XAMK BEYOND

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Impacts

Marja-Liisa Neuvonen-Rauhala & Cai Weaver (eds.)

XAMK
South-Eastern Finland
University of Applied Sciences

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1 INTRODUCTION

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The theme of Xamk Beyond 2022 is impacts. Under the theme of impacts, we asked our authors to share how they can measure and verify the impacts of our activities at South-Eastern Finland University of Applied Sciences. We were interested in, for example, what kind of tools they use to measure how objectives are achieved in their RDI work or how they address the impacts of their work for regions, industries, or people.

A well-known argument is that universities are engines of growth and development in their regions. We challenged our authors to look at their work and ask themselves, could your investigation and research take part in this discussion. As UASs are intricately connected with working-life and practice-oriented, do UASs differ from universities and if so, how are these results and impacts evaluated and measured?

Xamk is a publicly funded higher education institution and thus it is our duty to ask questions about the results we produce. While this is first and foremost a question of responsibility, it is also a matter of quality. We must reflect upon how we manage to act and reform competencies, research, and development in socially responsible and sustainable ways for a better life and improved wellbeing. We asked these questions in our open Call for Papers to potential writers of Xamk Beyond. We were pleased to receive many noteworthy topics and different approaches, which open the results of their applied research in a new way.

Responsibility, Sustainable Development, and Effectiveness

Potinkara (2018: 87) has suggested that in universities of applied sciences, we consider the impact of our teaching in terms of social influence, whether a student can find work after graduation, or what are the broader consequences of out RDI activities. We can understand impact as a change in well-being that is achieved by certain actions taken, for example how the lives of people who have adopted digital skulls have changed or what a life without discrimination could look like.

The Finnish Innovation Fund Sitra has published a review (2022) of how companies and public organisations see and handle responsibility, sustainable development and effectiveness in their activities and reporting. The Sitra report also opens how these concepts are combined to each other in practice, as the report is new, we will first look at the points they raised clarify the connections between those above-mentioned concepts.

Hellström & Parkkonen (2022) say that their aims in Sitra's report is to consider how (social) responsibility meets sustainable development and effectiveness in perspective of the future. Hellström and Parkkonen argue that responsibility is an upper-level concept, which should be considered when analysing social discussions and other insights. The responsibility framework is included in 1) the purpose of responsibility, 2) the societal impact of operations, 3) stakeholder relations, 4) the direct environmental and social effects of the organisation's own activities, 5) the governance model, 6) personnel and 7) responsibility management.

Interestingly, according to Hellström and Parkkonen, pathfinder organizations fulfil these approaches in parallel activities combining both footprints and handprints. Footprint refers to an organization's own direct activities and handprint refers to social effectiveness of challenges of sustainability. When attempting to achieve broad societal impacts, they demand lengthy periods and cooperation with many actors. This means that we need to consider impacts as systemic phenomena. (Hellström & Parkkonen 2022.)

In Xamk Beyond 2022, the impacts discussed are both direct and indirect, and in some cases, impacts could be even more, if Xamk is able to disseminate possibilities and effects of its education and development activities into its wider stakeholders along with partners. Xamk Beyond is responding to the impact challenge of social responsibility and sustainable development.

The majority of Xamk Beyond's articles concentrate on presenting societal impacts of operations and direct social effects of cooperation with partners. If we are thinking responsibility issues more widely, there is still room for developing approaches to evaluate especially the handprint of cooperation with stakeholders. As Hellström and Parkkonen have noticed, responsibility issues connected with impacts and sustainability are also under constant development. However, opens of articles in this Xamk Beyond are contributing to this development challenge and discussion interestingly.

Digital Impacts and Social Responsibility

Xamk is committed to the United Nation´s programme for Sustainable Development Goals (SDGs). The goals set the 2030 agenda and defined global sustainable development priorities with 17 core goals (UN Global Compact Strategy 2021-2023, 2021). To meet these goals, it is our responsibility at Xamk to share our expertise developed in our research, development, and innovation (RDI) projects, to support and challenge industry and businesses, higher education institutions, municipalities, staff, and students, to build a more sustainable future together. Further, we must be able to evaluate and report both footprints and handprints of our operations. The first report conducted at Xamk concerned the evaluation of the responsibility of 2020 operations of Xamk (see Ervaala & Neuvonen-Rauhala 2021). To promote more impact and permanent effects we have adopted SDGs to assist our researchers and experts with their work. We aim for the strong social impact of our RDI activities and head towards achieving the strategic vision of Xamk: to boost the vitality of South-Eastern Finland.

With the analysis of our ongoing RDI projects it seems that we have made most of our actions to promote especially two goals: Goal 8: Decent work and Economic Growth and Goal 9: Industry, Innovation and Infrastructure. Over one hundred projects meet these two goals. We have also done effective work with several more goals, such as: Goal 12 Responsible consumption and production, Goal 4 Quality Education and Goal 17 Partnerships for the goals. We still have a long way to go, but we have started the work and all our annual 300 projects aim to meet one or more goals and make the world a bit better!"

Thus, in this issue, our authors build on the avenues opened in last year's 'Xamk Beyond 2021: Sustainable Development and Social Responsibility', which included several key interventions into how applied research activities at Xamk address sustainable development and social responsibility in practice. In much the same vein, they continue the ongoing investigation into the possible different pathways to help connect education and business strategies with global digital priorities (SDG Compass, 2021). In this issue of Xamk Be-

yond, we contribute to this discussion recognises impacts of many kinds of activities that are included in professional higher education. Our authors delve into topics ranging from the digital everyday of youth to student exchanges and questions of national and European identity. They explore topics relating to such matters as digital social responsibility with digitization training and digital archiving solutions. Finally opening such topics as 5G services and competitive sustainability, as well as developing new solutions to measure RDI project impact. These are no doubt timely interventions into their respective fields, which take locally developed knowledge from regional development projects and research to the international stage.

In their article 'The Digital Everyday of Youth: Participatory Digital Assemblages or New Digital Divides?', Tuuva-Hongisto & Korjonen-Kuusipuro challenge the commonly held assumption of youth as digital natives. While investigating youth digital participation, they highlight emerging digital inequalities, the differences in attitudes between urban and rural youths, as well as many of their perceptions towards the digital space. In their timely discussion, Tuuva-Hongisto & Korjonen-Kuusipuro reveal the often-pessimistic attitude that some young people have towards social media. Further, many youths erect strict boundaries between what is public and what is private in the digital realm. As a result of their research, they raise the need to go beyond the assumptions we may have about youth and technology and conduct intersectional research that takes a more considered approach of young people and their participation in digital worlds.

Continuing the theme of youth and young people, Hellström explores the impact of short-term cultural exchanges on the national and European identity of Finnish students. These exchanges differ from traditional Erasmus exchanges as they are shorter in duration and include active participation within a project. Hellström's findings reveal that the length and frequency of the exchanges do not contribute as much to the perception of the trips, rather it is the goal and content of the exchange that has a more substantial impact on the students. Furthermore, Hellström laments the decline of international student mobility and suggests that as a countermeasure, more resources could be dedicated to international services and that the potential of these shorter exchanges could be explored further.

In their article, Ristolainen, Saltiola, and Järn challenge the notion that anyone can scan or digitize a document. Understanding the field of digitization as a skilled field, requiring specialised skills and knowledge, they explore the digitization competences required to successfully meet the current and future requirements of businesses and organisations. On the basis of their findings, they devised digitization training for professionals that can support digitization projects in workplaces. Their research and training have significant

impact as there are currently no other digitization education available in Finland. Further, the devised training has potential to develop the Mikkeli region further, where the projects were based, as the professional digitizer training fulfil the City of Mikkeli's training targets for unemployed people. The outcome of the training has significant impact for memory organisations, public sector, and makes digitization workers more proficient in the future and improve the quality of digital archives and digitization processes.

In their article 'Memoriaali: A Bridge from Citizens to Archives' Jääskeläinen & Saltiola continue the theme of digital preservation and present their solution Memoriaali, which is a front end and back end software tool that enables the collection of memories, documents, photographs, and other material. The aim of their research is to prevent the loss of meaningful material from citizens who would not have the necessary tools, resources, or expertise to do so. In their paper, Jääskeläinen & Saltiola discuss the challenges and successes of developing Memoriaali and explore the potential applications and impact for their development work. Their work has international significance, as Memoriaali has the capacity, once implemented, to reduce the workload of archives in gathering, processing, and categorising material.

Pondering questions of education and 5G technology, Handelberg, Happonen, Isohanni, Laitinen, and Pellikka make a noteworthy intervention into the field. They consider how 5G technology can positively contribute to sustainable development and safety as it provides increased energy efficiency and faster networking speeds (among others) over existing networking technologies. Moving beyond the technological applications and benefits, they tackle the question of how higher education institutions can improve their own teaching and development of 5G technology to address the challenges of sustainable development. In their research, developed a new type of satellite hackathon as a solution to these challenges. Their findings reveal that by harnessing new technologies and developing new educational tools and methods, there is potential to have a major impact on global sustainable development. These are particularly relevant for universities of applied sciences.

In their article 'Solutions for Improving Impact Evaluation - Case Hyviö', Janhunen & Kosonen address the issue of impact directly by creating a solution to verify the actual effects and impact of activities. Concentrating first on the health and wellbeing sector, they developed the application family Hyviö, to support impact measurement, while also enabling the monitoring of a customer's journey and use of services, this enables the adaptation of services to customers and facilitates the data-driven assessment of service use. What is noteworthy in their approach is the potential for changing the lifespan of projects, as when impact is properly assessed it would encourage follow-up measures and activities.

This could transform the field by supporting project teams and funders to build on existing work through the open assessment and measurement of project results.

In our concluding remarks, we reflect upon the impact made by Xamk Beyond over the past three issues. We take a critical look at how we have succeeded to achieve our objectives and what work remains to be done. We also offer some insights for the future and how Xamk Beyond may evolve to continue to be a relevant publication, both in terms of scientific content and also as a way for our staff to develop their scientific writing and publishing skills and reach more international audiences. We open our editorial processes and explore future directions for the series. Finally, we reveal the theme of the next Xamk Beyond 2023: Digitization.

This issue of Xamk would not be possible without the hard work of our authors, editors, and Publication and Production Services at South-Eastern Finland University of Applied Sciences. We would like to thank our writers for the hard work they have put into researching and reporting their work, and for making this issue of Xamk Beyond full of interesting and timely interventions into their respective fields.

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2 THE DIGITAL EVERYDAY OF YOUTH: PARTICIPATORY DIGITAL ASSEMBLAGES OR NEW DIGITAL DIVIDES?

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ABSTRACT

Young people today actively participate in digital cultures in terms of their personal development, identity, expression, and participation, but some benefit more from digitalization than others. Drawing on quantitative and qualitative research material collected during 2021, we examine the digital participatory cultures of young people in Finland. We want to go beyond a simplistic interpretation of impacts and their measurements by understanding digital inequalities and digital participation as experiential and structural factors. Our results are in line with Literat et al (2018) who argue that there is a broad "access rainbow" which describes how young people engage with digital culture. This access rainbow is partially reflective of young people's physical access to technological resources, but also of the ways in which cultural capital and expectations influence forms of participation. Further, we conclude that multi-sited digital ethnography offers a way to a more empathetic understanding of young people's everyday lives in digital environments and opens avenues to more effective research.

Keywords: digital inclusion, participation, digital culture, youth, everyday life

Introduction

Young people today are active producers of digital youth cultures and digital contents. They actively participate in digital cultures in terms of their personal development, identity, expression, and participation. However, some users benefit from digitalization over others. For example, the statistics in Finland reveal an increase in the number and complexity in youth's learning difficulties, illiteracy, and growing inequality in welfare conditions and experiences.

Finland represents the crystallized idea of digital society that has been developed around the ideology of technological imperatives (Talsi & Tuuva-Hongisto 2009) and socio-technical imaginaries (Jasanoff & Kim 2009). This means that national development of digitalization in Finland has followed these rationalities and in a strong belief in them. Technologies have been kept apart from social structures and processes, and digital ICTs are positioned as a neutral good (Halford & Savage 2010). These logics have been seen in, e.g., a non-questioning political push towards digitalization of significant services, education, and political participation; as a means to transform life-chances and a way to equal opportunities for social/societal participation in every corner of the society, especially among youth as "digital natives" and "cyber-children" (Prensky 2001; Holloway & Valentine 2003). Youth are seen as a generation who find and adopts digital services first, and the youth-cultural meaning of digitalization is significant (Ito et al. 2010).

While youth with socio-culturally "proper" backgrounds cope well within the requirements and offerings of digitalization, the statistics show an intensification of deprivation, disadvantage, and political withdrawal among those who lack the necessary socio-cultural and material resources (Statistics Finland). In addition, digi-technological imperatives have not washed away the dividing significance of concrete homeplace spatiality in youth's life-choice possibilities concerning education, labor, leisure, and societal participation (Armila, Käyhkö & Pöysä 2018). Overall, today we witness a strengthening of structure-based, intersectional inequalities among youth, understood as a complex process of socio-cultural stratification that is intertwined with material opportunities as well.

In recent years, several scholars have argued that we need a more nuanced, theoretical and contextualized understanding about the digital divide, which traditionally has been defined in terms of access and skills. Multidisciplinary research of the digital divide has brought to the fore how digital skills, digital literacy, and benefits of using digital technologies vary greatly among people. Bridging these "new" digital divides calls for understanding of "digital literacy crusaders" (Meinrath et al. 2013) as well as critical multidisciplinary analysis of inequalities created by digitalization (van Dijk 2018).

Instead of concentrating on digital divides, we need to look for the gaps in participation and inclusion. Moving towards truly participatory digital culture requires analytic explorations of how digital information and communication technology tools are implicated in social circumstances and culture, and what our society and culture chooses to do with these tools. Following Jenkins et al. (2009), we use digital participatory culture as a term that cuts across educational practices, creative processes, community life and democratic citizenship.

In this paper, we argue that understanding of participation and inclusion requires more research on everyday resources, participation opportunities, and ways to develop cultural competencies and social skills needed for participation and digital engagement. We draw on empirical data from a questionnaire and focus group interviews of young people born in 2005 to examine the assemblages of participatory digital culture among young people in Finland. We ask how participation is understood and formed in everyday life, and what kind of challenges young people face. By analyzing data from three different living areas with their different age structures and class-based demographics, we also include place as a significant factor in our study.

Materials and methods

In our paper, we draw on qualitative and quantitative data and analyze digi-cultural opportunities, practices, and meanings among young people. Our quantitative research material consists of an Internet survey for young people born in 2005. There were 240 respondents, out of which 54% were girls, 42% boys, and 4% chose other or declined to answer. The qualitative data in this paper consists of 12 thematic individual interviews (6 girls, 6 boys) and two focus group interviews with 4 participants (3 girls, 1 boy). We have also conducted online observations and written fieldwork diaries of how these young people use digital media in their everyday lives. Because of COVID-19, we have relied on a digital ethnography approach, and our interviews and observations were implemented online.

In the analysis of qualitative data, we have followed the idea of multi-sited media ethnography (Hine 2015) aiming at making visible the digi-cultural practices of young people's everyday life at multiple local and digital ethnographic sites. This media ethnographic approach enables us to analyse different youth-cultural and territorialized forms in the ways young people themselves actively produce material into digital agendas, or not. With this approach, we can understand the different ways of how places traverse online/offline contexts and are collaborative, participatory, open and public (Pink et al. 2016). Furthermore, this approach enables us to make visible connections and intra-actions between online and locality-based realities. The analysis of the qualitative research data was made by using NVivo software.

First, both researchers coded the interviews individually. Then we compared and reflected on our analysis before creating a collective understanding by combining the interview data with the field work diaries and quantitative data.

In our study, we define digital ethnography as a way to understand the meanings of digital technologies and the social and cultural practices of digitality in Finnish society and people's everyday lives. Further, we see it as a means to utilize digital tools at different stages of research. (Pink et al. 2016; Standlee 2017; Korjonen-Kuusipuro et al. 2022). The ethical hot spots of digital ethnography were related to applying for ethical vetting, entering the field, negotiating participation, obtaining consent, and being aware of and possibly dismantling different power relations. It was particularly important to consider the publicity of digital spaces. The key principles of good scientific practice at all stages of research are reliability, honesty, appreciation, and responsibility (European Research Ethics Practice and Guidelines 2020). One key research ethical guideline is also that research should not harm subjects in any way. Although these principles are clear, their implementation in everyday research requires constant attention, context-based interpretation of social situations and human sensitivity (Korjonen-Kuusipuro & Kuusisto-Arponen 2019).

Place-based digital participatory assemblages

In our contemporary society and everyday lives, we easily assume that all young people are active producers of digital youth cultures and digital contents, and they actively participate in digital cultures. Furthermore, the integration of digital media in everyday living is commonly perceived in terms of seamlessness. Part of this discourse is the widely accepted idea among media scholars that the spatial distinction between online and offline has completely lost its bearing in the post-digital age (Tudor 2021).

The concept of place frames our study, which operates in three fundamentally different Finnish localities: 1) in a remote and emptying agricultural municipality; 2) in a small working-class and industrial town that seems to lose its young population; and 3) in a growing, youthful city that has an image of a tempting region, especially for young adults. We understand place as a significant material and socio-cultural landscape to grow up towards early adulthood and is seldom considered in social-scientific and cultural analyses of meanings, lifestyles and life-courses (Armila et al. 2016; 2018; Korjonen-Kuusipuro et al. 2018). By analyzing data from three different living areas, with their different age structures and class-based demographies, we trace the significance of place as a material and socio-cultural condition for digital imperatives and imaginaries.

Figure 1. A word cloud generated from interview data.

According to our quantitative data, young people have either a smart phone (97%), a computer (63%), or a tablet (35%). 90.4% of all respondents reported that they are confident about their abilities to use these devices, and they know where to find help if needed. However, in the remote municipality only 80.4% thought they had skills they needed. The majority of the respondents (87.9%) agreed with our statement that it is easy to learn how to use new devices or digital services. YouTube (99%), WhatsApp (96%), Instagram (95%), Snapchat (93%) and TikTok (85%) were used by most. Also in our qualitative data, these same applications were the most used.

> *Researcher: So, what are the main applications what you use?*
> *Aleksi: Probably like WhatsApp, YouTube, Google.*
> *Oskari: And Snapchat.*
> *Aleksi: Yes.*
> *Researcher: Well, is it more for cell phone or computer use? Or both at the same time?*
> *Oskari: More cell phones, but like both.*
> (H8b-9b_Dequal[1])

Although the frequent usage of social media apps, our interviewees were not very active in social media. They did not actively post or publish on their social media channels; it was more about chatting and communicating with friends or just watching and following media content. So, while some young people participate heavily in "geeking out," the vast majority engage more substantively in consuming rather than creating digital media (Ito et al.2010).

[1] All names in this study are pseudonyms

Our participants were also very aware of their privacy in social media, and most of them had private accounts so that they could, for example, control their followers.

> *Well, I haven't really published anything recently. I haven't posted any pictures on Instagram in a year or so. Probably the latest post is some answer on Twitter.* (Mikael H6b_Dequal.)

> *Yeah, well, when I don't have Instagram or anything, then I don't like to post a lot, the only place I use every day, like with friends, is through Snap.* (Sofia, H3a_Dequal.)

In our questionnaire, we also asked what restricts young people from using digital devices. Parents, time, and affordance of devices were mentioned, but most often young people reported that it was their interests in different issues (see Figure 2). The number of young people that were not interested was highest in the remote municipality (51%), but it was quite high also in the growing city (43%) and in the industrial town (41%). This might indicate that young people can easily fall outside participatory digital assemblages, if they are not at all interested in digital worlds.

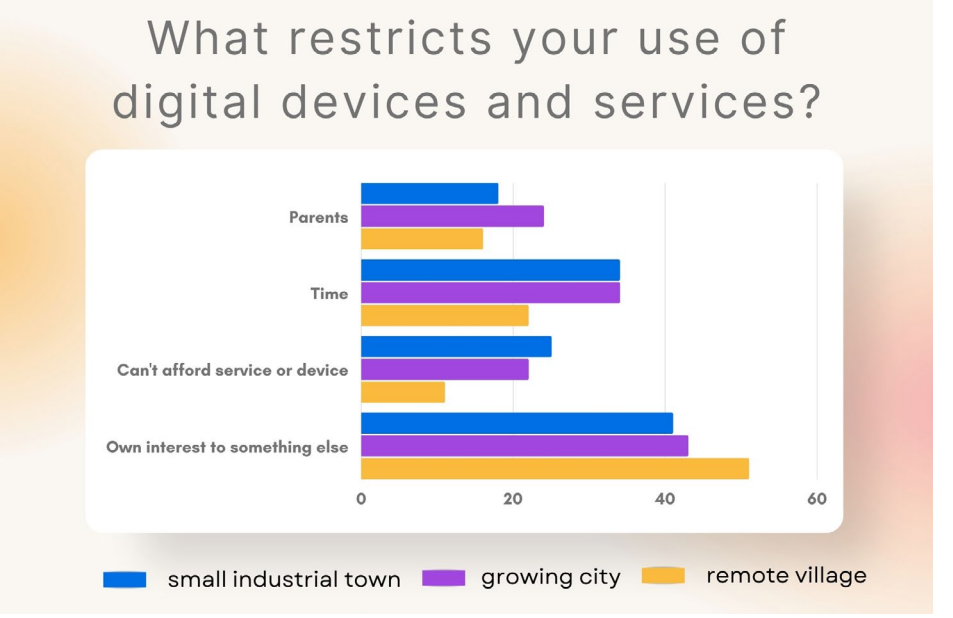

Figure 2. What restricts your use of digital devices and services?

In the analysis of the interviews, we wanted dig deeper into the "not interested" category. We discovered that the online world was mainly for messaging and filling the moments when they felt "I have nothing to do". Nonetheless many of our participants had met new people, even made new friends online, they still felt face-to-face meetings were more important than meeting people online. Face-to-face shopping was also more favored than online shopping.

Furthermore, the interview data shows the power of parents in young people's lives and in shaping their relationship towards online participation. For example, one participant explained how her mother forbids her to take her mobile phone to school, even though it may be needed during classes. Schools were also important places to build participation. However, even this was not self-evident. The following short excerpt of Emilia's and Maria's interview shows how their school class had a WhatsApp group organized by pupils where they were not invited until the teacher had asked someone to do that. This illustrates how fragile digital participation may be among young teenagers. It is also notable how online and offline worlds meet even in a short discussion like this.

> *Researcher: Did it feel bad, when you did not belong to this group?*
> *Emilia: On the other hand, I would not like to be part of it, because I had this experience from primary school that if you asked what is for home-work, nobody never answered. I don't really see it [belonging] essential.*
> *Maria: And for me, if someone is saying things about you behind your back. They cannot talk about you if you are there.*
> *Researcher: Well, yes. Do you think that people have been talking about you behind your back?*
> *Maria: In that group? I do not know. Maybe more in real life, face-to-face.*
> (H1a-2a_Dequal.)

The change from principally offline to online information, communication and services, affects relations and processes in ways that are fundamental for our social lives and societies. Digital systems do not merely digitize existing social relationships but generate new forms and reconfigure existing ones. It is important then to understand how digital information is accessed, understood, and used, how it is constructed, and its dynamics – how people make sense of it and navigate its socio-technical contours. (Webster et al., 2020). There is a broad "access rainbow" that patterns how young people engage with digital culture. It is partially reflective of their physical access to technological resources but also of the ways in which cultural capital and expectations influence forms of participation (Literat et al. 2018).

Discussion

In framing our research through a cultural approach and focusing on contextual understanding, the questions of impacts are also intertwined and multifaceted. In our research, we aim to broaden the understandings of digital divides: by looking beyond the questions of access, we go beyond a simplistic understanding of impacts and their measurements. Scrutinizing digitalisation as a socio-cultural phenomenon and as a factor influencing the lives of young people is socially significant. From the point of view of effectiveness and impacts, research focusing on socially significant topics is of vital importance. The inequality that is traced in our research is not only experiential but, in many respects, structural inequality that can be either reinforced or reduced by policy decisions and debate. Therefore, highlighting the effects of digitalisation and the ways in which it is intertwined with growing inequalities, it is also important from the viewpoint of research impacts. However, we must also take notice of how young people's voices are heard in society.

Our youth-focused analytical framework facilitates a deeper and more complex understanding of youth's varied digital participation practices and digital participation as a sociocultural practice. In examining digital participation, we need to understand the agencies, practices, contexts, and intensities of youth's mediated participation (cf. Literat et al. 2018).

In the future, we need more research on everyday resources and opportunities how young people participate in digital worlds. More research is also needed on the ways young people develop cultural competencies and social skills needed for participation and digital engagement, and the contexts of the digital engagement. In our ongoing DEQUAL project, our preliminary analysis shows that digital participation is a fragmented phenomenon, and it must be studied in all its complexity. Furthermore, our results show how young people in different localities have different ideas about digital worlds – in rural areas young people do not seem so interested in it, or see the benefits of digital participation, but in urban settings young people tend to see both the pros and cons of it, even though they can have critical views. We are also able to see how the neighborhoods and households, for example parents and school environment influence young people's digital relations.

Our participants seemed to have the necessary equipment and skills, but their views about the benefits of online participation were sometimes quite pessimistic and restrictive. They saw online worlds addictive and time-consuming and had very pessimistic views about their own abilities to influence the future, as Aleksi formulates it: "You can't influence it. The role for humans is just to adapt." (H8b_9b_Dequal). Thus, we argue that in order to understand all nuances of digital participation, we also need empathetic understanding to take these views into account and thus, do more effective research.

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3 STUDENTS EXPERIENCING COMMUNITY: SHORT-TERM CULTURAL EXCHANGES STRENGTHEN THE NATIONAL AND EUROPEAN IDENTITY OF FINNISH STUDENTS

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ABSTRACT

In Finland, the importance of internationality is recognized at all levels of education. Internationality is reflected in the daily life of schools as diverse forms of activity, but mobility often forms the heart of the activity (OPH 2018). Mobility is often conducted through various youth exchange programs, which have a long history, and aim to provide young people from different countries with experiences of community. This article highlights the experiences of four Finnish students of higher education in one Erasmus+ project which operated from 2018-2021. This article reflects on how taking part in short term, international student visits have a positive impact on the student's European identity and enables students to experience community within and across borders. Given the beneficial impacts of participating in short-term exchanges, this could be an opportunity to deeper connections within Europe for those young people, who for various reasons usually do not apply for them. The themes of youth, internationality and identity are of topical importance, as the COVID-19 pandemic has severely affected young people.

Keywords: Youth, youth exchange, national & European identity, community, inclusion

Introduction

2022 is the European Year of Youth and therefore young people are receiving special attention in social and cultural policy and projects. The European Parliament explained the reason for the focus on youth as a way of "re-establishing a positive outlook for European young people negatively affected by the impact of the COVID-19 pandemic" (European Parliament 2021). One of the aims of the European Year of Youth is to organize activities for young people across Europe (European Parliament 2022). The EU has long considered various youth exchange programs important and the Erasmus+ program, which has been running since 1987 is a good example of this. Erasmus+ supports youth, education, training and sport in Europe. The budget of the 2021-2027 Erasmus+ program is 26.2 billion € and is nearly double the funding than the program for 2014-2020. Compared to the predecessor, it has a stronger focus on social inclusion, digitalization and the green transitions. (European Comission s.a..) The program is the largest organization supporting the international mobility of students of higher education (OPH 2019, 5).

In Finland, the international mobility of students is perceived to be an important part of the internationalization of higher education, and this is reflected in various national policies (OPH 2019, 5). In addition, the results of the Youth barometer from year 2018 reveals that youth in Finland consider mobility and learning about different cultures essential. They also see language skills and internationality as important skills to succeed in life. (Myllyniemi & Kiilakoski 2019, 67).

Despite widespread recognition, in a report made by Finnish National Agency for Education (2019) related to periods abroad for higher education students, it became clear that long-term periods abroad for students have decreased since 2016. Long-term study and internships exceeding three months are considered long-term. All exchanges of less than three months are counted as short-term. (OPH 2019, 5-6). For example, in universities of applied sciences, periods abroad have decreased by twenty percent in the period 2016-2018. In the same time span, short-term exchanges abroad have become slightly more common, in particular for students in universities of applied sciences when compared to university students.

Taking a longer timeframe, in recent years the number of students undertaking international mobility has also decreased overall. The report shows that in the light of statistics, students have not shifted from long to short term periods abroad instead (OPH 2019, 8). There are also large differences between higher education institutions in terms of international student mobility (OPH 2019, 9). Unsurprisingly, for short term exchanges neighboring countries and Europe are the most popular destinations for Finnish students (OPH 2019, 18).

The European Union funded project EU-CAB (Comparative Analyses of European Identities in Business and Every-Day Behaviour) operates within the framework of the Erasmus+ Strategic Partnerships in Higher Education. The duration of the project was from October 2018 to December 2021. The project's aim was to find out whether, and to what extent: "the return to national state positions in the economy and society in selected EU countries, which seems to be apparent latest since the summit of the refugee movement in 2015, reflects on identity and behaviour of the people in the states concerned" (EU-CAB s.a.). In addition to scientific insight, the students are also expected to gain experience in cooperation with representatives of various European countries and gain in-depth knowledge of those countries (Diehl-Becker 2021, 24). The Duale Hochschule (Cooperative State University) Karlsruhe, Germany, coordinates the project and it offers possibilities for joint learning and research for students from six European countries (Finland, Hungary, Poland, France, Germany and Portugal). The project explores in collective identities and behaviour in the countries mentioned above. The students are expected to conduct empirical scientific studies (observation and surveys) in each participating country. (EU-CAB s.a..). The duration of the visits (Intensive Study Programs) is one week. As the project consists of several short-term gatherings over a longer period of time rather than a singular long visit, this may not be traditionally seen as a form of exchange or an internship abroad. Yet, and perhaps because of it, this is fruitful to examine.

In this article, I discuss what the Finnish students, who participated in the EU-CAB project have gained from the experience of taking part in short-term, international student visits and whether they have encountered any challenges in participating. This paper reflects on how taking part in short term, international student visits have a positive impact on a student's European identity, strengthens the national identity, and also enables students to experience community and create friendships within and across borders. Within the framework of the EU-CAB project, identity was defined as a "social phenomenon that is widely identical with the 'self-concept' that an individual has formed about him – or herself" (see Diehl-Becker 2021, 36). In this article, identity is understood in the same way, but instead using the gender-neutral terms of "them" or "themselves".

The themes of youth, internationality and identity are of topical importance, as the COVID-19 pandemic has severely affected young people. Many young people have experienced difficulties with the restrictions following the outbreak of the pandemic. Distance learning and social isolation have left their mark on young people, and many have experienced loneliness and feelings of hopelessness. Naturally, the COVID-19 pandemic has also had a strong impact on the mobility of young people and the implementation of various projects and exchange programs. The impact of which brought new challenges to the European

Union's goals for youth exchanges. Particularly now, it is important to promote factors that strengthen the community among the young. The results of this research brings value for all who organize and facilitate the various exchange programs for youth as well as for young people, who are considering going abroad.

Semi-structured interviews were used as a method of data collection. Interviews are well suited as a method when information about experience is needed. The quantity of interviewees is not always a considerable factor, but what matters is that the interviewees have knowledge about the subject. Thus, I interviewed the four Finnish students that participated in the EU-CAB project, during autumn 2021. The duration of each interview was approximately an hour. The audio records were transcribed into documents. Due to the nature of qualitative research, the data collection, interpretation and analysis were not separated, instead the relation between these stages was cyclic. The material was analyzed with content analysis (see Alasuutari 2011; Tuomi & Sarajärvi 2018). In total, less than 15 Finnish students participated in the EU-CAB project. Therefore, complete anonymity for the four interviewees cannot be guaranteed. According to the general principles of ethical research, this was told to the respondents during the interviews, and they granted consent, however, it is difficult to know whether this had an impact on the answers they gave in during the interviews.

Understanding the experience: What did the students tell us?

The Finnish students described that common for those from Finland who participated in the EU-CAB project, was like-mindedness. They were social, adventurous, and eager to try new things. Due to this, the Finnish group became very close-knit. The EU-CAB project seemed to the students to attract a similar kind of people both in Finland and in other countries that were involved. The participants were usually outgoing, egalitarian and interested in both travelling and meeting new people and found it easy to talk and connect with people. The participants had good language skills (English) which helped them communicate better with each other. Further, the project's underlining principle of cultural exchange brought people together. In particular, the first trip that was organized as part of the project was mentioned as an important source for bonding for the participants, as at the time everything was new for them.

Pierre Bourdieu (1996) theorized that people are endowed with different capitals that either enable or complicate their existence and behavior in different social fields. Therefore,

the capital that people possess determines their position in a particular field. According to Bourdieu, every social field requires certain capital from its users in order to function as valued members of said field. Bourdieu defined four major capitals: economic, social, cultural, and symbolic. In light of Bourdieu's work, one could say that the Finnish students possessed both social and cultural capitals, which made it possible for them to successfully participate in the activities of the project. It seemed that they had also mobility capital, which is connected to their personal life history, family background and age (Murphy-Lejeune 2002, cited in Piispa 2019, 141). The participants knew both how to travel and move, and they were internationally orientated. Previously, they had all travelled a lot before participating in the EU-CAB project. It is possible to say that Europe is familiar for them.

Young people have different opportunities to benefit from or enjoy exchange programs, whereas for some it is not even possible. Research have shown that those young people who take part in exchange programs are already more internationally oriented than the average youth and have also more opportunities for mobility. (Piispa 2019, 132, 134). Those who are positive about mobility are also, on average from more educated homes and are more educated, thus also having social and cultural capital suitable for mobility (Piispa 2019, 141).

Although, all the participants had travelled significantly prior to the EU-CAB project, they stated that the project in particular had a significant impact on their lives. Both on the personnel level as well as the professional. On a personal level, it was a place for own growth. Their self-esteem was strengthened, their confidence and faith in their own activities and abilities increased, too.

From the perspective of national and European identity

Some students stated that the experience of being involved in the EU-CAB project seemed to both confirm and diversify their perceptions of national identity and their sense of European identity. Feelings like this are common among exchange students (see for example, Van Mol 2013; Cairns et al. 2018, cited in Piispa 2019, 132). These two identities do not compete, instead they seem to be connected and run in parallel (Pew Research Centre 2018, cited in Myllyniemi & Kiilakoski 2019, 52). Experiences of belonging and identities are always subjective, but the relation is a two-way phenomenon. An individual feels belonging to a group, embraces the identity of the group, but at the same time these identities also produce social groups. This engages cultural, national as well as ethnic identities. (Tajfel 1978; Billet 2004, cited in Myllyniemi & Kiilakoski 2019, 51).

The reflection about identity arose within the students some thoughts about Finland being different from the other countries that participated in the EU-CAB project. It was difficult for them to precisely identify the differences, it was more of a general feeling that Finnish culture, to some extent, differed from the cultures in the countries involved. Finland was experienced to be a little bit loose and unattached from the rest of Europe, which was seen as more cohesive, perhaps partially due to geographical factors.

The geographical distance from the rest of Europe was mentioned by the students several times. They felt the rest of Europe as more connected in one way. For the other countries involved in the project the physical distances were close, or at least it was easy and possible to travel by train or car between countries. For the other EU-CAB participants, it seemed that they had travelled a lot and were already familiar with each other's countries, except for Finland. Finland was an unknown. Therefore, students from other countries naturally expressed some stereotypes about Finns and Finland, but thanks to communication, Finnish students felt that they could change these attitudes to some extent.

At the same time, there was also many similarities between the different countries, and the participants felt that they have a lot in common with young people living in other EU countries. They could experience the feeling of togetherness across national borders. They could also identify with the other young people from other countries. In a global world, the style, music, social media apps used by the youth, are the same. Thus, knowledge, values, attitudes and lifestyles move across borders with far-reaching consequences for both individuals and cultures (Myllyniemi & Kiilakoski 2019, 56).

The diversity and benefits of short-term international student visits

Within the limits of EU-CAB project, the journeys were short and comparable with the length of a normal tourist trip, lasting one week. Still, all the participants underlined that EU-CAB trips were very far from regular tourist trips. They spent time in places, where tourists did not. They interacted with young people from different countries on a deeper level and this interaction made them reflect on how other people see them, Finnish people, and Finnish culture overall. Considering things from different perspectives was one thing that the participants found very rewarding. When you concentrate together on finding values and features that you have in common, instead of the differences, that makes you also reflect on your own position towards Europe. According to Pulkamo (2007, 508), it is the reflection of action and experience that is central from the educational view. Reflection

takes the experience to a higher level, where students have the opportunity to learn new things. The students felt that this kind of interaction breaks down existing stereotypes that they might have of certain countries and groups and allows for a deeper understanding of people and their behavior.

It is difficult to say to what extent the experience itself produces an appreciation of diversity and an understanding of new cultures, which has been a key idea in the creation of various European youth exchanges (Lafraya 2011, cited in Myllyniemi & Kiilakoski 2019, 58). Or if it is more the case that those who are already interested in different environments apply for these projects and exchange -programs (see also Myllyniemi & Kiilakoski 2019, 58).

Some of the students had also taken part in exchange programs previously and they also compared these EU-CAB trips to longer exchange programs in terms of intensity. Short-term international student visits within the EU-CAB project were seen by the students as a low threshold alternative to exchange programs. In this format, it is an entity that would be suitable for a wider amount of young people as it provides an opportunity to connect with Europe for those young people who do not want, dare or perhaps cannot leave their homes for a longer period of time. For example, more than a third of those who start their studies in higher education are over the age of 24, making it more likely for some to already have a family, children, or work (OPH 2019, 8). There are many students for whom short periods abroad could be better suited than long ones (OPH 2019, 8).

The results of the Youth Barometer from 2018 (Myllyniemi & Kiilakoski 2019, 63) reveal that half of the respondents feel very European and almost 9 out of 10 feel European to some extent. The Youth Barometer also asked how young people see Europe. 77% of the respondents understood Europe as a geographical area. Whereas only 44% of the respondents saw Europe as a community of values. From this point of view, much work remains to be done to strengthen the common European identity (Williamson 2015, cited in Myllyniemi & Kiilakoski 2019, 62-63).

COVID-19 has had a significant impact on how the EU-CAB project was implemented. Many of the planned trips abroad had to be replaced with virtual visitations. From the student's point of view, you cannot compare the online events and the trips that were carried out live. For the students, the most rewarding aspect of this project was about the possibility to meet new people and get to know their cultures. The participants felt that a huge part of this was lost within the online events. The variety of the people that participated in these online events changed too, which had the effect that the sense of community was not as strong. As a result of this, the students felt that the online events were a downside of the

project. Nevertheless, the students thought it was great that the project was able to continue, despite challenges that no one could have foreseen. Moreover, the distance occasions could be rewarding in another way, for example the Finnish students gathered together for these events, which increased their sense of community and belonging together.

The participants underlined that being involved in the EU-CAB project has been one of the best experiences of their time studying and exceeded their expectations. Primarily this has been only a positive experience for them. The students recommend that more young people should take part in projects like this. One of the students described this as a "once in a lifetime experience, and on the whole, there is nothing but pure benefit to participating in such a project".

Discussion

Over the last two years, due to COVID-19 pandemic, new challenges for mobility emerged. Research, however, shows that international student mobility was declining in Finland even before this (OPH 2019). According to a report (OPH 2019, 27-28) the staff of higher education, see a decline in mobility for a variety of reasons related to higher education institutions, examinations, and students. For example, the message regarding students' periods abroad can be partially contradictory depending on a variety of factors. While encouraging mobility and recognizing its importance, resources are often diverted away from student mobility. More attention is also being paid to the fact that students should graduate quickly, and as a result, periods abroad can be perceived as a burden that postpones graduation further.

Students themselves feel the pressure to graduate quickly and many also work to finance their studies and living costs, which makes periods abroad costly and difficult to arrange. Furthermore, there are also not enough staff working with issues of international mobility to promote periods abroad, leaving many young people unaware of the possibilities available to them. (OPH 2019, 27-28). Thus, young people also do not necessarily recognize the benefits of mobility. Here, according to the green paper published by the European Commission (2009, 7), for example, teachers and youth workers would have the opportunity to encourage young people to participate more in various European programs. The situation of young people must also be taken into account and listened to, as there can be many factors in young people's lives that prevent them from participating in various European youth programs, and poor language skills are one of the biggest barriers (European Commission 2021, 12).

Language and intercultural skills are an integral part of European identity (European Commission 2009, 8) and one of European Union's efforts is to ensure that every citizen can

learn at least two foreign languages from an early age (European Commission 2021, 11). In Finland compulsory schooling begins the year a child turns seven. Since 2020, every child in the first grade starts to learn their first foreign language however, only a small margin chooses a language other than English (Vipunen – Education Statistics Finland), although one of the goals of the reform was the desire to diversify language skills (see Pyykkö 2017, 34).

In Finland, language learning both at primary and secondary level have become more one-dimensional and in addition to the native languages of Finnish and Swedish most study only English (Pyykkö 2017, 9). Overall, learning languages other than the compulsory languages have declined significantly at all levels of education. The languages offered also varies from municipality to municipality, which can lead to further inequalities in children and young people. Diverse language skills and the opportunities they bring should be everyone's right, as language skills are a major asset and provides Finnish people with opportunities for both education and working life (Mäntylä & Maijala, 2020). Presumably, because of the goals of the EU-CAB project and the way students were supposed to be working together, students with good English language skills applied for the project. The interviewees had also mainly used English in the framework of the EU-CAB project. The use of English is common, for example about 90% of the vocational education students use English during their Erasmus+ period (OPH 2020).

Indeed, there is a need for educational policy decisions that support both the diverse range of languages in different municipalities throughout the young person's learning path as well as international mobility, regardless of the young person's place of residence or socioeconomic background. A change in attitude is also needed, so that learning other languages than English is seen as important and diverse language skills are appreciated.

Conclusion

In this paper, I have presented the participants thoughts of the involvement in the EU-CAB project and thereby highlighted the importance of short-term cultural exchanges abroad have on the path of young people's lives. It differs from exchange programs in the ease of participation and differs from regular tourist trips in its intensity and reflective nature. The duration and frequency of the trips do not seem to matter in terms of how relevant the journey is perceived. Instead, the goals and content of the journeys; active acquaintance with people and culture in other countries and reflection in relation to one's own perceptions and culture, seem to be important. Short-term cultural exchanges, including those that consist of several gatherings over a longer period of time, such as the EU-CAB

project, could therefore be an opportunity to deeper connections within Europe for those young people who, for various reasons, cannot leave their home for a longer period of time.

Although the specifics of the EU-CAB project and its results were not considered in this article, the article is sure to have some overlap with one of the objectives of the EU-CAB project, which was to provide students with knowledge from European countries and facilitate cross-border cooperation. Participation in a project with a cultural exchange component is an important experience for the participants, both on a personal level (personal growth, strengthening of self-esteem and agency) as well as gaining a broader understanding of Europe. Thus, participation also strengthened the national and European identity of young people and offered experiences of community across borders. Furthermore, this provided a genuine opportunity for young people to make friends, which contributes to their general well-being at a time when several studies show that many suffer from loneliness and isolation (e.g., see Kauppinen, Lahtinen & Haikkola 2021).

As previously mentioned, the European Union has systematically and purposefully supported the mobility of young people around Europe, but according to research young people have different opportunities to benefit from exchange programs. This could be assumed to apply to participation in international projects to some extent. Partly, this is a question of inequality. In this light, given the educational implications of participating in projects like this, gaining social and cultural capital (see also Nikunen 2013, 218), strengthening social inclusion, and experiencing cross-border community, it is important that this kind of projects would reach those young people who usually do not apply to them.

Further research could consider the matter from a broader perspective. Furthermore, questions to address could be how to increase interest among young people who may not think participating in this kind of projects is "their thing". This would be the first step to consider how to offer this opportunity to those who do not immediately recognize it as beneficial for them and take up the question of what needs to be done, both at the societal and the individual level, to make this opportunity a possibility for them as well. Furthermore, it would be important to examine why international student mobility is declining currently and what measures should be taken to address this. One such argument is that students have other ways to gain international experience and exchange studies are no longer that unique. (OPH 2019, 28). However, in the future, it might be important to consider how to encourage and motivate young people to participate and how to make participation smooth overall, taking into account the different life situations and capital of young people.

One interviewee said that "Finland could bring more internationality to all studies, because that is the future". No actor or entity alone will solve the challenge of increasing the mobility of young people, but to improve the situation, extensive, multi-professional collaboration is needed (European Commission 2009, 15). Particularly now, when Europe is confronted with new challenges. The European Unions' goal of supporting young people is admirable, but it is important to overcome the obstacles on the way, and offer young people hope and community regardless of their background. Thus, special attention must be paid to preventing inequality and to achieve this, perseverance, goals, action and dedication are needed.

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4 NEED FOR DIGITIZATION PROFESSIONALS: CREATING NEW TRAININGS IN FINLAND

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ABSTRACT

The need to digitize analogue materials is evident; some materials need to be preserved and others made available for citizens, researcher use, government or public sector. The sheer volume of materials to be digitized demands competences to plan and manage digitization projects as well as to conduct the work and digitize the materials. This paper analyses the digitization competencies needed to meet the needs of world of work and addresses the question: how digitization training can enhance competencies and support organisations and businesses. Close cooperation with organisations and businesses, surveys as well as training places for students are able to shape the training content to suit the needs. The training consists of general digitization training, but specifically respond to the needs of memory organizations and municipal organizations, as well as individual study paths and student guidance needs. Since Finland and many other Nordic countries have no other digitization training available, the background and outcomes of training planning and trainings are valuable.

Keywords: digitization, digitizing, competence, competency training, education and training, pilot experiments, regional development

Introduction

The National Archives of Finland and Finnish Heritage Agency have estimated that it will take 200 years at the current pace of digitization to fully digitize all their materials (Rosvall 2022). Further, this does not include the materials owned by the municipalities, public sector in general, foundations, trusts and other organizations. The sheer volume of materials needed to be digitized demands also the competence to plan and manage digitization projects, and to complete the work itself and digitize the materials. The decision on the format of documents to be archived by National Archives puts further pressure on transferring documents into a digital form (Kansallisarkisto 2021).

Information management and its legislation provide the basis for archival, archival management and information service from archival materials. Municipalities and cities are obliged by the government to preserve a variety of records and documents. In addition, municipalities are required to hand over public documents held by public authorities on request. In recent years, this work has been done in a simpler fashion by a variety of online services, which allow the customer to access the document directly. For example, new digital services, research needs, the vast number of documents and lack of archival premises have increased the pressure to digitize municipal archives comprehensively. Centralized digitizing could address this problem. (DOC 2019; Kansallisarkisto 2019).

A large paper archive requires that the information can be challenging to be managed and found within the municipalities' archives. By digitizing archived materials, information can be found faster, and the time spent in the archive will be reduced significantly. Digitization also helps to make information more accessible: direct enquiries by phone or emails about documents are significantly reduced when the information is digitally available. With digitization, resources and time for people to focus on their core competencies will improve, and space previously used as an archive can be freed up for other purposes. The Finnish government has set a target that by 2030 all paper archives must be digitized. Currently, this policy only applies to government institutions and their archives. However, it is estimated that the policy will sooner or later apply to the public sector. The digitization of archives should be considered in cities' and municipalities' information management plans and budgets. It is not necessary to digitize all documents at once, but it is a good idea to split the project over several years. This will ensure a resource-wise approach. (DOC 2019).

The pressure to digitize is evident, but is there enough knowledge on how to do it? In Finland, there is no continuous training on digitization. In vocational education, there is a study unit called "Working in Record Production" (Opetushallitus 2022). One vocational

school in the Helsinki area has implemented object scanning in their curriculum with their students and they have also conducted document digitization for National Archives of Finland in the past. Otava folk high school near City of Mikkeli has had digitizing studies in the past. In Mikkeli University of Applied Sciences, there has been digitization training offered twice, approximately a decade ago in a project. Currently there is no other higher education level training in digitization in Finland and no specialist trainings. For example, in Sweden there is a 15-credit course of 'Digitizing Cultural Heritage Material' which is part of the master's programme, Library and Information Science, Digital Library and Information Services (University of Borås 2022). The level of training influences the prestige of the sector, especially at national level.

Why is training on digitization needed? Cannot anyone scan a document? The Federal Agencies Digitization Guidelines Initiative (2009, 4) defines digitization as; "a complete process that broadly includes: selection, assessment, prioritization, project management and tracking, the preparation of originals for digitization, metadata collection and creation, digitizing, quality management, data collection and management, the submission of digital resources to delivery systems and into a repository environment, and assessment and evaluation of the digitization". Digitization is not only scanning but a process that needs to be managed. Dahlström and Hansson (2019, 3-4) use the phrase 'document criticism' to highlight the need to understand that digital reproductions are results of decisions made in the digitization process. They also state that the discussion of digital provenance comes down to authenticity, metadata, and usability. Li and Sugimoto (2014, 148) describe digital provenance as a "*chronology or chronological information related to management of a digital object* and it is *necessary for long-term use and preservation of digital resources"*. The provenience and life cycle of a digital object is impossible to manage without paying attention to metadata (documentation) of the processes (Moreu et al. 2008, 1). Only well managed and quality processes can ensure authenticity of the document and ensure the usability of the document.

Thus, there is a clear need to develop digitization training and skills to ensure qualified workers for businesses' and organisations' demands. In this paper, we analyse the competences needed in digitization work and, also describe the competencies the trainings should teach. This paper analyses the digitization competencies needed to meet the needs of businesses and organisations. The results of "Planning Project of Mass Digitization Skills Training" and "The Professional Digitizer Education" pilot projects as well as the "Digitization Competencies Training Project" support development and implementation of new digitization trainings. After exploring the results of the projects, we describe the training and the results of the implementation, and the modeling of the training and training materials.

First, we will describe the methods used in those three projects. Then we introduce the results of the training and competence need surveys. Finally, we draw conclusions from the project results and discuss the benefits of training for students and possible future avenues for development.

Methods

The research approach was a case study. The research methods include surveys, interviews, observations, modelling and analysing existing documentation. This case study aims to get an overall picture of the study subject by using different methods (Vuori 2021).

The main objective was to investigate what are the training, employee and employment needs of the National Archives and other memory organizations and digitizing companies. To create digitization training, additional studies and information seeking were conducted to determine what the current state of digitization and digitization training is locally, nationally and even internationally. The main aim of the planning was to make sure that the National Archives would have enough qualified people to work in the field of digitization.

Firstly, we analysed the National Archives documentation of planned mass digitization processes and operations. Using the documentation, we made a survey of the competencies needed in the field of digitization. In the survey, we asked for the evaluation of the importance of different competencies. The survey was sent to the National Library of Finland and Central Archives for Finnish Business Records (Elka). The results of the survey were explored in more detail using interviews. This made it possible to define concepts, competencies and processes and gain a better understanding on what is needed in training programs and units. We visited both institutions and observed the digitization functions and processes. We mapped the labor needs of the above organizations in our surveys and interviews. We also examined, how many employees they already have in their digitization processes and their education level. In addition to these local organization surveys, we also studied some digitizing companies within the Mikkeli region and companies further afield. Their employee and training needs were examined in the study. The survey focused on identifying the expertise and technology needs, and the related process of companies implementing digitization and developing digitization systems. A total of 24 digitization companies in Finland were sent a questionnaire of their employer and training needs. Email discussions proceeded with 12 digitization companies. Two of these companies became closer partners and we held cooperation meetings in December 2021 and our cooperation will continue. In addition to these surveys and interviews, Disec Ltd conducted a wider study of quality requirements for digitizers and digitization experts, the quality requirements of the digitizing process, equipment, and systems (Disec Oy 2019).

The Professional Digitizer Education project focused on implementing the results of the planning project. However, all the local organization survey results of the previous project were reviewed and updated at the beginning of this second project to ensure the accuracy and timeliness of the collected data. The additional methods were the modelling of the training, storification, and gathering feedback from students. For the development of education, getting feedback from students was important. We used the student feedback form of the graduation phase (Vipunen - Education Statistics Finland) of the University of Applied Sciences as a basis for feedback. Based on this feedback, we gained important information on how to develop training in the future which was then utilized in the following project.

Education was modelled for possible further use. For example, the modelling and concrete description of the processes made different elements of the educational process visible. The description of modelling of the training process resembles the methods of service design. A simple, three-tier model was built for the use of modelling. At the first level, a person is a beginner with some knowledge. At the second level, a person already has an understanding, but does not yet know how to make full use of it in their practical work. At the third level, a person already has deep knowledge, which they are also able to apply to practice, and can develop their expertise in a goal-oriented manner.

The effectiveness of the devised training was considered throughout the process. Areas of the effectiveness of education may include factors related to the participant, to the educational process, to the participant's organization or social, cultural, economic, and historical factors (Tenhula 2007, 15). Training was designed to consider the individual needs of the student and, the business and organizational perspective. In addition to the project plan, we received information from students and the results of the initial mapping of the Digitization Competencies Training project.

The impact of mass digitisation in Finland on trainings

The Finnish Government made the decision in June 2017 that archival paper materials held by governmental and municipal authorities should be digitized by 2030 (Kansallisarkisto 2018). There have not been any other large scale mass digitization projects internationally in the archival sector that aim to dispose of original records after digitization as planned in Finland (Hirvonen 2017). Everyone who participates in the mass digitization processes requires new skills.

The decision was made to locate the mass digitization centre in Mikkeli if the situation, and budget were favorable. In the spring of 2020, the refinements to the timetable and the extension of the mass digitization operations were made. (Eräkaski 2022.) The mass digitization operations of National Archives began in Mikkeli in May 2021 (Honkamaa 2020). Locating the digitization operations of the National Archives of Finland in Mikkeli would make sure there would be new employment opportunities and it would support the functions and future of Memory Campus network. There was also a need to make sure that National Archives and other local organizations had sufficiently qualified people to undertake the work.

The first project 'Planning Project of Mass Digitization Skills Training' took up the responsibility to plan pilot trainings for digitization workers and digitization experts. The primary aim of the project was to conduct digitalization skills and employer needs mapping. The project also included an assessment of digitization training needs of the relevant organizations in the sector. A training plan for future digitization skills training was developed on the basis of these results. In the addition of mappings and planning, the one important aim of the project was also to support the relocation of the National Archives' mass digitization operations to the City of Mikkeli.

The second project 'Professional Digitizer Education' implemented training devised in the first project and improved them further. The primary aim of the project was to produce skilled digitization workers and experts to meet the current and future needs of the region's businesses and organisations. During the project, pilot training for digitization workers was modelled and described for possible further training programs. The selection of students was carried out in cooperation with the organizations of the region and the employment opportunities for students were also facilitated.

The 'Digitization Competencies Training Project' shifted the focus onto planning a digitization project. The main objective of the project has been to continue to develop the training designed and implemented in previous projects, to strengthen the skills and digital competence of the workers. In the long run, the projects will help develop the entire industry, businesses and organizations in the region and enable the development of the long-term training of digitization workers and experts, both regionally, nationally, and internationally. The project lays the foundation and activities that will help to safeguard the need for digitization experts and ensure the workforce in the future.

Results of the training needs of memory organizations and companies

At the time of the first survey (2019) the National Archives of Finland did not have any digitization workers in Mikkeli, but they had 15-17 digitization workers in Helsinki. At the time of the latest survey (2021) they were ready to start mass digitization in Mikkeli, and they had hired some designers and digitization workers to design and start mass digitization functions. In the spring 2022, they had 20 people in different positions in their mass digitization functions. The majority (15) are digitization workers, so they have had increasing employer need for training as the educational backgrounds of digitization workers vary a great deal. Including educational qualifications in IT, photography, or design, from higher or further educational institutions. In addition to standard employees, they have workers who are either conducting civilian service or work experience. At the National Library, they had 17 digitization workers working at the time of the first survey in 2019. At the time of the latest survey (2021), there are approximately 20 digitization workers and 1-2 digitization related workers, like library secretaries. The educational backgrounds of their employees are mostly from the IT or library sector, and some of them have carried out image editing trainings or information science studies. At the time of the latest survey (2021), National Library was planning to expand their operations, so they had need for new digitization workers and possibly more in the future (2022-2024).

Elka had two full-time and 2-3 part-time employees working in digitizing at the time of both surveys (2019 and 2021). They are also planning to expand their digitization in the future. The estimated number of digitization workers for year 2024 is 7. Some of Elka's digitization workers have participated in the Ministry's SAPA training (Service package for the archiving and preservation of e-government documents). Some have also participated the local folk high school's (Otavan Opisto) training, which includes digitizing in their curriculum.

Table 1. The change in the number of digitization related employees in Mikkeli in the years 2019 and 2021/2022.

Year/Organisation	National Archives of Finland (Mikkeli)	National Library of Finland (Mikkeli)	Central Archives for Finnish Business Records' (Elka)
2019	0	17	4–5
2021/2022	20	20-22	6–7

In addition to these memory organization surveys; local information management and digitization companies were studied during the first two projects. They were asked if they have any training needs in digitization and what kind of expertise they have in digitizing. Mostly they did not express any special training needs in the field of digitizing. However, they have expertise and applications for the preservation of digital records and consulting expertise in digital archiving, information management, enhancing processes and developing operations. They also have expertise in the digitizing equipment, in process know-how, automated metadata capturing and AV-digitizing.

In addition to survey updates during The Professional Digitizer Education project, we also conducted the survey for companies outside the Mikkeli area. The survey responses showed that some companies have future needs for employees in the digitization process (including pre-processing, scanning and other digitization activities) and in terms of managerial tasks. Most respondents had digitization training needs, generally related to the management of the whole digitization process. Training in quality assurance was also needed. Some companies currently provide their own training and induction by themselves.

The surveys provided us with a comprehensive overview of the needs of the digitizing field, both in the public and private sectors and helped us to provide targeted, high-quality education which could meet the needs of organizations.

Results of digitization competency needs

Our results reveal that there is a need for a) general digitization training – not for mass digitization training, b) training that covers the whole digitization process – not just scanning, and c) practical training is important component of the learning process. These were the higher lever principles guiding the creation of the training.

O'Harrow et al. (2020, 3) study was consistent with our results. They stated that the more general the digitizing education is, the easier it is to apply. Even though the training was planned as a general training, we kept one caveat by covering the special functionalities of mass digitization. They also explained that the need for a specific ability is always dependent on the environment, situation and the different variables of a project or responsibilities. The studies also show that the learning is effective when theory is connected to practice. Knowledge accumulates with practical work, and in the specific tasks where decisions are made. (O'Harrow 2020, 3).

The needs of students were recognized when we constructed a Digitization Training Environment, we also offered training places for students to practice their skills. Students of both training programs had the ability to use the Xamk Digitization Training Environment.

Based on the survey results, the needed competencies were basic knowledge, cataloguing competencies, preparation competencies, scanning competencies and validation and quality verification competencies. From these, preparation and scanning competencies were considered the most important. Other necessary competencies highlighted were project planning skills, quality control methods, and understanding the digitization process. Information technology skills form the foundation of all necessary competences. In the next table we summarise the key competences gathered from the survey, and we present the results of training using training modeling paraphrased into identify, know, and understand areas.

Table 2. Important digitization competencies. The competence outcomes of survey have been summed up and modified using the modeling from the training.

Project management	**Identify**	Identifies project/process management tools Identifies project/process management phases and standards
	Know	Knows project/process management competence Knows different digitization processes
	Understand	Understands how processes can be developed
Preparation	**Identify**	Identifies different types of documents (paper documents, cards, bindings, maps, drawings, photos, AV material). Identifies various materials (document storage platform, etc.). Identifies various methods and minimum measures of preparation for digitization.
	Know	Knows what kind of material is suitable for different scanners. Knows occupational safety aspects (e.g., moldy material). Knows archival eligibility and its implications for preparation measures

Scanning	**Identify**	Identifies various scanners and other devices (e.g., large power scanner, large size scanner, mast scanner, document scanner) Identifies for what purposes different scanners can be used Identifies different file formats Identifies issues related to the settings of scanners Identifies text recognition methods Identifies issues related to saving a file (raw file, access files, naming, folder structure, etc.)
	Know	Knows how to optimize scanner selection for each use Knows things to do with calibrating scanners Knows things about profiling scanners Knows about applying scanning settings to suit different datasets. Knows issues related to adequacy and smoothness of image quality (e.g., color rendering, resolution, sharpness, noise, and white balance) Knows the basics of image processing
Quality management	**Identify**	Identifies description standards and instructions Identifies quality assurance tools
	Know	Knows requirements of archival sector Knows how quality can be ensured at different stages of the digitization process
	Understand	Understands adequacy and smoothness of image quality (color rendering, resolution, sharpness, noise, and white balance)

Although there was an initial need to train workers specifically for the needs of mass digitization, some applicants and specialist students wanted to know more about digitization and gain a deeper understanding of the digitization process. The needs of the applicants and students were more of a combination of organized digitization workers and expert training. This was also an indication that digitization skills are needed for the workplace. This information helped to plan Digitization Competencies Training and provided solid background knowledge about the needed competencies.

Planning is the most important part of digitization, as this is the best way to minimize errors. Technologies should not be primary, but the need for digitization determines the whole process. (Scott 2018). However, it is important to understand that preparatory work often takes up most of the time of digitization work.

The competence demands of digitizing have developed rapidly. For example, the scanning technology, automatic description, and the digital quality assurance have improved significantly. Further, the utilization of artificial intelligence has started to become part of everyday practices in digitization. The National Archives of Finland have taken mass digitization to another level because their program for large-scale mass digitization also includes eradication and is thus s unique internationally.

Digitization work is carried out on the museum field extensively. The survey results of Finish Heritage Agency (Museovirasto 2022) show that the educational, skills and work experience backgrounds of those currently doing digitization work vary widely, from *trainee to professional*. This is noteworthy, as in terms of digitization quality management, the professionalism of digitization staff is a key factor.

Implemented digitization training

On basis of our survey results, different trainings were designed for both digitization workers and experts in digitization. The trainings were designed to be as short to enable effective comprehension of the digitization process and to cover the essentials.

The digitization training of the specialists was mainly based on the existing studies of Master's Degree Programme on Information Management and Digital Archiving and integrated into the educational provision of Open UAS. Eight people were trained in the Digitization Professional (digitization specialist) training. The expert education in digitization was classed as continuing training for archival professionals already active in the field. The specialist training in digitization was 15 credits and was composed of three courses of five credits, which were Digitizing Quality Assurance and Data Availability, Process Description and Development, and Electronic Archiving and Long-Term Preservation. The Digitization Quality Assurance and Data Availability course was organized by the project. This course consisted of project planning, how digitization workflows should work and how to test quality assurance in the processes. The goal was that the student understands the basic aspects of digitization processes and related quality assurance methods, consider the requirements of data security and the availability of the data. After the course, the student would know different metadata standards, methods of text recognition, and understands legislative and ethical perspectives related to the accessibility and publication of data.

The implementation of the Digitization Professional (digitizer) trainings were timed in accordance with the production launch stages of the National Archives mass digitization

production environment. There were 30 digitization workers to be trained, divided into two groups, that is, 15 people with one training implementation and 15 in another. The training participants were mostly people that were either unemployed or under threat of unemployment. The duration of the training of the digitization workers was 15 credits and consisted of three 5 credit courses: Basic Competence in Digitization, Advanced Competence in Digitization, and Implementation of the Digitization Project. In addition, students had the opportunity to take supplemental studies (5 credits) from Open UAS.

The goal of the Basics of Digitization (5 ECTS) was for the student to recognize the whole digitization process, the issues, and key concepts to be considered, as well as the equipment, technologies and other tools related to digitization. Advanced knowledge of digitization (5 ECTS) had the goal that the student knows and understands the standards, recommendations and quality assurance methods of digitization and be able to develop their work considering the needs of legislation, safety, long-term preservation, and further use of the material. The goal of the implementation of the digitization project (5 ECTS) was that the student was able to plan, implement, document, report and evaluate a small-scale digitization project and work in digitization tasks.

Students of both training provisions were able to use Xamk Digitization Training Environment. Training places offered for digitizers a training and education of 2-4 credits. The needs of digitization worker students could be acknowledged, and employment abilities improved by recognizing their individual educational needs. The individual study paths of students were supported by identifying and recognizing prior competences and strengthening digital prowess and teamwork capabilities. Employment could be supported through training periods, communication of open digitization positions, providing support for producing an effective CV, and developing information retrieval, problem-solving, teamwork, and the use of communication technologies.

Students thought that training increased their employment prospects. In addition, students thought it was important to get to know prospective employers during their training and to learn in an actual working environment. It was particularly important for students that their skills and knowledge were refreshed and kept up to date with their job search in mind. People who had carried out work in the field thought that theoretical knowledge was very significant, which increased their understanding about digitization.

As a direct result of the trainings, 44% of the unemployed participants or those under threat of unemployment were employed in digitization jobs and other jobs. During 2020 and 2021, 17 jobs were opened at the National Archives in mass digitization operations.

In addition, other jobs in digitization in 2020 and 2021 opened in the National Library (5), the Central Archives of Finnish Business Records (1) and the City of Mikkeli (1). This illustrates the need for training in digitization competencies.

"Digitization Competencies Training" focused even more on the individual study path and supporting digital skills needed in the project planning and management. The training provided participants with the understanding of the digitization process and the necessary competencies to conduct digitization projects. The aim was to provide knowledgeable and digitally capable digitization project promoters and implementers for current and future needs of organisations and businesses. The training was aimed at workers in relevant sectors, such as document administration, information management, and archiving. Thus, there was no training places offered. There were 40 digitization workers to be trained, divided into two educational groupings, that is, 20 people with one training implementation. The digitization competence training was 10 credits. Training was composed in cooperation with the municipal sector and businesses and continued existing partnerships that are essential for training.

The outcome of the trainings was that the National Archives, the National Library, the Central Archives for Business Records, and Muisti Centre of War and Peace employed students after the digitization trainings. In addition to that expertise in organisations and businesses has increased.

Training materials and modelling

During the project, training materials were composed and developed. Recorded expert lectures were utilized in training and as educational materials. The set of training materials were stored in the Library of Open Educational Materials, where they are accessible to all. In accordance with policy for the Open Education and Educational Resources, the training materials are mainly licensed under the CC BY-SA 4.0 license which enables distribution and modifications. Materials consisted of digitization course materials, digitization lectures, training model and accompanying reading. The recorded lectures were Legalities of Digitization, Electronic archiving, and security for the long-term storage of electronic material, Perspectives on Mass Digitization - National Archives Mass Digitization Service, Potential of AI in the Electronic Archiving, Photo Digitization Workflow and Special Requirements for Photo Digitization.

Student's study path and education contents

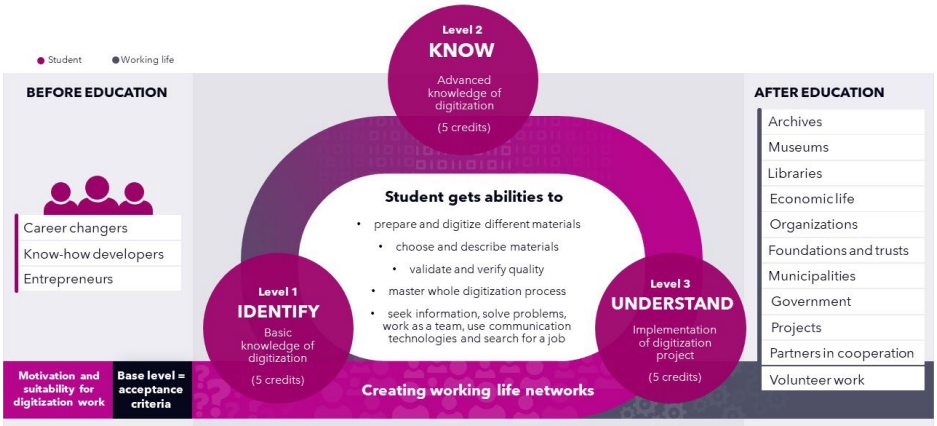

Figure 1. Student's study path and training contents of the digitization worker

As the Figure 1 demonstrates, student's study path begins from motivation. At level 1 student identifies the basic knowledge of digitization. At level 2 student knows the advanced knowledge of digitization. At level 3 student understands digitization and can implement a digitization project. Student gets abilities for example to prepare and digitize different materials, choose, and describe materials, validate, and verify quality and master the whole digitization process.

The training was modelled for possible further use. Based on the skills objectives defined in cooperation with digitization organizations, work was undertaken on a training model to meet the needs of digitization from the working life. Key decisions about developing the model included the scope of training, the definition of competence objectives and levels, the course structure, and the definition of different learning paths. Content construction was based on the knowledge gathered in the project design and supported by a broad expertise view of the competence needs of digitization in a variety of work tasks. The training model wanted to be able to serve different competence objectives and paths. Participants' training paths were storified into four different study paths: unemployed, the career changer, entrepreneur, and the know-how developer. Visual patterns were created to describe the training model that follows the visual look of the project, thus maintaining identifiability to the product family. The development of the service process and opening the entire customer path description also wanted to develop the visibility of the South-Eastern Finland University of Applied Sciences as an industry trainer.

Discussion

The Association of Finnish Local and Regional Authorities (Kuntaliitto) has studied the digitalization and digital capability of Finnish municipalities. The importance of developing digital capability has been identified in the municipal field. Transformation of working life and digitalization have also changed the needs of municipalities in terms of skills. The impact of digitalization has increased the pressure of the development of activities and financial resources in municipalities. (Lyly et al. 2021).

We have proven the importance of digital skills and training of staff in this article, but challenges remain with developing digital skills, specifically relating to a lack of resources (time and money) for training. There is also a need for the better monitoring of the level of competence of organizations in digitalization-related competence. Municipalities and local authorities have a good understanding about the benefits of cooperation and co-development for digital development and digital literacy. However, again the most common barrier to implementation is a lack of resources. (Lyly et al. 2021.)

Digitization is often seen in many places primarily as manual labor work and a way to support employment. The financing conditions of projects and the employment assistance of the government shape the support for employment. However, digitization is a skilled field that requires a wide range of understanding and competences. In general, there is lack of willingness and competence to allocate resources and personnel to achieve the quality of digitization or in the worst case, quality is not even demanded in a digitization project. Often, digitization is seen as synonymous with scanning. The idea is that scanning is something that everyone can do however, is not the case. Digitization requires a diverse range of know-how, from design to technical knowledge and understanding of quality in digitization and is not just the use of a scanner. When using the scanner, you must be able to configure settings, calibrate and maintain the scanner as well as consider quality. Even when digitizing paper documents, photographs might be discovered that are essential to understand the context of the document. There may be need for camera digitization. On the other hand, there is the service perspective to consider when selecting documents to be digitized. Chalmers (2019, 11) states that the service work also: "includes coordination and support work, maintenance and repair work, work to connect users to digitized output, work to manage the evolving relationship between print and digital resources, and work to care for resources, patrons, and colleagues". Sometimes it might be just one person the digitization project relies on (Chalmers 2019, 200).

The rush to work makes it difficult to familiarize and plan. Some projects come unexpectedly and without clear plans. However, managed project planning could make resources more

available and support smoother processes, while investing knowledge into digitization. There will always be changes in a project, but the changes should be minimized, and the changes can be reduced mostly by discovering the full extent of the customer requirements during the beginning of the planning stage (Dvir et al 2004).

Fortunately, we have had the opportunity in this project to improve digitization competence and skills as well as create a new training for experts. Now, we have trained 54 workers and specialists in digitization. Earlier, many places have had to train personnel themselves because there has not been sufficient external training provided. Orientation to work is always needed but it is good to have a deeper understanding that is grounded in theory and supported by empirical training practices. The amount of the trained professionals increases the awareness of the digitization process, quality and management in different digitization sectors. Hopefully, the awareness spreads in workplaces and the training will have a wider impact.

The level of training influences the prestige of the sector, especially at national level. The results of our surveys demonstrate the need for different levels of training. Vocational schools in Finland would benefit from marketing Working in Record Production training, as it could be useful to one vocational school to specialize in training digitizers. On the other hand, the South-Eastern Finland University of Applied Sciences could develop their Master's Degree curriculum and Open UAS of Information Management and Digital Archiving training focusing on digitization project planning for these new specialists.

"Professional Digitizer Training Project" and "Digitization Competencies Training Project" and all the training courses implemented during projects have gained interest both locally and internationally, especially from industry professionals, public sector, companies, and the general public. From a local perspective, professional digitizer trainings answer the need of digitizing companies in the Mikkeli Region and the same time trainings fulfill the City of Mikkeli's target to offer training for unemployed people and provide them with the opportunity to qualify and even apply to open positions in digitization activities. Training in digitization competencies address the skills and knowledge needs of memory organizations, public sector, and other digitizing related companies. In order, to make digitization workers, especially in museum sector, more proficient in the future, it is important that quality management guidance be integrated into the content of training programs in this field.

The design planning and subsequent training projects must be considered being successful in relation to the circumstances. The first training was already planned to be mostly online, which meant that the COVID-19 pandemic did not affect the implementation as much as it would have affected if the training would have entirely been contact teaching

On the other hand, especially in digitization training, practical learning is particularly important. We also increased learning time at work during the autumn and time in the training environment. In addition, the initial competence survey could have considered, for example, selection issues and perhaps opened the expertise needs in project management, availability, and the end-user more. The ongoing project will conduct initial and final mapping for students to better verify the development of skills and the training effectiveness.

The planning project that was mapped out at the start helped improve the quality of the trainings. There was time to explore, study and analyse the actual needs. In this Digitization Competencies Training, we had the experiences of the former project that could be utilized, and we gathered more information that could be taken into consideration. For example, in Digitization Competencies Training Project it was possible to prove and demonstrate the impact of the learning results. Based on feedback from students and applicants, the second training was designed to focus more on project management and design of a digitization project.

Continuing the work to train qualified people is important due to the lack of digitization education in the face of the current business and organizational needs. The next step is to strive to help current businesses and organizations by producing a guide for the designers of future digitization projects, which utilizes the contents of the training and collected data. The guide can be used in digitization trainings, and further it supports digitization projects organized in the workplaces. The guide includes real case examples of digitization projects at work, representing different types of digitization projects and serves as a model for how different ways and to different extent digitization projects can be carried out. The guide also aims to facilitate the process of getting started in a digitization project and to help with the design, including memory lists, process descriptions and project management tools. The guide increases the expertise in digitization projects and helps organizations to introduce workers to the digitization project planning.

Potential future training would benefit from being lighter in their implementation and possibly split into smaller parts or sections. Since there is no other digitization training available in Finland, it is important that training be as easily approachable as possible, that it is possible for as many as possible to complete it. Pilot trainings have produced training models and a description of trainings as well as training materials, but guaranteeing persistence requires integration into existing structures. Digitalia (Research Center on Digital Information Management) and Memory Campus network of South-Eastern Finland University of Applied Sciences Xamk have started to make plans for the continuity of digitization training. In the future, a new nationally significant creative hub of excellence and research environment, Memory Lab, will be created in the City of Mikkeli as a part of Digitalia and

Memory Campus. This will make it possible to operate as a research environment specialized in data-driven knowledge processing, with the aim of generating excellence, supporting new student entrepreneurship, and accelerating the growth of start-up companies. Also new educational openings are possible and desired. The establishment of such training courses and programs in Mikkeli would also significantly contribute to regional development and create new jobs. This could form part of Memory Lab's education provision, and they could be conducted in cooperation with local memory organizations, either online or face-to-face, with the help of created training models in these projects. In addition to training courses, cooperation with companies enables further partnership opportunities, like lectures, thesis projects, internships, and development or student projects. The need for knowledge in digitization also provides opportunities for educational exports.

Our digital environment is expanding and evolving faster all the time, both locally, nationally, and internationally. This can be seen in digital processes, customer orientation and technology developments, among other things. COVID-19 has, for its part, accelerated this transition. However, sometimes people forget that all the necessary material has not yet been put into digital form and there is a need to do this well to ensure that our material is well preserved for future generations, accessible, and easy to utilize.

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5 MEMORIAALI: A BRIDGE FROM CITIZENS TO ARCHIVES

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ABSTRACT

A significant amount of meaningful memory material is lost on daily basis. There is an urgent need to collect these memories, documents, photographs, and other materials, when we still know the biographical information of the objects. A comprehensive harvesting method for these precious memories has been missing thus far and Memoriaali aims to be the solution for this problem. Governmental actors and other public sector organizations are obliged by legislation to preserve their documents, but many other actors, such as citizens, are on their own. Memoriaali provides a solution to this dilemma by enabling citizens or communities to donate their memories into an archive via a simple to use, secure web UI. Although this has only been piloted in two organizations so far, the results of this project are very encouraging. Finnish archival sector actors, communities and citizens have expressed their interest in the Memoriaali platform and its possible applications. The results and surrounding discussions have demonstrated that the development aims of the project are vital, not only in Finland, but universally as well.

Keywords: development platform, digital archiving, online platform, enriching metadata, crowdsourcing, regional development.

The problematic nature of digital preservation

In an archival community, technology has brought new opportunities for preserving digital data. Archives must work more closely with citizens, information producers and information users. If not, material possessed by users, for example public, will vanish in the future, either deleted accidentally or on purpose. This could occur for several reasons, perhaps the value of the data is not understood or lost due to technological issues such as corruption or bit rot.

In Finland, The Archives Act 23.9.1994/831 obliges governmental actors, courts, and other public sector actors to preserve documents created in relation to their function and actions (Finlex, 2022). Actors obligated by legislation are able to get guidance from the Finnish National Archives, but other actors are on their own. The intention of this paper is not to dive deeper into the act, but the fact that digitized analog material and digital-born material that must be preserved for long-term cannot be preserved without further action taken. Additionally, it is a highly unlikely situation where the Finnish National Archives or other official archival actor accepts donations from common citizens.

The process of receiving and processing content, either analog or digital, is slow and labor-intensive. Therefore, there is a need to develop various processes for receiving and processing material using the latest technological solutions. Receiving digital information is still a time-consuming, human-driven effort, which requires cleaning disks, unpacking disk images, converting file formats, and so on (Hänninen, 2019). Similarly, donating content to an archive can be even more difficult than receiving content, especially in a case where an archive strictly states what kind of content and what format they accept. This can make it difficult for individual citizens or organizations to contribute to the archives.

Automation and ease of use are key aspects to increase the number of users who wish to donate their data to the archives and use the existing archival content. When everything happens automatically in the background, precious human labor and time can be directed into more profitable work.

People might have collections of analog material, like printed documents, letters, and photos stored in cardboard boxes or wardrobes in their family archives. These, possibly interesting, artifacts will age and deteriorate over time. Therefore, it is important to encourage people to digitize these important memories, such as war-related photos and letters, and preserve them properly (Jääskeläinen et al. 2017). However, analogue and digital-born materials require unique preservation methods, and as such this paper only concentrates on digitally-born materials or already digitized materials. Thus, analog material waiting to be digitized is a challenge waiting for future research projects or the actions of other actors.

Memoriaali was designed and developed to address these problems. It enables archival actors to receive digitized donations from citizens or communities via a simple-to-use, secure web UI. It allows anyone to donate their memories into an archive and makes it possible to utilize crowdsourcing and enrichment of existing archival content. Therefore, Memoriaali tackles a global problem in the digital preservation field and solving this dilemma could also contribute to the emergence of a profitable business.

In this paper, we explore our proposed solution, the project background and digital archiving literature. After the literature review, we then present the Memoriaali on-line web service, how it was designed and implemented for gathering materials and enrichment. We also examine the pilot cases and how we incorporated user feedback into our service. Finally, the continuity and commercialization plans for Memoriaali are described.

The Memoriaali Web Service

The Memoriaali web service aims to ease the donation and reception of digital material via simple to use web UI and to automate the processing of the collected material as much as possible.

Memoriaali Project

Memoriaali Project was a joint project of four participants.

- MikseiMikkeli, development company of City of Mikkeli,
- Xamk, South-Eastern Finland University of Applied Sciences,
- ELKA, Central Archives of Finnish Business Records and
- Muisti, Centre of War and Peace Muisti.

Project participants combined their expertise and created new operational model and platform for donation and reception of digital materials.

The process of donating, receiving, and accepting digital materials is still missing. Larger archives have their own established processes but smaller archives and especially the donators don't. Migrating the materials into an archival format or just sending them to an archive has been a difficult task for the donators. Therefore, significant amount of valuable material remains on users' possession on old computers, laptops, USB drives, etc. Memoriaali will be

a simple to use digital receiving platform that can be used anytime anywhere which solves the problem related to donations.

When the existing "not well organized" material is received from the donors, it will be a cumbersome task to fit it into an archive. Lots of human effort, which involves cleaning disks, unpacking disk images, converting file formats, etc. is needed. Releasing this person work was one of the main objectives of the project and it is one of the core problems in the field of digital preservation. Memoriaali solves the receiving problem by automating significant amount of the receiving related tasks and therefore contributing to the emergence of a profitable business in this area.

Aim was to pilot Memoriaali in two participating organization and to explored and developed business models for commercializing their products and services. Pilots focus on material reception and usability, revenue logic models and service concepts from a business development perspective.

Crowdsourcing

With crowdsourcing[2], users have been successfully engaged in expanding existing content in various fields. For example, Poole, in Benoit III & Eveleigh (2019) uses Flickr as a case study where users can add descriptive information to photos, like comments, tags, and notes. This has been deepened in a partnership between Flickr and Library of Congress, called Flickr Commons, and it helped to increase access to public photos and encouraged the public to contribute information. Nokia has also gathered crowdsourced information when co-creating a vision of the community's dream mobile phone (Kelleher, 2011). Chrons and Sundell (2011) on the other hand presented a solution where OCR errors were fixed with crowdsourcing. In case of archives, crowdsourcing could mean for example providing people access to archival collections, by making them searchable with simple tools and letting users enrich the preserved data with social tagging, crowdsourced transcription, and content commenting. This phenomenon is called participatory archives, in which archives "are created by, for and with multiple communities, according to and respectful of community values, practices, beliefs and needs" (Gilliland & McKemmish, 2014). This kind of additional work from participants can substantially ease the burden of the archivists and brings added value to the preserved cultural heritage content. However, there are challenges as well, like trustworthiness, leading to the question of: How could the system know if the added content is appropriate and correct? (Benoit III & Eveleigh, 2019).

[2] the practice of turning to a body of people to obtain needed knowledge, goods or services

The challenge of ensuring the accuracy of crowdsourced data is considerable. Moderators are needed for those operations, which is time consuming work, especially if there is a large volume of user updates and additions. On the other hand, a lack of comments and posts can also be an issue, so a balance between crowdsourcing and moderation needs to be found. Engaging the audience, disseminating information about user contributions, and telling people they are contributing for greater good are the keys in finding the balance. Utilized tools and systems must also be simple to use without technical knowledge. This is one aspect that the designed Memoriaali platform addresses.

The motivation of contributors has been studied and it has been noticed that users' personal connection with an archival organization is the strongest trigger or motivation for contributing (Benoit III & Eveleigh, 2019). Although, users do not have a personal connection with Memoriaali before they add content after this however, the situation can change. A user might think that it would be great to have the possibility to upload grandpas' old war photos to the service, and to see if other users would be able to recognize places or other people from the images. Perhaps this might even lead to a discussion or connection with the content updaters. The potential of these discussions for research and development cannot be underestimated.

As Poole explains in Benoit III & Eveleigh (2019), most of the organizations which are using participatory archiving have noticed that social metadata even rival that of institutional metadata in terms of usefulness, and it has become a very beneficial activity in their operations. Although, some organizations have not observed any changes in their operation when using social metadata. That said, citizens can provide quite accurate additional information, when it comes to identifying people, places, objects, and time periods. As Jansson, I-A. and Huvila, I. justified in Benoit III & Eveleigh (2019) the general publics' memorial information is very important and needed in archival information (Benoit III & Eveleigh, 2019).

Overview of the Infrastructure

The definition of software development work and the actual programming of the Memorial platform was started by studying existing vendors and similar solutions. Some vendors were interviewed to assess whether an existing system could be utilized as a basis for the Memoriaali. The interviews also provided some ideas for the development targets. It was quickly discovered that existing open-source archival systems are too professional and therefore too complicated, such as Roda or ESSArch, to be used as a basis for Memoriaali. For example, an OAIS (Open Archival Information System) conformant Roda expects that the file to

be uploaded (ingest) is already in a correct SIP[3] (Submission information Package) format. Further, during the input phase it asks more questions about the format, validations, fixity computations and authorizations. It is practically impossible for an average end user to answer these questions correctly. Furthermore, the UIs of both archival systems are created for archival professionals who are familiar with the archival workflows and terms. Presentation of Roda ingest phase is shown in figure 1.

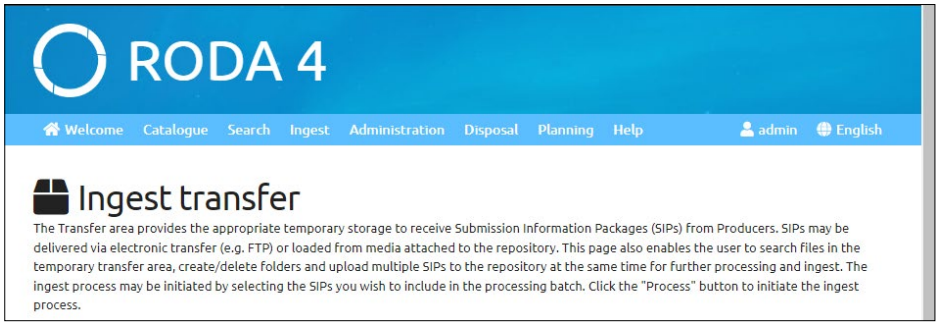

Figure 1. Roda is an end-to-end OAIS archival solution. It's not an easy task to ingest a SIP package.

Even though the UI look nice and sleek for an archival professional, for a first-time user it's even difficult to understand the terminology. In case of Roda the upload functionality is even hidden behind the three dots on the right-hand side of the figure.

Therefore, a decision was made that the platform will be built from the scratch by utilizing existing code libraries if possible. This approach gave developers a freedom to implement things how they like and consider the end users' perspective carefully.

The Memoriaali platform is a combination of front-end and back-end software which are designed to be working seamlessly together. The system front-end handles the interaction between the user and the system, and the back-end is responsible for conducting all the actions that front-end requires. In practice, Memoriaali works similar to a receiving platform, which enables citizens and actors to donate digital information to the archives. This way Memoriaali, does exactly what Jääskeläinen et al. 2017 stated when writing about the citizen archive. However, we must note here that the Memoriaali platform does not handle the long-term preservation, instead it creates E-ARK compliant OAIS SIP packages that can be easily transferred into an archive. Therefore, it only stores the content during the manipulation, enrichment, and package creation processes.

[3] https://dilcis.eu/specifications/sip

The platform works as follows: From the user's perspective, the first step is to either upload new content or to start browsing existing one. If a user uploads a new file or set of files, there are various things that will happen before the transfer into a true digital archive can happen. Figure 2 demonstrates the simplified steps from user to the archive. The uploaded materials must be processed, checked for viruses, appraised, migrated into archival formats, enriched with technical, administrative and descriptive metadata (e.g., access rights), processed OCR, among other actions. The Memoriaali platform has been designed to be a place where most of the above-mentioned things happen in the background before the actual transfer to a true digital archive can be triggered by the platform main user.

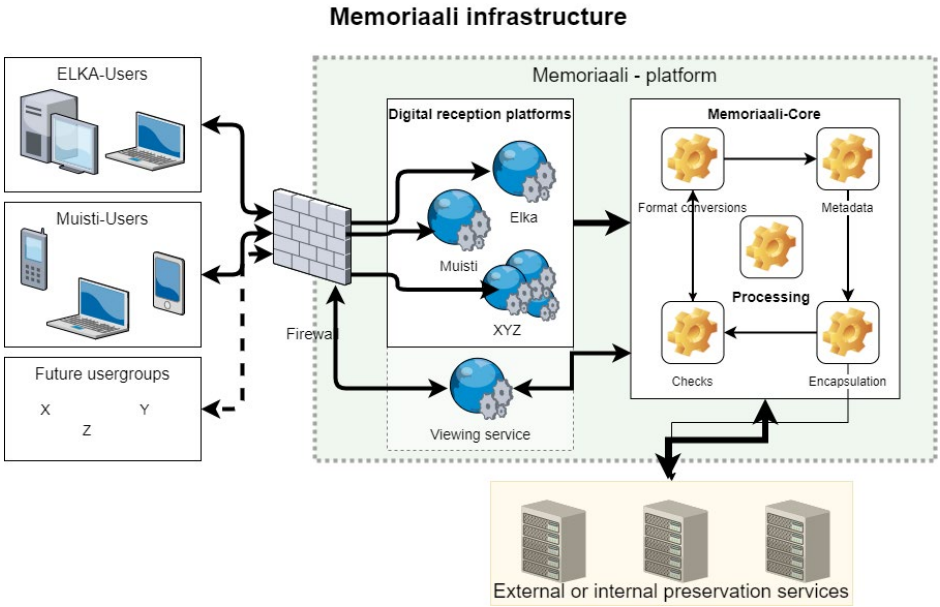

Figure 2. Simplified Memoriaali infrastructure.

Technical Solutions

Memoriaali is fully based on open-source code, libraries, and tools, making it widely customizable and extendable when needed. The codebase will be released with yet to be decided license, within suitable code sharing service, such as Github or Gitlab. Using open-source libraries on the other hand speeds up the development process by allowing the developers to focus on sections that need modification the most. On the other hand, it also causes delays due to lack of support and missing features which then require more labor.

From the technological side, React JavaScript UI library was chosen for the front-end due to its wide extensibility and community support. The back-end is implemented with NodeJS

Express framework, and SIP packages are created by utilizing the latest CommonsIP library. In addition to core technologies, Memoriaali relies on many open-source libraries:

- Bcryptjs is used for hashing the stored user passwords
- ClamAV is used for detecting viruses and malware
- Handlebars is used for creating the metadata templates
- Exiftool and Tika are both used to gather metadata from the uploaded content
- ImageMagic is used for creating preview images from the uploaded content
- Tesseract is used to conduct OCR (Optical Character Recognition) for the uploaded content.

During the design phases, it was decided that Memoriaali will follow the European wide E-ARK SIP specification (DILCIS BOARD, 2022) to be widely compatible with the existing compliant repositories. During the project, the SIP creation and upload functionality was successfully piloted with Disec Yksa Archive. However, the SIP encapsulation is still an optional stage and the uploaded content with the enriched metadata can be transferred to an archive as a plain payload thus not all repositories are SIP conformant. Still, the compatibility with other standardized systems would allow data to be exchanged with ease. The standard descriptive metadata allows common searches and the use of ontologies (e.g., spatial data).

Finally, the Memoriaali platform includes a tool for collecting oral history, which supports the participatory archives phenomenon (Gilliland & McKemmish, 2014) by introducing another and intuitive way for donating memories into an archive. With this functionality, the citizens can record their own war-related memories straight to Memoriaali in audio or video format. Muisti requested this feature thus their war related collections could greatly benefit from such functionality. War memories are being possessed by elderly people to whom it is simpler to describe happenings verbally instead of writing.

Existing solutions that could have been integrated into Memoriaali were sought, but none of the existing solutions fulfilled the requirements. For example, one solution was so strongly focused on the health care sector that the functions would have required significant adaptation to make it a natural part of Memoriaali. Another ready-made service also would have required a lot of development to work as part of Memoriaali and modifying it would not have been the most cost-effective option. In terms of appearance, the service was quite outdated, and the provider had not made any dedicated development efforts to support the needs of modern online services. Based on this benchmarking and the resulting report, the project decided to utilize a tendered subcontractor, MindHive Oy, for implementing the Memoriaali oral history collector component. As Zareba says in Becker-Schaum et al.,

one issue that affects to oral history gathering is the reliability of people's memories. Events could have been happened tens of years ago, so for example structured interviews could help to get memories. It is also important to make oral history information available to the public and different kind of archival platforms are the tool for that purpose and it also will help archives to develop their data collection process. (Becker-Schaum et al., 2018.) With Muisti's Memoriaali remembrance tool for collecting oral history, it is possible to collect people's memories about war and peace. Muisti can add supporting questions to the tool to help people to structure and remember their memories and facilitate the recording. This tool will also give new valuable data available for scientific use and for public. Tool will be later available also for other organizations and companies which are utilizing Memoriaali in collecting data for their archives. The tool can open up many new possibilities in data gathering in oral history context, because people can record their memories by themselves, and it will reduce the need of labor work.

It needs to be mentioned that developing Memoriaali was not an easy task and during the latter phases of the project an independent evaluator spotted some critical flaws that would have compromised the system and all the uploaded content. Repairs for these flaws were tendered and were corrected in co-operation with the project personnel. Without the security fixes sensitive or limited company materials for example in case of ELKA, would have been quite easily accessed by any starting hacker. These issues were fixed, but due to this extra workload the schedule of the Memoriaali project required an extension to be able to make it ready for the production.

Enrichment of the meta data via crowdsourcing

Crowdsourcing is one of the most important elements of the Memoriaali project as it empowers its users. By enabling active participation in the processes of archiving, Memoriaali allows its users to submit their materials to archives with ease. With crowdsourcing metadata, Memoriaali democratizes knowledge production and enriches archived materials. For example, in Muisti's Memoriaali user can add comments to other people's public materials. They can name people, places and timelines in war-related photos, letters, and documents. To avoid spam and incorrect additions, Memoriaali uses crowdsourcing and the participation of volunteer expert users to approve proposed additions. In Elka's Memoriaali, when even adding restricted accessed company materials, company's personnel will have access to their Memoriaali materials, and they can contribute their additional knowledge to their materials.

Memoriaali will improve receiving, understanding, and accessing of private archives. Even if the donor wants to keep his data private, Memoriaali offers a solid way for the donor and archival specialist to communicate and complete the data for it to be moved to long lasting archiving systems.

Pilot cases

After developing a common Memoriaali core, it was the intention that two actors would customize the outlook and functionality of the platform to suit their specific needs. The participating actors were Muisti and Elka.

Muisti Centre Of War and Peace is a new modern war museum with many technological installations and exhibitions. It opened in June 2021 in Mikkeli, Finland and it has been very popular tourist destination. Muisti examines the effects of war from the perspective of humans. It has several interactive exhibitions, like artificial intelligence assisted experiences and a VR war scene. The Muisti Memoriaali platform will help citizens to save their war related memories, like war photos, war letters and other war related documents which have been preserved from the war within family albums, shoeboxes in attics, or other external media. With the help of Muisti Memoriaali they can donate these materials to the public collection of Muisti and enrich Finnish war history in a way that was not possible previously.

The second pilot actor is Elka (Central Archives for Finnish Business Records). Their mission is to secure the preservation of Finnish business life. Materials preserved in Elka, which are not classified business content are freely available for studying via Elka Memoriaali. Elka receives material from companies in many different formats. It can either be analog material that is digitized, or transferred via external USB devices, CDs, DVDs or older media. Elka Memoriaali offers one more way for transferring material from companies for preservation. It enables companies and associations contribute their own materials, like annual reports and other company related documents to Elka's Memoriaali services themselves via Memoriaali UI or by e.g3., uploading the content with sFTP for patch processing[4].

During the project, both participating actors tested Memoriaali internally, but due to the previously mentioned critical flaws, pilots with actual customers or clients were not conducted at Elka due to business-related security requirements. Before every conducted test, the project team held internal workshops to ensure that Memoriaali was ready for the test.

[4] Does a set of predefined actions for all content at once

- In the first testing workshop creating a user account, logging in, adding personal data, adding files to Memoriaali and searching were tested. After the testing workshop, any shortcomings were edited and corrected by the software developers. Then the first pilots were conducted internally in the project companies.
- In the second testing workshop, the group functionality and different interfaces for the moderator and the basic user were tested. The second pilot was organized also internally in project companies and after that testing guidelines to external parties were sent in December 2021. The external parties were the Aalto University Semantic Computing Research Group (SeCo), the AADA (ArchiveDigital Asset Management) project team and other experts interested in Memoriaali.
- In the third testing workshop, the user guide for the public pilot and the functionality of the user interface were tested. After the third testing workshop, improvements were made to the Memoriaali and Muisti conducted the third pilot in which Memoriaali service, and its crowdsourcing functionalities were tested by actual users. Elka kept its third pilot internal, and tests were conducted with publicly available customer organization materials.

In the case of Muisti, it was essential for the pilot to test different types of data, such as interviews, photographs, letters, and other miscellaneous private data (figure 3). The interview materials included the interviews of the Responsible Women's Association on the home front, the Rukajärvi Veterans' Historical Society, and Muistis' own interviews with war orphans. Photographic material in the pilot included Toivo V. Narva's letters and other miscellaneous private material, including the private letter collection of Osmo Anttalainen, and other smaller private material. In addition, Muisti piloted the crowdsourcing functionality of the Memoriaali project by inviting military history enthusiasts to test the crowdsourcing tools. The remembrance service was piloted on an open memory data store. The crowdsourcing and memory data formed the final pilot package to be implemented.

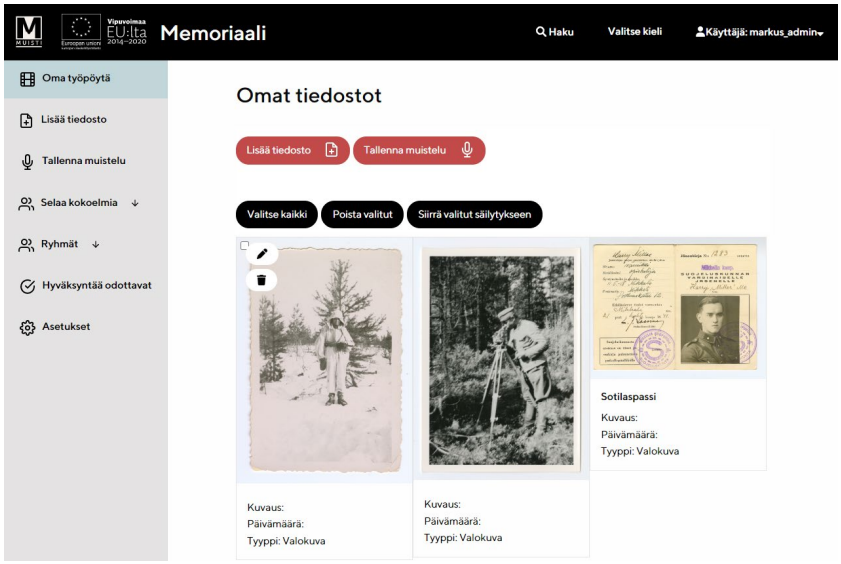

Figure 3. Development time reference image of Memoriaali data collection (Muisti).

Both internal and external pilots gave important feedback and information to the system designers and developers for further development of back-end programming and developing the user interface of Memoriaali (figure 4).

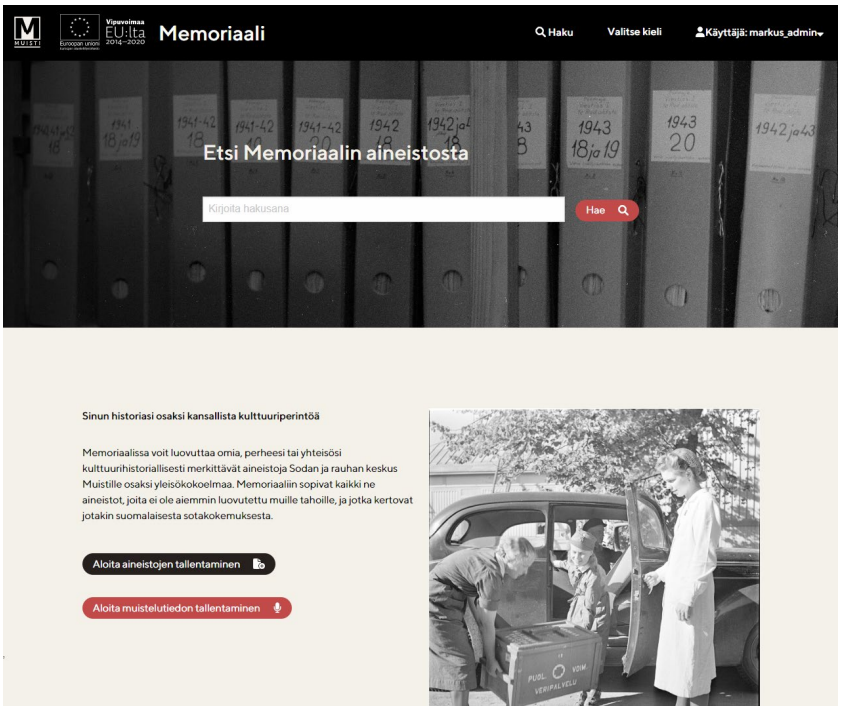

Figure 4. Development time reference image of Memoriaali User Interface (Muisti).

Discussion

The final objective of the project was to be able to pilot the Memoriaali within the participating organizations. However, during the project it discovered that the term piloting was not necessarily clear for all actors who assumed Memoriaali would be a production-ready system. This raised several issues, which escalated when the project codebase was examined by an outside reviewer. For example, all uploaded files were in a web-server public folder and as such, unprivileged users could run admin tasks by calling the endpoints directly e.g., with Postman tool. Further, the session management did not fulfill the basic online service level. However, the discovered issues, including the security ones, were fixed by an external actor. So, a lesson learned, it is important to consider security aspects even with development projects, thus the results might end up to production. Fixes at the end stages of the project or development can be quite costly and cumbersome.

The Memoriaali project was able to identify working model, test existing solutions, modify existing code base and develop an operational system for the donation, reception and usability of digital materials. The implementation of the Memoriaali platform was quite a challenge. Much of the work had to be designed and implemented by the project personnel. There were fewer ready-made development solutions available than expected, and so the programming work was very time-consuming. In hindsight, it is easy to say that it might have been a wise idea to take some existing CSM (Content Management System) as a basis for the development. This way we could have avoided the identified security issues and the functionality of these CMS systems could have been extended with plugin development. One of the reasons why this path was not followed was the utilized programming language. Our developers are familiar with Node, but most of the well-known and well supported CMS systems are implemented with PHP.

Even before the development, and especially during, both users and professionals of the Finnish archival sector have expressed their interest towards the Memoriaali platform. Discussions have mainly been related to reducing slow and labor-intensive work currently conducted by people. These and other discussions around the Memoriaali and its possibilities have made it clear, that the development aims of the project are vital for the archival sector in Finland to preserve the information that soon will be lost.

Research and development of different kind of archival tools is rapid nowadays and we can be on the cutting edge of this development with the Memoriaali platform. Digitization needs will be increased because of the to be renewed Archives Act 23.9.1994/831, which should be released at the first quarter of 2023. Memoriaali will help archives and other actors gathering data to receive the digital data straight from the people and customers and

release their work power for other tasks. As most of the problems experienced nationally are universal, the project and the Memoriaali platform will contribute to the development of the archival sector also internationally. The visibility and attractiveness the whole Memory Campus area as a place of interest will likely be increased due to Memorial platform.

One possible future, among many others, for the Memoriaali is its inclusion as one of the first Memory Lab's services. Memory Lab will be a new AI and data governance related research center, which just received a large investment funding. The goal of Memory Lab will be to enable co-operational research possibilities with companies and offer a test environment for companies and other organizations. Second possibility is just to release the source code with a permissive open-source license so that anyone could further develop it or take it into use. The third and the most prominent future is some kind of hybrid model which combines the abovementioned possibilities. Furthermore, thus Memoriaali was an EU funded project all its results need to be available if anyone asks.

The co-operation between Memoriaali project partners and development of the Memoriaali platform will continue to be able to take it into production use in Muisti and Elka. More development has to be done in both planning and coding level, and more features and functionalities will be added before publishing the first commercialized version of it. Also, productization of Memoriaali must be done before publishing it, so it will be an attractive and saleable for other organizations, like museums and memory organizations, to buy.

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The Memoriaali project ran between 1.6.2020-30.06.2022 and was part of the Memory Campus development platform. The purpose of the Memory Campus network is to develop expertise, research and training in archiving, digitization, and digitalization, and to bring new research, development, training, and experts to the region. Targets also include strengthening cooperation within archiving and information management companies and commercializing new innovations with companies. These actions are targeted at enhancing co-operations and producing new businesses, increasing turnover and bring hopefully new jobs to the region.

Terms and Abbreviations

CMS	Content Management System
CommonsIP library	One library for creating E-ARK conformant IP packages
Digitalia	Research Center on Digital Information Management of South-Eastern Finland University of Applied Sciences, Xamk
E-ARK	European wide consortium related to digital content management and digital preservation
Elka	Central Archives for Finnish Business Records
ESSArch	Open-Source End-to-End E-ARK compliant archival solution by Swedish ESSolutions
GLAM sector	Galleries, Libraries, Archives, Museums
IP package	Information Package defined in OAIS reference model
Long-term preservation	The process of preserving digital information for several decades or even centuries
Memoriaali	EU funded development project: Developing the Digital Reception and Usability of Materials and Web Platform in Memory Campus
Metadata	Data that provides information about other data
Muisti	Muisti Centre of War and Peace (modern war-related museum)
OCR	Optical Character Recognition
Roda	Open-Source End-to-End E-ARK compliant archival solution by Portuguese Keeps
SIP	Submission Information Package
UI	User interface
VR	Virtual Reality
Xamk	South-Eastern Finland University of Applied Sciences
Yksa Archive	Commercial archive system by Disec Oy

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6 DEVELOPMENT OF FIFTH GENERATION SERVICES AND OPERATIONS THAT IMPROVE THE PRODUCTIVITY OF OUR COMPANIES AND COMPETITIVE SUSTAINABILITY OF OUR PLANET

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ABSTRACT

Drawing on the recent literature of 5G technology, this article considers how 5G technology together with edge computing can significantly improve energy efficiency, data security and privacy on digital infrastructure and thus sustainable development. Having recognized the potential of 5G technology, the research questions of this paper are:

1. how can higher education help in the rapid learning and adoption of technology
2. how higher education can leverage 5G technology in its own operations.

Key words: 5G technology, edge computing, databased services, higher education, learning environments

Introduction

Technology and markets are evolving at an accelerating pace. Data transfer rates, data analysis and data-driven business are growing exponentially. Development is driven by green transition and the digitalization that supports it. 5G technology, edge computing together with other new technologies enable new types of cost-effective data-based services. As modern networks continue to evolve towards 5G and the Internet of Things (IoT), there is a need to manage rapidly increasing data transfer and network capacity requirements to provide low latency services and to increase capacity in a sustainable way. 5G technology combines wireless connectivity without delay for large amounts of data from a variety of sources, as well as instant on-site analysis of data, allowing real-time service and confidential data to be kept in cloud services other than general aggregate data. New types of efficient and better services can be created for better value, by combining real-time capabilities, detailed data from a variety of sources, and by analyzing it quickly on-site. The latest technology and data-driven business can help sectors ranging from primary production, industry, logistics and trade to education, healthcare, and the creative industries.

Edge Cloud computing is transforming the telecoms landscape. Edge computing is about processing data closer to where it's being generated, enabling processing at greater speeds and volumes, leading to greater action-led results in real time. It offers Communications Service Providers (CSPs) flexibility, lower overall costs, and high service availability to meet the growing demands on networks, sustainability challenges, as well as new applications and data by consumers and enterprises. Further, this will open significant business opportunities for edge application developers that can build new digital services that use data processed at

the edge. Higher educational institutions have role to link to critical future areas of interest with sustainable development goals and attract multidisciplinary expertise.

Drawing on the literature of communications network technology and how it can promote sustainable development and safety, this article considers how edge computing can significantly improve energy efficiency, data security and privacy on digital infrastructure. Having recognized the great potential of 5G technology, the research questions of this paper are:

1) how can higher education help in the rapid learning and adoption of technology;
2) how higher education can leverage 5G technology in its own operations.

In relation to the first question, we present a new satellite type of hackathon implemented in cooperation between Finnish Universities of Applied Sciences and Nokia Plc, promoting the development of new types of products and exploring solutions for complex challenges. In response to the second research question the 5G Mokki Tech Space is developed. The learning environment allows learning and abilities to be developed quickly to where they are needed, while this expanded training and business service will help improve business productivity. At the same time, it improves students' pathways to working life and contributes to the sustainable development of the world.

The article proceeds as follows. First, we review 5G technology and its effects on sustainable development and safety. Secondly, we answer the research questions about how higher education institutions can speed up their teaching and development of 5G technology and their own transition to utilizing the technology. Finally, we summarize the possibilities of 5G technology and the possibilities of higher education institutions to accelerate the teaching and utilization of technology in their own operations.

Driving Productivity and Sustainability via 5G Technologies

Several global challenges can be solved by investing in industry 4.0 or the 4th industrial revolution. The Fourth Industrial Revolution is the current and developing environment in which disruptive technologies and trends such as the Internet of Things (IoT), robotics, virtual reality (VR) and artificial intelligence (AI) are changing the way modern people live and work. It results in a more efficient use of resources, which again is directly linked to environment and sustainable economic growth. Investment, collaboration and trust for ensuring innovation and growth. There is significant potential in industry 4.0 to increase

productivity across all sectors and industries. It is a key driver to maintain and further develop competitiveness and at the same time, contributes to the UN's sustainable development goals. However, the investments in industry 4.0 solutions and IoT applications have not yet achieved their potential of increased productivity and competitiveness. As previous studies have shown (see e.g., Narayanan et al. 2020; Aijaz, 2020), 5G and the related technologies is the key for unlocking efficiency in society and in every industry and form a key part of industry 4.0. 5G drives digitalization of industrial sites across different industry segments. It has the potential to improve global economies by increasing in productivity in a sustainable way, as 5G reduces dramatically the energy needed to transfer bits of data.

Significant economic and social value can be gained from the widespread deployment of 5G networks. Technological applications, enabled by a set of key functional features, will facilitate industrial advances, improving productivity and profitability, and enhance urban and citizen experiences. To accelerate the adoption of 5G, new collaboration models and agile practices among stakeholders are needed, along with clear methodologies to estimate the social value creation to enhance the business case of 5G. In fact, the telecom and network business will change with 5G. New products and business models are needed to transform from the macro-network business to industry specific solutions with tailored offerings. The market opportunity is driven by the following factors:

1) **Technology Disruption**
   - Adaptive tailoring for Network Hardware, Software, platforms and applications are needed for industrial use cases.

2) **Market Disruption**
   - Current operator-driven model of "one-size-fits-all" does not work anymore for industrial IoT customers, with myriads of IoT devices to be connected

3) **Business Model Disruption**
   - Selling the tailored networks also directly to the end customers, not only to the operators. Simultaneously, the operator middle-layer is partly vanishing from the monetizing model.

A new generation of network infrastructure will be built with 5G to complement the current macro-level networks. This will enable new generation connectivity and connected applications for all sectors of society. It is estimated that the total market for 5G infrastructure is $76 billion USD (United States Department of Justice, 2020). Intelligent connectivity, enabled by 5G, will be a catalyst for socio-economic growth with an estimated $13200 billion USD of global economic value reached by 2035 (World Economic Forum, 2020), generating 22.3 million jobs in the global value chain alone.

Impact on Sustainability

Connectivity is a key enabler of sustainable economic growth and a major contributor to the delivery of the UN's 17 Sustainable Development Goals (SDGs). In 2016, the mobile industry became the first sector in the world to commit to the SDGs – pledging to leverage the networks that mobile operators have built and the services they deliver (World Economic Forum 2018). The added value of 5G derives mainly from contributing to health and well-being, enhancing infrastructure, promoting sustainable industrialization, and fostering innovation. Teaching 5G technology and quickly adopting the technology for the development of higher education institutions' own operations is of great importance.

Energy efficiency, trust, service level, condition monitoring, fault detection, reliability, and resilience are fundamental requirements for next generation communication networks and cloud operation. In addition, the nature of devices and applications is changing, and the collection and real-time processing of data is driving the transformation from centralised cloud-based infrastructure models towards edge. To support that, edge computing involves building localized data centers for computation and storage at or near where they are needed. This decreases latency and removes the need for all traffic to run over the full transport network, optimizing the use of network resources, cost of the resources, energy usage for the data transport and therefore enabling sustainability on digitalization. With 127 new IoT devices connecting to the Internet every second, issues of latency, bandwidth, and security are inevitable. Intelligent technologies, like AI and robotics, require greater speed and processing power, and edge computing is the answer to capitalizing on these advancements (Accenture 2021). The expected massive data traffic increase on these applications along with data centers, increasing number of connected smart devices and IoT sensors will cause major changes to future networks, network architecture and sustainability. By 2025, 80% of all generated data is expected to be processed at the edge enabled by the intense ecosystem collaboration among CSPs, network technology providers and web-scalers (IDC, Statista 2021).

Global developments and the rise of personal demands for safety

Our current operating environment has rapidly changed in recent years and our safety as individuals has been threatened, first from the COVID-19 pandemic and second from the war in Ukraine. They have raised personal demands for safety and called into question the meaning of a safe environment. The pandemic, for example, highlighted the importance of health security, and the war, in turn, highlighted the need for security, self-sufficiency, preparedness for cyber-attacks, and a response to the energy, raw material, and food crises caused by the war. Viewed in a broader context, humanity has prospered rapidly through specific measures, which has had a positive effect on the sense of security in many societies. However, our perception of human security is constantly evolving, and we cannot overlook the natural world that our security depends upon, where biodiversity is declining faster than ever before in history.

The consequences of these actions can be severe and far-reaching, not only for human security and personal livelihood, but also for the economy. This was explored in the 2021 Dasgupta Report on 'The Economics of Biodiversity' which notes the importance of needing a broader notion of security than the classical notion of state security, which is why human security was developed as a concept in 1994 at the UN and puts individuals and nations in a more prominent position. Environmental security, financial security, personal and physical security, community security, health, and universal human rights have become areas of understanding the concept of security in a more holistic manner (see for example, Salonen 2010).

Human security and large-scale societal upheavals can drive development, research, and innovation. However, these cultural, social, and technological experiments need to also consider sustainability change and search for solutions to solve these issues. Sustainability change refers to the adaptation and development of our entire ways of life, such as local livelihoods, human security, housing, energy infrastructure, transport, and the food chain, concerning environmental changes. The construction of solutions can be approached with a proactive approach, considering rapidly evolving technologies, factors affecting safety and needs, and, for example, regional industries. In order to solve these complex problems, it is necessary to strengthen regional, national and international knowledge sharing and cooperation and develop understanding in connection with the development of human security. Education plays a significant role in this.

5G Technology and its influence on daily life at an educational institution

The impact of advanced communication technologies has significantly influenced society, business, and culture. This has also reinforced the concept of a global village, as people now communicate with others from all over the globe as if they were geographically close. Smart phones allow people to maintain continuous communication without interruption. Sarwar and Soomro (2013) sort to find out the impact of smart phone on the society in areas of health, education, human psychology, business, and social life. The authors explained that smart phones do have a positive impact on the society as it enables one to be connected, provides an edge in business and education, have applications and services due to new technology, and better utilization of time, however there are also negative impacts such as disrespectful behavior, privacy issues, addiction and distractions (Sarwar & Soomro 2013). The importance of smart phones and other technologies is accepted, but also raises concerns of the potential misuse. Some of the effects of this misuse range from having an impact on academic performance to affecting physical and emotional wellbeing.

In general, smart phone technologies like 5G enables exposure to modern technological skills and facilitates learning, while helping to develop positive and receptive attitude to technology. Users are able to customize information to meet their knowledge acquisition needs and practice the safe use of data and technology for individual and national growth. In fact, mobile technology has advanced so much that wearable tech is now an option to consumers – with many owning smartwatches that have similar capabilities to a mobile phone. The tech industry's next bet is a series of technologies usually called augmented reality (AR) or mixed reality (XR).

Education, rapid learning and adoption of 5G technology

Educational institutions have a duty to attract multidisciplinary expertise to address critical future areas of society and global challenges, such as sustainable development goals. At the same time, society is increasingly setting objectives and preconditions for actors to implement sustainable development in all their activities while technological development accelerates and provides new opportunities to achieve this. In this context, Universities of Applied Sciences (UAS) work to support companies in terms of new skills, utilization of latest knowledge, and the development of activities. With the impact of these development measures, the role of UAS as a responsible actor also increases.

Finnish UAS strive to promote the goals of sustainable development through their own activities. In accordance with the action plan prepared by the Rector's Council of UAS, Arene, which are guided by the United Nations (UN) Agenda 2030 Sustainable Development Program and the Ministry of Education and Culture's Sustainable Development Guidelines, higher education institutions implement measures to increase the impact of polytechnics and reducing of economical footprint (Arene, 2020).

Indeed, UAS have a significant impact on society and its sustainable development. 30,000 experts in various fields graduate annually from UAS across Finland. Through research and development (RDI), UAS also have a significant impact nationally and internationally, with the total volume of RDI activities being about EUR 220 million and the employment impact of the activities being about 9,500 person-years. In general, the role of higher education institutions as factors in the development of companies is indicated by a survey by the Ministry of Employment and the Economy, according to which more than 70% of companies have cooperated with UAS and universities in the last two years (Arene, 2020; Ministry of Foreign Affairs, 2019). For their part, UAS can make a significant contribution to creating a sustainable future by focusing on the production of new skills as well as research, development and innovation. The impact can be divided into six different areas, both of which have direct and indirect effects:

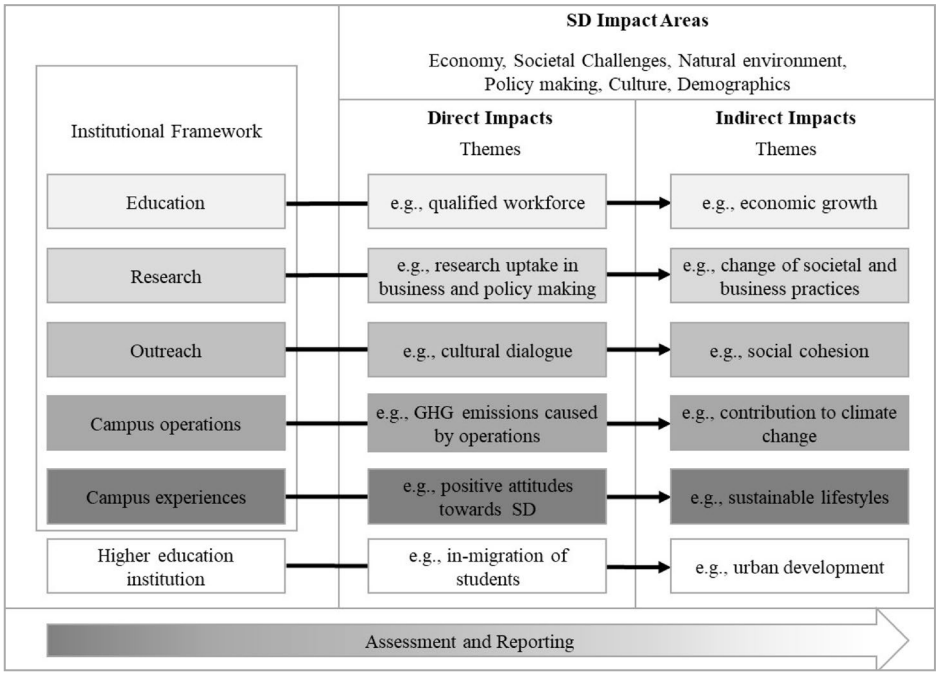

Figure 1. Direct and indirect impacts of UAS (Findler et al., 2018).

The most significant of these impacts is new know-how (new graduates, continuous learning) that indirectly affects economic growth. As well as the impact of research, development and innovation through the exploitation of results, which also indirectly impacts on social and business decisions. However, far-reaching and wide-reaching effects are often overlooked, but these impacts develop societal debate and thus create cohesion (Findler et al., 2018). Therefore, Universities of Applied Sciences need to understand the totality of their influence at their different levels of activity so that they can consider the effects of their own activities on wider social development. One important cornerstone of this is to support societal digitalization as whole. As stated, digitalization can support the achievement of the UN's Sustainable Development Goals by utilizing the use of the latest technologies in the development of new products and services as well as in the development of processes. This enabling role of digitization is in terms of data collection, management, processing, and processing. But for cooperation between actors to be possible, data transfer is also required. Enabling technologies related to digitalization include big data, artificial intelligence (AI), platform technologies, blockchains, the Internet of Things (IoT), and the communication networks of the future 5G and 6G (Velden, 2018).

Figure 2. Digital Responsibility Goals (Meir et al., 2020).

It is important to take responsibility into account when conducting research, development and innovation activities related to sustainable development. Without organizations being able to meet requirements of digital responsibility it is impossible to build trust, and without trust it is impossible to gain a wide adaptation of results. One way to implement responsibility is to consider the digital responsibility goals as proposed by German Identity Valley's framework (Meir et al. 2020). The objectives are divided into seven sections:

1. Digital literature, enables unrestricted access to relevant digital material for different target groups.
2. Cybersecurity, the security of services and products is considered in the management of the data of individuals in the operation of services.

3. Privacy, the individual is protected in the digital world beyond current requirements.
4. Data fairness, including non-personal data, shall be protected and the use of data between the parties shall be fair.
5. Trustworthy algorithms, algorithms must be explainable, verifiable, and fair to different parties.
6. Transparency, digital services and products are transparent to different parties in terms of both data processing and decision-making.
7. Human agency and identity, attention as a human individual and putting the individual at the center of the digital world.

Hackathon as a tool

A hackathon is an event where teams and individuals create different solutions to given challenges or assignments in a fixed time period. The hackathon meets our need to quickly learn about 5G technology and apply the technology to different fields. The challenges in the hackathon can be introduced in advance, or they can be more specific and limited themes that involve connecting different competencies and acquiring necessary resources. If necessary, the hackathon seeks a wide range of expertise from different fields of education and environments, starting with, for example, connecting actors from different universities or companies.

The hackathon partners should be involved in the challenges, such as companies, principals, researchers, and mentors, who can act as owners of the challenges and as sources of the necessary resources (know-how, skills, and finances). The hackathon themes can provide a broader context for universal global challenges such as climate change or the ever-changing security environment. Such themes are wide-ranging and topical in nature as well as topical. They also mostly touch on international needs, as well as regional areas and livelihoods.

The hackathon's operating method enables the delineation of challenges that emerge in the real world. Solving the challenges with relevant partners creates a connection with research, and innovation activities, develops realistically ambitious business goals, and the ability to cultivate change built through multidisciplinary expertise. With a sufficiently broad context and the connection of knowledge, perspectives, or solutions to the future's significant security or sustainability challenges can be developed. In a broader context, the solution to the challenges shifts from, for example, examining the details of security and climate crises to cross-cutting solutions for sustainability transitions. An example of development work in this context is the use of new technologies in hackathon assignments. For example, how can 5G technologies be utilized in crisis management, adaptation, and preparedness? Such themes are essential both locally and globally as they can address, among other things, water and electricity infrastructure, cyber security, health, defense, and changes in several local industries.

The context of development activities can also be based on the UN Agenda 2030 program for sustainable development. Several public organizations and companies link their activities and responsibility goals in this context. Cooperation between research institutions, universities, universities of applied sciences, and companies will also lay the foundations for strategic action, which will also be promoted, for example, by reforming corporate responsibility regulations currently being prepared in the EU. Thus, human security is linked to a broader agenda and the building of climate security. In practice, for example, it is necessary to be prepared for various security-related events, such as changes in the supply chain, demographic changes, pandemics, hybrid wars, and climate changes, such as droughts. These can change both human safety, the business environment and operating conditions. Current global events have revealed different interdependencies in societies. Perceiving interdependencies and ensuring human security are qualities we may need more in the future (Dasgupta Review 2021). For this reason, considering human security and promoting sustainable development requires new ways of working, products, and services that are a higher degree of processing, quality, or features. These development areas can be addressed, for example, in hackathons.

The nature of hackathons is to create a way of working and an atmosphere for the participants that are experiential, educational, and productive. Higher education institutions can connect diverse viewpoints together, which is important factor in the creation of solutions and applying emerging technologies to specific challenges. Motivation in events can be related to, for example, employment, the opportunity to create and network, and to move agilely to practical follow-up measures. Therefore, it is essential to provide participants with a structure that promotes understanding of the broader context and the introduction and commercialization of new solutions.

There is a growing need for supportive opportunities to build one's path in the university field. Indeed, new multidisciplinary learning pathways challenge the notion that there is only one right way to address individual or systemic challenges. A hackathon's working method involves creating connections and solutions through the participant's skills, preferences, and drivers. Educational institutions have also important role to facilitate the link to critical future areas, such as sustainable development goals, and attract multidisciplinary expertise. Company scenarios and real-life context for creation provides platform to devise creative solutions, which can also deepen the learning process for participants during the event. This is because the hackathon's participants have the opportunity to learn about the possibilities of technologies and create links to industries. A satellite hackathon opens up possibility to work in multiple diverse teams and connect the expertise from regions with specific expertise or clusters, like in the case of logistic hackathon, held as a satellite event between multiple actors from different universities.

5G Logistics Online Satellite Hackathon May 2021

5G is a new technology and it can be applied to many business areas globally, for example logistics, which is also one of the main strategic areas for South-Eastern Finland University of Applied Sciences - Xamk in Kymenlaakso region. Here, we piloted a new concept due to the global COVID-19 restrictions. Normally participants of any hackathon would meet face-to-face with others and companies, but that was not possible in 2020 and 2021. In the new concept, we not only created a new way of working, but also a new way of thinking. In this pilot, we were supported by the region's major logistics hubs, Pyhtää Airport, Kouvola multimodal railroad terminal, and major export port Hamina-Kotka.

In this pilot satellite hackathon, everything was conducted online in the same time window, in every participating university of applied science (Savonia UAS, Centria UAS and HAMK UAS). In this context, a satellite hackathon refers to working on the same task remotely with team members using different communication platforms that each university prefers, within different time zones too. The participating companies were online as well, providing challenges to the teams and giving keynotes addresses. In this pilot, while the participating universities were from Finland, some students were located outside Finland. Some participants also came from other universities through the Entrepreneurship Society network. Each university took care of coaching their own teams during the time window. This way, the main organizer requires fewer staff members for the two-day online event.

Online multi-UAS hackathon

Organizing a hackathon online was not only possible, but also beneficial as a tool for solving problems and educating students. Rather than traveling to an event, incurring expenses through travel, accommodation and staff hours, participating companies only need to provide few hours of their time at their own office for the event. For participating students, the communication with team members is somewhat more difficult and being creative is a different experience compared to the face-to-face event, but it is possible and requires some adaptation. On the positive side, students can work on challenges in their own time, and have a break from active university studies when operating from home. For university staff members, the productive work would not stop for the event if it is done online instead of a certain fixed location. For the other participating universities within the network, the motivation is that they have no need to budget travel expenses for the staff. Further, they can also include the online event as part of certain study units to help encourage participation in the hackathon. This would help to ensure there are enough teams in the event, which can sometimes be an issue in offline hackathons.

With the new concept, there are opportunities for each university in turn to become the leading partner. That means that they can adapt the 5G technology to their regional strategic focus areas by receiving challenges from major partner companies, while other participating universities can learn from different strategic alignments and network. The concept is ready for global use as well since 5G or incoming 6G can boost any sector of business whether it is private or public. Students can be located anywhere in the world when participating in the event.

In this hackathon, our challenge givers received new concept ideas for their businesses. Compared to many other university-based events, this event created real business solutions of 5G that were piloted quickly. Some solutions have become part of daily operations and new start-ups were established to develop concepts further as globally saleable and scalable solutions.

A new kind of learning and service environment utilizing 5G technology

Taking together the opportunities of 5G network technology and the needs of education institutions to develop new impactful services, the new 5G Mokki Tech Space concept was developed at Aalto University Hack the Mall 2019. This is a two-week summer school, in which a hackathon is jointly conducted by several universities and companies. The conceptualized 5G Mokki allows knowledge and skills to be taken quickly to where they are needed. A new expanded training and business service will help improve business productivity. At the same time, it improves students' pathways to working life and contributes to sustainable development by reducing the need to travel or move elsewhere and by increasing people's equal opportunities for education, work and services.

The 5G Mokki Tech Space is a modular, multifunctional service station, containing a high-tech learning and communication environment in the shape of a small cottage - "mökki" in Finnish. The station enables innovative uses of 5G mobile communication technology. The 5G Mokki offers cloud services and efficient edge computing. It provides an environment to learn about the latest information and communication technologies, or develop new 5G-powered applications and services, as well as remote, the decentralized production and distribution of products and services.

Accelerated by the COVID-19 pandemic and green transformation, functions such as knowledge work, education and learning, self-care, healthcare, but also entertainment, hobbies, shopping and other service experiences are increasingly performed remotely. By

leveraging 3D worlds with exceptionally stable and fast connections, new service concepts make it possible for people to work, learn, and (re)create anywhere. The stations are rolled out in cooperation with telecom operators.

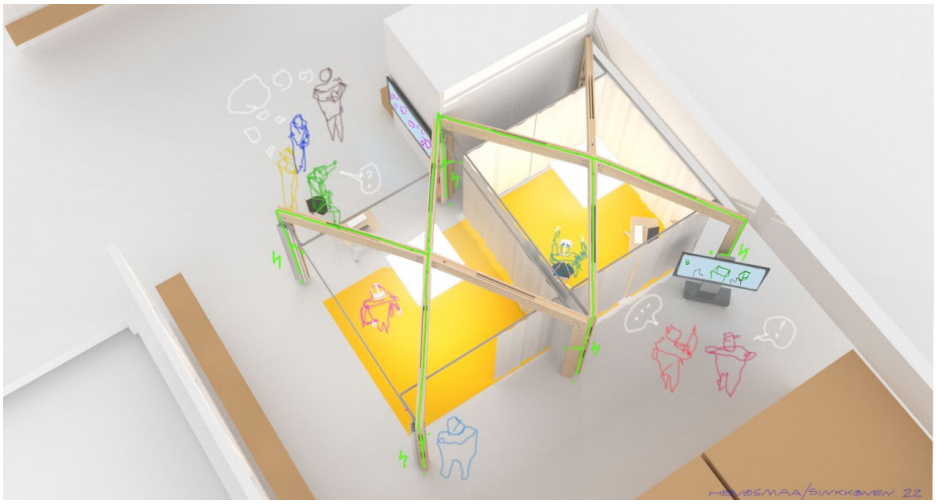

Figure 3. Miniature of 5G Mokki in the design phase at South-Eastern Finland University of Applied Science, on Mikkeli campus. Image by Antti Hevosmaa and Antti Sinkkonen

In addition to promoting technological know-how, the 5G Mokki Tech Spaces also serve as a platform for entrepreneurship and commercial innovation. The physical 5G Mokki has a modular structure with a metal or wooden frame, which can be quickly delivered and installed anywhere, including the desired technologies and equipment for either short or long-term use. The station is connected to a fixed or mobile data network and reliable power supply. It can sustain itself with power through an electrical charging and storage system for solar energy. This means that it can be taken to areas with low-quality or limited infrastructure. The Mokki can be equipped for any outdoor conditions.

Various equipment packages exist for the 5G Mokki Tech Spaces. A basic setup might include, for example: 1. Virtual reality (VR), augmented reality (AR) and audio-visual (AV) equipment; 2. Compact studio equipment for producing, sending and receiving VR/AR/AV programmes; 3. Kinect camera equipment and software for creating, sending and receiving holograms; 4. A private 4G / 5G (and in the future also 6G) network, which enables the conception, development and implementation of new services and productions utilizing mobile networks. The Mokki can be fitted with additional or specialized equipment to suit a variety of cases, for example, healthcare or agriculture. Such equipment might include, for example, drones carrying the base stations of a mobile network.

Conclusion

Technology and markets are evolving at an accelerating pace. Data transfer rates, data analysis and data-driven business are growing exponentially. Development is driven by digitalization and the green transition. Increasing digitalization is needed for a sustainable green transition to occur. Digitalisation also helps our progress towards achieving the Sustainable Development Goals (SDG). 5G technology and edge computing, together with other new technologies, enable completely new types of cost-effective data-based services. 5G technology combines wireless connectivity without delay for large amounts of data from a variety of sources, as well as instant on-site analysis of data, allowing real-time service and confidential data to be kept in the hands of cloud services other than general aggregate data. By combining real-time, more detailed data from a variety of sources, and analyzing it quickly on-site, new types of efficient services can be created for better value. The latest technology and data-driven business helps all sectors from primary production, industry, logistics and trade as well as education, healthcare, and the creative industries.

The key imminent role of 5G can be summarized as follows

- **Speed:** 5G will multiply data transfer speeds based on efficient signal processing. Prioritizing development needs based on input from the industry players will enable organizations, startups, SMEs and large companies to build basis for a profitable and globally scalable solutions and new businesses.
- **Latency:** Improved latency will enable new AR and VR based applications that drive Industry 5G efficiency promise. They enable new ways to install, maintain and operate industrial processes in challenging conditions. Furthermore, improving latency enables real-time analytics and actions based on advanced analytics and AI as well as related visualization solutions.
- **Reliability:** Industrial applications and processes call for high reliability provided by the 5G networks.
- **Coverage:** Widespread 5G coverage will multiply the number of sites empowering e.g., smart cities and logistics.

This article drew on the literature of the recent communications network technology and its possibilities to help achieve sustainable development goals. After this, we considered how higher education institutions can promote the learning and introduction of new technologies and thus, promote sustainable development and a safe environment. The need for change was considered from two perspectives. Firstly, how higher education can help in the rapid learning and adoption of technology. Secondly, how education can leverage 5G technology in its own operations.

We presented a new satellite type of hackathon implemented in cooperation between Finnish universities of applied sciences to promote the development of new types of products and explore solutions for complex challenges. Educational institutions have critical role to link future areas, consisting of sustainable development goals, and attract multidisciplinary expertise. We also presented a new kind of learning, service and business development environment utilizing 5G technology. This environment allows learning and abilities to be taken quickly to where they are needed. A new expanded training and business service will help improve business productivity. At the same time, it improves students' pathways to working life and contributes to the sustainable development of the world.

This article contributed to the existing literature on 5G technology and explored how educational institutions can be promoting the learning and application of new technology. Technology offers new opportunities that can be harnessed to meet the diverse needs of society and its actors. The 5G satellite hackathons showcased fast-paced training packages for new products and services in collaboration with several universities of applied sciences and universities. The 5G Mokki Tech Space network, in turn, demonstrates the transformation of education to support more innovation and business, leveraging the latest technology. It also demonstrates that education is no longer thought of as a national optimization but as optimization for solving large global problems. Indeed, new methods and tools for education and a new allocation of educational resources can have a major impact on global sustainable development.

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7 SOLUTIONS FOR IMPROVING IMPACT EVALUATION: CASE HYVIÖ

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ABSTRACT

Today, a widely debated issue in research & development (R&D) work is how to verify the actual effects and impact of planned and implemented activities. There is a growing need for tools to evaluate how goals and objectives are achieved. In this paper, we introduce one concrete solution for such purposes: Hyviö was developed in HyviöPro project by Active Life Lab at Xamk, in collaboration with the providers of local health and wellbeing services. It is a useful tool for funders and project planners alike. Hyviö is an application family that supports impact measurement across a variety of industries, while also allowing service providers to follow customer advancement on an on-going basis and tailor services accordingly, resulting in an improved data-driven, customer experience. Furthermore, it enables many service weaknesses to be addressed in almost real time due to the reliance on real-life data. We maintain only services and projects that are able to demonstrate their actual impact will succeed in the future.

Keywords: R&D, effectiveness, impact, impact measurement, health and wellbeing services, Hyviö

Introduction

The impact of R&D activities has been investigated for decades by academics, industries and economic policy advisors. For instance, scholars have examined the role of R&D investments in firm performance and innovativeness (e.g., Belderbos et al., 2004), while another stream of research links different types of R&D activities with the innovativeness of industries, societies, and countries overall (e.g., van Hemert & Nijkamp, 2010). In general, it appears that the more businesses and governmental institutions invest in the interaction between different types of innovation systems, human capital, and R&D and the more innovative they become.

We understand *effects* to be typically short-term, referring to concrete issues that have changed as a result of specific actions, whereas *effectiveness* (impact) is a broader issue evaluated in the mid-long term, 3-5 years, or in the long term, more than 6 years (see Heliskoski et al., 2018). It is often easier to demonstrate what changed rather than to show actual benefits – or drawbacks – to society overall. In other words, we tend to focus more on immediate effects than on impact.

One important challenge for impact measurement as Ståhl (2017) raises is the diversity of the underlying actions. For instance, changes in nutrition happen as a result of certain actions in agriculture policy, food industry, trade business, health behaviour, and beliefs related to health and wellbeing, among others. Ståhl (2017) further recognises a challenge typical for health and wellbeing sector, namely, transforming evidence-based information into routine. Thus, often single actions to tackle nutritional challenges are not enough. Effects and impact need to be evaluated related to the action's immediate objectives, while still considering that the effect of all interventions to one's health state cannot be measured at once. The latter does not mean that a single intervention could not be effective at all.

The objective of our paper is to demonstrate how measuring effects and impact could be made easier, and what types of aspects need to be taken into account in service or system development, business, and user perspectives to succeed. We describe the steps and lessons learnt from Hyviö tool development and pilot cases. The results are particularly valuable for professionals who need effective measurement tools for their projects, whether working as commercial service providers, public sector representatives, or R&D experts. We contribute to the field by introducing a simple concrete solution to assess the effects and impact also in the long term, bridging the gap between effects and impact. Even if the solution has been developed in the context of health and wellbeing services, it is applicable across a variety of sectors.

The rest of the article proceeds as follows. First, we describe the general background and problem setting, including the importance of measuring actual outcomes of R&D activities, as well as the need to build easy-to-use digital tools for such purposes. Second, using the HyviöPro project as a case study, we open the objectives of the more in detail, after which we outline what kind of tool was developed, and how. We conclude by discussing the broader importance and applicability of the tool, as well as proposing some avenues for further research and development.

Problem

Within the field of research and development, impact measurement is not self-evident. It also raises some concern, as not everyone within the higher education sector is convinced that evaluation activities are worthwhile tasks (Kelly & McNicoll, 2011). In the UK, more than 17,000 academics signed a petition to withdraw the inclusion of impact assessment from REF proposals (Penfield et al., 2013). Many researchers expressed concern that funding will be steered towards disciplines where impact is most easily demonstrated. In this field, freedom and trust are highly appreciated, whereas evaluation and measurement may appear as a means of external control. Such tensions are far beyond the scope of our paper but based on these observations we may suggest that measures with real-life data are not always welcomed in all university-driven R&D projects.

We hypothesize that there are three major obstacles in gaining a more realistic picture about impact. Firstly, it is an issue of professional culture within the field of R&D, as described above, freedom and autonomy are highly valued, and impact assessment might be seen as running counter to these principles. Secondly, certain problems may arise from the required long-term perspective – there is a rush to proceed to new or further projects and gain additional funding, instead of evaluating what was already accomplished. Thirdly, the simplest reason might be a lack of solutions which would be easy to adopt and use, and, in the case of SMEs, also cost-effective to integrate to their business instead of temporary experiments. **Our paper tackles the third problem.** In our view, organisations taking part in R&D activities would benefit from better tools to measure the outcomes on the micro-level. We need to bridge the gap between effects and actual impact and produce outcomes that significantly contribute to societal wellbeing.

Our starting point is health and wellbeing services. In general, people tend to make unconsidered health decisions and experience the feeling of impatience when waiting for healthcare, partially because they are eager to achieve psychological closure on their goals (Roberts &

Fishbach, 2020). Based on our personal discussions with several healthcare professionals, these service providers described the underlying discrepancy in customer-company relationships: customers tend to require immediate results, whereas health professionals highlight that actual change does not happen overnight. It requires commitment, deep-level learning and even institutionalising new routines related to exercise, sleep and nutrition. From this perspective, there is a need to combine short-term and long-term measurement in helping customers. The former helps to motivate them, whereas the latter shows the actual impact. For health and wellbeing service businesses, measurement data as a whole has major business potential. It may help to identify new target groups and reveal latent customer needs, for example.

However, many small businesses operate with scant resources and their digital competence may be relatively low (Rajahonka & Kosonen, 2021), both in adopting new tools and in applying data to advance customers' wellbeing. Effective health promotion requires effective wellbeing services for the target groups who need them; individual health is a crucial aspect of wellbeing (see Scott, 2012). In addition, there is also a need for trusted services, as businesses deal with highly sensitive data. Therefore, developing wellbeing service effectiveness is a prerequisite for both business growth and evidence-based specialization.

Objectives

The specific aim of the project was to build an open platform to collect, analyse, and implement effectiveness data to develop new effective wellbeing services. We focused on the South-Savo region in Finland, as this was where the project was located. This strengthens intelligent specialization towards knowledge-intensive services in wellbeing service and technology companies, as well as in the public and third sectors. As the outcomes of any project (health and wellbeing services and R&D projects) are hard to measure on a micro-level, the idea of Hyviö was further matured. Specifically, it was developed, firstly, to bridge the gap between effects and actual impact, and secondly, to provide a simple solution for evaluation.

The diversity of underlying actions that have an effect on health and wellbeing (Ståhl, 2017) should not mean we do not measure impact at all. On the contrary, there is a growing need for tools and valid measures to assist in evaluating impact in the long term. Secondly, many health and wellbeing service providers are actually small businesses who may have lacked systematic and data-based service development (see objectives 4-5 below and Rajahonka & Kosonen, 2021). In our view, both service providers and customers would therefore benefit from simple tools that focus on the long-term impact from the very beginning, not just on immediate effects.

Thus, the main objectives of the HyviöPro project were: 1) the wellbeing service profiling and effectiveness platform; 2) defining effectiveness as a goal of wellbeing service providers; 3) piloting the effectiveness platform; 4) aligning the effectiveness data with business development service tracks; 5) implementing the effectiveness platform to promote new business creation; 6) publishing and marketing the effectiveness platform. In the following sections, we discuss more in detail how the project addressed these.

Solution

To address the needs outlined in the previous section, Hyviö was developed as a tool to measure effectiveness from any service or project. It can be used in health and wellbeing services to find out the micro-level outcomes and effectiveness, as well as R&D projects and in any project that has a timeline. The timeline can be, for example, recovering from knee injury, or developing a new solution with public funds.

In this section, we examine the development stages of the original application and consider the wider use of Hyviö and current use cases. The idea of measuring physical health effectiveness in this type of application originally started in 2017. This coincided with the construction of the Active Life Lab and Saimaa Stadiumi in Mikkeli, Finland. Hyviö (HyviöPro's predecesor) was one of the first projects to be run under Active Life Lab.

Developing the solution within health and wellbeing services

A mobile application was developed, through which users of the wellbeing services could input personal results and experiences of the offered service. Firstly, Hyviö was a mobile application for measuring individuals' wellbeing, a form of self-reflection of an one's own wellbeing state. However, it was quite clear after two years of development that the main focus of Hyviö should pivot towards health service providers' service effectiveness rather than consumers only. This resulted in the HyviöPro project in 2019, with Pro standing for professionals. Thus, Hyviö's development goal was changed to build an analytics tool for easier and real-time access to health service providers (See also, Jantunen et al., 2020).

Several validated questionnaires and other data collection methods (such as, data input fields for physical health measurements) are available on the Hyviö platform. The methods were chosen based on the intended health outcomes as defined by the service providers.

Firstly, the primary outcome of a given intervention are defined, for example, what aspect of health the service aims to improve. Thereafter, the primary outcome is measured with a valid method (e.g., questionnaire) before, during, and after service usage to assess within-group changes in the primary outcome.

Currently, there are some Finnish and global competing solutions, but none have specifically similar functionalities. Unfortunately, often the existing solutions, although they may possess shortfalls, stand out as the primary competitors for the simple reason that many firms and organizations can be somewhat resistant to change (see e.g., Kim & Kankanhalli, 2009, Hsieh, 2015 for status quo bias in adopting new information systems and services). There are also solutions that we see as direct competitors, while at the same time recognizing what Hyviö does differently.

Solutions such as *mSurvey* and *Medified* offer solutions to measure effectiveness but for a very specific niché. *mSurvey* is a digital survey and mapping solution for the needs of the healthcare industry and rehabilitation agencies and *Medified* markets the platform for mental health monitoring. *Vaikuttava yritys* has workshops and webinars to sell impact training to companies rather than a software tool. These are Hyviö's biggest competitors marketwise and Hyviö has to stand out in the marketing competition. In addition, Sitra, TEM, and SOSTE talk about impact on societal level. None of these can be considered as a competitor to Hyviö, but possible partners in the future.

Hyviö automatically creates a report to summarise the effects and impact. Reports are not only for professionals who provide the services and collect data, but also serve as a method of transparency also for end customers. They can monitor their own advancement and interact with health and wellbeing professionals all in one location. Professionals select the measures they need to apply their own services, after which they collect the measurement data using Hyviö. Figure 1 shows an example of a service called "Intervention 2" using two validated measures.

Questionnaire	Answers (all clients)	Baseline measurements (averaged)	Baselines with followups (averaged)	Latest answers (averaged)	Effect (percentage)
Intervention	**10 (8 clients)**				
ISI (Insomnia Severity Index)	5	12.3 points	16.5 points	12.5 points	-24 %
10 meters walking test	5	4.3 seconds	5.3 seconds	4.1 seconds	-23 %
Velocity		2.7 m/s	1.9 m/s	2.4 m/s	+29 %

Figure 1. Example of a measurement report

Next, we examine how Hyviö works in measuring public health care company impact in a real use case. Essote's (South Savo Social and Health Care Authority) healthy-lifestyle counselling's primary objective is to enhance client's interaction with better monitoring. Their secondary objective is to lower the overall service cost by enhancing an individual's health. With the help of the information gathered in Hyviö, one such application is that it becomes possible to develop a better-functioning service that lowers the risk of developing type 2 diabetes in the South Savo region (https://hyvio.fi/case-julkinen-organisaatio/).

In Hyviö seminar in May 2021, Essote's project coordinator described how in his new work role he was able to use and analyse measures better than before. Lessons from this counselling project showed that type 2 diabetes risk measurement was not well suitable to the type of intervention, where it was used previously. The pilot case was a 6-months group healthy-lifestyle counselling for Essote's personnel. The team applied Hyviö to measure and validate effects and manage the service program.

Other use cases and current phase

Hyviö has been developed into an application family that aims to measure the impact of health and wellbeing services as well as any project that has a timeline, such as R&D projects. Companies providing these services are able to follow their impact at three different levels: organizational, service, and customer. Most of the applied measures are scientifically validated. They can also be modified to match the specific needs of companies. Consumers can also see their progress on a service from the mobile or web app. From one perspective, besides measuring effectiveness, Hyviö is comparable to Google Analytics, for example, and from the other, Google Forms or Webropol.

R&D projects are important user-cases of Hyviö as well. Figure 2 provides an illustration of a visual report in Hyviö, here focusing on improving digital competence. This is an actual measurement of Xamk's R&D project Digiportaat 2.0 (2021-2023).

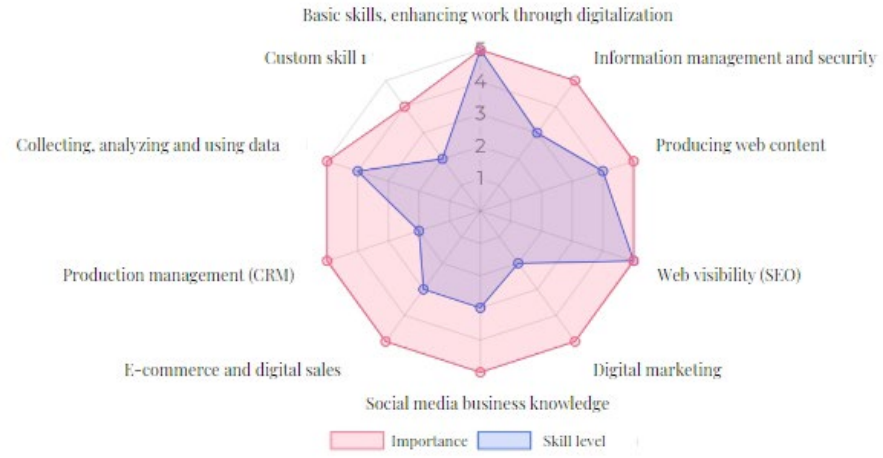

Figure 2. Example of a visual report in Hyviö, case: Your Digital Competence

Project customers (small and medium sized enterprises, SMEs) first evaluated the overall importance/significance of specific digital skills in their business using a scale from 1 to 5, marked in pink, from basic skills to information management and security, producing content, visibility, advertising, social media in business use, online stores and sales, production management, and collecting, analysing and using data. Then, they rated their current skill level using a scale from 1 to 5, marked with blue. The more detailed meaning of each component is also clarified to customers. From the visualisation we can see that the widest gap between significance and current skills is within collecting, analysing and using data, as well as producing digital content.

Hyviö's development was grounded in multi-disciplinary knowledge and collaboration with customers. The voices of end users, health service professionals, entrepreneurs and R&D project personnel were considered at all stages of development and testing. The development team has covered various disciplines and perspectives: researchers, R&D specialists, physiotherapists, software professionals, and business developers. This has been done to guarantee better usability in every field of the service. Hyviö has also been cyber security audited, taking into account the requirements related to storing and managing personal information.

Currently Hyviö is in a pilot phase with more than 100 professionals using the service, and upwards of 800 customers across services. As evidenced in the previous section, Hyviö is well suited to measure physical health effectiveness, but it also works on any follow-up questionnaire use cases more in general and across different fields. For example, the effectiveness

of publicly funded projects could be measured using Hyviö, which is being currently done in ongoing Xamk's R&D projects Digiportaat 2.0 and ARVO.

Lessons learnt

Benefits and drawbacks

In this section, we will explore the key areas of learning points throughout Hyviö's development, along with the resulting outcomes. Firstly, development work should be conducted with business use cases. The original idea for Hyviö came from measuring individual well-being and providing a mobile application for such purposes. However, instead of focusing on individual-level outcomes, the main effort went to evaluating the effects and impact of business services. This also poses greater business potential for services such as Hyviö.

Secondly, established solutions do not always need to focus on a specific industry only. Here we identify a major growth potential, as more and more projects are conducted in collaboration across industries and disciplines. The most important lesson from HyviöPro development was to transition the tool to a more general impact measurement tool in R&D projects. The only necessary condition is a specific timeline for projects, as we described earlier. The same evaluation tool could be applied e.g., in measuring cost-effectiveness in construction projects, well-being at work among transportation and logistics business, or the societal impact of SIB funding.

Thirdly, we suggest that multi-disciplinary teams may have better results in developing customer-driven solutions than traditional software teams. Even if the solution matches customer needs well, adopting new tools always poses certain challenges among user groups. It is important to note that adoption takes time, particularly in larger organisations. In addition, developing the appropriate measures requires time and effort from R&D projects; Hyviö is the tool to execute them. However, as previously mentioned there may be a certain level of resistance to change when it comes to evaluating impact in the field of research.

In addition to learning and using better measures, the benefits of Hyviö adoption include better data management and analysis. In the Essote case, we noticed that previously a significant amount of health data were still collected using paper questionnaires, from which the data were then transferred into a digital format. Hyviö allows both the easy collection and analysis of datasets, while it also provides a safe platform to store data for further use. From a service provider's perspective, specific attention must therefore be paid to data security

mechanisms. Regarding the general data protection and regulation (GDPR), Hyviö has been audited and all the necessary steps have been completed to prevent fraud and misuse of data. Yet data management remains a field which always involves risks and threats and must be continuously re-evaluated to ensure ongoing data security.

As potential drawbacks, registration of users may cause a bottleneck in terms of getting higher response rates. Users may also respond anonymously and this means less detailed opportunities for evaluating effects and impact. On the other hand, many services and projects are by nature targeted at customers who want to see their own progress. In this sense, registration does not represent a problem, while adoption of the service in general may do so. R&D projects, in turn, require customers and participants to complete certain actions by nature, such as measuring effects. Some challenges may arise from marketing and selling solutions developed in universities, compared to commercializing solutions developed in the private sector.

Future directions

How can Hyviö be developed in the future? Based on the lessons learnt, reporting and data analysis opportunities are constantly developed to better match different types of cases. Usability studies could be applied regarding the clarity of reports. Hyviö already supports R&D projects in collecting, reporting and storing the necessary data, but it is clear the analysis tools and means to visualise data should be developed further.

In technical terms, end users should be able to register easily using social authentication, such as with a Google account. This improves data security e.g., by providing two-way authorization when users log in from un-identified devices. In addition, strong authentication will be implemented for organisations and projects requiring such methods. Finally, an interesting avenue for further efforts is impact measurement itself: how do organisations and projects succeed in getting responses to surveys within a 3–5-year timeline?

In sum, in development work within the health and wellbeing sector, Hyviö is simple to use and does not require technical configuration. New measures, especially validated ones, can be easily added and they can be flexibly defined. This means that the results algorithm can be programmed exactly to follow the validated measure or it can be case specific. Each measure report can also be tailored to match specific customer needs. Moreover, the results of data analysis are visually user-friendly, accessible with an up-to-date web browser and are easy to read. Currently, more than 10 wellbeing businesses are using Hyviö as well as several R&D projects at Xamk, and Essote's lifestyle counselling. Feedback from pilot R&D

projects within Xamk and its partner organisations are collected both during projects and after the projects have finished. On-going modification has been made to match the service with different cases. Development is active and guaranteed to continue at least until 2026 (5 years after HyviöPro). This time interval should be enough to reveal the full potential of Hyviö for both businesses and public sector organizations.

Results and discussion

Usually measurement data is analysed reactively, which means that the results of a project can only be demonstrated when a project is nearing its end, or after. The Hyviö tool allows the measurement of effects in real time, on an on-going basis. This may result in significant cost savings and benefits, as wellbeing services and development projects can be better directed towards the right goals. Hyviö also provides an easy way for companies to measure the impact of their services with validated measures and automated analytics data. Businesses only have to modify the questionnaires once to gain fully analysed data in real time.

In our pilots, there is currently no data availability from a 5-year perspective as the service is relatively new, but with strong partnerships and networks the ground is well set for measuring effectiveness in the longest run. In this paper, one of our starting points was that effects are evaluated much more often than actual impact. How could Hyviö solve this problem, then? Persistence is key. From customer perspective (see Scott, 2012), we cannot change the applied services and systems every quarter just for the sake of change or newness. Furthermore, the collected datasets need to be taken good care of so that broader impact and significance can be evaluated. As the old saying goes, "you get what you measure" - even if tools such as Hyviö are not shortcuts to increased wellbeing, they help users and service providers to reach common objectives. The challenges underlying health service impact still prevail, such as transforming knowledge into action and routine (Ståhl, 2017), but even this challenge may be easier to overcome with shared platforms and service families.

From the perspective of health and wellbeing businesses, there is a trend that being able to show real-life effects and impact is crucial. Considering the digital transformation and competitive landscape, services can be sold effectively only by demonstrating they have actual impact. Here Hyviö provides a helping hand. Businesses that market their services that rely on demonstrating actual results may gain a competitive advantage. Moreover, Hyviö supports the on-going improvement of services and projects in almost real time, as it allows service providers to follow customer advancement and, if there are perceived drawbacks, tailor the services accordingly. Changes are significantly easier to make when you know what to change, based on actual data.

From a funder's perspective, Hyviö is a potential tool to demonstrate the impact of SIB funding. This is important since the SIB funding mechanism is based on the expected impact, as a result of the investments made. Effective funding mechanisms require solid knowledge about the expected and actual project results. Without a transparent, robust measure of these impacts, it is difficult to realize the effects of investments. In this case, both investments and R&D could be hampered. Our proposed solution does not guarantee the desired outcome, but it provides a helping hand to evaluate impact.

The service has a wide variety of further application areas. It can be practically applied in almost any field that has measurable cases that require constant follow-up measures. These range from SMEs to large businesses, and from municipalities to other public sector officials and third sector associations. For instance, large retail businesses could measure employee wellbeing with Hyviö, which could strengthen their ability to retain employees and improve employer reputation, or insurance companies could provide discount for customers who have reached jointly agreed wellbeing objectives. These few examples illustrate how Hyviö could be applied across industries to develop better services.

There are various streams for future research and development efforts as well. At the Hyviö service level, there is a need for marketing to commit more customers, gather feedback from users and pilots, and continue technical development. The threshold to try Hyviö will be lower in the future, as it will be integrated with well-known services, like many other software-as-a-service (SaaS) solutions. Thereafter, starting to use the service does not require professional guidance.

Future efforts should be directed to demonstrating the benefits of measurement tools, 'evangelising' the solution, and also changing the mindset of professionals so that the customer perspective and real-life data could speak over vague statements of project impact. For researchers, the most important lesson from Hyviö development is to prepare research settings and projects so that they support constant evaluation and analysis of advancement - not merely regressively collecting feedback after the project has ended. When impact is properly evaluated, in a way projects would have a longer time span; tools that ease impact measurement would encourage follow-up measures, which are currently rare. This, in turn, would help project teams and funders to avoid common pitfalls such as 're-inventing the wheel' with every new project. Further, it would support targeted actions in the right place, while having potential to increase the openness of knowledge e.g., by supporting comparisons across projects that have similar types of measurement objectives.

To conclude, we have demonstrated how Hyviö provides concrete steps towards more effective services and projects. For South Savo, it has the potential to strengthen the profile of the region as a significant contributor to sustainable well-being, data-driven development and the data economy in general.

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8 CONCLUDING REMARKS

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The Impact of Xamk Beyond

Xamk Beyond was initially launched as a forum for writers from Xamk and their associates to write scientific-adapted articles either from the field of higher education or on the basis of research, development, and innovation activities. The objective was to strengthen the competence of our staff as writers while also disseminating the results of their work to international audiences. Every issue of Xamk Beyond has a theme. The first theme was 'Business development, Co-operation, and Sustainability' and the second theme was 'Sustainable Development and Social Responsibility'.

This is the third issue of Xamk Beyond and the theme is 'Impacts'. With such a theme, it dares us to explore the impact of Xamk Beyond. Thus, let us look back over the previous three issues of Xamk Beyond and reflect on what we have done, how we have succeeded to accomplish these objectives and what work remains. We offer insight for the future and anticipate what might happen next. In these concluding remarks, we will first consider Xamk Beyond in statistics, then evaluate how Xamk Beyond has developed over the years, and finally reflect on the editing work and explore future directions for the series.

Xamk Beyond in Numbers

Below is a rough table of statistics that shows how many articles have been processed through the last three issues, totaling 28 published articles altogether. In just three years, Xamk Beyond has outperformed the parent publication of Xamk Research, which over the last five

years has published 5 articles in English and 16 articles in Finnish. From the potential pool of writers at South-Eastern Finland University of Applied Sciences, every year Xamk Beyond seems to catch the same number of articles for consideration. This year is a bit different, because instead of two articles that were not for one reason or another completed, we lost five. One of those exceptional articles dropped out as it was accepted into a peer-reviewed journal. Congratulations! Another article was a victim of a Russia's war against Ukraine as the project it was handling was put on hold.

Table 1. Statistics of three volumes of Xamk Beyond

	2020	2021	2022	Total
Published articles	9	11	8	28
Non-finished	2	2	4	8
Rejected or suggested to publish elsewhere	1	2	1	4
Total number of writers for published articles, of which females	23 of which 13 females	22 of which 15 females	17 of which 9 females	62 of which 36 females
Representing unit of writers:				
Education	4	4	1	9
RDI	12	14	12	38
Other	1	2	1	4
External	6	2	3	11

There are six writers who have continued to publish in Xamk Beyond for at least at two issues. What might this reveal about the writing and publishing process of Xamk Beyond? Or the broader conditions for writing in Xamk? What is then, the potentiality of writing from education or RDI projects results for the wider public?

As we raised in our last issue (Neuvonen-Rauhala, Uotila, & Weaver 2021), writing an article for Xamk Beyond is an involved process. It takes on average 8-10 months to go from abstract submission to publishing the final manuscript. For some, it requires a rethinking of the way in which they write and for whom. Readers of scientific texts are less interested in the specific details of a project, but rather the findings or the transferable results and how they contribute to the broader scientific literature. Thus, we might say that scientific writing is always done in collaboration with others, be it with co-authors, subjects, literature, editors or peer reviewers. As such, to develop this dialogue, the feedback and revision process of Xamk Beyond is far more labour intensive than our other internal series and we commend

our authors for sticking with the process.

In Xamk Beyond, authors receive guidance on how to actualize their abstracts, feedback on a first draft of the manuscript, and in-depth comments and language editing on their final manuscript. It bears a striking similarity to the submission of process of a peer reviewed journal article, but with detailed and constructive feedback given to authors to develop not only their article, but also their general scientific writing competence. These are skills which are honed and developed over a writer's entire career, both as their own individual competence through writing and practice, but also in collaboration with peers, reviewers, and editors (Graham & Harris 2013). This process may feel somewhat heavy for novice scientific writers, but it contributes significantly to their professional development as they become more familiar with the conventions of scientific writing and publishing.

Developing the competence of scientific writing

Hanna Vilkka (2020) argues that academic writing is active processing of reading, thinking, and analyzing what is done and achieved, intermediated to the public, and targeted at specialists for further use and development. Vilkka instructs students of higher education, but her advice is relevant for all writers, especially when writing is not a part of their daily work. So, it seems that by reflecting on what we have read or experienced, we can understand more about the world. But is it enough for scientific writing?

Generally, in universities of applied sciences we are used to writing reports for funders where we describe what we have done, our results or posting updates to social media and blogs. The concentration for producing thoroughly analyzed and well-researched articles requires a different kind of orientation and skills than tweets or reports. Though, they do not always exclude each other.

At least, Rutger Bregman, a well-known Dutch author, recently said in an interview of Nordic Business Forum that following news is not so important than to follow what is happening at the field of developing science and especially with the history of humankind. With that kind of attitude, we can find time to develop our skills that require more patience and constant practice. As a university of applied science, we need to make time to go beyond professional writing and develop our applied scientific publications.

According to Vilkka (2020), scientific texts can be recognized in the way that they argue reliably and convincingly with evidence. A scientific article is intertextual and contextualized

with prior scientific discussion based on research. The content is neutral and strictly follows the basis of good scientific procedures. To produce text according to the mentioned rules imposes more requirements on articles and especially on writers than traditional publications. First, you need to want to accomplish the task, then you need to train your writing skills. Finally, you need to write. It is so simple, isn't it?

It is quite clear that individual aspirations are a crucial factor for promoting scientific publishing. But, as important as individual actors are, we can ask what is done by the higher education institution itself. In Xamk, we are developing support systems for individual writers through sparring sessions, proofreading and editing services, open access publishing guidance, publication bonuses, and the recently launched scientific writing career path (see Weaver, Suojärvi & Laitala 2021).

On the career path, permanent members of staff can get up to 160 hours a year freed from other responsibilities to focus on their professional development in scientific writing and activities, whether these hours are used for training, writing, or editing depends on an individual's needs. This launched in Spring 2022 and while it is too early to speak of results, it might even be counterproductive to do so. As time is invested in professional development and producing better professional or scientific articles, it will likely lead to a decline in the overall number of publications. But in the long run this is the right approach. The emphasis should be on developing an individual's writing competence as part of a community of writers, rather than focusing solely on increasing the number of peer-reviewed publications. As scientific writing competences are strengthened and developed, it will spill over into other critical thinking activities and publications to improve the quality of all work produced.

In universities of applied sciences, many of us are trained in the constructivist school of thought and see the world as incomplete, and that is why there is room for seeing applied science as an unaccomplished activity. It provides the possibility to question readymade issues and unopened black boxes (see e.g., Kiikeri & Ylikoski 2004) for further development. Bruno Latour (2005) uses the concept of black box when referring to phenomena that are taken as given and not investigated as long as they work (see also Lehtonen 2004).

The apparatus of publication processes in Xamk does well, and we regularly exceed our yearly objectives when we consider our results within a quantitative framework. Indeed, there are many interesting and noteworthy publications by content. But if we assess how many of them are scientific publications or even peer-reviewed, the situation is different. It also opens a discussion of whether we should open the black box of publications to produce more applied scientific publications.

Thus, we know what the social construction of publication as a result or an artifact is, and the publication process is also visible. But what still stays in the black box is what happens or needs to happen with writers to prepare an applied scientific article for peer reviewing. One thing Latour (2005) suggests is distance as a trigger occasion for visibility and therefore for observation. In the case of writing articles, it means time for learning, time for research and time for revisions. Demanding tasks and objectives require time, as well as trust and support from the organization side.

From the individual writer to a community of writers

The institutional focus has thus far been on individual professional development. Those who wish to develop their applied scientific writing skills can apply for the personalised resources to do so, whether that is some time for writing on the career path, publishing in Xamk Beyond, feedback on their writing and article drafts, or training. These are laudable measures and are the necessary first steps in developing our scientific publishing culture. Yet, there is further potential for harnessing this individual aspiration and transforming it into a supportive community with an open interdisciplinary dialogue between peers. Although the underlying conventions of each discipline is different, the common foundation of the principles of scientific writing can bridge those disciplinary divides.

What role could Xamk Beyond take in supporting this? Beyond the current measures, we might open the article reviewing process to staff outside of our publication group, perhaps to those who are on the scientific writing career path or external to Xamk. Further, we could bring in those who wish to develop their scientific merits by inviting them to work alongside our editors as a guest editor in producing special issues of Xamk Beyond. By opening the editorial and reviewing process, we could enable our staff to gain a more holistic understanding of the publishing process while developing their editorial and feedback skills. This could, in turn, lead to additional interest in scientific publishing as new connections emerge between education, RDI, and support service staff. This is, of course, speculation, but in the spirit of universities of applied sciences we should experiment with ways to develop our scientific publishing culture and community alongside efforts to improve our metrics and the number of scientific articles published.

In this volume of Xamk Beyond, we made visible the results of our writers personal and co-operational process of research and writing. We can only estimate what it has meant to them in terms of material and emotional resources. That is why it might be worthwhile to

investigate premises of producing applied scientific articles by tracing actors both material (institutional, resources etc.) and emotional (aspirations, motivation, skills, mentoring, supportive, etc.) in the publication process. This is a research initiative the university of applied sciences must support to fulfill the demanding objectives and development requirements. These results would also help to edit Xamk Beyond and publications for Xamk Research.

Xamk Beyond 2023: Digitalization

The next theme for the fourth issue of Xamk Beyond will be 'Digitalization', in the broadest sense. This third issue of Xamk Beyond includes already examples of digitization and digitalization, and in the next issue these themes could be explored in more detail and follow what happens next. Novel approaches and initiatives are welcome. Especially what happens in the field of education and educational environments. What kinds of solutions and applications will be used in the future? What are the experiences of pilots? What lessons have we learnt from the pandemic that could be applied in future education or RDI activities? How might digitization improve access to resources or knowledge?

Universities of Applied Sciences and Universities alike are finding ways to fulfil the criteria of Digivision 2030. The implementation of Digivision 2030 guides the development work of education and RDI. Developing solutions and follow-up activities require many kinds of reflective and reflexive discussion and evidence-based research. What are some possible theoretical and practical guidelines and implications? Further, the Ingenium consortium is just starting its work and because of this higher education cooperation might be changing. What is its contribution in developing international learning environments and learning? How can the work we do contribute to the scientific literature?

The questions and possibilities are endless for the theme of Digitization, let's address some of them through the medium of scientific writing!

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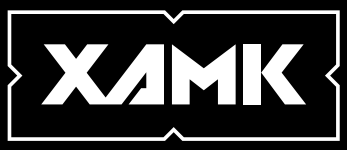

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