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DIGITAL TOOLS IN HOME ECONOMICS EDUCATION, REALLY? CARRYING OUT A COLLABORATIVE PROJECT FOR DEVELOPING LEARNING TASKS WITH THE SUPPORT OF DIGITAL TOOLS

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Abstract

Home economics as a practical school subject does not necessarily connect with digital learning. Therefore home economics teachers often raise the question if and how to integrate digital tools at all? This paper gives an overview of the international collaboration of teacher educators and researchers of the home economics area from 4 Nordic-Baltic countries working in finding innovative ways of using digital tools in home economics lessons. We open the process of the project, main results as well as challenges. The LEAD project (Learning and digitalization in home economics education) set home economics education in contemporary schools into the centre for integrating students' previous knowledge and building organized knowledge structures with the help of digital tools. The project had two intertwined intentions. First, to find methods on how to effectively use digital technologies in a given subject to promote students learning in a genuine way. Second, we wanted to find innovative ideas for novel student-led learning tasks, which expect students experimenting, knowledge integration and construction. The outcomes of the LEAD project are freely available electronic materials (in 5 languages) with 12 lesson plans with didactical explanations and learning tasks that help teachers to prepare lessons according to the contemporary needs of the subject. Developed materials were partly tested in contemporary schools to get instant feedback and raise the quality of project results. It is predicted that developed materials will increase didactic possibilities of using digital technologies for learning as well as help students to deepen their knowledge structures and promote the acquisition of skills and key competences. The result of the project was especially needed and relevant due to corona crises as teachers were forced to switch on online learning. Although experiencing various challenges, we value the possibility of exchanging the know-how and doing development with colleagues as the future challenges in terms of subject content and teaching methods of the subject area are similar.

Keywords: Collaborative development, home economics, digitalization.

1 INTRODUCTION

Worldwide, the broadest aim of home economics education is to help 'students to discover and further develop their own resources and capabilities to be used in their personal life, by directing their professional decisions and actions or preparing them for life' [1]. Similarly, in the Nordic-Baltic area, this school subject aims to give students the knowledge and skills to manage their everyday actions now and in the future. The learning tasks in home economics lessons are tied to students' everyday experiences and are rather unique because they often include practical learning activities, such as food preparation [2]. It is because of this that home economics is frequently considered a practical school subject that provides mainly culinary skills [3]. Therefore, the idea of using digital tools in home economics lessons may sound uncommon.

The value of using digital tools remains untapped during practical food preparation tasks, as these most likely have only an illustrative role or provide an opportunity to record what has been done. At the same time, the wider purpose of home economics education cannot be forgotten. Theoretical aspects of home economics are needed to understand the knowledge behind one's daily practices [3]. The digitisation of daily life also expects students in the home economics context to learn to use digital tools to manage tasks at homes (e.g. household activities such as meal and budget planning) [4]. To cover such wide range of topics in home economics lessons, teachers need reliable materials and ideas on how to plan diverse (digital) learning activities. There are not many ready-made pedagogical solutions for home economics teachers to apply, as the available learning materials involving digital technologies are mostly

designed for the introduction of the topic (e.g. to motivate students) or for revising the learned material at lessons and are not designed for supporting students' learning processes.

According to the requirements in curriculum [5] knowledge should be linked with students' everyday situations by creating organised knowledge structures that are transferable to real-life situations. At the same time, studies (e.g. Brante & Brunosson [6]) have shown that students have difficulties in transferring subject-specific knowledge from other school subjects or real-life situations. The reasons for this are the lack of an ability to see the link between different pieces of school-learned knowledge, having an incorrect understanding of various concepts or not understanding the meaning of learning tasks [7], [8]. The Learning and Digitalisation in Home Economics Education (LEAD) project aimed to reveal possibilities how to integrate students' previous knowledge (from other school subjects as well as from students' out-of-school learning situations) and to build organised knowledge structures in home economics education. Home economics content supports the organisation of learning activities that are focused not only on subject-specific aims but also more broadly on fostering students' learning skills through practical learning activities (e.g. how to interpret and explain different actions as well as how to think critically and foster different literacies). Because they are close to students' everyday experiences, such tasks are meaningful and motivating [9]. Therefore, education in home economics lessons can achieve a strong transfer of students' knowledge if the tasks are designed to do so [10]. Innovative solutions are needed to help teachers develop their lessons according to the contemporary needs of the subject and thereby increase the quality of students' learning outputs (i.e. promoting the acquisition of students' various skills through home economics education).

According to the Horizon Report Europe [11], today's young Europeans are the first generation to become adults in a digital society. Technology has shaped and educated this generation of students. They have been active and enthusiastic participants in the creation of online communities since early childhood, and digital tools have already been used in learning processes for quite some time. Although digital tools in education are highly promoted and their benefits have been reported [4], teachers still have limited understanding of how to use digital technology to promote students' learning, especially in a practical school subject such as home economics. Teachers in this subject area have mainly used digital tools for organising their own work or for illustrating their teaching [12]. In recent years, due to the corona crisis, many subject teachers have had to use distance learning in their teaching process, which has necessitated a rapid reorganisation towards using digital solutions. A survey of subject teachers conducted after the first corona period in spring 2019 confirmed teachers' desires to develop their own digital competencies and to support students' learning with different digital solutions [9]. So, it can be expected that subject teachers have developed digital competences over the last few years, although, as Sundqvist, Korhonen and Eklund [4] suggest, we also need changes in teaching practice to ensure the contribution of digital tools is a positive one. This change in teachers' activities makes it possible to meet the wider objectives of the curriculum, as the development of students' digital competences is cross-curricular, enabling the use of digital solutions and tools to achieve different subject objectives [5], [13], [14], [15].

Based on the specific subject matter of the home economics subject, the LEAD project was the first to systematically connect digital learning possibilities to the school subject of home economics. The innovation in this project, lies in a novel understanding of how to effectively use digital technologies. We were interested in identifying digital tools and solutions that would provide students with help during the learning process, both when constructing knowledge individually or in a group.

2 METHODOLOGY

2.1 Project background

The Erasmus+ Key Action 2, Strategic Partnership LEAD project was financed by the European Commission (see the project requirements in the programme guide [16]). The initial project duration was 30 months, starting in October 2018.

2.1.1 Members of the project team

The LEAD project united a group of teacher educators and researchers in the area of home economics from four Nordic-Baltic universities: Tallinn University (Estonia), the University of Helsinki (Finland), the University of Gothenburg (Sweden) and the University of Agder (Norway). The communication and general planning of the project involved one contact person from each partner organisation who collected and forwarded the information and organised the process on the national level. Altogether, we

had 12 university members (three from each university) who contributed to the project. Project members shared similar backgrounds in terms of experiences and interests, with all being connected to home economics education and didactics. Also, we had varying experiences in developing learning materials and study books for home economics education on a national level. Nevertheless, the project favoured the exchange of knowledge and experiences between researchers and thereby helped increase our own expertise and professionalism.

To improve the quality of the developed materials, we also included home economics teachers (n = 8) from all partner countries (Estonia, Finland, Sweden and Norway) in the developmental process. These teachers participated in the project as volunteers and represented various contemporary schools in the partner countries. They shared their valuable insights into different project phases and complemented the final materials based on their experience.

2.1.2 Project aim and target group

The overall aim of the project was to elevate home economics teaching to a higher level by illustrating how to teach the subject meaningfully with the help of digital tools. Thereby, the target group in this project was home economics teachers who could implement the materials in their lessons and influence students' learning. The project was initiated by the need to find novel ways to use digital tools in home economics lessons, focusing on implementing digital tools in this subject to promote student learning. Before the project, there were not many ready-made pedagogical solutions for home economics teachers to apply, and they were mostly designed for the introduction and revision of the topic. Regarding innovative solutions, the project had two intertwined objectives. First, we looked for digital tools that would help students during the learning process, both when constructing knowledge individually or in a group. Second, we wanted to find ideas for novel student-led learning tasks, which promote students' experimentation, knowledge integration and construction. Putting school-learned knowledge into action helps students understand the task at hand, deepen their knowledge structures and see the possibilities for the transfer of their knowledge. The school subject of home economics creates good opportunities for such actions.

2.2 Project actions

Several activities helped us achieve the aim of the LEAD project, and we used different methods for working collaboratively on national and international levels. The project period was divided into five smaller phases: (1) increasing knowledge, (2) developing the material, (3) school implementation, (4) improving the material and finalising the development and (5) dissemination. It was beneficial to divide the project activities into smaller phases because it enabled us to have a better overview of the advancements, to stay on schedule and to monitor the work during the project period.

All activities were accompanied by online meetings and discussions, which were organised effectively via Zoom. At first, online meetings were planned between transnational meetings. However, during the process, online meetings became the only good discussion option, as face-to-face meetings needed to be cancelled due to the corona pandemic. Nevertheless, these meetings gave us the opportunity to engage all partners in active discussion and to increase the quality of the innovations developed on a national level.

2.2.1 Increasing knowledge

The project started with a knowledge-gaining activity for all project members. Although most collaboration between partners was organised through online options, it was necessary to meet in person to establish common plans, make decisions and agree upon the expected quality requirements. Also, personal meetings facilitate team bonding and act as a motivator for their active participation.

As our previous experiences with the use of digital tools in home economics learning tasks varied, we needed to be educated regarding the issue at hand before beginning the development of the needed learning materials. Therefore, we used a seminar format to increase the knowledge of the participants and engage in discussion for the consideration of different viewpoints. Seminars enabled us to gain new knowledge in an interactive way and to exchange our experiences of different countries. At the same time, innovative strategies and creative methods have been used to open our minds and find solutions for digital learning tasks in home economics context. These methods helped us to find fresh and innovative ideas for the learning tasks and to establish quality requirements for the developed material.

2.2.2 Developing the material

The developmental work was started in native groups (a group of Estonian members, a group of Finnish members etc.), and every partner country offered concrete lesson ideas to be considered for further development. We grouped the partner countries (Estonia/Finland; Sweden/Norway) so that everyone had a constructive partner who followed the process and added evaluation or comments to Google Drive at least once during the period. Additionally, we held virtual meetings with all partners to discuss developments. Ideas were introduced, and we decided together which ones best fit the commonly established requirements and would be compiled for further work.

Using shared Google Drive files for co-editing enabled us to present the work in progress to other partners, engage in collaborative content creation, support online discussions when making improvements in real time and receive valuable feedback. Presenting the native groups' work to all partners was beneficial. As we are all educators, we came to see weak points and details in the developed materials that needed clearer wording or stronger content. Also, co-editing was useful for monitoring the participation of different members to also ensure that everyone was actively participating. Co-editing was used throughout the process of developing innovative materials. At the end of this phase, we felt that there could have been more collaboration, so we decided that the pairs would communicate more during the next developmental phase.

2.2.3 School implementation

We used school implementation for testing the use of the developed learning materials in home economics lessons in each partner country. The testing was done to evaluate the developed lesson descriptions and learning tasks, their content, chosen didactic methods and the workability of the chosen digital tools. In this phase, data was collected primarily for the purpose of improving the materials. Teachers who implemented the developments in their lessons contributed their qualitative evaluations through 'conversational interviews' after each tested lesson. Testing gave us valuable qualitative feedback about the implementation and helped in revealing the aspects that needed to be improved and thereby enabled us to raise the quality of the end result.

2.2.4 Improving the material and finalising the development

The free-form suggestions we collected from home economics teachers regarding the lesson plans were analysed and taken into consideration in this developmental phase. School testing opened our eyes and the analysis of the experience allowed us to notice more. Thus, partners worked together more actively in this phase to give qualitative feedback on the additional lesson descriptions and learning tasks. In addition to the work in smaller groups, several virtual meetings with all partners were organised to discuss every individual lesson in detail.

The last task in the development stage was to edit the final material and translate it into the necessary native languages. The quality of the final material was then evaluated by partners (also keeping in mind the quality requirements established at the beginning of the project), meaning that everyone gave written feedback and suggestions for final improvements. These suggestions were discussed in a virtual meeting with all members present. Although we had analysed and discussed all lessons several times, we identified new questions in relations to translating the final results, as the lessons needed to be adjusted to suit each partner country and its subject content and curricular expectations.

2.2.5 Dissemination

The project ended with the online distribution of our innovations to possible users: home economics teachers and teachers of other subjects, teacher educators in the field of home economics, teacher students in partner universities and educational ministries in partner countries.

For sharing the project results, seminar day(s) for teachers were organised in every partner country to introduce the new learning materials and didactic methods to teachers. We revealed the principles behind the developed lessons and learning tasks and shared the gained experiences. Additionally, we gave participants hands-on opportunities to experience various learning tasks (and digital tools) in a student role.

This phase gave us feedback about the final result, as seminar day participants were asked to fill in a questionnaire that contained both qualitative and quantitative questions about digital learning in general, the seminar day and the introduced material. The questionnaire was designed on the Survey-xact platform, and data was collected from the period of October 2020–September 2021 (depending on corona restrictions and opportunities to organise a seminar day in partner universities). Altogether, 250

participants provided feedback, out of which 199 responses (64 from Estonia, 55 from Norway, 41 from Finland and 39 from Sweden) were included in the analysis. Some responses had to be removed from the dataset because of missing answers.

The project activities and results were evaluated also by project members according to three aspects with rather subjective indicators: (1) the quality of the developed material, (2) the quality of the multiplier event and (3) the broader dissemination of the projects' results. For the final analysis, we organised an online meeting and had an open discussion about the project's activities and results, during which we used a list of collaboratively set criteria to determine what the quality of the developed material is.

3 RESULTS

3.1 Project outcomes

One of the outcomes of the LEAD project was the freely available electronic material, 'Digital Tools Supporting Learning Activities in Home Economics Education: Materials of the Erasmus+ KA201 strategic collaboration project Learning and Digitalisation in Home Economics Education (LEAD)'. In this material, we present the lesson ideas and teaching materials for 12 different home economics lessons. The material expands the content of home economics, giving teachers ideas on how to address topics such as nutrition, food choices, consumer education and sustainable management in their home economics lessons. The material identifies various possibilities for how to (1) implement digital tools purposefully in home economics lessons, (2) prepare lessons according to the contemporary needs of the subject and (3) promote students' learning outcomes. In addition to lesson design and learning tasks, each lesson in this material includes didactic explanations for the teacher, which reveal the principles of the developed learning materials and offer ideas for how to apply these concepts in home economics lessons. Digital tools that are included in learning tasks allow students to participate in activities, both by using what the teacher offers and by creating content themselves. These new learning tasks give students the opportunity to analyse and systematise existing knowledge and experience through the use of digital tools and to adapt what they have learned to the structure of their previous knowledge.

These materials are available in five languages: English, Estonian, Finnish, Norwegian and Swedish. By translating the developed lessons, we modified the original ideas to fit the aims of each national curriculum. Materials were uploaded to partner university web-pages, the EU Project Results platform and digital learning materials portals in partner countries (e.g. the *e-Koolikott* or *Landslaget for mat og helse i skolen*). The dissemination period of the material was uplifting, as the development was received with gratitude. The information was added to several social media groups, distributed via university email lists, included in university newsletters, sent to our colleagues all over the world (including e.g. Australia and Mauritius), received by the educational ministries and has also reached the pages of *Õpetajate leht* (an Estonian newspaper for teachers). Thus, we can say that the dissemination has been wider than planned, and we have received several supportive letters that give us confidence that the material is needed and useful. It is hard to predict how many people the material has actually reached because our colleagues have also shared it with their contacts.

Another outcome of the LEAD project was the improved quality of home economics teaching, as the developed materials widened teachers' understanding of the didactic possibilities associated with the use of digital tools in learning. After the project, we can say that home economics teachers in partner countries are familiar with the developed learning materials and understand the pedagogical principles of implementing these in subject teaching to contribute to students' learning. Furthermore, teachers who participated in the multiplier events have experienced the tasks in a student role and have thereby gained an understanding of the additional value of using digital tools meaningfully in a home economics context. Teachers can organise lessons according to the contemporary needs of the subject. Therefore, we predict that the developed innovative learning materials will have an impact on students' learning in home economics lessons. The developed materials make it easier for students to create systemic knowledge constructions because these promote the acquisition of skills and key competences. At the same time, project members have also gained new knowledge and skills that will be applied in teacher education in universities and in in-service training.

3.2 Feedback from teachers

Although the teachers' questionnaire was broader, the focus in this overview is on the feedback given regarding the developed teaching materials and seminar days. Open-ended questions were reviewed using qualitative data analysis.

The teachers' answers demonstrated the usability of the teaching material. Many teachers pointed out the positive aspects of learning through experience, which means that, through their own experience of using the proposed digital solutions, teachers were inspired to use a specific tool and related task in their work. The answers these teachers provided were diverse; for example, they stated, 'I am excited to use the material', 'With the help of what I have learned, I can make the lessons more meaningful', 'It is a good opportunity for integration with other topics' and it can also be used 'together with other teachers'. As a result of the positive responses from teachers, it can therefore be assumed that, by using this material, home economics teachers will be able to address more theoretical topics that create links with everyday practice.

On the other hand, there were also some teachers who approached new ideas from a distance, pointing out that the developed materials gave them ideas, but the actual use of the materials in their teaching depends on the extent to which the tool is suitable for them. For example, teachers wrote: 'I think the materials are usable to some extent', 'I have to read the material first', 'I try to use it' or 'I use what suits me'.

The results of this survey show a positive attitude towards the prepared materials, but the actual implementation of developed materials by teachers depends on the teachers' own interests and opportunities to use the material. This material has served its purpose by providing teachers with solutions for using digital tools in the classroom, improving the quality of subject teaching, increasing didactic opportunities to use digital tools for learning, helping students deepen their knowledge structures and fostering students' acquisition of skills and key competences.

3.3 Project members' reflections

Based on the project members' final evaluation, we can say that, despite the challenges we faced, all planned project activities took place, and the collaboratively set requirements were met in the final material. At this point, we would like to point out the value of the collaboration and some of the challenges we experienced in the process.

As project members, we have experienced how empowering collaboration can be and have been inspired by how valuable and great the results can be if everyone shares their input based on their strengths and experiences. As stated before, this is the first time when different Nordic–Baltic countries have set goals and developed a subject field together in a home economics context. Based on our experience, collaborative approach was a very rational way to develop this project, as our field of study is small, and collaboration allows us to unit our resources. Although the content of the subject may vary slightly between countries, the challenges of teaching the subject in the digital era are similar. Based on the above, we strongly recommend a strategic partnership project for small disciplines to work together when developing innovations. It is beneficial to combine resources and have discussions that would be limited if organised only on a national level.

Although the collaboration was of great value, we also faced some challenges during the project period. The most significant challenge was the corona pandemic, which caused delays in the schedule and forced us to ask for an extension of the project period. We also had to postpone all planned meetings (including transnational meetings and school testing). At some point, it became clear that we needed to rethink our activities and organise more virtual meetings in the Zoom environment to be able to continue the project activities on a national and transnational level. National regulations and university rules made us revisit the plan for the seminar days and organise them online in Finland and Norway. The latter was the biggest loss, as teachers' interest in participation was unexpectedly large. Additionally, we faced technical challenges when the mail server of one partner institution collapsed. From our perspective, this influenced the normal collaboration between partners because the memory from their mailboxes disappeared, the Google Drive collaboration was no longer possible, and we had no certainty regarding what information had been received by those members. Fortunately, the WhatsApp group, which was created at the beginning of the project, made it possible to identify the problem and to start looking for other creative solutions for collaboration.

4 CONCLUSIONS

As expected, the project has widened participating teachers' understanding of teaching in the area of home economics education. The LEAD project has introduced several ways in which digital tools can support students' learning and knowledge construction beyond practical food preparation. Based on participants' feedback, we can say that the developed material met teachers' expectations and that it was inspiring and long-awaited. Teachers valued the resulting material as an essential aid for conducting

student-led learning tasks with the help of digital tools. Seminar days gave teachers ideas on how to implement digital tools more purposefully, and the discussions during the day demonstrated how the event increased teachers professional knowledge of how to use digital tools in a given school subject.

The results of the project were especially needed and relevant due to the corona crisis, as teachers were forced to switch to online learning and needed good ideas for how to use digital tools in home economics lessons. Thereby, the corona crisis has also influenced the long-term benefits of this project. The need to use digital tools in all school subjects has increased remarkably. Therefore, the didactical knowledge and lesson materials developed during the LEAD project will be added to teacher training courses and in-service teacher training at partner universities.

With this project, we have initiated a discussion of how to use digital tools meaningfully in a practical school subject. Although the project was successful, not all home economics teachers' needs were met with the developed material. In addition to providing teachers with the necessary support to integrate digital tools in their lessons, the continuous (collaborative) development of digital learning materials is needed.

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