar du ibland ditt material med andra lärare?
 - Varför?
 - Hur?
- Hur arbetar du idag med att lära eleverna grundläggande ekonomiska begrepp, tex. Ränta, lån, osv.?
 - Hur?
- Ger du dina elever läxor i privatekonomi?
 - Hur planerar du läxorna?
 - Hus distribuerar du läxan?
 - Varför?

Frågor om läromedel:

- Vilka läromedel använder du vid undervisning av privatekonomi?
 - Använder du idag några digitala verktyg i undervisning av privatekonomi?
 - Vilka?
- Finns det läromedel som du skulle vilja använda men inte kan?
 - Varför?
- Vilka läromedel föredrar du?
 - Varför?
- Finns det läromedel du inte vill använda i undervisning av privatekonomi?
 - Varför?
- Finns det något sätt som du skulle vilja utveckla din undervisning på?

Frågor om bedömningen:

- Hur dokumenterar du elevernas prestation inom privatekonomi?
 - Varför?
- Hur mycket tid lägger du på uppföljning och dokumentation av dina elevers nivå och utveckling?
 - Varför?
- Tar du i beaktning både barnens prestation under lektionstillfällena och under prov?
 - Hur?

Frågor om den framtida prototypen:

- Vilka problem stöter du på idag när du planerar en lektion i privatekonomi?
 - Hur löser du dessa problem idag?
 - Hur skulle ett digitalt verktyg hjälpa dig med det här problemet?
- Vilka problem stöter du på idag när du bedömer dina elever?
 - Hur löser du dessa problem idag?
 - Hur skulle ett digitalt verktyg hjälpa dig med det här problemet?
- Om du hade ett digitalt verktyg som hjälpte dig att följa dina elevers utveckling, vilka funktioner tror du att du skulle vilja ha/vad skulle vara nyttigt för dig?
 - (Koppla ihop med läroplanen för enklare betygssättning?)
 - (Dela med elever och föräldrar?)
- Finns det något ytterligare som du vill lyfta som inte kommit fram under den här intervjun?

Appendix D – Tasks and post test interview script (iteration 1)

Uppgifter för Alestedt Finta och Westlings (Hernwall, Hullgren & Söderberg 2018b) prototyp:

1. Skapa en lärolinje.

Frågor:

- I prototypen kan man som lärare välja olika teman på en lärolinje, vad tycker du om översikten av lärolinjen?
 - Varför?
- Skulle du vilja se alla lärolinjer för en klass samtidigt eller enskilt?
 - Varför?
- Skulle du vilja kunna se en individs lärolinje?
 - Varför?
- Skulle du vilja att det fanns något ytterligare tema?
- När skulle du använda funktionen att skriva ut en övning?
 - Varför?
- Om du fick välja vad som skrivs ut från sidan vad skulle du skriva ut då?
 - Varför?

[Visa prototypen för deltagaren och låt den skapa en lärolinje]

- Vi har redan frågat denna fråga en gång men vill undersöka om du vill justera ditt svar:
- Vilka behov skulle du vilja att en digital prototyp uppfyller?
 - Varför?
- Varför ändrade du dig?

Appendix E – Tasks and post-test interview script (iteration 2)

Uppgifter för Ervasti och Nyströms prototyp version 1.1:

1. Skapa en ny lärolinje med en övning i, på så sätt att den ligger kvar där nästa gång du loggar in.
2. Ladda ner en övning som en annan lärare gjort och lägg in den i en lärolinje.

Uppgifter för Ervasti och Nyströms prototyp version 1.2:

1. Gå in på en grovplanering för en klass och redigera lektionsvecka 4.

Frågor:

- Vad är ditt helhetsintryck av programmet?
 - Varför
- Var det någon funktion du tyckte om särskilt mycket?
 - Varför
- Var det någon funktion du inte tyckte lika mycket om?
 - Varför
- Hur upplevde du termerna i programmet?
 - Varför?
- Var det några ord eller uttryck som inte passade in?
 - Vilka?
- Var det något som betydde något annat än du trodde?
 - Vilka?
- Vad innebär “lärolinje” för dig?
- Vad innebär “grovplanering” för dig?
- Hur var det att navigera i systemet?
 - Varför?
- Fanns det någonting i systemet som överraskade dig?
 - Varför?
- Fanns det någonting i systemet som skapade frustration?
 - Varför?
- Att skapa en ny lärolinje var [skala från väldigt lätt - väldigt svårt]
 - Varför?

- Skulle du använda den här funktionen?
 - När?
- Att ladda ner en övning var [skala från väldigt lätt - väldigt svårt]
 - Varför?
 - Skulle du använd den här funktionen?
 - När?
- Att skapa en grovplanering med tillhörande lektion var [femgradig skala från 1 väldigt lätt - 5 väldigt svårt]
 - Varför?
 - Skulle du använda den här funktionen?
 - När?
- Är det något annat du vill lyfta, som vi inte frågat om?

Appendix F – Tasks and post-test interview script (iteration 3)

Uppgifter för Ervasti och Nyströms prototyp version 2:

1. För klass 7a på Sällbergaskolan, gå in på den detaljerade bedömningen för Anna Annasson och ändra hennes betyg så att hon har ett A på alla bedömningskriterier.
2. I 7a:s grovplanering, dela uppgifterna för vecka 4 med eleverna på valfritt sätt.
3. Ladda ner den övning som har högst tidsåtgång, som är skapad av en annan pedagog.

Frågor:

- Vad är ditt helhetsintryck av programmet?
 - Varför
- Var det någon funktion du tyckte om särskilt mycket?
 - Varför
- Var det någon funktion du inte tyckte lika mycket om?
 - Varför
- Hur upplevde du termerna i programmet?
 - Varför?
- Var det några ord eller uttryck som inte passade in?
 - Vilka?
- Var det något som betydde något annat än du trodde?
 - Vilka?
- Hur var det att navigera i systemet?
 - Varför?
- Fanns det någonting i systemet som överraskade dig?
 - Varför?
- Fanns det någonting i systemet som skapade frustration?
 - Varför?
- Att ändra en elevs bedömning var [skala från väldigt lätt - väldigt svårt]
 - Varför?
 - Skulle du använda den här funktionen?
 - När?
- Att ladda ner en övning var [skala från väldigt lätt - väldigt svårt]
 - Varför?

- Skulle du använd den här funktionen?
 - När?
- Att dela en övning med eleverna var [femgradig skala från 1 väldigt lätt - 5 väldigt svårt]
 - Varför?
 - Skulle du använda den här funktionen?
 - När?
- Är det något annat du vill lyfta, som vi inte frågat om?

Appendix G – Tasks and post-test interview script (iteration 4)

Uppgifter för Ervasti och Nyströms prototyp version 3:

1. Gå in på den detaljerade bedömningen för Felix Adamsson i klass 7a och ändra hans allmänna kommentar.
2. Ändra Felix betyg i konsekvenser till A
3. I 7a:s grovplanering, dela uppgift 1 för vecka 4 med enskilda elever i en klass via en molntjänst.
4. Ladda upp en egen övning, välj den som har minst tidsåtgång.

Frågor:

- Vad är ditt helhetsintryck av programmet?
 - Varför
- Var det någon funktion du tyckte om särskilt mycket?
 - Varför
- Var det någon funktion du inte tyckte lika mycket om?
 - Varför
- Hur upplevde du termerna i programmet? Det är samma termer som vi använder, upplevde inget konstigt.
 - Varför?
- Var det några ord eller uttryck som inte passade in? Nej, det kände jag inte
 - Vilka?
- Var det något som betydde något annat än du trodde? Nej
 - Vilka?
- Hur var det att navigera i systemet? Ganska enkelt, det här med kom hem det är ju samma överallt, det är att man kommer till startsidan
 - Varför?
- Fanns det någonting i systemet som överraskade dig positivt?
 - Varför?
- Fanns det någonting i systemet som skapade frustration?
 - Varför?
- Uppgift 1 var [femgradig skala från 1 väldigt lätt - 5 väldigt svårt]
 - Varför?
 - Skulle du använda den här funktionen?

- Vad var bra med denna funktionen?
 - Vad var mindre bra?
- Uppgift 2 var [femgradig skala från 1 väldigt lätt - 5 väldigt svårt]
 - Varför?
 - Skulle du använd den här funktionen?
 - Vad var bra med denna funktionen?
 - Vad var mindre bra?
- Uppgift 3 var [femgradig skala från 1 väldigt lätt - 5 väldigt svårt]
 - Varför?
 - Vad var bra med denna funktionen?
 - Vad var mindre bra?
- Uppgift 4 var [femgradig skala från 1 väldigt lätt - 5 väldigt svårt]
 - Varför?
 - Skulle du använda den här funktionen?
 - Vad var bra med denna funktionen?
 - Vad var mindre bra?
- Är det något annat du vill lyfta, som vi inte frågat om?

Appendix H – Ervasti and Nyström prototype version 1.1

Here is a description and pictures of the prototype in the second iteration. The result of the cooperative evaluation conducted with the prototype is described in section 4.2 *The second iteration*.

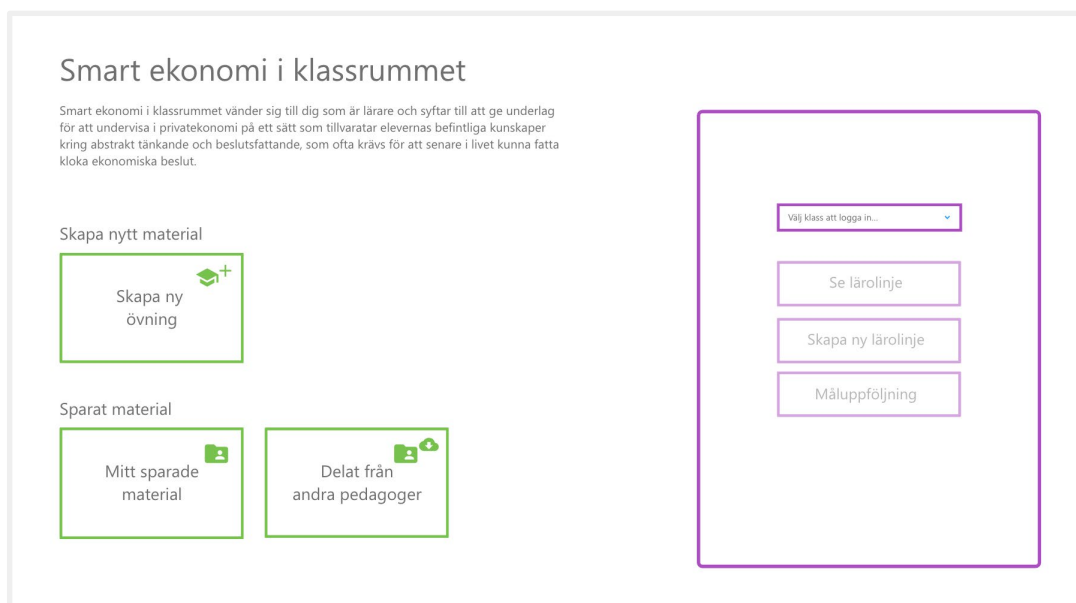


Figure 23. The first screen of the prototype.

From the first screen of the prototype (figure 23) the user could navigate to create an assignment, see their saved material or see what other users have shared. The user needs to choose a class in order to see a learning trajectory or the documentation of the pupils' performance.

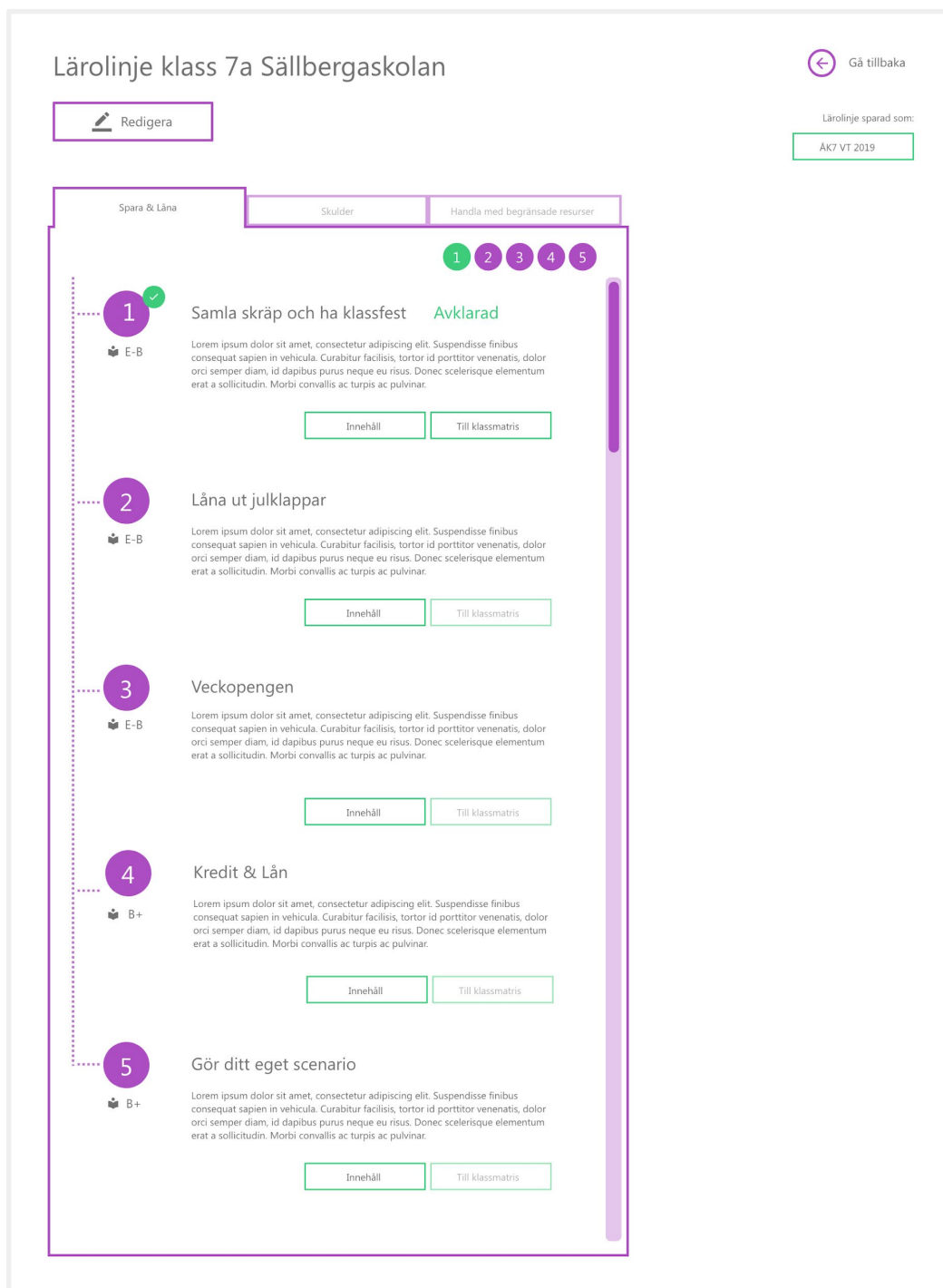


Figure 24. The overview of a learning trajectory.

In the learning trajectory (figure 24) the user can switch between the themes by changing tab at the top. Every theme consists of several assignments that has a small description in the overview, if the user clicks the button with the label “Innehåll” (English: content) the user will see the assignment and more information about it. If the users clicks the button with the label “Till matrismål” (English: matrix goals) the user will see a matrix of the knowledge requirements of the chosen learning trajectory.

The system indicates if an assignment is completed by adding a green circle with a checkmark next to the assignment and by making the circle at the top green instead of purple.

Lärolinje klass 7a Sällbergaskolan

← Gå tillbaka

Redigera

Lärolinje sparad som:
AK7 VT 2019

Spara & Låna Skulder Handla med begränsade resurser

1 2 3 4 5

← Tillbaka till lärolinjen

2 Låna ut julklappar

E-B

Att låna ut sina leksaker eller prylar är något som de flesta eleverna förmodligen gjort någon gång. Att låna ut något till någon annan kan ju säkert göras som en god gärning, men ibland kan man också förvänta sig något mer tillbaka. Denna uppgift utgår ifrån hur barn kan låna ut till varandra och hur återbetalning kan ske i deras värld.

Läs upp scenariot nedan för eleverna och låt dem leva sig in i dem. Låt därefter eleverna diskutera eller skriva om sina reflektioner kring de olika besluten som eleverna möter i scenariot.

Vad övar eleverna på?

Eleverna övar på att reflektera kring att spara, inte i form av pengar men i form av tid, för att kunna konsumera mer. Ju längre de väntar och "sparar", desto mer har de råd att konsumera. De får dessutom reflektera kring återbetalning och att stå i skuld till någon.

Vad säger läroplanen?

Läroplanen för årskurs 1-6 säger att eleverna ska ges förutsättningar att utveckla sin förmåga inom "Ungas ekonomi, sparande och konsumtion" vilket denna uppgift syftar till att göra eftersom eleverna får öva på det abstrakta tänkandet som ofta krävs i verkliga ekonomiska situationer.

Scenario del 1 - SPARA [Skriv ut elevark](#)

"Josef och Fatma är syskon, Josef är 10 och Fatma är 12. Det har precis varit jul och i julklapp har Fatma fått en iPad och Josef har fått en Hoverboard. Josef är jättenöjd med sin Hoverboard men han vill gärna titta på Youtube och spela spel på Fatmas nya iPad ibland också. Han frågar Fatma om hon kan tänka sig att låna ut sin iPad till Josef och då säger Fatma att det är ok, och hon ger honom 3 alternativ att välja mellan:"

- Låna iPaden varje söndag mellan klockan 17 och 18 i januari och februari
- Låna iPaden en lördag i januari och en lördag i februari
- Vänta i 2 månader och låna iPaden hela sportlovet (sista veckan i februari)

Låt eleverna diskutera följande frågor i 5-10 minuter:

- 1 Vilket alternativ ger Josef mest tid att använda iPaden?
- 2 Vilka är fördelarna med att Josef väntar länge på att få låna Fatmas iPad?
- 3 Vilka alternativ tycker ni Josef ska välja? Motivera!

Förklara för eleverna:
Det som eleverna gjorde i denna uppgift var att tänka kring att spara längre tid gör att de har råd att konsumera mer. I detta fall handlade det om att vänta kort tid - låna iPad lite, vänta längre tid - låna iPad mer. Vid senare tillfällen i livet kanske det istället handlar om att spara pengar kort tid - ha råd med lite och spara länge - ha råd med mer.

Elevinlämningar

Måluppföljning

Figure 25. The overview of an assignment inside a learning trajectory.

The first section of the assignment inside a learning trajectory (figure 25) is information about the assignment, the purpose of the assignment, how the assignment should be conducted, what the pupils are practicing and how it's connected to the curriculum.

The second part with the pink background is the assignment and the material that is meant for the pupils. The teacher can print out the pink section by clicking on the link above the pink section.

To the right is one button with the label "Elevinlämningar" (English: pupil submissions) that takes the user to the pupils submission, and one button with the label "Måluppföljning" (English: grade monitoring) that takes the user to documentation of the grades.

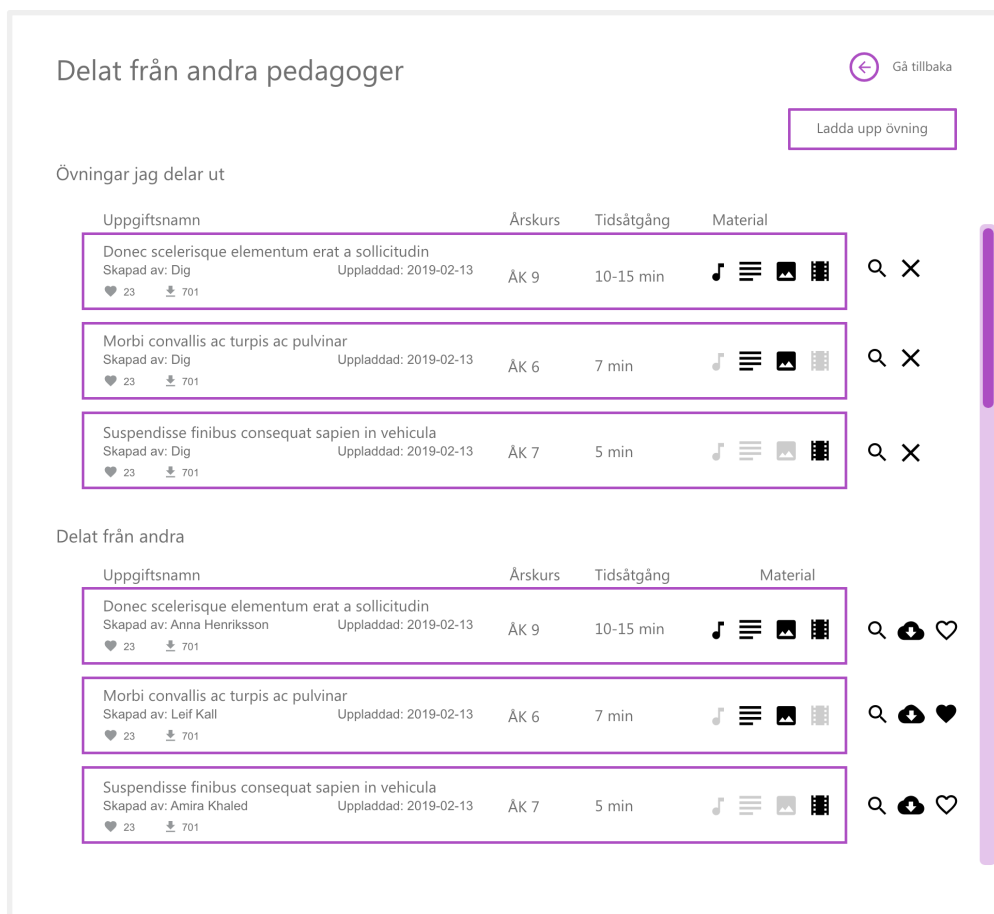


Figure 26. The screen where the user could see assignments that it shared to others and that other users shared.

In the list with material shared by other users (figure 26) the user could see how many likes and downloads every assignment had, when it was uploaded, which class it is suitable for, duration and what kind of material it included (listen to audio, read text, look at pictures and watch a movie). The icons to the right of the boxes with the assignment are actions, the magnifying glass is to preview the assignment, the cloud with a downward pointing arrow is to save the assignment and the heart is to like the assignment. At the top of the list the user would see the material that it shared to other and underneath that material that other users shared.

The user can upload new assignment by clicking the button at the top right with the label “Ladda upp övning” (English: Upload an assignment).

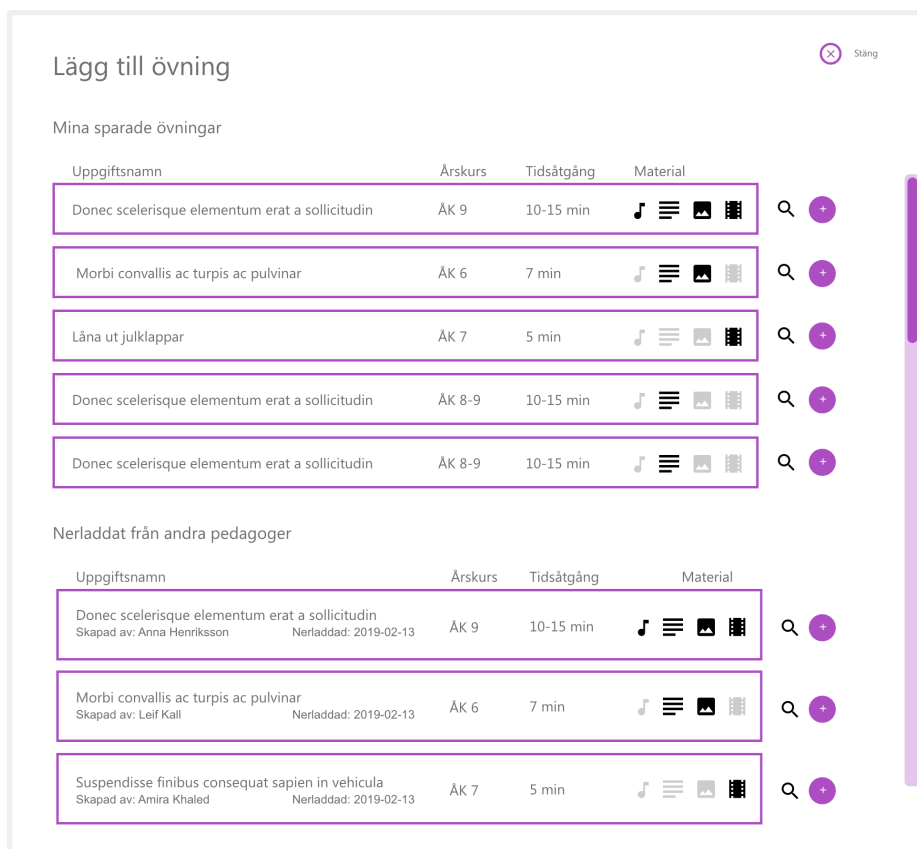


Figure 27. The list with saved assignments.

When a user wanted to add an assignment to the learning trajectory, they saw a list (figure 27) with their own assignments and assignments they saved from other users. They could see the name of the assignment, which class it is suitable for, duration, what material that was included in the assignment (listen to audio, read text, pictures or watch video).

The icons next to the boxes of assignments are actions, the user can preview the assignment by clicking on the magnifying glass and add the assignment by clicking on the circle with a plus on it.

Appendix I – Ervasti and Nyström prototype version 1.2

Description and pictures of the alternative prototype in the second iteration. The result of the cooperative evaluation conducted with the prototype is described in section 4.2 *The second iteration*.

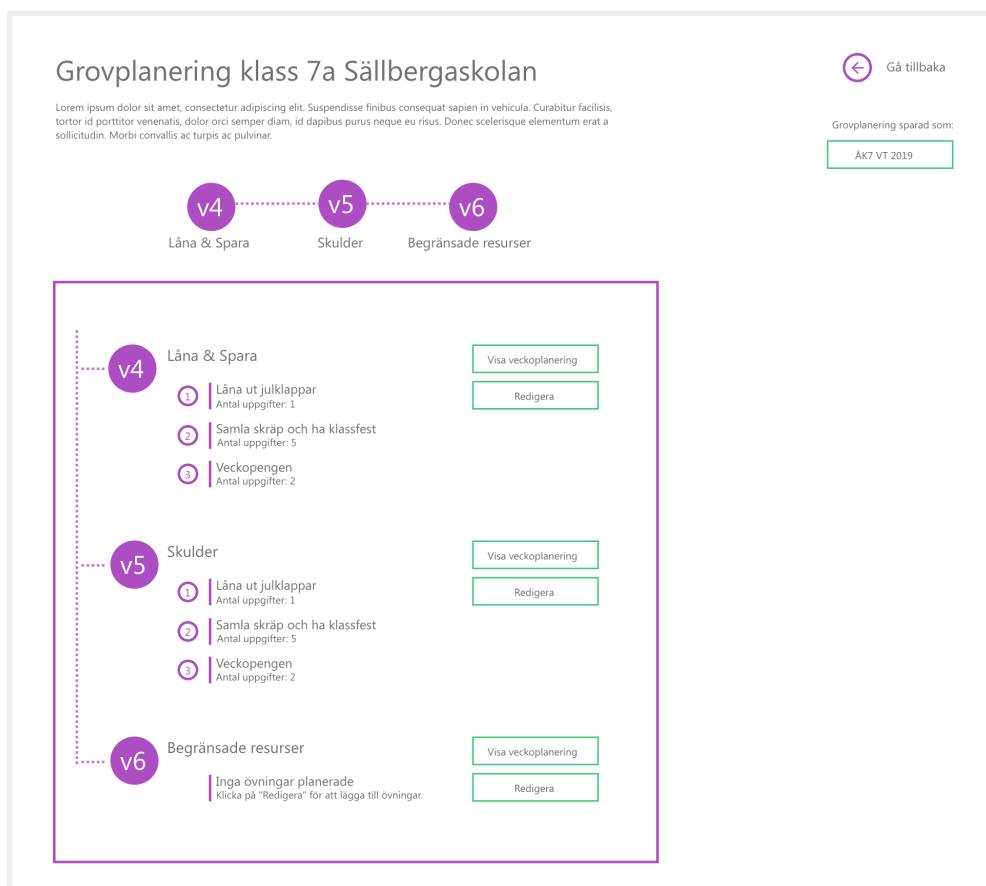


Figure 28. The overview of the rough draft teaching plan.

In the rough draft the user could set a theme for every week and see which assignments were planned (figure 28). Next to every week is two buttons, one with the label “*Visa veckoplanering*” (English: show weekly planning) and one with the label “*Redigera*” (English: edit). The button that leads to the weekly planning shows the teacher an overview of that week, the button that leads to edit allows the user to edit the plan.

Veckoplanering v 4, klass 7a Sällbergaskolan

← Gå tillbaka

Sparad i grovplanering:
AK7 VT 2019

Matrismål

- Hälsa, ekonomi och miljö i måltiden
- Konsumentekonomi

Låna ut julklappar Samla skräp och ha klassfest Veckopengen

1 E-B

Låna ut julklappar

Att låna ut sina leksaker eller pryflar är något som de flesta eleverna förmodligen gjort någon gång. Att låna ut något till någon annan kan ju säkert göras som en god gärning, men ibland kan man också förvänta sig något mer tillbaka. Denna uppgift utgår ifrån hur barn kan låna ut till varandra och hur återbetalning kan ske i deras värld.

Läs upp scenariot nedan för eleverna och låt dem leva sig in i dem. Låt därefter eleverna diskutera eller skriva om sina reflektioner kring de olika besluten som eleverna möter i scenariot.

Vad övar eleverna på?

Eleverna övar på att reflektera kring att spara, inte i form av pengar men i form av tid, för att kunna konsumera mer. Ju längre de väntar och "sparar", desto mer har de råd att konsumera. De får dessutom reflektera kring återbetalning och att stå i skuld till någon.

Vad säger läroplanen?

Läroplanen för årskurs 1-6 säger att eleverna ska ges förutsättningar att utveckla sin förmåga inom "Ungas ekonomi, sparande och konsumtion" vilket denna uppgift syftar till att göra eftersom eleverna får öva på det abstrakta tankandet som ofta krävs i verkliga ekonomiska situationer.

Scenario del 1 - SPARA [Skriv ut elevark](#)

*Josef och Fatma är syskon. Josef är 10 och Fatma är 12. Det har precis varit jul och i julklapp har Fatma fått en iPad och Josef har fått en hoverboard. Josef är jättenöjd med sin hoverboard men han vill gärna titta på Youtube och spela spel på Fatmas nya iPad ibland också. Han frågar Fatma om hon kan tänka sig att låna ut sin iPad till Josef och då säger Fatma att det är okej, och hon ger honom 3 alternativ att välja mellan:

- Låna iPaden varje söndag mellan klockan 17 och 18 i januari och februari
- Låna iPaden en lördag i januari och en lördag i februari
- Vänta i 2 månader och låna iPaden hela sportlovet (sista veckan i februari)

Låt eleverna diskutera följande frågor i 5-10 minuter:

- 1 Vilket alternativ ger Josef mest tid att använda iPaden?
- 2 Vilka är fördelarna med att Josef väntar länge på att få låna Fatmas iPad?
- 3 Vilka alternativ tycker ni Josef ska välja? Motivera!

Förklara för eleverna:
Det som eleverna gjorde i denna uppgift var att tänka kring att spara längre tid gör att de har råd att konsumera mer. I detta fall handlade det om att vänta kort tid - låna iPad lite, vänta längre tid - låna iPad mer. Vid senare tillfällen i livet kanske det istället handlar om att spara pengar kort tid - ha råd med lite och spara länge - ha råd med mer.

Koppla till matris

Redigera veckoplanering

Figure 29. The overview of a weekly planning, every assignment has a tab each on the top.

In the overview of a weekly planning the assignments were divided into separate tabs (figure 29). The first section of the assignment is information about the assignment, the purpose of the assignment, how the assignment should be conducted, what the pupils are practicing and how it's connected to the curriculum. The second part with the pink background is the assignment and the material that is meant for the pupils. The teacher can print out the pink section by clicking on the link above the pink section. To the right is one button with the label "Koppla till matris" (English: connect to matrix) that lets the user connect the assignment to the grade documentation, and one button with the label "Redigera veckoplanering" (English: Edit weekly planning) takes the user to the editing mode of the assignment.

Veckoplanering v 4, klass 7a
Sällbergaskolan

Abbryt utan att spara Spara

AK 9 Spara & Låna E-B

Redigera matriskoppling Redigera elev-vy

Låna ut julklappar Samla skräp och ha klasfest Veckopengen

1 E-B

Låna ut julklappar

Att låna ut sina leksaker eller prylar är något som de flesta eleverna förmodligen gjort någon gång. Att låna ut något till någon annan kan ju säkert göras som en god gärning, men ibland kan man också förvänta sig något mer tillbaka. Denna uppgift utgår ifrån hur barn kan låna ut till varandra och hur återbetalning kan ske i deras värld.

Läs upp scenariot nedan för eleverna och låt dem leva sig in i dem. Låt därefter eleverna diskutera eller skriva om sina reflektioner kring de olika besluten som eleverna möter i scenariot.

Vad övar eleverna på?

Eleverna övar på att reflektera kring att spara, inte i form av pengar men i form av tid, för att kunna konsumera mer. Ju längre de väntar och "sparar", desto mer har de råd att konsumera. De får dessutom reflektera kring återbetalning och att stå i skuld till någon.

Vad säger läroplanen?

Läroplanen för årskurs 1-6 säger att eleverna ska ges förutsättningar att utveckla sin förmåga inom "Ungas ekonomi, sparande och konsumtion" vilket denna uppgift syftar till att göra eftersom eleverna får öva på det abstrakta tänkandet som ofta krävs i verkliga ekonomiska situationer.

Skriv ut elevvark

Scenario del 1 - SPARA

"Josef och Fatma är syskon. Josef är 10 och Fatma är 12. Det har precis varit jul och i julklapp har Fatma fått en iPad och Josef har fått en Hoverboard. Josef är jättenöjd med sin Hoverboard men han vill gärna titta på Youtube och spela spel på Fatmas nya iPad ibland också. Han frågar Fatma om hon kan tänka sig att låna ut sin iPad till Josef och då säger Fatma att det är ok, och hon ger honom 3 alternativ att välja mellan."

- Låna iPaden varje söndag mellan klockan 17 och 18 i januari och februari
- Låna iPaden en lördag i januari och en lördag i februari
- Vänta i 2 månader och låna iPaden hela sportlovet (sista veckan i februari)

Låt eleverna diskutera följande frågor i 5-10 minuter:

- 1 Vilket alternativ ger Josef mest tid att använda iPaden?
- 2 Vilka är fördelarna med att Josef väntar länge på att få låna Fatmas iPad?
- 3 Vilka alternativ tycker ni Josef ska välja? Motivera!

Förklara för eleverna:
Det som eleverna gjorde i denna uppgift var att tänka kring att spara längre tid gör att de har råd att konsumera mer. I detta fall handlade det om att vänta kort tid - låna iPaden, vänta längre tid - låna iPad mer. Vid senare tillfällen i livet kanske det skulle handla om att spara pengar kort tid - ha råd med lite och spara länge - ha råd med mer.

Figure 30. The editing mode of an assignment.

When the user is in editing mode of an assignment (figure 30) the user can change both the teacher section of the assignment and the pupil section of the assignment. The user has to click on the pen on the left of the section to start editing, the user can duplicate the section by clicking on the symbol with two squares and delete the section by clicking on the symbol with the bin.

At the top of the box with the assignment the user can choose which class is suitable for the assignment, which theme it belongs to and what grade a pupil can accomplish by completing the assignment.

Appendix J – Ervasti and Nyström prototype version 2

Here is a description and pictures of the screens in the prototype with a new design in 4.3 *The third iteration*.

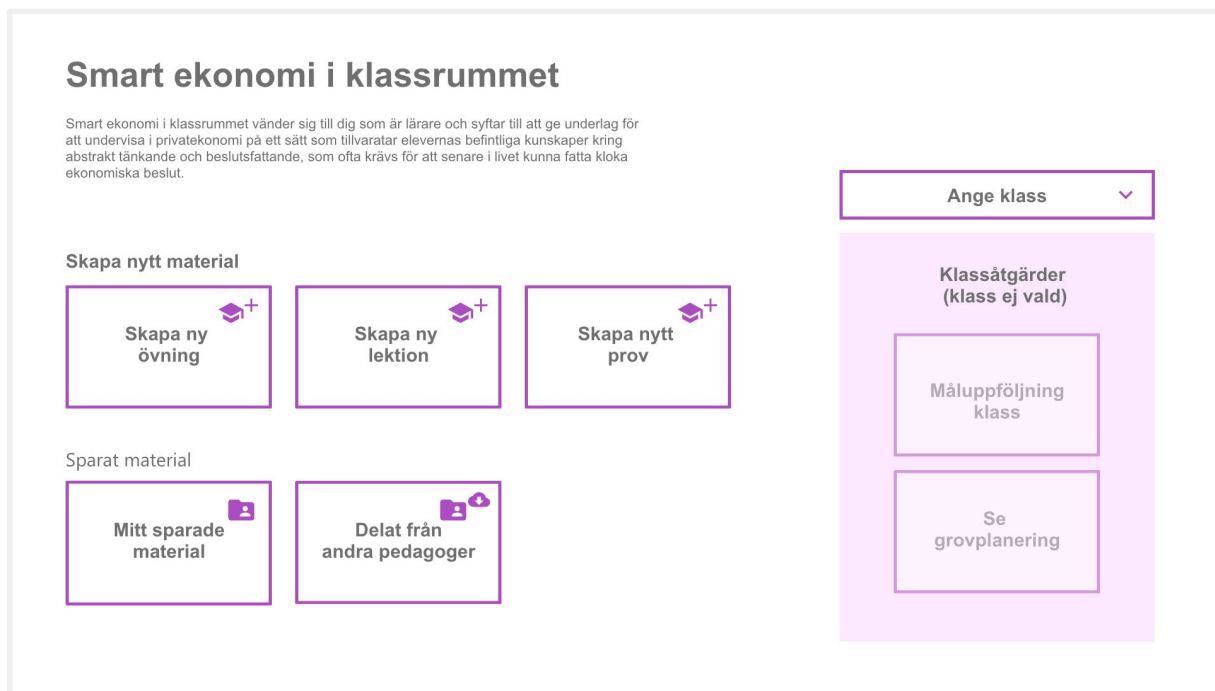


Figure 31. The first screen of the prototype,

From the first screen of the prototype the user can navigate to create an assignment, see their saved material or see what other users have shared (figure 31). The user needs to choose a class in order to see a learning trajectory or the documentation of the pupils' performance.

Målföljning

Målföljning klass 7a Sällbergaskolan

Titel: Skolverkets kunskapskrav 7-9
Skapad av: Skolverket

Den här målföljningen är baserad på det som står i skolverkets läroplan, om du vill kan du hämta andra mål från ditt sparade material alternativt formulera om målen genom att trycka på "redigera mål".

Gå tillbaka

Se individuell bedömning

Redigera målföljning

	Betyg E	Betyg C	Betyg A
Val	Eleven väljer tillvägagångssätt och ger enkla motiveringar till sina val med hänsyn till aspekterna hälsa, ekonomi och miljö.	Eleven väljer tillvägagångssätt och ger utvecklade motiveringar till sina val med hänsyn till aspekterna hälsa, ekonomi och miljö.	Eleven väljer tillvägagångssätt och ger väutvecklade motiveringar till sina val med hänsyn till aspekterna hälsa, ekonomi och miljö.
Döj elever >			
Anna Annasson	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Ali Muhammed	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Awar Kabul	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Bella Nygren	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dautaj Leunit	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Ei Ahmed Amani	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Emma Svensson	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eric Smedlund	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fakhro Mustafa	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Felicia Nyström	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Felix Adamsson	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hussein Marwa	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Isabelle Nyström	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Johan Karlsson	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Johanna Ervasti	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Klara Britz	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lovisa Nyman	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Magnus Englund	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Rickard Willner	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Ronja Engberg	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Sofia Nyman	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jämförelser	Eleven gör jämförelser mellan olika konsumtionsalternativ och för då enkla resonemang med viss koppling till konsekvenser för privatekonomi.	Eleven gör jämförelser mellan olika konsumtionsalternativ och för då utvecklade resonemang med relativt god koppling till konsekvenser för privatekonomi.	Eleven gör jämförelser mellan olika konsumtionsalternativ och för då väutvecklade resonemang med god koppling till konsekvenser för privatekonomi.
Visa elever v			
Konsekvenser	Eleven kan föra enkla och till viss del underbyggda resonemang kring konsekvenser av olika konsumtionsval och handlingar i hemmet utifrån frågor som rör en hållbar social, ekonomisk och ekologisk utveckling.	Eleven kan föra utvecklade och relativt väl underbyggda resonemang kring konsekvenser av olika konsumtionsval och handlingar i hemmet utifrån frågor som rör en hållbar social, ekonomisk och ekologisk utveckling.	Eleven kan föra väutvecklade och väl underbyggda resonemang kring konsekvenser av olika konsumtionsval och handlingar i hemmet utifrån frågor som rör en hållbar social, ekonomisk och ekologisk utveckling.
Visa elever v			

Figure 32. The grade follow-up focused on the requirements.

In the grade follow-up the user can see every requirement and expand a list of all the pupils in the class underneath it to quickly grade the students (figure 32). There are two buttons at the top right, one with the label “*Se individuell bedömning*” (English: See individual assessment) that takes the user to a list where they can choose a specific pupil to see a more detailed assessment.

The other button with the label “*Redigera målföljning*” (English: Edit grade follow-up) takes the user to a editing mode of the grade follow-up which allows the user to add and edit requirements.

Måluppföljning klass 7a Sällbergskolan

Titel: Skolverkets kunskapskrav 7-9
Skapad av: Skolverket

Den här måluppföljningen är baserad på det som står i skolverkets läroplan, om du vill kan du hämta andra mål från ditt sparade material alternativt formulera om målen genom att trycka på "redigera mål".

Elev	Betyg	Kommentar
Anna Annasson	E: 1 C: 0 A: 2	Aktiv på lektionerna
Ali Muhammed	E: 2 C: 1 A: 0	Väldigt duktig men kan ibland behöva stöd med vissa ord
Awar Kabul	E: 0 C: 1 A: 2	Visade bra resonemang om att låna julklappar 21/1
Bella Nygren	E: 0 C: 2 A: 2	Aktiv på lektionerna
Dautaj Leunit	E: 1 C: 0 A: 2	Väldigt tyst på lektionerna, visar bra resonemang i text
El Ahmed Amani	E: 2 C: 1 A: 0	Aktiv på lektionerna
Emma Svensson	E: 0 C: 1 A: 2	Väldigt duktig men kan ibland behöva stöd med vissa ord
Eric Smedlund	E: 0 C: 2 A: 2	Visade bra resonemang om att låna julklappar 21/1
Fakhro Mustafa	E: 1 C: 0 A: 2	Aktiv på lektionerna
Felicia Nyström	E: 1 C: 0 A: 2	Väldigt tyst på lektionerna, visar bra resonemang i text
Felix Adamsson	E: 2 C: 1 A: 0	Aktiv på lektionerna
Hussein Marwa	E: 0 C: 1 A: 2	Väldigt duktig men kan ibland behöva stöd med vissa ord
Isabelle Nyström	E: 0 C: 2 A: 2	Visade bra resonemang om att låna julklappar 21/1
Johan Karlsson	E: 1 C: 0 A: 2	Aktiv på lektionerna
Johanna Ervasti	E: 2 C: 1 A: 0	Väldigt tyst på lektionerna, visar bra resonemang i text
Klara Britz	E: 0 C: 1 A: 2	Aktiv på lektionerna
Lovisa Nyman	E: 0 C: 2 A: 2	Väldigt duktig men kan ibland behöva stöd med vissa ord
Magnus Englund	E: 1 C: 0 A: 2	Visade bra resonemang om att låna julklappar 21/1
Rickard Willner	E: 2 C: 1 A: 0	Aktiv på lektionerna
Ronja Engberg	E: 0 C: 1 A: 2	Väldigt tyst på lektionerna, visar bra resonemang i text
Sofia Nyman	E: 0 C: 2 A: 2	Har varit borta 2 lektioner, behöver ta igen

Figure 33. The list of the individual grade follow-up.

In the list with the individual grade follow-up the user can see the pupil's comment and how many A's, C's and E's the pupil has (figure 33). The user can edit the grades and the comment of a pupil by clicking on the pupil's name.

Måluppföljning / Se individuell bedömning / Anna Annesson

Måluppföljning Anna Annesson

Gå tillbaka

Allmän kommentar: Aktiv på lektionerna

Redigera kommentarer

	Betyg E	Betyg C	Betyg A
Val	Eleven väljer tillvägagångssätt och ger enkla motiveringar till sina val med hänsyn till aspekterna hälsa, ekonomi och miljö.	Eleven väljer tillvägagångssätt och ger utvecklade motiveringar till sina val med hänsyn till aspekterna hälsa, ekonomi och miljö.	Eleven väljer tillvägagångssätt och ger välutvecklade motiveringar till sina val med hänsyn till aspekterna hälsa, ekonomi och miljö.
	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Kommentar:	Anna visade utvecklade resonemang under Kulturella lektionen 28/1		
Jämförelser	Eleven gör jämförelser mellan olika konsumtionsalternativ och för då enkla resonemang med viss koppling till konsekvenser för privatekonomi.	Eleven gör jämförelser mellan olika konsumtionsalternativ och för då utvecklade resonemang med relativt god koppling till konsekvenser för privatekonomi.	Eleven gör jämförelser mellan olika konsumtionsalternativ och för då välutvecklade resonemang med god koppling till konsekvenser för privatekonomi.
	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Kommentar:			
Konsekvenser	Eleven kan föra enkla och till viss del underbyggda resonemang kring konsekvenser av olika konsumtionsval och handlingar i hemmet utifrån frågor som rör en hållbar social, ekonomisk och ekologisk utveckling	Eleven kan föra utvecklade och relativt väl underbyggda resonemang kring konsekvenser av olika konsumtionsval och handlingar i hemmet utifrån frågor som rör en hållbar social, ekonomisk och ekologisk utveckling.	Eleven kan föra välutvecklade och väl underbyggda resonemang kring konsekvenser av olika konsumtionsval och handlingar i hemmet utifrån frågor som rör en hållbar social, ekonomisk och ekologisk utveckling.
	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kommentar:			

Figure 34. The overview of a specific pupil's grade follow-up

When the user clicks on a name the user can see the pupil's grades and comments (figure 34). The comment could be a note saying when the pupil showed an elaborative argument or if a pupil missed a class and needs to catch up on that theme. To edit the comments the user needs to click on the button at the top right corner.

Delat från andra pedagoger

Delat från andra pedagoger

Här kan du se material som andra pedagoger delar ut. Du kan ladda ner andras material, eller välja att själv ladda upp något du skapat.

Ladda upp eget material

Gå tillbaka





















Ovningar	Lektioner	Prov	Grovplaneringar	Mål	Favoritmarkerat
Uppgiftsnamn	Årskurs	Tidsåtgång	Form	Åtgärder	
Låna ut julklappar Skapad av: Anna8573 Uppladdad: 2019-02-13 ♥ 23 ↓ 701	ÅK 9	10-15 min	Individuell	 	
Samla skräp Skapad av: Daniel_NO Uppladdad: 2019-02-13 ♥ 23 ↓ 701	ÅK 6	7 min	Grupp	 	
 Vilket mellanmål väljer du? Skapad av: Daniel_NO Uppladdad: 2019-02-13 ♥ 23 ↓ 701	ÅK 4-9	5 min	Hela klassen	 	
Hur många tior kostar en lastbil? Skapad av: Daniel_NO Uppladdad: 2019-02-13 ♥ 23 ↓ 701	ÅK 9	20 min	Individuell	 	
Spara, spara, spara Skapad av: Anna8573 Uppladdad: 2019-02-13 ♥ 23 ↓ 701	ÅK 6	7 min	Grupp	 	
Jämförelse av olika kakor Skapad av: HistoriaMia Uppladdad: 2019-02-13 ♥ 23 ↓ 701	ÅK 4-9	5 min	Hela klassen	 	
Kredit Skapad av: HistoriaMia Uppladdad: 2019-02-13 ♥ 23 ↓ 701	ÅK 9	10-15 min	Individuell	 	
Diskussionsövning för lyxfällan Skapad av: Lars_555 Uppladdad: 2019-02-13 ♥ 23 ↓ 701	ÅK 6	7 min	Grupp	 	
Robin Hood Skapad av: Anna8573 Uppladdad: 2019-02-13 ♥ 23 ↓ 701	ÅK 4-9	5 min	Hela klassen	 	
Tjäna pengar Skapad av: Lars_555 Uppladdad: 2019-02-13 ♥ 23 ↓ 701	ÅK 4-9	5 min	Hela klassen	 	

Figure 35. The overview of assignments that other users were sharing.

At the screen with shared material (figure 35) the user can save material from other users. At the top of the list the user can choose if they want to look at assignments, lessons, tests, rough drafts of a teaching plan, requirements for grade follow-ups or everything that the user have favourite marked.

The users can see the name of the material, who uploaded it, how many likes and downloads it has, when it was uploaded, which classes it is suitable for, duration, and if the material is meant as an individual, group or class assignment. The icons to the right are actions, the user can save the material by clicking on the cloud with a downward pointing arrow and like the material by clicking on the heart.

Mitt sparade material / Övning: Låna ut julklappar

Övning: Låna ut julklappar

Skapad av: Dig 2019-01-27 Redigerad: 2019-03-03 [← Gå tillbaka](#)

[Redigera](#) [Dela](#)

Låna ut julklappar

Att låna ut sina leksaker eller pryglar är något som de flesta eleverna förmodligen gjort någon gång. Att låna ut något till någon annan kan ju säkert göras som en god gärning, men ibland kan man också förvänta sig något mer tillbaka. Denna uppgift utgår ifrån hur barn kan låna ut till varandra och hur återbetalning kan ske i deras värld.

Läs upp scenariot nedan för eleverna och låt dem leva sig in i dem. Låt därefter eleverna diskutera eller skriva om sina reflektioner kring de olika besluten som eleverna möter i scenariot.

Vad övar eleverna på?

Eleverna övar på att reflektera kring att spara, inte i form av pengar men i form av tid, för att kunna konsumera mer. Ju längre de väntar och "sparar", desto mer har de råd att konsumera. De får dessutom reflektera kring återbetalning och att stå i skuld till någon.

Vad säger läroplanen?

Läroplanen för årskurs 1-6 säger att eleverna ska ges förutsättningar att utveckla sin förmåga inom "Ungas ekonomi, sparande och konsumtion" vilket denna uppgift syftar till att göra eftersom eleverna får öva på det abstrakta tänkandet som ofta krävs i verkliga ekonomiska situationer.

Scenario del 1 - SPARA

"Josef och Fatma är syskon. Josef är 10 och Fatma är 12. Det har precis varit jul och i julklapp har Fatma fått en iPad och Josef har fått en Hoverboard. Josef är jättenöjd med sin Hoverboard men han vill gärna titta på Youtube och spela spel på Fatmas nya iPad ibland också. Han frågar Fatma om hon kan låna sig att låna ut sin iPad till Josef och då säger Fatma att det är ok, och hon ger honom 3 alternativ att välja mellan:"

- Låna iPaden varje söndag mellan klockan 17 och 18 i januari och februari
- Låna iPaden en lördag i januari och en lördag i februari
- Vänta i 2 månader och låna iPaden hela sportlovet (sista veckan i februari)

Låt eleverna diskutera följande frågor i 5-10 minuter:

- 1 Vilket alternativ ger Josef mest tid att använda iPaden?
- 2 Vilka är fördelarna med att Josef väntar länge på att få låna Fatmas iPad?
- 3 Vilka alternativ tycker ni Josef ska välja? Motivera!

Förklara för eleverna:

Det som eleverna gjorde i denna uppgift var att tänka kring att spara längre tid gör att de har råd att konsumera mer. I detta fall handlade det om att vänta kort tid - låna iPad lite, vänta längre tid - låna iPad mer. Vid senare tillfällen i livet kanske det istället handlar om att spara pengar kort tid - ha råd med lite och spara länge - ha råd med mer.

Kunskapsområde:
Spara & Låna

Årskurs:
AK 9

Används i:
AK9 VT 2018
AK9 VT 2019

Lägg till i en grovplanering

Figure 36. The overview of an assignment.

In the overview of an assignment the user can see information about the assignment in the big box (how to conduct it, what the pupils are training on and how its connected to the curriculum) (figure 36). There are two buttons above the box, the one to the left with the label "Redigera" (English: edit) lets the user edit the assignment. The button to the right with the label "Dela" (English: Share) lets the user share the assignment with other users.

At the right in the purple boxes the users can see which theme the assignment belongs to, what class it is recommended for and in which rough drafts it is used. Under the purple boxes is a button with the label "Lägg till i en grovplanering" (English: Add to rough draft) that allows the user to add the assignment to an existing rough draft.

Groplanering / Veckoplanering

Veckoplanering v 4, klass 7a Sällbergaskolan

Gå tillbaka

Mål

- Hälsa, ekonomi och miljö i måltiden
- Konsumentekonomi

Lägg till aktivitet

Låna ut julklappar

1

Hur vill du dela uppgiften?

Skriv ut elevark Dela via molntjänst Dela via mail

Låna ut julklappar

Att låna ut något till någon annan kan ju saklart göras som en god gärning, men ibland kan man också förvänta sig något mer tillbaka. Denna uppgift utgår ifrån hur barn kan låna ut till varandra och hur återbetalning kan ske i deras värld.

Läs upp scenariot nedan för eleverna och låt dem leva sig in i dem. Låt därefter eleverna diskutera eller skriva om sina reflektioner kring de olika besluten som eleverna möter i scenariot.

Vad övar eleverna på?

Eleverna övar på att reflektera kring att spara, inte i form av pengar men i form av tid, för att kunna konsumera mer. Ju längre de väntar och "sparar", desto mer har de råd att konsumera. De får dessutom reflektera kring återbetalning och att stå i skuld till någon.

Vad säger läroplanen?

Läroplanen för årskurs 1-6 säger att eleverna ska ges förutsättningar att utveckla sin förmåga inom "Ungas ekonomi, sparande och konsumtion" vilket denna uppgift syftar till att göra eftersom eleverna får öva på det abstrakta tänkandet som ofta krävs i verkliga ekonomiska situationer.

Scenario del 1 - SPARA [Dela uppgift med](#)

"Josef och Fatma är syskon, Josef är 10 och Fatma är 12. Det har precis varit jul och i julklapp har Fatma fått en iPad och Josef har fått en Hoverboard. Josef är jättenöjd med sin Hoverboard men han vill gärna titta på Youtube och spela spel på Fatmas nya iPad ibland också. Han frågar Fatma om hon kan låna ut sin iPad till Josef och då säger Fatma att det är ok, och hon ger honom 3 alternativ att välja mellan."

- Låna iPaden varje söndag mellan klockan 17 och 18 i januari och februari
- Låna iPaden en lördag i januari och en lördag i februari
- Vänta i 2 månader och låna iPaden hela sportlovet (sista veckan i februari)

Låt eleverna diskutera följande frågor i 5-10 minuter:

- Vilket alternativ ger Josef mest tid att använda iPaden?
- Vilka är fördelarna med att Josef väntar länge på att få låna Fatmas iPad?
- Vilka alternativ tycker ni Josef ska välja? Motivera!

Förklara för eleverna:

Del som eleverna gjorde i denna uppgift var att tänka kring att spara längre tid gör att de har råd att konsumera mer. I detta fall handlar det om att vänta kort tid - låna iPad lite, vänta längre tid - låna iPad mer. Vid senare tillfällen i livet kanske det istället handlar om att spara pengar kort tid - ha råd med lite och spara länge - ha råd med mer.

Figure 37. The overview of the weekly planning.

The weekly planning (figure 37) is where the user could see the planned assignments but also add more assignments by clicking the button to the right with the label "Lägg till aktivitet" (English: Add activity). The users could share the assignment by clicking on the link "Dela uppgift med elever" (English: Share assignment with pupils) next to the title of the scenario.



Figure 38. The dialogue box for sharing an assignment with pupils

The user could share the assignment with the pupils by printing out the section meant for the pupils, share through a cloud service (e.g. Dropbox or Google Drive) or by email (figure 38).

Appendix K – Ervasti and Nyström prototype version 3

Here is a description and pictures of the screens in the prototype with a new design in 4.4 *The fourth iteration*.

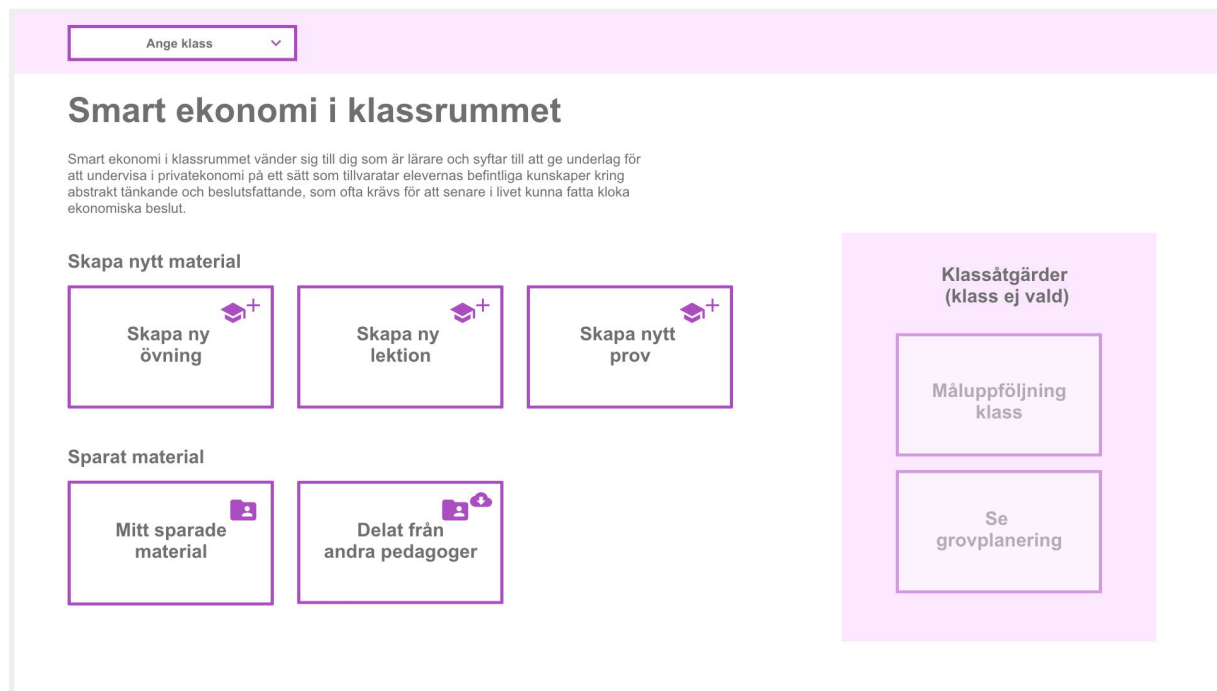


Figure 39. The starting screen of the prototype.

From the starting screen of the prototype the user could navigate to create an assignment, create a lesson, create a test, their saved material and material shared by other users (figure 39).

If the user would choose a class by using the dropdown menu at the top left of the screen, they could also see the documentation of the grades and the rough draft of the teaching plan. The bar that the dropdown menu is placed in is static which enables that the user can switch between classes no matter where the user is in the system.

7a Sällbergaskolan

Gå tillbaka Hem

Veckoplanering v 4, klass 7a Sällbergaskolan

Mål

- Hälsa, ekonomi och miljö i måltiden
- Konsumentekonomi

Lägg till aktivitet

Dela uppgifter med elever

Låna ut julklappar

Samla skräp och ha klassfest Veckopengen Lägg till övning

1 Låna ut julklappar

Att låna ut sina leksaker eller prylar är något som de flesta eleverna förmodligen gjort någon gång. Att låna ut något till någon annan kan ju såklart göras som en god gärning, men ibland kan man också förvänta sig något mer tillbaka. Denna uppgift utgår ifrån hur barn kan låna ut till varandra och hur återbetalning kan ske i deras värld.

Läs upp scenariot nedan för eleverna och låt dem leva sig in i dem. Låt därefter eleverna diskutera eller skriva om sina reflektioner kring de olika besluten som eleverna möter i scenariot.

Vad övar eleverna på?

Eleverna övar på att reflektera kring att spara, inte i form av pengar men i form av tid, för att kunna konsumera mer. Ju längre de väntar och "sparar", desto mer har de råd att konsumera. De får dessutom reflektera kring återbetalning och att stå i skuld till någon.

Vad säger läroplanen?

Läroplanen för årskurs 1-6 säger att eleverna ska ges förutsättningar att utveckla sin förmåga inom "Ungas ekonomi, sparande och konsumtion" vilket denna uppgift syftar till att göra eftersom eleverna får öva på det abstrakta tänkandet som ofta krävs i verkliga ekonomiska situationer.

Scenario del 1 - SPARA Dela uppgift med elever

"Josef och Fatma är syskon, Josef är 10 och Fatma är 12. Det har precis varit jul och i julklapp har Fatma fått en iPad och Josef har fått en Hoverboard. Josef är jättestygg med sin Hoverboard men han vill gärna titta på Youtube och spela spel på Fatmas nya iPad ibland också. Han frågar Fatma om hon kan tänka sig att låna ut sin iPad till Josef och då säger Fatma att det är ok, och hon ger honom 3 alternativ att välja mellan:"

- Låna iPaden varje söndag mellan klockan 17 och 18 i januari och februari
- Låna iPaden en lördag i januari och en lördag i februari
- Vänta i 2 månader och låna iPaden hela sportlovet (sista veckan i februari)

Diskutera följande frågor i 5-10 minuter:

- Vilket alternativ ger Josef mest tid att använda iPaden?
- Vilka är fördelarna med att Josef väntar länge på att få låna Fatmas iPad?
- Vilka alternativ tycker ni Josef ska välja? Motivera!

Förklara för eleverna:

Det som eleverna gjorde i denna uppgift var att tänka kring att spara längre tid gör att de har råd att konsumera mer. I detta fall handlade det om att vänta kort tid - låna iPad lite, vänta längre tid - låna iPad mer. Vid senare tillfällen i livet kanske det istället handlar om att spara pengar kort tid - ha råd med lite och spara länge - ha råd med mer.

Figure 40. The overview of an assignment.

When the user leaves the start screen two links appear to the right in the top bar, the first link with the text "Gå tillbaka" (English: go back) takes the user back to the previous screen. The second link with the text "Hem" (English: home) takes the user back to the start screen of the prototype (figure 40).

In the last prototype there was two buttons for sharing the scenario with the pupils, one next to the title of the scenario and one high up to the right (figure 40).



Figure 41. The dialogue box for sharing an assignment with the pupils.

When the user clicked the button for sharing the scenario with pupils several options appeared. The users could share the scenario to the entire class or to specific pupils. The sharing options were printing on paper, sharing through cloud service or emailing the scenario to the pupils (figure 41).

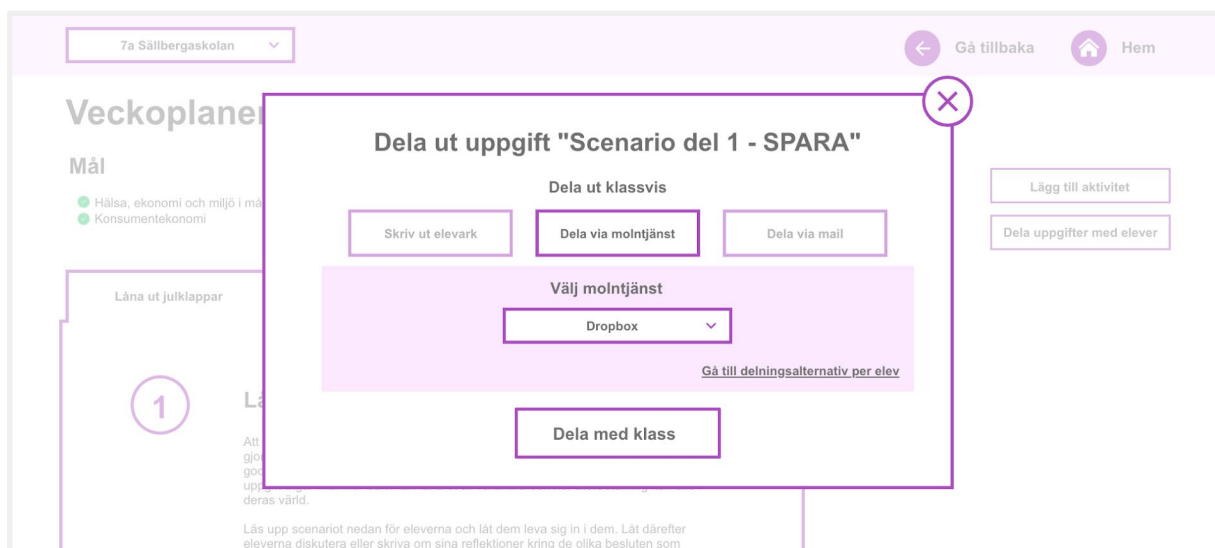


Figure 42. The dialogue box when the user has chosen to share the assignment with the cloud service Dropbox.

When a user wanted to share through a cloud service they could choose between Dropbox and Google Drive (figure 42).

7a Sällbergaskolan

Gå tillbaka Hem

Mitt sparade material

Här hittar du både ditt egna material men även material som du laddat ner från andra pedagoger.

Utforska andras material

Ladda upp eget material

Övningar	Lektioner	Prov	Grovplaneringar	Mål	Favoritmarkerat	
Uppgiftsnamn ▾			Årskurs ▾	Tidsåtgång ▲	Form ▾	Åtgärder
Låna ut julklappar Skapad av: Dig ♥ 1 ↓	Uppladdad: 2019-02-13		ÅK 9	20 min	Grupp	♥ 🗑
Samla pengar till klasskassan Skapad av: Dig ♥ 1 ↓	Uppladdad: 2019-02-13		ÅK 6	10-15 min	Grupp	♥ 🗑
Köpa nya kläder Skapad av: Dig ♥ 23 ↓ 701	Uppladdad: 2019-02-13		ÅK 9	10-15 min	Helklass	♥ 🗑
Panta burkar Skapad av: Anna8573 ♥ 23 ↓ 701	Uppladdad: 2019-02-13		ÅK 9	10 min	Individuell	♥ 🗑
Sommarbär och äpplen Skapad av: Dig ♥ 1 ↓	Uppladdad: 2019-02-13		ÅK 6	7 min	Grupp	♥ 🗑
Lån eller gåva Skapad av: Anna8573 ♥ 23 ↓ 701	Uppladdad: 2019-02-13		ÅK 4-9	7 min	Helklass	♥ 🗑
Köpa färdiga bullar eller köpa själv Skapad av: Dig ♥ 23 ↓ 701	Uppladdad: 2019-02-13		ÅK 9	5 min	Individuell	♥ 🗑
Världens resurser Skapad av: Dig ♥ 23 ↓ 701	Uppladdad: 2019-02-13		ÅK 6	5 min	Grupp	♥ 🗑
Sveriges resurser Skapad av: Anna8573 ♥ 23 ↓ 701	Uppladdad: 2019-02-13		ÅK 4-9	5 min	Helklass	♥ 🗑
Vilken mjölk ska jag köpa? Skapad av: Dig ♥ ↓	Uppladdad: 2019-02-13		ÅK 4-9	5 min	Helklass	♥ 🗑

Figure 43. The list with the users saved material.

When the user scrolled through lists with their saved material, they could sort the list by clicking on the title of the column (figure 43). The user could sort the list by name, class, duration, and form.

The user could directly in the list choose if they wanted to like the material by clicking on the heart or delete the material by clicking on the bin.

7a Sällbergaskolan

Gå tillbaka Hem

Individuell bedömning klass 7a Sällbergaskolan

Titel: Skolverkets kunskapskrav 7-9
 Skapad av: Skolverket

Den här måluppföljningen är baserad på det som står i skolverkets läroplan, om du vill kan du hämta andra mål från ditt sparade material alternativt formulera om målen genom att trycka på "redigera mål".

Betyg	Elev	Allmän kommentar												
<table border="1"> <tr><td>E</td><td>C</td><td>A</td></tr> <tr><td>✓</td><td></td><td></td></tr> <tr><td></td><td>✓</td><td></td></tr> <tr><td></td><td></td><td>✓</td></tr> </table>	E	C	A	✓				✓				✓	Anna Annasson	Aktiv på lektionerna
E	C	A												
✓														
	✓													
		✓												
<table border="1"> <tr><td>E</td><td>C</td><td>A</td></tr> <tr><td>✓</td><td></td><td></td></tr> <tr><td></td><td>✓</td><td></td></tr> <tr><td></td><td></td><td>✓</td></tr> </table>	E	C	A	✓				✓				✓	Ali Muhammed	Väldigt duktig men kan ibland behöva stöd med vissa ord
E	C	A												
✓														
	✓													
		✓												
<table border="1"> <tr><td>E</td><td>C</td><td>A</td></tr> <tr><td></td><td>✓</td><td></td></tr> <tr><td></td><td></td><td>✓</td></tr> <tr><td></td><td></td><td>✓</td></tr> </table>	E	C	A		✓				✓			✓	Awar Kabul	Visade bra resonemang om relationen mellan värde, resurs och tid 21/2
E	C	A												
	✓													
		✓												
		✓												
<table border="1"> <tr><td>E</td><td>C</td><td>A</td></tr> <tr><td></td><td></td><td>✓</td></tr> <tr><td></td><td>✓</td><td></td></tr> <tr><td></td><td></td><td>✓</td></tr> </table>	E	C	A			✓		✓				✓	Bella Nygren	Aktiv på lektionerna
E	C	A												
		✓												
	✓													
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E	C	A												

Figure 44. The list with the individual grade follow-up.

The user could see a list of the individual grades and comments in a class, the grades were presented visually in a table instead of listing the amount of each grade (figure 44). By clicking on a pupil's name, the user could edit both the comment and the grade.

Appendix L – Participants quotes in Swedish

Quote from the first iteration:

Ja, man får väl skämmas om man leder den där ligan “har kopierat mest”.

Iteration 2:

Jag tyckte om att det var avskalad, det var inte så svårt att se vart man ska klicka vidare. Jag gillar att det inte är så mycket saker [på skärmen].

Quote from the third iteration:

Jag skulle vilja ha möjlighet att lägga in en egen bedömningsmatris eller välja att ta en färdig som är direkt mappad till skolverkets kunskapskrav. Om man själv kan få göra en egen kan man göra att det står vad som menas med det, inte använda samma torra språk som i skolverkets kunskapskrav.

Quote from the fourth iteration:

Material delat från andra pedagoger är grymt, annars söker man själv väldigt mycket. Det kan vara svårt att hitta material av bra kvalitet. Ofta gör jag om materialet oavsett, jag tar idén och anpassar det till elevgruppen.

Appendix M – Thematic analysis (iteration 1)

Anpassningsbart material	Anpassa för olika förutsättningar	Olika ekonomiska situationer
		Olika diagnoser
		Språksvårigheter
	Dokumentation av uppgifter	Sparar uppgifter i en pärm
		Sparar uppgifter i datorn
		Reviderar alltid återanvända uppgifter
Hjälpmedel	Verktyg i undervisningen	iPads verktyg
		Chromebooks verktyg
	Läromedel i undervisningen	Film läromedel
		Pengar läromedel
		Bok läromedel
		Kronofogdens hemsida läromedel
		Programmet lyxfällan läromedel
Quiz läromedel		
Undervisning	Lektionsplanering	Lektionsplanering tidskrävande
		Lektionsplanerar i ett block
	Form av undervisning	Undervisar på olika sätt
		Undervisar främst med diskussion
		Undervisar med film
		Undervisar med böcker
		Undervisar med diskussion
		Undervisar med eget material
Dela material	Dela material	Delar allt material med andra lärare
		Delar inget material med andra lärare
		Vill dela lektionsmaterial digitalt med elever
Underlag för bedömning	Visa kunskap på olika sätt	Redovisa med reklamfilm
		Redovisa med foto
		Redovisa med film
		Redovisa med röstinspelning
		Redovisa med egen reflektion
		Sparar elevernas svar
	Dokumentation för bedömning	Skriver kontinuerligt ner bedömning
		Matris som bedömningsunderlag
		Lägger mycket tid på bedömning
		Eleverna vill se detaljer på bedömning

Appendix N – Thematic analysis (iteration 2)

Friktioner	Lärolinje	Lärolinje betydelse
	Logga in	Logga in hur
	Betygsdokumentation	Matris betydelse
	Skapa uppgift	Betygssätta uppgift ej möjligt
		Spara uppgift hur
	Dela material	Lorem ipsum
		Symbolers betydelse
	Navigation	Hitta till rätt ställe
Delighters	Dela material	Listan med uppgifter
	Design	Gillar avskalat
	Grovplanering	Grovplanering är modifierbar
Önskemål	Grovplanering	Önskar veckoplanering
	Betygsdokumentation	Vill lägga in egen bedömningsmall
	Skapa uppgift	Spara automatiskt

Appendix O – Thematic analysis (iteration 3)

Friktioner	Dela uppgift med elever	Hitta "dela med elever"
	Navigation	Hitta till rätt ställe
	Betygsdokumentation	Tid för att sätta betyg
	Dela material	Symbolers betydelse
	Design	Ogillar den lila färgen
Delighters	Dela material	Möjlighet att dela med andra pedagoger
		Att man kan redigera andras uppgifter
		Listan med uppgifter
	Design	Gillar avskalat
	Betygsdokumentation	Redigerbara bedömningsmallar
Önskemål	Dela material	Möjlighet att sortera på kategori
	Grovplanering	Att elever ska kunna göra uppgifter direkt i systemet
	Navigation	Hemknapp
	Betygsdokumentation	Ge elever tillgång till betygsdokumentation

Appendix P – Thematic analysis (iteration 4)

Friktioner	Design	Den lila färgen
	Betygsdokumentation	Tid för att sätta betyg
	Dela material	Symbolers betydelse
Delighters	Dela material	Möjlighet att dela med andra pedagoger
		Att man kan redigera andras uppgifter
		Listan med uppgifter
	Design	Gillar avskalat
	Betygsdokumentation	Redigerbara bedömningsmallar
	Navigation	Hemknapp
Önskemål	Involvera elever	Att elever ska kunna göra uppgifter direkt i systemet
	Betygsdokumentation	Ge elever tillgång till betygsdokumentation