

RESEARCH

Teaching about Personal Finance in HCS – Suggestions from a Design-Based Research Approach

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Supported by the notion of concept-driven design and design-based research, as well as the tradition of critical pedagogy and the idea of sociomaterialism, the aim of this article is to explore and develop a didactic tool for education in personal finance to be used within the formal education system. The object studied is an artefact for teaching about personal finance among Swedish middle school pupils in the subject area Home and Consumer Studies (HCS). We define personal finance as economizing with (limited) private resources.

In this article, we (a) describe the process of developing a prototype for teaching about personal finance and (b) discuss qualities of platform and content in relation to such an artefact. The design process is based on three assumptions (Hernwall & Söderberg, 2019): in contrast to many statistical/assessment studies, children this age have at least an initial understanding of basic principles of personal finances and of economizing; HCS teacher education in Sweden has little (to no) focus on personal finance; and Swedish HCS teachers are confronted with an almost complete lack of teaching material in the domain.

Conceptualized as a design-based research methodology, the focus is therefore a didactic interest in supporting teachers' possibilities to teach personal finances to their pupils in a way that supports learning based on the pupils' own understanding of the basic principles of economization. Framed by design-based research, the artefact developed within the project is a prototype of a digital tool to be used as a teacher support in teaching about personal finance. One acknowledged aspect of the use of digital tools is that they allow multimodal literacy. The development of a prototype with the purpose of creating a tool for teaching about personal finance followed an iterative cycle of three stages and four interpretative revisions.

The parallel process of developing *and* testing a technological artefact has resulted in seven proto-theories on essential qualities for a didactic tool that supports learning about personal finance. This entails not only the appropriation of economy as "economization with (limited) resources", but also guides the transition from understanding to a useful repertoire of teaching activities.

Keywords: Personal finance; Design-based research; Education; Home and consumer studies; Teaching material

Introduction

Given phenomena such as the growing complexity of consumer financial services, products for long-term savings and loans, and the increased use of digital solutions opening up for global consumption 24/7, it is fair to say that the financial market met by young people today is dramatically different than that just one or two generations ago. The development of financial competence therefore seems both necessary and inevitable. Simultaneously, we know from studies measuring financial literacy and numeracy among different populations that many (adults)

have low competence in matters of personal finances, as illustrated by problems among adult populations executing basic calculations and lack of knowledge about and understanding of what is commonly considered essential financial literacy (Banks & Oldfield, 2007; Lusardi, 2015; Lusardi & Mitchell, 2011; OECD, 2005; Van Rooij, Lusardi, & Alessie, 2011). From other studies, we know that such limitations in knowledge are correlated to a more stressed economic situation and/or less elaborated choices in the financial market (Hastings & Tejada-Ashton, 2008; Stango & Zinman, 2008, 2011). Studies on the Swedish population confirm that many adults lack basic financial skills (Johan Almenberg & Säve-Söderbergh, 2011; J. Almenberg, Vestman, & Säve-Söderbergh, 2015; Johan Almenberg & Widmark, 2011). This lack of adequate competences thus gives rise to a range of problems in relation to consumer behaviour and financial choices.

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Given this introduction, there seems to be a general need for a more elaborated financial education and a particular need for personal finance education. However, experience shows that it is difficult to design educational programmes that capture the complexity of personal finances (Mandell & Schmid Klein, 2009), as the field of practical knowledge is both conceptual, numerical and also concerns the ability to take action regarding an evaluation of both external and internal factors (Johnson & Sherraden, 2007). Minimal research has been conducted to investigate children and financial education; therefore, it is not possible to draw any conclusions about the effectiveness of education (Suites and Meszaro, 2005; Sherraden et al., 2011; Collins and Odders-White, 2015). Therefore, the need for research about how children learn about basic financial and economic matters has been raised (Danes and Haberman, 2007). Based on our previous research (Hernwall & Söderberg, 2019), we argue that even if conceptual and numerical knowledge are important, we need to pay attention to what young people actually do master and start the training from that point of departure. PISA/OECD (OECD, 2012, 2017) tend to focus on and measure a delimited set of predefined financial literal and numerical competences, but consequently risk missing the actual capabilities of the subject. Obviously, there is an important difference between, on the one hand, having appropriated a set of concepts from the financial market or performing domain-specific calculations and, on the other hand, having financial capability of relevance for the everyday lifeworld. The latter is, we argue, a more fundamental understanding.

The school subject of the compulsory Swedish school is, in this case, Home and Consumer Studies (HCS), and the specific core content is “Personal Finance” (for a more elaborated description of HCS, see Lindblom, Erixon Arreman & Hörnell, 2013). The domain of personal finance is a minor part of the HCS subject in Swedish elementary school, from grades 4 to 9. To illustrate the marginal position of personal finance in the Swedish national curriculum, it can be stated that HCS is by far the school subject with the least number of guaranteed lesson hours, or merely 1.7% of the total guaranteed educational hours of elementary school (Hernwall & Söderberg, 2019). The primary focus of HCS is on food, food preparation and meal processes, whereas personal finance is just a small percent of the few HCS hours (see Hernwall, Hullgren, & Söderberg, 2018; Skolverket, 2011). Even if not stressed in the national Swedish curriculum for compulsory school, the field of personal finance, and of financial literacy in general, are in other contexts considered important life skills (OECD, 2017). In addition, in their thematic quality review of the HCS subject, the Swedish Schools Inspectorate emphasized the lack of teaching and methods for teaching about personal finance (Skolinspektionen, 2019). This conflict between, on the one hand, the need to develop a necessary life skill (financial literacy) and, on the other hand, limited resources (HCS), is a key challenge framing this article. Or in other words, this explorative study focuses on a specific core content, not being prioritized, in the smallest subject of the curriculum for compulsory school in Sweden.

Understanding learning and knowledge as an intertwining of human and artefact comes with consequences for the domain of didactics: Selander (2017) argues that the manner in which (in what mode) something is presented is also the starting point for the learning process.

Both the question of how knowledge is represented and given form in different contexts – including how the context makes it possible or allows the knowledge to take form – and the question concerning how knowledge is used and assessed are interests in the field of didactics. (Selander, 2017, p. 37)

In meetings with stakeholders within the HCS domain (teachers, teacher trainers and teacher students, as well as government officials, researchers, school development professionals, etc.), it has become clear that HCS teachers lack support for teaching about personal finance (Skolinspektionen, 2019). Conceptualized as design-based research, the focus of this article is a didactic interest in how to teach about personal finance paired with a critical/emancipating pedagogical aim of developing the conditions for young people to appropriate basic economic principles. In this article, we therefore (a) describe the process of developing a prototype for teaching about personal finance in the domain of HCS and (b) discuss the qualities of the platform and content in relation to such an artefact.

The overall aim of this study is to explore and develop teaching material for education in personal finance to be used within the formal education system. The focus is on supporting teachers' possibilities to teach personal finances to their pupils in a way that supports learning based on the pupils' own understanding of the basic principles of economization.

We start by elaborating on the theme of personal finance in an educational context, which is the subject matter of main interest. After discussing the subject area of Home and Consumer Studies (HCS) within the Swedish compulsory school, we present the design methodology used for the process of iteratively elaborating on teacher support for teaching about personal finance in middle school, leading up to a set of proto-theories. The article ends with a discussion of how to develop the field of teaching about personal finance within the subject area of HCS.

Before moving on to the theoretical assumptions, a note on the terminology. Framed by design-based research, the *artefact* being developed is a *prototype* of a *digital tool* to be used as a *teacher support* in teaching about personal finance.

Theoretical assumptions

In this article, we conceptualize human actions as a matter of sociomaterialism (Barad, 2003; Orlikowski, 2007), as an entanglement of the social and the materiality in everyday life. Based on this assumption, and given the practice of formal education, we argue that the conditions for learning are inextricably intertwined with the available tools and how (and if) these tools are appropriated.

In the perspective of sociocultural theory (Vygotsky, 1978; Wertsch, 1991), tools have an emancipating quality as they broaden the scope of human actions, regardless of being strength (the lever), sight (binoculars), memory (pen and paper) or speed (bicycle). The consequence of this is twofold. First, it opens up possibilities for actions that are not available without these tools. The human can, with the support of the bicycle, extend the physical space experienced and transport information recorded on a piece of paper, among others. Even though tools become entangled with the life-world, they do lack the plasticity of digital media. Thus, digital media are adaptable to a wide range of situations and personal needs, leading to a blurring of the distinction between what is uniquely human and what is a tool (which is often impossible, or perhaps even irrelevant, to distinguish) (e.g., Clark, 2003; Haraway, 1991). The second consequence – an ontological assumption about what it is to be human – is that when appropriated, the affordances of the tools become internalised as possibilities for *human* action, extending how we conceptualize ourselves. It is in this perspective that tools, or medias in the vocabulary of (McLuhan, 1964/1994), are to be understood as “extensions of our consciousness” (ibid.). The actions of humans, as well as the qualities of technological objects, are therefore to be understood as emerging in what Barad (2003) term “sociomaterial assemblages”, or temporally stable agencies or interactions.

One further aspect of digital tools, or the use of digital tools, that is of relevance herein is that they allow multimodal literacy (Kress, 2009; Ventola, Charles, & Kaltenbacher, 2004), providing opportunities for a wide range of semiotic modes of expression. However, as (Kress, 2009) argues, the process of the translation of one utterance into *another* mode might imply more or less significant changes in meaning “across *genres*, across *modes*, across *cultures* and across any combination of these” (Kress, 2009, p. 124). This means that a broader variety of accessible and/or accepted modes supports a greater variety of voices and experiences to be expressed. In other words, tools make new actions possible, affecting how we understand ourselves and making the ongoing process of appropriation essential for human cognition and consciousness.

Personal finance in the Swedish national curriculum and in the classroom

The subject area that includes personal finance is, in Swedish compulsory school, Home and Consumer Studies (Skolverket, 2011). This subject area has a long tradition, going back to the start of the 20th century. Obviously, the HCS subject has undergone rather profound changes since its introduction as Home Economics. Over the century, it has come to include more “consumer studies”, consumer rights and financial literacy. Additionally, “personal finance” has tended to become synonymous with the latter, despite being obviously inextricably intertwined with, e.g., food preparation. This means that HCS has its roots in the idea of economizing household duties.

But personal finance is not considered a main area of interest in the current Swedish curriculum for compulsory

school (Lgr 11), even though concepts such as “consumer” and “sustainability” are used (if sparse) in relation to the core abilities of the HCS subject. A discussion can be made (although it is beyond the scope of this article) for how well the framing of HCS in the Lgr11 curriculum matches basic financial literacy as “an essential life skill” (as described by OECD, 2017, p. 3). Notably, many OECD/European countries have developed and in many instances also implemented national strategies and curricula for the financial education of young people (OECD, 2017): Sweden is not among those, which might explain why Sweden has not participated in the financial literacy part of the PISA studies.

In Sweden, teachers lack formal training within the field of personal finance. Björklund (2019) studied this lack of formal education and the manner in which teachers compensate for that in the classroom. Björklund concluded that different strategies can be used to deal with this lack of subject as well as didactic knowledge. In the present project, discussions with university teacher trainers in the HSC teacher training programme leading up to the design process presented herein also emphasized that the area of personal finance is more or less neglected in the teacher training programme, leaving it to the individual teacher to find her/his way of teaching about personal finance. In the most recent book on didactics in HCS (Hjälmeskog & Höijer (ed.), 2019), personal finance is not even mentioned. This suggests rather haphazard lesson planning and teaching content (didactics). Concurrently, this lack of support for teaching about personal finance opens the door for different stakeholders to try to meet such demands. Nevertheless, the competence of teachers to critically examine the quality and relevance of such teaching material remains a matter of discussion.

HCS is often taught in a divided class (10–15 pupils) due to limited space in the school kitchen, and the complexity of the teaching situation of young people handling cookware, etc. (Lindblom, 2016). Furthermore, the main focus in HCS is on food and food preparation; the already limited financial resources are primarily used for purchasing groceries for use in the classroom/school kitchen, implying a sparse interest among textbook publishers for producing HCS textbooks. With this lack of professional development and domain expert review of teaching material in the domain of personal finance, teachers tend to turn their attention to what they find on the internet (Björklund, 2019), which could consist of teaching material or support for lesson planning, found on their own or perhaps more frequently by recommendation of HCS teacher colleagues, such as information material from the Swedish Consumer Agency (Konsumentverket) or retail banks. Despite being valuable in relation to consumer rights and consumer law, consumer advice or financial services, this material tends to reflect a consumeristic notion of personal finance at the expense of sustainability or a circular economy. Also being more tuned to consuming financial services, than on a critical reflection on economy as economizing with (limited) resources.

The design process

Underlying the process of the design of a tool of didactic relevance in the HCS domain is the tradition of critical pedagogy (Freire, 2000; McLaren, 1998) in that we aim to (i) improve the personal finance education by (ii) supporting HCS teachers in their appropriation of fundamental financial concepts so that they (iii) have an appropriate intellectual and domain specific preparedness to assess (iv) the actual and by-education-developed financial competence of pupils grades 4 to 6. We ground this ambition in our initial studies on children's understanding of basic economic principles (Hernwall et al., 2018).

Using a design-based research approach (Barab & Squire, 2004; Brown, 1992; Collins, 1992; The Design-Based Research Collective, 2003) implies (if not explicitly) the assumption that the benefits with statistical studies, experiments or controlled trials are relatively small. In the endeavour to support the development of new qualities of relevance for the practice studied, the research endeavour should have at least the following traits (from Reeves, 2006, p. 95):

- addressing complex problems in real contexts in collaboration with practitioners;
- integrating known and hypothetical design principles with technological affordances to render plausible solutions to these complex problems; and
- conducting rigorous and reflective inquiries to test and refine developed prototypes, innovative learning environments as well as to define new design principles and/or theories of learning.

These traits are oriented towards needs within the practice and development of the increased quality of that practice (in contrast to objective truths), leading to a design research process based on the refinement of problems, solutions, methods and design principles (**Figure 1**).

The design-based research approach acknowledges that technology supported educational settings often are what (Selwyn, 2010) defines as “‘messy’ realities”. Even if Selwyn's interest is in the use of technology within pedagogical settings, the notion of ‘messy’ realities underscores the importance of situational understanding and thus of thick descriptions (e.g., Geertz, 1973) to develop a better

understanding of the complexity of educational and of didactic practices. Such a critical approach makes it possible, Selwyn argues, “to develop a more socially grounded understanding of the ‘messy’ realities of educational technology ‘as it happens’.” (Selwyn, 2010, p. 72) and consequently make it possible to go beyond the educational (or pedagogical) and technology divide often framing (i.e., hindering) the discussions. He further argues that it is important to see the educational setting as a social, cultural and political concern. Reducing education to blunt results such as grades or test results will inevitably miss the “messyness” of education, teaching and learning or, as phrased within the design-based research community, the importance of addressing complex problems in real contexts (e.g., Collins, 1992; Reeves, 2006, etc.). Herein lies an obvious challenge in determining what and how to present: the presentation must be rather extensive so that the conclusions are well grounded and transparent.

As Vanderhoven, Schellens, Vanderlinde, & Valcke (2016) in their project on developing education materials in secondary education (12 to 16-year-old pupils) on how to act safely on SNS (social networking sites), we will describe in detail the iterations and reflect upon all the four sequential steps (Reeves, 2006) of the design process. The researchers are academics with expertise in the fields of financial literacy and economic theory, and of pedagogical and media theory. Interaction design experts took charge of the design of the actual prototype (primarily step 2 and 3 below). A range of educational and HCS stakeholders (HCS teachers, HCS teacher students, HCS teacher trainers, researchers, school development experts, governmental officials, etc.) participated in the different activities hosted by us.

This rather small-scale study uses different, or mixed, qualitative methods to study childrens' understanding of basic economic principles (step 1), stakeholders experiences and needs (step 1 and 2), and prototype quality (step 3). As the overall aim of the process, and thus the motif for a concept-driven (e.g., Stolterman & Wiberg, 2010) design-based research, is on developing didactical theory and didactic tools, we find hermeneutic (interpretative) methodology better suited to capture critical pedagogical moments or qualities than statistical or other quantitatively oriented methods. The recurrent revision (**Figure 2** below)

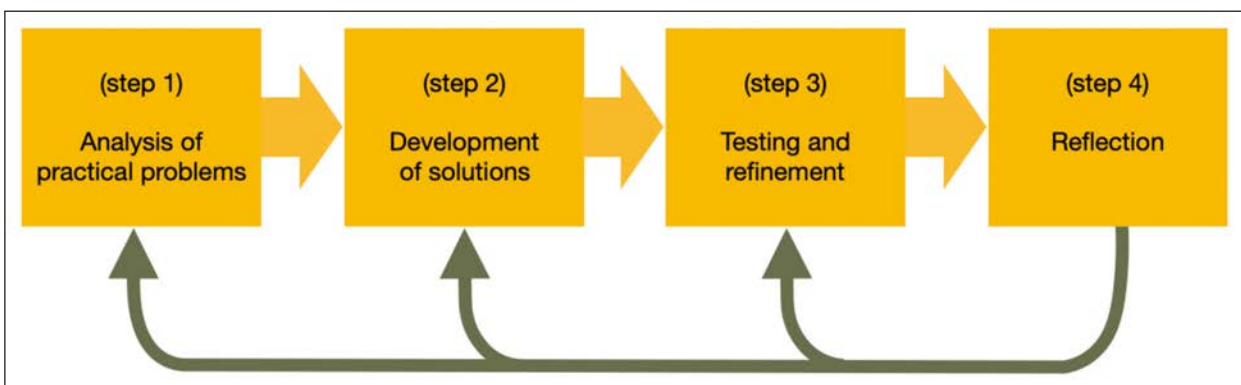


Figure 1: The Design Research process; refinement of problems, solutions, methods, and design principles (from Reeves, 2006).

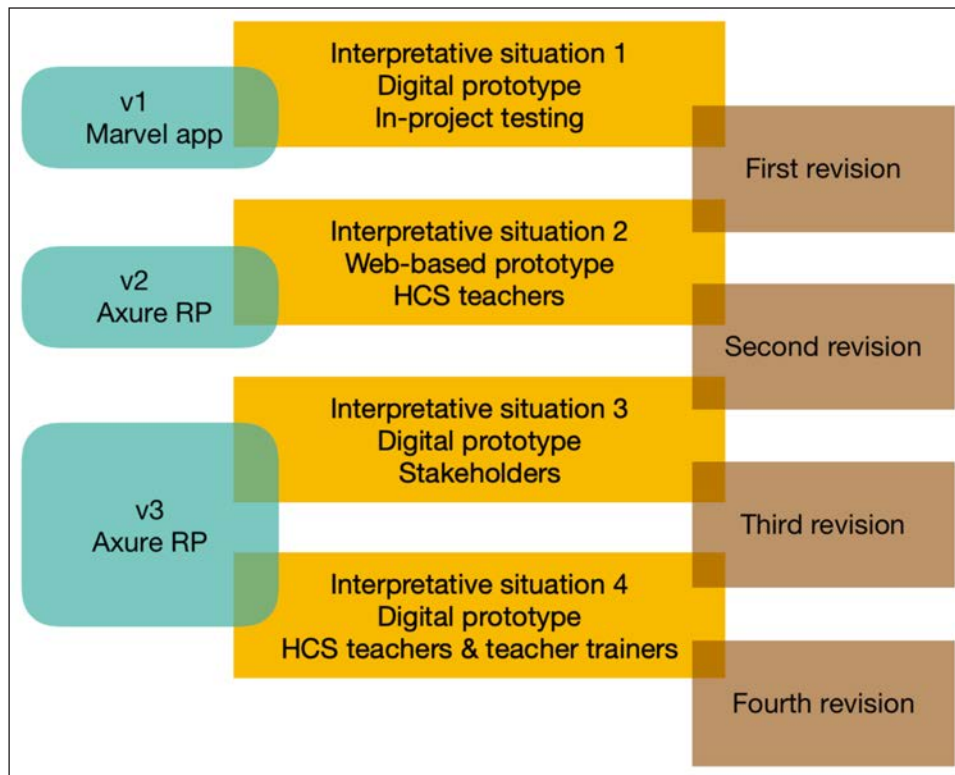


Figure 2: The design process.

in this article is not primarily an instance for prototype critique, but rather a phase for deepening understanding of the didactic challenge mediating not just the content but also the underlying idea of the approach to personal finance as economization.

Analysis of practical problems (step 1)

The project as a whole was started to study the financial competence of children age 10 to 12 years old (i.e., middle school ages). As this is a sparsely studied area and one that completely lacks subject didactic studies, teaching of personal finance within the HCS subject tends to build on information from the financial market (c.f. Hernwall & Söderberg, 2019).

The project therefore started out with a series of workshops with grades 4 to 6 pupils (3 different schools, 191 pupils in total). The aim of these workshops was to develop a deepened understanding of their understanding of basic economic principles (Hernwall, Hullgren, & Söderberg, 2017; Hernwall et al., 2018). In the setup of these studies, we took inspiration from theories such as the active and competent child (Hernwall, 2013; James & Prout, 1997) and learning as an interactive and social endeavour (Vygotsky, 1978; Wertsch, 1991) in consonance with creative research methods (Gauntlett, 2007; Siibak, Forsman, & Hernwall, 2013).

In setting up the workshops with the children, the ambition was to capture the children’s own perspective and experiences (Hernwall et al., 2017, 2018). In the scenarios presented to the children in the workshops, the guiding principles was to (i) present situations that were familiar to the children, (ii) create scenarios for discussion rather than testing, (iii) mix individual and group reflections,

(iv) make no explicit reference to “money”, (v) support different symbolic expressions (talking, writing, drawing), (vi) make every voice count and (vii) as far as possible, not expose the child’s socio-economic everyday lifeworld.

We had roundoff discussions with all the teachers involved, in direct connection with the workshops. This helped deepen our understanding of their experiences of teaching about personal finance, how HCS education varied between schools, and their conceptions of the financial competence among the pupils they meet. The teachers we met during these workshops were also given the opportunity to provide further comments via an online qualitative survey sent out after our visit to the schools. In this survey, and in our dialogue with other stakeholders, it became even more obvious that the subject area of HCS in general, and personal finance in particular, received rather marginal attention in the school setting (regardless of whether it was considered important).

This is the background for, or the analysis of the practical problem, the need of a support for teaching about personal finance in HCS. The prototype was to build on the same seven principles as the pupil workshops (c.f. above).

One challenge of studying children and a classroom context is the ethical issue of participant anonymity and confidentiality. As the study reported herein is based on knowledge generated from studies reported earlier (Hernwall & Söderberg, 2019), but focuses mainly on the development of a didactic tool including only adult actors, no need for ethical review has been identified. However, it can be noted that ethical guidelines published by the Swedish Research Council were followed (Svenska vetenskapsrådet, 2017).

Development of solutions (step 2)

In the development of the actual digital prototype, two interaction design experts (a User Experience Specialist and a Data and Solutions Architect) were presented with the tentative experiences and findings of the project (see Hernwall et al., 2017, 2018). These experiences were based on the analysis of the practical problem (step 1).

Testing and refinement (step 3)

As the main target group for the prototype are HCS teachers, rather than the actual teaching situation, the testing process involved different groups of teachers and teacher trainers and/or other stakeholders in four iterations:

1. The interaction design experts provided the research project with a rudimentary prototype (version 1). Discussion of (a) interpretation of basic economic principles and (b) the design/interaction idea.
2. An elaborated digital web-based prototype (version 2) presented together with an evaluation form for HCS teachers.
3. Version 3 of the prototype was presented and discussed at a workshop with HCS teachers, teacher trainers, researchers, government officials, etc.
4. Workshop with (a) HCS teacher students and (b) HCS teacher trainers based on version 3 of the prototype.

The prototype was used for reflection on didactic challenges in four cycles, here described as “interpretative situations” emphasizing that the testing and refinement process included different kinds of evaluation contexts.

Reflection (step 4)

The goal of the iterative process was to develop what (Vanderhoven et al., 2016) describes as “sharable ‘proto-theories’, which help to communicate relevant implications to practitioners and educational developers” (p. 467). Grounded in the interest in how to teach about personal finance, the proto-theories will be in the form of recommendations for a digital platform harbouring the subject content, in particular didactic reflections and recommendations on how to present such teaching material.

Results**Analysis of practical problems (step 1)**

Taking a critical stance towards the assumption that children have limited financial competence and also the predominant tradition of measuring to what extent they have (or have not) arithmetical and/or conceptual (financial) knowledge, our starting point was to determine the actual financial capabilities of children. Inspiration for the setup was obtained and developed at a workshop with stakeholders prior to the workshops with the children. Here it was emphasized the importance of identifying the children’s own experiences and perspectives in this domain.

The series of workshops with children provided a first essential experience that children do understand basic economic principles (defined as “resource”, “value”, “time”). As we conceptualize economy as “economize with (limited) resources”, rather than “finance”, it becomes necessary to ask (at least) two questions:

- Is this a conceptualization of personal finance (and financial literacy in general) that is of relevance for HCS?
- If so, do HCS teachers have the necessary financial competence to embrace the notion of “economize with (limited) resources” (and the concepts “resource”, “value”, “time”)?

The initial answer to these two questions, based on discussions with teachers we met while conducting the workshops, as well as discussions with government officials, was “yes, it is highly relevant” and “no, teaching about personal finance is neglected in many respects, which is probably dependent on teachers’ tendency to have a superficial, if not naïve, financial competence”. Thus, the design-based research process started at the intersection between the competences of the children, the lack of appropriate teaching support, and a (assumed) knowledge gap among HCS teachers, as proposed by the teachers themselves and by teacher education experts.

The need for appropriate teaching support in the area of consumer studies and personal finance is further accentuated by the scarce resources. The almost exclusively used¹ HCS textbook (Hjalmarsson, Sjöholm, & Arvidsson, 2018) for the Swedish compulsory school, though newly published, addresses personal finance primarily as a matter of weekly pocket money, consumer rights and key concepts in the financial market (e.g., allowance, interest). This representation represents the narrowing of financial competence to counting and concept knowledge (i.e. consumer perspective) at the expense of understanding basic financial principles.

To summarize, the pedagogical didactic challenge of developing a teacher support in this domain has been developed out of two tentative empirically grounded assumptions. The first is that there is an essential distinction between economy as “finance” and as “economize with (limited) resources”; the latter is of interest herein. Second, children understand the basic economic principles of “resources”, “value” and “time”, providing a likely basis for developing financial literacy.

Development of solutions (step 2)

Based on the analysis of the practical problem, the following five criteria were established for the interaction design experts when developing a teacher support for teaching about personal finance in HCS:

- I. It should support student (middle school) development of fundamental financial principles (“resource”, “value”, “time”).
- II. It should support teachers in broadening their understanding of financial literacy from the consumer perspective predominant in the curriculum, to a more reflected understanding of basic economic principles.
- III. It should reveal the existing financial capability of the pupils and support an understanding in relation to how this is articulated in the syllabus of HCS.
- IV. It should develop the subject HCS, in particular the area of personal finance.
- V. It should support teachers in their assessment and grading.

It is important to stress that the intended goal of this prototype is to be a support for HCS teachers in their education about personal finance, including examples and exercises. It should further describe the relationship between example and/or exercise, personal finance, and the syllabus/core content of HCS.

Testing and refinement (step 3)

In the third phase – testing and refinement of the prototype – four iterative cycles of interpretative and revision work were conducted. During this process, not only did the prototype develop, but also the understanding of the conditions for teaching about personal finance in HCS, the lack of support for teaching about personal finance within the HCS field, as well as the needs among HCS teachers in that domain.

Interpretative situation 1

In the initial phase of the work, the interaction experts were presented with preliminary results from the analysis of pupil workshops on the content of the curriculum and the founding ideas for the prototype (c.f. step 1 and 2 above). The first rudimentary version of the prototype therefore focused on how to present key concepts and was presented and discussed internally within the research project. The guiding principle for the critical analysis was the five criteria established in step 2 (above). The prototype was developed and presented in the web-based developer tool Marvel (marvelapp.com).

Already in the first version of the prototype, the task (in the form of a scenario) presented had complementary information about “What do the pupil’s practice?”, even though it lacked an explicit reference to the HCS syllabus. The task built on the idea of small groups (2–3 pupils) working together. In this way, the scenario opened up for discussion supporting a reflective understanding rather than striving to measure the level of conceptual or arithmetic competence.

First revision

The feedback on the first version of the prototype emphasized that personal finance as economization needed to be more visible in the scenarios.

Thus, the initial prototype illustrated the *necessity of making explicit connections to the national curriculum (Lgr 11) and the HCS syllabus*. Even though the fundamentals of economization (resource, value, time) are illustrated explicitly in the exercises, the *translation of these key concepts to the syllabus need to be elaborated*.

Interpretative situation 2

In the new version of the prototype (**Figure 3**) the aim was to (a) emphasise how task(s) related to the HCS syllabus and (b) make it more easy to understand the key concepts as fundamentals of economization.

Starting with the second version of the prototype the web-based developer tool Axure RP (www.axure.com) was

The image shows a screenshot of a web-based assignment page. At the top left, there is a blue circle with the number '3' and the text 'Uppgift: 3' in red. Below this, the text 'Antal lektioner: 1-2 lektioner' is displayed. Further down, it says 'Lektionsuppgift: Reflektera över värde'. The 'Beskrivning:' section starts with 'Denna uppgift är uppdelad i två delar och kan därför göras i båda delarna på en lektion.' Below this, there are two main parts: 'Del 1: Den första lektionen får eleverna i uppgift att skriva ned 4 aktiviteter eller upplevelser de gör eller brukar göra som innebär en kostnad av något slag. En sådan aktivitet eller upplevelse kan handla om allt från att gå på bio, äta mat på restaurang eller åka på semester med familjen.' and 'Del 2: På den andra lektionen får varje elev välja en av aktiviteterna eller upplevelserna de skrivit upp och som läraren skriver ut dem på tavlan. Eleverna får gärna välja ut den aktivitet eller upplevelse de tycker mest om, eller helst skulle vilja göra. Dessa utgör en inspiration och grund för resten av lektionen. Sedan delas eleverna in i grupper om tre till fyra där de får diskutera och motivera svar till följande frågor:'. A list of three questions follows: '1. Välj 3 aktiviteter eller upplevelser på tavlan. Vad är det som gör att de kostar?', '2. Vad är dyrast?', and '3. Om ni själva fick sätta priset, hur mycket borde då de tre aktiviteterna/upplevelserna ni valde kosta?'. Below these are two sub-questions: '4 a) Finns det något som inte går att köpa för pengar?' and 'b) Hur kan det vara värdefullt, om det inte kostar pengar?'. At the bottom of the description, it says 'Ställ en fråga i taget till klassen och låt eleverna diskutera i fem till tio minuter per fråga. Efter varje fråga kan en till tre grupper slumpmässigt väljas ut och får då kort presentera hur de svarade och varför.' At the bottom of the page, there is a green button with the text 'Vad övar eleverna på?' and a right-pointing arrow. Below that is a blue button with a circular arrow icon and the text 'Tillbaka till Uppgifter'.

3 Uppgift: 3

Antal lektioner: 1-2 lektioner

Lektionsuppgift: Reflektera över värde

Beskrivning:
Denna uppgift är uppdelad i två delar och kan därför göras i båda delarna på en lektion.

Del 1: Den första lektionen får eleverna i uppgift att skriva ned 4 aktiviteter eller upplevelser de gör eller brukar göra som innebär en kostnad av något slag. En sådan aktivitet eller upplevelse kan handla om allt från att gå på bio, äta mat på restaurang eller åka på semester med familjen.

Del 2: På den andra lektionen får varje elev välja en av aktiviteterna eller upplevelserna de skrivit upp och som läraren skriver ut dem på tavlan. Eleverna får gärna välja ut den aktivitet eller upplevelse de tycker mest om, eller helst skulle vilja göra. Dessa utgör en inspiration och grund för resten av lektionen. Sedan delas eleverna in i grupper om tre till fyra där de får diskutera och motivera svar till följande frågor:

1. Välj 3 aktiviteter eller upplevelser på tavlan. Vad är det som gör att de kostar?
2. Vad är dyrast?
3. Om ni själva fick sätta priset, hur mycket borde då de tre aktiviteterna/upplevelserna ni valde kosta?

4 a) Finns det något som inte går att köpa för pengar?
b) Hur kan det vara värdefullt, om det inte kostar pengar?

Ställ en fråga i taget till klassen och låt eleverna diskutera i fem till tio minuter per fråga. Efter varje fråga kan en till tre grupper slumpmässigt väljas ut och får då kort presentera hur de svarade och varför.

Vad övar eleverna på? >

Tillbaka till Uppgifter

Figure 3: Prototype version 2. Assignment.

used, and the prototype was now named “Clever personal finance in the classroom” (“Smart privatekonomi i klassrummet”). In the second iteration, we introduced the research project and the prototype in a closed Facebook community, asking HCS teachers to test the web-based prototype and provide open-ended feedback in a google form. We also contacted some HCS teachers via e-mail, asking for their feedback. Google analytics were used for visualization of interactions on the prototype. Without going into detail about this setup, it can be said that it was a challenge to receive feedback (we will revisit this in the concluding discussion). Furthermore, the developer tool did not give us the possibility to view numbers of hits on the web-page/prototype, so we have no idea how many actually tested it. All we know is the feedback number (4) on the feedback form. Although few, the responses were both varied (from positive and supportive, to negative and questioning) and elaborated. Nevertheless, the following should be understood as important and critical feedback on how to address teaching about personal finance from a small group of (likely dedicated) HCS teachers, rather than representing the HCS teacher community as a whole.

Key feedback and tentative conclusions

The feedback from the second interpretative situation (the form) can be summarized as follows:

- A. “This tool is a great addition to [HCS] as it has students planning and reflecting about the financial aspect, not only the food aspect. Very important!” (informant #2). As such, it provides inspiration to both lesson planning and ways to comprehend personal finance as intimately linked to the preparation of food.
- B. Given the limited frames for the HCS subject and the time needed for cooking rather elementary foods, the tasks in the prototype are way too complex and time consuming.
- C. Tasks that can include comparisons between the pupils and their socio-economic life situation should be eliminated.
- D. How the tasks are related to personal finance is not always clear, as some teachers seem to struggle with this connection, as they seem to understand personal finance as a question of financial literacy, rather than economizing with resources.

The major challenge to be addressed is therefore how to communicate in what way the suggested tasks do support learning about personal finance and, consequently, why “economization” is better suited as a starting point in the education about personal finance than “financial literacy” and/or “financial numeracy” (even though the actual naming of the exercises tended to be slightly traditional, as “saving”, “loans”).

Given the experiences from the second interpretative situation, one or several tentative conclusions are possible:

- *HCS teachers lack necessary financial competence* to appropriate the conceptual idea of how to teach about personal finance, as exemplified in the prototype.

- *The tasks in the prototype have no relevance to the HCS subject area.* One teacher answering the questionnaire supports this conclusion.
- *The teachers who answer have no experience in prototype testing.* Some comments provide support for this conclusion, as there is criticism on phrasing rather than the overarching idea. This is also an issue of in what “mode” a prototype should be presented, as what is being commented is at least to some degree interwoven with the qualities of the prototype (Lim, Stolterman, & Tenenberg, 2008; Rettig, 1994; Tohidi, Buxton, Baecker, & Sellen, 2006).

Second revision

The didactic challenge emphasized from the second interpretative situation can be framed as a question of *translation*: How to make evident *and* relevant the approach of personal finance as presented in the prototype? An additional question concerns how to connect this notion of “economization of (limited) resources” to the current curriculum, as the focus there is more on consumption and legal issues when addressing personal finance. This could perhaps be framed as an issue of *re-learning*, rather than learning (or learning new). Nevertheless, it lies within the tradition of the HCS subject to economize about cooking and food preparation. These didactic challenges were used as an essential backdrop for the third interpretative situation (below).

Interpretative situation 3

Version 3 of the prototype (**Figure 2**) highlighted the didactic challenge of translation (making relevant the notion of personal finance as based on resources, time and value) and of supporting re-learning among HCS teachers. The previous cycle of testing, together with similar experiences from meeting with (HCS) teachers when conducting the workshops with the pupils, provide a reason to understand the translation and create relevance as an essential challenge (**Figures 4 and 5**).

In the interpretative situation a mixed group of eleven stakeholders (HCS teachers and teacher trainers, school developers, government officials, and researchers in different fields such as didactics, economics and business administration, children’s culture, digital media, learning) participated in a full-day workshop. Leading up to the part on the prototype, the workshop presented tentative results from the research project (c.f. step 1 above) and treated themes such as children and financial competence as well as the HCS subject. The participants were thus introduced to the field of interest and had been working in small groups on matters of relevance to the theme of the prototype.

The part of the workshop focusing on the prototype was held by the interaction design experts. The steps for the workshop included (in three groups of 3 to 4 participants):

1. Sketching of a prototype, to be used in HCS that supports learning about personal finance. This as we wanted the workshop participants to frame the challenges of translation and re-learning without influence from the prototype “Clever personal finance in the classroom” (“Smart privatekonomi i klassrummet”).



Figure 4: Prototype version 3. Start page.

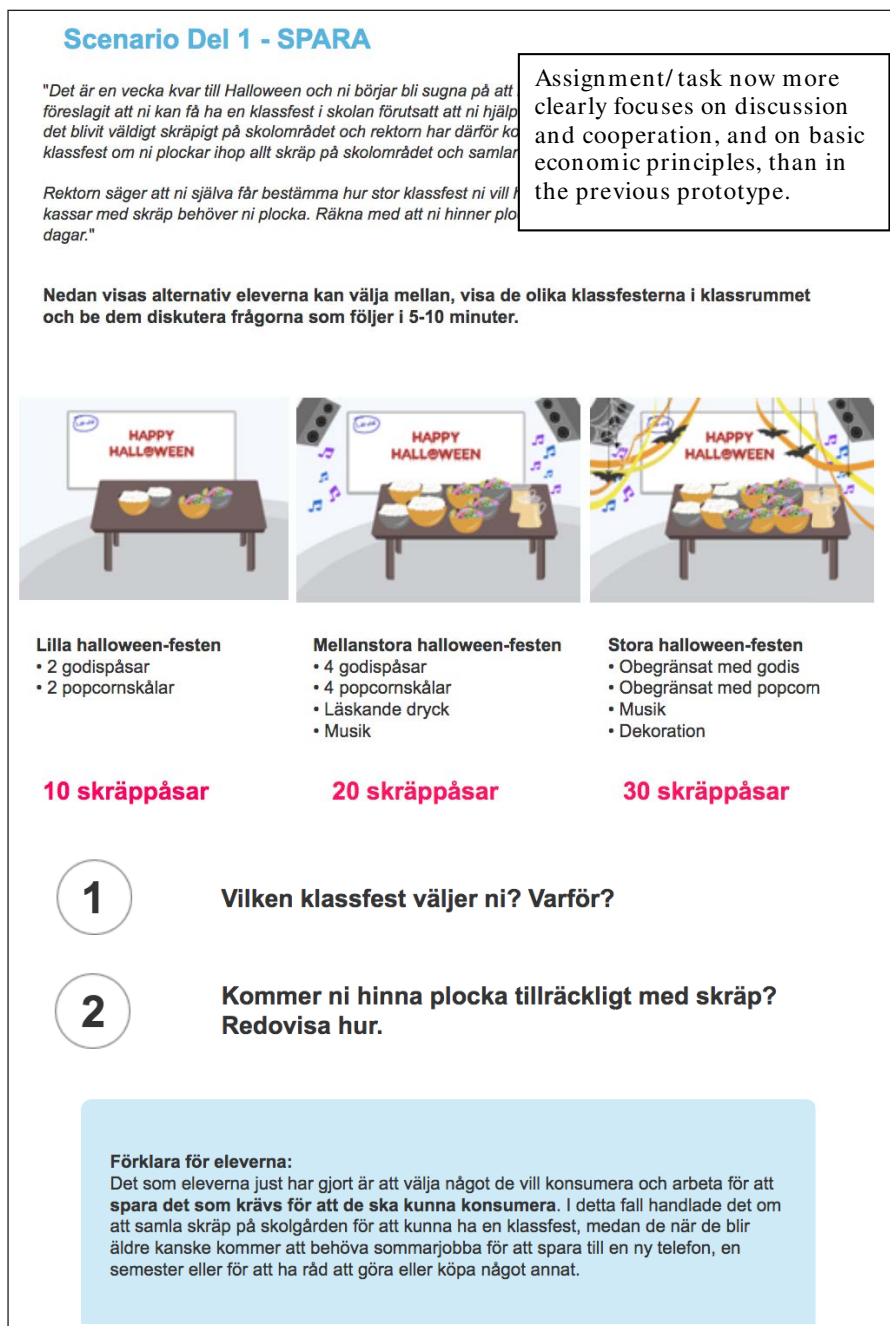


Figure 5: Prototype version 3. Assignment.

2. Presentation of and re-design of “Clever personal finance in the classroom” (“Smart privatekonomi i klassrummet”).

In summary, what can be considered the core content in personal finance and how can relevant learning material be created to support the learning and teaching about personal finance? (See appendix for an elaborated presentation of the workshop.)

Key feedback and tentative conclusions

In the third interpretative situation *translation* (key concepts) and *re-learning* (of HCS teachers) were key issues addressed. Following that, the following primarily didactic challenges and suggestions were developed and discussed in the workshop:

- *Translation and re-learning.* It must be clearly explained how the core content of the exercises are to be understood in relation to the curriculum and other control documents. There is a double challenge here, as (a) most teachers in the HCS field have only elementary knowledge in the basics of financial competence and (b) the prototype is grounded in “economization” rather than “consumption”. Even though the notion of economization is well established within the tradition of the HCS subject, the contemporary curriculum does not make that relation explicit, again making it necessary to guide the HCS teacher through the different exercises suggested and thus aid in the translation between the prototype content and the curriculum.
- *Neutral and flexible.* Teachers (users of the artefact) should have the opportunity to modify the content of the different exercises based on the needs, qualifications and conditions in the pupil group. Differences clearly exist between different pupils based on a great number of socio-economic, cultural, etc., factors. Additionally, a large number of immigrants/refugees have been welcomed into Swedish schools during the last couple of years, with diverse experiences and everyday life conditions.
 - This is also a technical and consequently usability challenge, as the artefact must be open to changes by the teacher.
- *Adaptable and relevant.* Coupled with the previous suggestion, the artefact for support in teaching about personal finance should offer the opportunity to change the examples, even though the character of the exercise is the same. One of the greater challenges for the contemporary school is to make the content relevant, and in a rapidly changing society, it can be crucial that the teacher pick up and relate to what is popular in the culture of the child at that time.
 - This is also a technical and, consequently, usability challenge, as the artefact need to be open to changes by the teacher.
- *Adaptable.* Given the varied conditions for the teachers and the HCS subject at different schools, different competences and experiences of the pupils, and other

such contextual factors defining the HCS subject in its actual implementation, length and complexity in the exercises must be open to adaptation.

- This is also a technical and, consequently, usability challenge, as the artefact needs to be open to changes by the teacher.
- *Relevant and neutral.* The school has an explicit assignment of being compensatory and equivalent, meaning that “Account should be taken of the varying circumstances and needs of pupils” (Skolverket, 2011, p. 10) in the general endeavour of education as being emancipatory. Nevertheless, it is of great importance that no single pupil should be pointed out and differentiated based on, e.g., socio-economic background. This must be taken into account when constructing the exercises, as family finance is an area of great (potential) sensitivity. The exercises should therefore never involve any relation to the actual family or personal finance. Obviously, a child experiencing exclusion is less inclined to participate, which will consequently affect learning.

Third revision

The key factors in the third revision of the prototype were connecting the content even closer to the curriculum, and also emphasizing the need of the tasks to be inclusive and open to teacher modification (to meet pupil needs, creation of relevance and level of complexity). In the next cycle, we met with HCS teacher students and HCS teacher trainers at one of the four HCS teacher educations in Sweden, with special attention to the prototype as a support for teaching about personal finance.

Interpretative situation 4

The fourth interpretative situation consisted of seminars with, on the one hand, the last year HCS teacher students (seminar 1) and, on the other hand, HCS teacher trainers (seminar 2). Both seminars were conducted at the same teacher training university. The aim of these seminars were to test and discuss the prototype in general and its qualities as a teacher support for teaching about personal finance in particular, from a uniquely insider perspective (**Figure 6**).

At seminar 1, five of the six last year HCS teacher students participated together with a second year HCS student (in total six HCS teachers students). After introduction of the theoretical and conceptual foundations behind the prototype, the actual prototype was presented by one of the interaction design experts. The teacher students then had access to the prototype via notebook or tablet computers and were handed a series of four themes to discuss in pairs of two: Is the prototype usable? What is the utility of the tool for pupils, what is that they learn? How well is personal finance, as economization of (limited) resources (resource, time, value) communicated through the prototype? And finally, ideas and suggestions for improvement.

Three teachers participated in the second seminar with the HCS teacher trainers. The setup was practically the same as in seminar 1, although less formal than with the teacher students. It also included a more meta-reflexive level, containing discussions on the level of (financial) competence

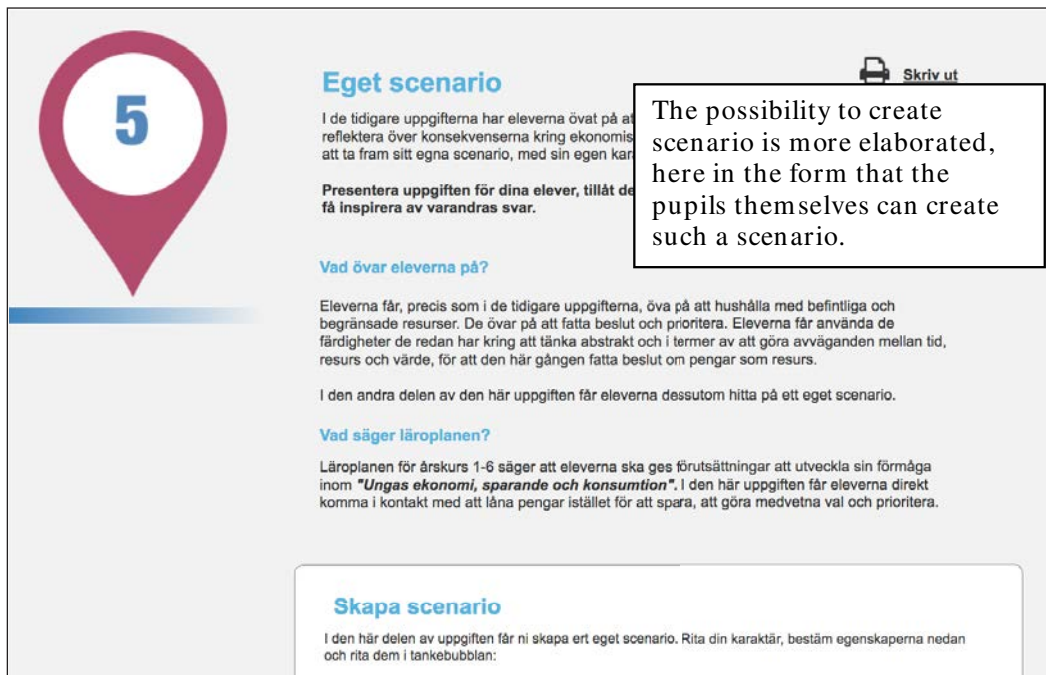


Figure 6: Prototype version 3. Create their own scenario.

among HCS teachers and the HCS subject as such. To complement their written feedback, we also took notes.

Key feedback and tentative conclusions

After the third cycle, we had no intention of making a fourth revision of the actual prototype, but rather to test it with the end-users in the fourth interpretative situation. Analysis of the feedback suggested the following:

- *Translation.* The relationship between the content of the artefact and its unique tasks concerns not only the curriculum but also the syllabus, which is a crucial didactic issue (c.f. discussion above, 3rd revision).
- *Transparent.* Teachers must be able to use the artefact without any introduction.
- *Relevance.* The introduction to the specific tasks should be as short as possible. In the prototype, each task is based on a scenario. This task must be short (preferably including other semiotic systems than written text, see below) in order to be read and made relevant based on the simple fact that, as they argue, pupils tend to place attention on explicit questions/assignments, thus missing the context.
- *Adaptable and flexible.* Adaptation of tasks based on situational conditions (c.f. discussion above, 3rd revision):
 - The possibility to choose tasks based on time available. This was also emphasized by the HCS teacher trainers in the second seminar.
 - The possibility to continue with a single task during two or more lessons. Also emphasized by HCS teacher trainers.
 - Less complex tasks that can be used as filler, requiring 5–15 minutes.
- *Adaptable and flexible.* Increased flexibility in adapting tasks based on interest, relevance, etc. (c.f. discussion above, 3rd revision).
- Adaptation cannot be a requirement, as there is limited time for lesson planning. This lack of time further implies a print option of the task for the teacher (i.e., making it easily available).
- *Multimodal.* With heterogeneous groups of pupils (different competences and pre-understandings, multiculturalism, learning challenges, etc.) the artefact should include and provide the opportunity to contribute in different semiotic modes (written text, spoken word, video, images) (e.g., Kress, 2009).
- *Relevance.* Finding the right level for the tasks is a challenge, as some pupils tend to lose attention if the exercises are too complex. In contrast, other pupils might find the same tasks too simple and, therefore, seek inspiration in other activities. This wandering-off is particularly topical when working on a connected computer.
- *Translation.* The possibility to receive suggestions for thematic planning, supporting different learning goals as stated in the syllabus. Making the parts make up a whole is important, and the need for that kind of support is obviously greater in an area where the teacher has reduced knowledge/competence. This again also goes back to the fact that personal finance has a rather marginal role in the syllabus (regardless of how important such competence might be).
- *Translation and didactic support.* Pedagogical/didactical suggestions for, and support in, how to implement the different exercises (such as role-play, value exercises).
- *Width rather than depth.* A way of making the artefact more useful is to incorporate more thematic areas (such as sustainability, consumption), as teachers prefer learning tools where as much as possible of the theoretical content is collected/available. In the contemporary educational landscape, teachers are often

obliged to personally find support and material for their teaching, as well as critically examine those resources. This is a time-consuming practice.

In addition to the above results, the HCS teacher trainers see a need for a tool such as “Clever personal finance in the classroom”, which adds further dimensions to the (sparse) available study material. Of particular interest was how the tool was connected to the HCS subject tradition of “home economics” and economization, which then must be clearly stated and argued for in the prototype, as it is what makes the tool relevant, they argue. What is lacking in the prototype, they continue, is the question of “what is money?” Although interesting and important, this feedback gives evidence of the didactic challenge in explicating how “money” is an instance of the intersection of resource, value and time, suggesting the particular challenge of developing new ways of thinking about already familiar phenomena.

Reflection (step 4)

During the process, technological and didactical recommendations evolved. Even though these technological recommendations for a digital platform are important in making the artefact useful as well as used, the main focus herein is on the didactic recommendations or reflections, that is, how to present such teaching material, such as personal finance, within the subject area of HCS.

Recommendations for a digital platform (technological recommendations)

1. Easy to access and use for teachers (and pupils).
Many teachers experience time as a limited resource. Hence, it is important that new tools are user friendly and easy to understand.
2. Offer possibilities for adaptation and modification.
With different circumstances in different classrooms, it is important that the teacher be able to modify content. Emphasized recommendation #1 above.
3. Possibility to print individual exercises.
Having exercises printed on paper give a sense of security, as technical problems are frequent in school settings.
4. Support the use of different modalities.
As pupils have different abilities and competences, it is important that the platform supports communication (information, hand-ins, feedback, etc.) in different modalities.

Recommendations for how to present such teaching material (didactic recommendations)

The following didactically oriented proto-theories are being developed from the four cycles of prototype testing. From a didactic perspective, support for teaching about personal finance should possess the following features:

1. Flexible and adaptable.
With the possibility of modifying and adapting the content of the teaching material based on the composition of the pupil group on new (popular cultur-

al) phenomena, etc., it will offer increased possibilities to meet the needs and support the learning of the individual pupil. This implies the possible adaptability of the time requirements and complexity of the different exercises, supporting more individually oriented and more subject relevant learning.

2. Neutral.
Neither content, nor the setup for the exercises, should signal the socio-economic lifeworld of the pupil(s). This implies that teaching within the domain of personal finance is a sensitive area in which teachers need support.
3. Relevant.
Our studies show that the children have a basic economic understanding, framed as “economization of resources”. especially if they are given the possibility to reflect for themselves on familiar or relevant phenomena. The content should therefore address the experiences of the child (without being in conflict with #2 Neutral). From a teacher perspective, the relevance of an educational tool is also a matter of it containing and making connections between different learning objects/thematic areas.
4. Essence.
In any construction, the base determines the quality of the final construct. In relation to the domain of personal finance within the HCS subject, economy as economization with resources is that base, as this is fundamental for financial capability. Furthermore, this idea goes hand-in-hand with the HCS subject, given its tradition of home economics, as well as with the all-the-more urgent issues of sustainability in contrast to consumption (c.f. Skolverket, 2011).
5. Multimodal.
As compulsory school in Sweden has an explicit goal of being compensatory and equivalent (Skolverket, 2011), it is important that all pupils have equal opportunities to express their competences and abilities. Opening up for multimodal expression (sound, image, movies, etc.) broadens the usefulness of a tool that is to be used in different socio-economic settings, with a variety of mother tongues among the pupils (some are newly arrived in Sweden) and also differences in basic cultural competences of reading, writing and arithmetic.
6. Translation.
The perhaps most critical, and in relation to didactics most difficult, challenge in developing teacher support in teaching about personal finance, as framed herein, is the issue of translation. Even though economization has a long tradition within the HCS subject, in which sustainability is high on the agenda, economy in general and personal finance in particular seem to be conceptualized as a matter of consumption, consumer rights, and a series of literacy and numeracy competences. The translation process concerns how to make the fundamental economic principles (resource, value, time) essential and to support HCS in understanding them as keys for a deepened financial literacy. However, it also

concerns the way in which these principles are connected to the HCS curriculum.

7. Openness & cooperation.

The setup of the exercises should focus on open questions or scenarios to support reflection and co-operation. The opposite, as prevalent in existing teaching material and support materials from authorities and organizations, would be to focus on the financial (monetary) vocabulary and standardized questionnaires. In the aim to achieve a critical understanding, we emphasize the importance of openness and discussion. In working together, the pupil is challenged to formulate her/his own perspective. Additionally, by listening to others, these personal experiences are given new dimensions and perspectives. Thus, the cooperation can be the metaphorical “zone” of the “zone of proximal development” (Vygotsky, 1978), supporting individual learning in cooperation with others having *other kinds of* experiences and/or perspectives.

Discussion and conclusions

The overall theme of this article is how to teach about personal finance paired with a critical/emancipating pedagogical aim of developing conditions for young people to appropriate basic principles of personal finances. Our interest in didactic support in how to develop the field of personal finance within the subject area of Home and Consumer Studies (HCS) in the Swedish compulsory (grades 4 to 6) has in this study been guided by some core principles from design-based research: analysis of practical problems; development of solutions; testing and refinement; reflection (Reeves, 2006). The model proposed by Reeves, (2006) is a delimitation of the more extensive design-based research models (The Design-Based Research Collective, 2003; Wang & Hannafin, 2005). Nevertheless, it captures some of the essential elements of the design-based research process, supporting the development of a new understanding of the conditions for teaching about personal finance in contemporary Swedish compulsory school. This phenomenon can be seen in how the parallel process of developing *and* testing a technological artefact for teaching about personal finance has raised questions on didactics in this domain. Herein also lies the ideological assumptions underlying the study: the tendency in the study area personal finance in the contemporary compulsory Swedish educational system is to focus on finance and consumption, overlooking the conditions for any individual (personal) to make long-term sustainable choices. Design-based research has therefore been a facilitator for discussions about and a deepened understanding of the conditions for teaching in general and in personal finance within the subject field HCS in particular.

We find it useful to approach the field of personal finance and financial competence as a complex of different kinds of competences (Hernwall et al., 2017, 2018). On the one hand are financial literacy (conceptual knowledge) and numeracy (arithmetic), which are often considered as knowledge a person either has or does not have. These features are often tested in different kinds of studies (Danes &

Haberman, 2007; Lusardi, Mitchell, & Curto, 2010; OECD, 2012). On the other hand is financial capability, which is a reflective and critical capability that is closely intertwined with understanding. Despite being an obvious reduction of the complexity of financial competence, it illustrates the different kinds of competences needed to fully appropriate the life skill requested by the OECD (2005).

There seems to be a relative lack of competence and confidence among teachers, increasing the risk of making education about personal finances even more marginal than suggested by the curriculum and syllabus. This was also confirmed by Swedish authority Skolinspektionen in their thematic quality review of the HCS subject (Skolinspektionen, 2019). Therefore, the great interest among HCS teachers, as well as other stakeholders, in the prototype presented here is not surprising. One crucial quality of teaching material about personal finance developed and tested in this study is that it supports not just the appropriation of economy as “economization with (limited) resources” but also guides the transition from understanding to a useful repertoire of teaching activities. Herein lies, we argue, the didactics of personal finance as well as the critical pedagogical dimension urging for another approach towards the subject area of personal finance. This study has, by using a design-based research approach, resulted in seven recommendations or proto-theories for what qualities are essential in such a teaching material:

1. *Flexible and adaptable* to interests and trends in the pupil group.
2. *Neutral* in relation to the unique socio-economic conditions of the individual.
3. *Relevant* content from the perspective of the pupil group.
4. Begin in the *essence* of how to understand economy (as economization).
5. *Multimodal* content supports many voices, perspectives and competences.
6. *Translation*, or making the connection between fundamental basic principles and the HCS curriculum.
7. *Openness & cooperation* as guiding principles for how the pupils should approach the field of interest.

This then answers the question of “how to teach about personal finance”, when framed as a teaching material such as the prototype tested. From this iterative, the design-based research process develops a first draft for a theory on the conditions for teaching about personal finance within the framework of HCS in Swedish compulsory school (grades 4 to 6), resulting in the first steps towards a theory for didactics of personal finance.

Even if we have earlier found that children understand the basic economic principles of “resource”, “value” and “time” (Hernwall et al., 2018), the didactic challenge seems to be found in the translation of these principles to the field of personal finance. We further know that neither the teachers nor the phrasings in the national curriculum (Skolverket, 2011) conceptualize finance or economy as primarily “economization with (limited) resources”. Even

though this framing of economy goes hand in hand with the tradition of the Home Economics subject area, personal finance in the current HCS subject is rather a reflection of the contemporary consumer society (based on the idea of unlimited resources) and the increased complexity of financial services. We therefore argue, based on the findings of this design-based research process, and with reference to a critical pedagogy, that a core assignment for the didactics of personal finance is to support the development of a more complex financial understanding and the necessary life skills (OECD, 2017) by starting with the familiar and building upon it. The appropriation of key concepts is thus not restricted to the pupils but also to the HCS teachers and the HCS subject.

We know from Vygotsky (1978, see also Säljö, 2010) that what will be learned is inseparable from the tools used. In appropriating basic economic principles with the support of teaching material, the learning process becomes intertwined with not just the artefact used but also its qualities. Here the support of multimodal theories (i.e. Kress, 2009) will obviously guide in the development of a digital tool for teaching about personal finance, opening up for both flexibility on several levels. Given the experiences from the design process described, the prototype evokes thoughts and ideas among the HCS teachers and other stakeholders that have tested it. The prototype, as an artefact and as learning material, thus becomes a socio-material (Barad, 2003) entanglement framing the conditions for the didactic situation – and if not used, there will be other sociomaterial entanglements constructing other didactic situations.

Limitations

Given a series of methodological limitations, such as the limited number of respondents in the second interpretative situation or the unstructured data collected from the third and fourth interpretative situations, the ambition with this article is to say something about the conditions for teaching about personal finance. With support from HCS teachers and a series of other stakeholders, we have had the opportunity to address the complex problem of how to teach about personal finance in the HCS context. The suggestions for the didactics of personal finance education in Swedish compulsory school have been developed in an iterative process, as proposed by design-based research theorists (Anderson & Shattuck, 2012; Barab & Squire, 2004; Brown, 1992; Collins, 1992). Even if mixed data have no inherent quality as such (e.g., Vanderhoven et al., 2016), the analysed qualitative data pave the way for a kind of continuous critical discussion that would not be supported by a more quantitatively oriented study. Additionally, even if this study has some methodological shortcomings, we argue that this study does provide groundwork for reasonable conclusions and implications. Despite the complex and mixed data, the results provide a coherent picture in terms of how teacher support can be designed in this domain. Therefore, we find that the presented prototype has relevance for pedagogical-didactical practice on conditions for teaching about personal finance. In a next step, it will be important to study the use of the proto-

type in an actual teaching situation and include the pupils themselves in the design and evaluation process.

Appendix

Setup workshop (interpretative situation 3):

1. Sketching: “Create a prototype, to be used in HCS, that supports learning by children about the economy (economization)”. 60 minutes. (Instructions: Start quickly; To be used with pupils; Support learning.) [Material available and/or method for collection: In addition to post-it notes, different-sized papers, and a variety of pencils, each group could also use the actual table as a “whiteboard” sketching/writing surface. Collected and photographed by the research team.]
2. Group presentation. 5 minutes/group. (What “problem” are you addressing? How is it to be used with pupils? How does it support learning?) [Each presentation summarized on a flipchart by the research team.]
3. Presentation (interaction design experts) of the prototype “Clever personal finance in the classroom”.
4. Group discussion and short presentation. 15 minutes. (How can the tool be used? What is the utility of the tool for pupils, what do they learn? What is missing in the tool?/How can it be developed?) [Each group received the questions on paper, to be answered and handed in.]
5. Renewed sketching. 60 minutes. (Grades 4 to 6; Teacher support; Children perspective/“economization”; National curriculum.) [Post-it, whiteboard table, etc.]
6. Group presentation. 5–10 minutes/group. (What “problem” are you addressing? How is it to be used with pupils? How does it support learning? Relation to national curriculum/HCS?) [Flipchart.]

Alternately, in summary, what can be considered the core content in personal finance and how can relevant learning material be created to support the learning and teaching about personal finance?

Note

- ¹ In a survey, 77% (N = 142) HCS teachers responded that Hjalmarsson et al. (2018) is the textbook they use (or 90% of the 107 teachers that do use textbooks), if complemented with other kind of material (predominantly available on-line). New versions of this book have been published since its first publication in 2016. In the survey, we made no distinction between different publications. There are no changes of relevance between these publications.

Competing Interests

The authors have no competing interests to declare.

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How to cite this article: Hernwall, P., & Söderberg, I.-L. (2020). Teaching about Personal Finance in HCS – Suggestions from a Design-Based Research Approach. *Designs for Learning*, 12(1), 29–44. DOI: <https://doi.org/10.16993/df.142>

Submitted: 30 April 2019

Accepted: 07 April 2020

Published: 24 April 2020

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Designs for Learning, is a peer-reviewed open access journal published by Stockholm University Press.

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