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Master Thesis

Well-being within the Digital Transformation Age among University Students - an Exploratory Research

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Abstract

The digital transformation has enabled global societal and economic developments on a large scale, but insights on how the digital transformation affects our well-being are fairly limited. However, the relevance of well-being within a digital context is becoming increasingly proposed as a result of the progressive integration of digital media and technologies in many areas of our modern life. Within the scope of this study, potential influences have been investigated to what extent an individual is exposed in today's digital environment and how these influences can pose an impact on their well-being. For this purpose, a theoretical framework was created based on literature, summarizing five aspects which include matters like Privacy and Data Protection, Online Safety, Access to information, Social interaction and Communication and Digital skills.

Furthermore, the current exploratory study, adhered to a qualitative methodology and was commissioned by the University of Twente in the Netherlands. Moreover, semi-structured interviews were conducted with eight participants in order to explore the experiences students make online and to discover how these relate to their well-being based on the theoretical framework. The interviews were transcribed and analysed using inductive thematic analysis.

Overall, six themes could be identified: 1) The COVID-19 pandemic as an opportunity to digital self-advancement, 2) The lack of control over own data creates feelings of uncertainty and resignation, 3) Negative events online are common and often formative, yet stimulate reflection, 4) The significance of digital skills and the perceived value of the digital transformation, 5) Various obstacles on digital well-being are encountered with individual strategies, 6) Reflection on own digital well-being and the need for digital awareness creation.

The study was able to reveal that the digital transformation is valued by the students as an opportunity for independent education but that also distress is experienced by the rapid digitalisation processes around them. Further, students are using strategies themselves that can assist them to enhance their own well-being, as taking breaks from the digital world and that it also would help them if educational institutions were more committed to promoting digital literacy. Limitations were found in the small number of interview participants, the diversity and gender ratio within these. Strengths of the study lied in the richness and details of the interviews. Finally, recommendations for future studies are on the investigation of different age groups and other social strata and the attention on stress relief in enhancing well-being within the digital age.

Introduction

The digital transformation age

With the tremendous and rapidly evolving digital technological progress of our time, which is shaping the path of the 21st century, our digital skills are in a constant process of transformation. This transformation not only takes place within the global infrastructure in regard to the expansion of industry, economy, research and politics, but as well as within the sphere of our socio-cultural and personal development (Cascio & Montealegre, 2016; Frangonikolopoulos, 2012; Neufeind, O'Reilly & Ranft, 2019). It has been argued that the digitalisation is considerably more than the sole utilization of information and communication technologies, but rather, the process itself is comprised of a multitude of technological, economic and social developments (Bitkom/Prognos AG, 2013; Neufeind, O'Reilly & Ranft, 2019; Valenduc & Vendramin, 2017). Digitalisation, conceptualised as a structural transformation, is thought to affect all areas of societal life that according to Zaviska (2019) can ensure the economic growth, strength and leadership of a country in the coming decades through adequate support, investment and implementation, in areas like industry, work and education (Bitkom/Prognos AG, 2013).

At the same time, the aim should be to shape this digital process of change in such a way, according to Zaviska (2019), that as many people as possible not only benefit economically but can also participate in it from a societal standpoint. This is not self-evident, because individuals ranging from young to old, with various educational and socioeconomic backgrounds, are expected to keep up with this established digitalisation process. In addition to the sovereign use of online media, this skills acquisition, ranges from independently gaining knowledge to orienting themselves in a constantly changing digital landscape (van Laar, van Deursen, van Dijk & de Haan, 2017).

However, it is precisely this expectation that raises further core issues, which relate not only to the digital skill-set and abilities of individual users (Shah, 2019). Apart from the correct operation of everyday technological devices, the navigation through online and social media platforms and the appropriate use of software, attention is increasingly being directed to other dimensions of the user's operational scope. For instance, in relation to the user's behaviour, actions and responsibilities online, the impact of digital media has on themselves, on their mental and physical health and the awareness of their own digital identity in regard to their well-being (Beetham, 2015; Shah, 2019). Thereby it becomes particularly noticeable that the users, operating

within a digital sphere, are confronted with a variety of challenges which are not only related to their digital competencies but also to the corresponding influence the digital medium poses on themselves and their well-being (Beetham, 2015).

Besides the benefits and opportunities, the pervasive digital transformation has enabled global societal and economic developments on a large scale. It becomes apparent to also reflect on the potential implications and challenges for each individual, such a process entails (Beetham, 2015; Shah, 2019; Zaviska, 2019). However, there are only limited insights into how our well-being is affected in regards to the ubiquitous digital transformation. Questions on how do people cope with this development, what strategies they employ, what their needs are and what they require from their environment, allow us to look beyond the apparent impacts of digitalisation within our society. And by exploring a further dimension like psychological impacts, such as well-being, a new inquiry can be created to investigate further needs, in order to ensure every individual to prosper within our digital age, accordingly.

The conceptualisation of well-being

The concept of well-being denotes a crucial and central term with regard to human health (Dodge, Daly, Huyton & Sanders, 2012). However, well-being encompasses a multitude of conceptualizations within contemporary literature and has been subject to substantial debates by various approaches ranging from health science, philosophy, sociology to psychology concerning its meaning (Dodge, Daly, Huyton & Sanders, 2012; Fredrickson, 2001). Hence it is of particular importance to illustrate a more general conceptualisation as a theoretical basis, in order to put it into a digital context.

Thus, the construct of well-being is extensively investigated in psychological research, especially in the field of positive psychology. A distinction is often made between hedonistic and eudaimonic well-being, which is assessed in terms of subjective and psychological well-being (Bolier et al., 2013). Hedonism constitutes the foundation for the concept of subjective well-being and describes that humans strive to maximize satisfaction, happiness and joy in life and simultaneously try to avoid pain and suffering (Diener, 2013; Eid & Larsen, 2008). Hedonistic well-being is typically assessed in terms of positive affect, low negative affect, life satisfaction and happiness (Bohlmeijer and Westerhof, (in press). The eudaimonic perspective on the other hand, which is the base for psychological well-being, emphasizes personal growth and self-realization

and is defined regarding a person's full potential of functioning (Bolier et al., 2013). The term eudaimonia was originally formulated by Aristotle and describes a good life in which all living beings strive for the good, for happiness. At the centre of the eudaimonic approach is a humanistic conception of human beings, which sees the individual as a shaper with valuable strengths (Bolier et al., 2013; Ryff, 1989; Bohlmeijer and Westerhof, (in press); Eid & Larsen, 2008; Fritz-Schubert, 2017).

Based on these two basic perspectives on well-being, further research on theories have been established which contributed significantly to research on well-being, where besides subjective and psychological well-being the construct of social well-being is included (Keyes, 1998). Whereby an individual of a particular society, feels part, accepted and regards the society as meaningful, is seen as a further necessity for personal growth (Keyes, 1998). It becomes clear here that the approach within positive psychology places the individual in a holistic centre, in which well-being ought to be the essential objective to reach its full potential.

Beyond the psychological perspective on well-being, there are also approaches from economic philosophy such as the capability approach, which is a normative approach coined by Sen (1993). The capability approach gives input to a different perspective regarding the construct of well-being on a broader and societal domain whereby additionally to the psychological well-being of an individual, the importance of constructing a supportive environment is stressed in which personal development can occur (White, Imperiale & Perera, 2016). Thereby, creating an appreciation of the diversity of human needs, quality of life, agency and autonomy is emphasized in order to promote well-being. Thereby presenting objective indicators, which are essential in terms attaining quality of life and well-being in individuals. (Mitchell et al., 2016; White, Imperiale & Perera, 2016).

What can be expressed by the juxtaposition of the two different approaches in regards to well-being is that well-being can be conceptualised within a subjective but also in an objective sense (Castellacci & Tveito, 2018). By this means, the capability approach allows us to draw feasible, objective and necessary parameters, to what extent well-being can be understood by means of a collective endeavour indispensable for the personal development of the respective individual within a given society, enabling to establish a ‘good life’ to achieve well-being in terms of the eudaimonic approach (Castellacci & Tveito, 2018). For this reason, according to Castellacci and Tveito (2018) these two different but not mutually exclusive approaches, are both able to

provide valuable insights into the formative impact of digitalisation on an individual's well-being in the contemporary age.

Well-being within the digital age

The relevance of well-being within a digital context is becoming increasingly proposed as a result of the progressive integration of digital media and technologies in broad areas of our modern life (Gui, Fasoli & Carradore, 2017). Digital technologies, ranging from our smartphone to the smartwatch, which records our activity, from social media such as Facebook and Instagram to the online webinars within our digital workplace, have become indispensable for most of us. And precisely, for this reason, it is essential to critically examine the effects of these technologies on several dimensions of well-being. With this being said, the fusion of well-being, in relation to the use of digital information technology, is a fairly new approach which recently has rather tended to be focused on the average usage time spending on mobile applications. For instance, on how digital screen usage correlates with well-being, on the perceived overload of choices or the constant digital information exposure (Cecchinato et al., 2019; Zeike, Choi, Lindert & Pfaff, 2019).

On this occasion, however, it is advocated by a growing number of researchers to look beyond the mere deployability of digital tools alone, but on placing the focus on challenges that users face. Which might arise, for instance, according to Beetham (2015) from the pressure to adapt in a constantly changing digital environment or in relation to digital risks on privacy and personal security (Castellacci & Tveito, 2018; Chambers & Sandford, 2018; Isaak & Hanna (2018); Houghton & Joinson, 2010; Lampe, Ellison, & Steinfield, 2007). And extending it to additional concerns, for instance the Organisation for Economic Cooperation and Development (2019) includes, like political confrontations on social media platforms, online harassment, discriminatory hostility, stalking and cyberbullying, highly sensitive graphical content freely accessible to everyone or the altered perception on the infinite abundance of information fed by an adjusted algorithm, which should to be taken into account when discussing well-being within a digital world (Cheng, Bernstein, Danescu-Niculescu-Mizil & Leskovec, 2017; Douglas, 2016; Kaakinen, Keipi, Räsänen & Oksanen 2018; Reed, 2009). In this respect, fundamental questions should be asked according to Beetham (2015) and Shah (2019) on how an individual does perceive and adapt to these matters within the process of digitalisation as a phenomenon of our time and what its role as a user is. How do people cope with these digital stressors? How do individuals define themselves

in such a multifaceted environment and feel confident about how digital technologies shape our everyday lives? These questions can be classified under the concept of digital well-being, which is intended to cover these areas, placing the individual at the centre of a digital environment with the participation within a digital world (Beetham, 2015; Shah, 2019; Gui, Fasoli & Carradore, 2017). Following on from this, five aspects from the literature could be gathered, summarizing potential influences an individual can be exposed within today's digital environment which might have an influence on their well-being they are experiencing, which are shown in *Table 1*.

However, only a handful of studies have addressed the term, conducted research and attempted a definition of the construct of 'digital well-being' (Gui, Fasoli & Carradore, 2017). In the study by Nansen et al. (2012), for instance, the term was first used in connection with the online usage of children in Australia. The study addressed the risks of digital media use to children's health and social development, in terms of the behaviour of existing interpersonal relationships online and the ability to deal with commercial online content. In addition, Beetham (2015) mentions in her report various points that she considers to be possibly destructive to the digital well-being of students and education providers, such as experienced stress in relation to a digital work environment or illegal online behaviour and places the role of digital well-being specifically into the context of the accountability of educational institutions. Moreover, Gui, Fasoli and Carradore (2017) attempted in their proposal a more precise definition. Whereby digital well-being is illustrated as '*a state in which subjective well-being is maintained in an environment characterised by digital communication overabundance'*, with the central question on how an individual is able to cope with the constraints of a digital environment with regard to the opportunities that co-exist on its simultaneous use.

Table 1

Various experiences that individuals are confronted within a digital environment

Aspect	Examples	References
Privacy and Data Protection	Privacy settings in regards to appearance online (e.g SNS); Awareness on personal information online (e.g. pictures, sharing sensitive information from self and others); Usage of secure networks; Awareness of online surveillance; Digital footprint online; Perceived control over personal data	Houghton & Joinson, (2010); Lampe, Ellison, & Steinfield, (2007); Isaak & Hanna (2018); Beetham (2015)

Online Safety	Cybercrime (scams, viruses, hacking, blackmailing, illegal activities like music or movie streams, activities in darknet and deep web); Confrontation online on social media (e.g witness or victim of harassment, inappropriate sexual behaviour, racism, discriminatory behaviour, online gossip, cyberbullying, trolling); Privacy violation (e.g stalking, doxing, swatting)	Organisation for Economic Cooperation and Development, (2019); Reed (2009); Beetham (2015); Kaakinen, Keipi, Räsänen & Oksanen (2018); Douglas (2016); Cheng, Bernstein, Danescu-Niculescu-Mizil & Leskovec (2017)
Access to information	Information overload; Graphical images of sensitive matters ('death porn', gore content, graphic violence, NSFW, NSFL); Information abundance (Fakenews, Conspiracy Theories); Information bubble (Influence on political and cultural beliefs); Altered information-algorithms (e.g used in Google, Youtube); Censorship	Gui, Fasoli & Carradore (2017); Castellacci & Tveito (2018); Tait (2008); Campbell (2004); Rapp & Salovich (2018); Davidson et al., (2010); Dhir, Yossatorn, Kaur & Chen (2018)
Social interactions and communication	Change in social interaction (e.g ghosting); Substitution in face-to-face interactions and decrease in time of these; Development and cultivation of already existing relationships Superficial relationships; Social Competition; Social Shaming	Gross, Juvonen & Gable, (2002), Sabatini & Sarracino (2017); Kraut et al. (2002); Binder et al. (2009); Shah (2019); LeFebvre et al. (2019)
Digital skills	Knowledge on usage and navigation with digital technologies; Awareness of own ICT skills (e.g reorienting oneself in new digital environment, meet changing requirements in the digital world; confident handling of software that is used for work or private use); Means to acquire digital skills (access to the internet, access to technologies); Internet self-efficacy	Jacobsen & Forste (2011); Hasan & Linger (2016); Eastin & LaRose (2006); Helsper & Eynon (2010)

Note. ICT, Information and communications technology; *SNS,* Social network sites*; NSFW,* Not safe for work; *NSFL,* Not safe for life

By taking a closer look at these attempts to grasp the construct of digital well-being, it becomes apparent that there seems to be a lack of uniformity on the definition. It appears to be similar regarding the dimensions it derives from, which have been expressed rather vaguely in prior studies. Nevertheless, in nearly all of these mentioned papers it is emphasized that digital well-being within our digital age, can already be regarded as an essential determinant of an individual's general well-being and quality of life, which why it is worthy of more attention (Beetham, 2015; Gui, Fasoli & Carradore, 2017; Nansen et al., 2012).

Extending the current domain

On closer examination, it is noticeable that the term ‘digital well-being’ as the sole construct contains little research, but the idea of how our well-being is influenced through the internet or social media platforms already encompasses more inquiries (Castellacci & Tveito, 2018). However, with an extension of the current research in regards to internet usage or on social media, to a wider range of the digital transformation processes concerning well-being, this particular area of research can contribute to valuable understandings and can thereby provide crucial insights for prospective research. Then, by extending the range of domains, such as the impact of digital systems on an individual’s subjective, psychological and social well-being, in regard to its mental health, an essential link can be established to understand the impact that a constantly evolving digital environment can pose on our well-being and the effects on the process of human flourishing. Further, since well-being is a multidimensional concept, by adding a further layer in relation to the capability approach, enables the opportunity to review the environment in which personal development can occur, where a person can strengthen and live out his/her true potential.

Thereby, particularly the academic and educational continuum can benefit from insights on well-being within a digital context, since it is increasingly concerned with the challenge of providing their students with adequate knowledge regarding digital skills in order to cover a wide range of topics such as digital creation, information literacy and digital communication. As skills in these areas will become progressively valuable in the coming years and will be indispensable for the national and global labour market in the future (OECD, 2019; Zaviska, 2019). However, it is argued that not only the operation of digital capabilities should be the sole aim of the existing educational provision. As according to Chambers and Sandford, (2018), the digital sphere, not only impacts our behaviour and decision-making processes but should be understood as social forces, posing a large impact on our understanding of reality, our social interactions, our perception of ourselves and our self-conception. And should be therefore regarded as a major influencing factor especially in young people's identity development, performance in shaping our well-being (Castellacci & Tveito, 2018). Therefore, it is advocated, besides the mere teaching of digital skills, there needs to be room for reflection of one's own well-being with regard to a digital landscape.

By means of these insights, on how such a rapid digital transformation impacts students, for instance, further considerations can be placed on how such a digital transformational process should be mediated. Whereby a holistic approach could be applied, where the learner is at the centre

of his digital strengths, and where an environment of personal and professional development can be enabled. Where students are able to develop a wide range of personal resources in regards to their digital usage skills, by simultaneously experiencing well-being and positive emotions, to foster resilience in order to prevent mental illness.

The present research

Especially in times of the current pandemic of COVID-19, where we can observe that large parts of the education and labour sector are forced to build a bridge towards digital solutions, like home-office in a digital workplace or online classes, in order to maintain employment and educational activities, this seems to be a highly promising and far-reaching field of research. As a result of the crisis, an acceleration of the already progressing digitalisation process is visible, which seems to make the exploration of such a subject-matter even more urgent. However, current studies on well-being within our digital age, are quite fragmented and only provide a limited body of research on the extent to which well-being within a digital context is experienced, what dimensions it contains and how it can be assessed. Furthermore, no theoretical foundation of a general definition could be established, so far.

Therefore, this thesis aims, besides the assessment on the digital skills of students, additionally to generate insights and explore how the construct of well-being in a digital age can be operationalized. Further, the role of digital well-being within an educational and academic context shall be determined on the premise how individuals can be given the opportunity to independently evolve and thrive within a digital environment and how this can be supported within a social and institutional context. Thus, this paper intends to initiate a discussion on the extent to which educational institutions pose a responsibility in regards to the digital well-being of their students in terms of evaluation and improvement. Hereby three research questions were posed and that serves as a basis which will be answered in the course of this exploratory research.

1. *How does the digital transformation affect student's well-being as experienced by students?*

2. *What strategies do students use to navigate the digital transformation in a way that enhances their well-being?*

3. *What do students need personally and from their environments to help them navigate the digital transformation in a way that enhances their well-being?*

Method

The current study adhered to an exploratory schema by utilizing a qualitative methodology. Semi-structured interviews were conducted with eight participants in order to explore the experiences students make online and to discover how these relate to their well-being. The interviews were transcribed and analysed according to the thematic analysis by Braun and Clarke (2006). The study was approved in April of 2020 by the ethics committee of the faculty of behavioural sciences (nr. 200445).

Background

This study was conducted at the University of Twente, in Enschede, located in the east of the Netherlands. The UT belongs to one of the three technical universities in the Netherlands, and offers additionally a wide range of studies in social sciences. Currently, over 11.000 students from 79 different nationalities are enrolled in 20 Bachelor and 36 Master programs. Furthermore, the UT is currently staffed by 3150 employees (University of Twente, 2020).

The present study was part of another research focusing on the digital capabilities of students at the UT which was requested by the Service Department LISA. The LISA Department is responsible for primary digital processes at the UT, within the three main fields concerning the university library, the ICT (Information and Communication Technology) and the Archive. LISA pursues the goal of creating a coordinated information service environment, which should enhance the administration for all employees and students within the academic administration processes (LISA, 2020). As commissioner of this research, LISA hopes that this study will provide valuable insights into how levels of well-being of UT students are affected by digitalisation processes, but also what can be done to support students in order to improve their well-being within a digital context.

This vision is also in line with the mission of the University of Twente, *Shaping 2030*. Whereby the objective of the University of Twente is to establish itself as an institution that is committed to the realisation of a digital and fair society by 2030 (University of Twente, 2020). In which a key point is how, with regard to the ongoing digitalisation process, an educational environment should be created where students can be invited to be equipped with the necessary digital skills. And as a result, lifelong learning can be made possible, to educate the coming generation of students in the next years to become confident digital citizens who, with their skills,

will drive a sustainable society forward (University of Twente, 2020). This thesis aligns with this vision and aims to contribute to the investigation of digital well-being of students, in order to provide new solutions and measures to foster well-being, which can be used in the future to further the mission of the University of Twente of shaping 2030.

Study design

This exploratory study followed a qualitative design. The study design of an exploratory research has been chosen since there consists only a small body of knowledge on how well-being in a digital age is experienced, and therefore this method has been found to be most appropriate to obtain greater insights into this particular field (Rendle, Abramson, Garrett, Halley & Dohan, 2019).

The design involved first the completion of a Qualtrics survey and the completion of an online self-assessment tool on digital capabilities, which was considered for the purpose of recruitment of study participants. Since the thesis was part of another study that examined the digital skills of UT students and therefore utilised the *Digital Discovery Tool*, in this study the tool was not used for analytical purposes but solely for recruitment processes to mobilise participants. Thereafter followed the qualitative part, which closed with an interview about the topic of well-being within the digital age.

Participants and recruitment

The study was conducted in April and May of 2020. By recruiting the participants, a broad range of different recruitment methods were used to get a wide pool of students. Different channels of communication were considered, such as the social network of the researchers and the LISA Department. In addition, the network of other associates who had contacts to the various study associations at the UT was also made use of. In order to make students aware of the study, they were approached via email to participate and further the online questionnaire of the *Digital Discovery Tool* was placed on the UT's BMS test subject tool, Sona systems. SONA is an online platform widely used in higher education to recruit students as research subjects. Participants who took part in the study via SONA received one SONA credit in return for their participation. It was determined for the inclusion criterion that only UT students, regardless of their field of study, who

were at least 18 years old and had a good command of the English language at the time of data collection, were eligible.

The participants were students of all disciplines from the University of Twente. No distinction was made between their academic background, therefore all students who were currently enrolled in their Bachelor, Master or PhD were admitted to participate. Overall, 167 students took part in the first survey to evaluate their digital skills and filled out an online questionnaire and the *Digital Discovery Tool* from Jisc. The majority of the students who participated were enrolled in the studies of Social science such as Psychology or Communication Science. In addition, the further participants were divided into Engineering and Technological studies, were in either the first or second year of their Bachelor studies and most came from the Netherlands and from Germany. The age range was between 18-28, 98 (58.6%) were female and 68 (40.7%) were male.

Of the 167 participants, a purposive sample of 8 students was selected, based on their indication of further participation in an interview regarding their perspective on digital well-being. To diversify the sample, students for the interview were additionally selected by their study subject and their study year, in order to have a broad range of different opinions and perspectives. Of the eight participants selected, two were male and six were female. Among the participants, two studied Psychology in their Master, two studied Communication in their Bachelor, one participant did their Bachelor in Electrical Engineering, another one did their Master in Spatial Engineering, one in Creative Technology Bachelor and one participant pursued a PDEng. All of the eight study participants were foreign students with four being international students and the other four being from other European countries.

Procedure

The present study was divided into two parts. First, the students were asked about their participation by the provision of a link, which guided the participant to an online survey. Before using the *Digital Discovery Tool from Jisc,* participants were asked to fill out questions through Qualtrics. As an incentive, the participants were informed in the online questionnaire about a reward for a follow-up interview. After the completion of the Qualtrics questionnaire, students were provided with instructions on how to use the *Digital Discovery Tool*, whereby participants were directed to the external website of the Digital discovery tool where they had to create an

account in order to use the tool. From the students who participated in the online questionnaire, a purposive sample of eight students was selected out of those, who indicated that they would be available for a further online-interview. In order to include a broad range of different opinions and perspectives, interview participants were selected by the aforementioned selection criteria.

Secondly, the selected students were then contacted via email and asked about their availability for an online-interview. Skype was used as a medium for conducting the online interview, enabling audio recordings of the interview. These were transcribed and after 30 days deleted. The selected students were then interviewed about well-being within a digital age. Before the online interview, the participants were asked about their consent to record the interview and the usage of their answers. After the interview, the students who took part in the interviews were compensated with 10€ vouchers provided by LISA, the commissioner of this research.

For this particular study, the participants had to attend in total either one or two sessions. First, filling out the Qualtrics survey together with the discovery tool took around 30min, participating in the second session the interview, for selected participants took approx. 30-45mins. The recordings of the interviews were saved on *Surf-drive*. *Surf-drive* is an encrypted online storage feature specifically built for research in higher education. After completion of the study, the interview data from Surf-drive was transferred to an M-drive of the supervisor and the data on the Surf-drive was deleted.

Materials

Qualtrics survey. An online survey was created using Qualtrics, in order to inquire basic properties of the student population. Qualtrics is a software tool used to compile online surveys and provides additional features for data collection and analysis. The Qualtrics questionnaire contained seven basic questions about the field of study, the current academic year, the participants age, nationality, gender and whether the student would consider participating in a follow-up interview on their perspective on well-being in a digital age or about their opinion on the *Digital Discovery Tool* itself.

Digital Discovery Tool. The *Digital Discovery Tool* is an online self-assessment questionnaire which is intended to evaluate digital capabilities of students and staff (Jisc, 2020). The *Digital Discovery Tool* has been developed by Jisc, a British registered non-profit agency that

promotes digital technologies in research and higher education institutions (Jisc, 2020). The questions are about the participant's self-rated experience and confidence in their digital experiences and skills, derived from the six different elements of the Digital Capacities Framework formulated by Jisc (see appendix X for the complete survey). It includes six skill-areas consisting of *1) ICT proficiency, 2) Information, data and media literacies, 3) Digital creation, problem-solving and innovation, 4) Digital communication, collaboration and participation, 5) Digital learning and development and 6) Digital identity and wellbeing.* According to Jisc (2020), these six capability fields are crucial for students and staff in order to succeed in a digital environment. After completing the questionnaire, one will be provided with an individual report illustrating one's current digital skill levels, which are supposed to represent the respective competencies within these six digital domains.

The function of the digital discovery tool in this study was used for recruitment purposes but not for analysis regarding their students confidence in their digital skills.

Interviews. A semi-structured interview was applied which are commonly used to gather perceptions, perspectives or attitudes and is according to DeJonckheere and Vaughn (2018) the most suitable method if one wants to explore an individual's thoughts, feelings and beliefs due to its flexible nature, supplemented by follow-up questions. Here open questions were used as well and the interviewer adhered to the detailed formulation of the questions, but occasionally prompted the participant in order to get more details on the answers. The interview scheme developed for this study consisted of 15 questions about well-being in a digital context. The questions could be divided into four domains regarding the *Influence of COVID-19 crisis on digital usage, Digital experiences on well-being, Impacting factors on well-being, Evaluation of the Digital discovery tool.* Most of the questions addressed in the interview, were concerned with the experiences students make online and how these are related to their well-being, to identify views and opinions on the subject of digital well-being. A further domain has been added to the interview schema, in response to the current COVID-19 crisis. It is thereby intended to gather the students' impressions, regarding the digital changes in their life, they might experience. The questions posed in the digital experiences domain are based on five aspects according to research explained in the introduction, all of which the modern digital user is confronted online. These aspects entail *privacy and data protection, online safety, access on information, social interaction and communication and digital*

skills. The table about each aspect and what it contains can be found in the introduction (see Table 1).

With the initial version of the interview scheme, a pilot interview with a participant was conducted, in order to assess whether the questions of the schema were not too abstractly formulated, to examine whether certain domains were outside the frame of reference of the participants or whether questions appeared difficult to understand. Based on the feedback of the pilot interview, questions were reformulated and new questions were added. Furthermore, the interview procedure was carried out according to an iterative approach in which the interview scheme was partly revised and readjusted. This also occurred for instance after the first interview in which a question has been removed and another has been reformulated. The final interview schema is to be found in Appendix C. Overall 8 interviews were conducted. The length of the interviews ranged from 30 to 69 minutes and on average an interview was about 44 min of length. The interviews were conducted between April and May of 2020.

Data Analysis

The answers from the recorded interview of all participants were transcribed with the software tool Amber Script. In order to ensure data protection, personal, identifiable information, such as the names of interview participants, were changed to disguise their identity. The raw interview data was thoroughly read multiple times in order to get familiar with the data.

From that basis, each fragment was then assigned to a code according to the method of constant comparison and by utilizing the software tool Atlas.it. With the method of constant comparison, the aim is to identify significant patterns by continuous comparison between the respective interview transcripts, in order to extract interpretations from the data and thus establish a consistent stratification of evidence of the phenomenon (Glaser & Strauss, 1967; Wong, 2008).

Different codes were used for each of the four domains of the Interview scheme: 1. *Influence of COVID-19 crisis on digital usage, 2. Digital experiences on well-being, 3. Impacting factors on well-being, 4. Evaluation on own digital well-being*, which has been linked to contextually answer the posed research questions. These particular domains emerged through the collection of a wide range of literature on specific examples of various experiences that individuals are confronted within a digital environment related to topics like *Privacy and Data Protection, Online Safety, Access to Information, Social interactions and communication, Digital Skills*, which

can be found in the Introduction (see Table 1). These examples together with the research questions provided a systematic basis for the development of the interview scheme.

Based on the responses about the experiences of the participants and the existing set of literatures, these responses could be gathered and deductively coded, for example if the participants referred to certain examples, leading to the further development of the coding scheme. This was possible, for example, in relation to the topic of the general experiences that the participants experienced within a digital environment. However, this was different for experiences where no literature existed, such as in relation to the COVID-19 experiences of the students. In this case, it was possible to code recognition patterns related to the subject-specific question, for example whether their digital usage had increased since the COVID-19 pandemic. For this purpose, purely inductive coding was used. This inductive coding process was also applied when it came to the *'individual factors influencing well-being'* that participants considered for themselves. These were then initially named as one single code, but if there were several overlaps in content, it was evaluated whether a new code was formed. For example, in response to the question *'What helps you to maintain or enhance your well-being in a digital environment?'* Some participants initially answered *'to share what you're feeling'* or *'time management'*, however, with more and more students describing that it generally helps them to take breaks or reduce their digital screen time, the code *'Going offline and taking breaks'* was established.

From time to time difficulties regarding the coding process of the interviews arose. Here, for example overlaps between different codes were encountered which had to be assigned to a single code. Thus, for illustration, participants gave many different and sometimes vague statements concerning how they felt in relation to negative experiences they experienced online. Among them fell for instance expressions of 'feeling unhappy', 'sad', or 'stressed' which were grouped under the code 'F: Unpleasant Feelings'. However, other emotions such as 'Fear' or 'Paranoia' were coded separately due to the fact that they were frequently mentioned by different participants on separate occasions.

Moreover, challenging was as well to recognise the emergence of a potential new construct. Here participants sometimes referred to noticeable incidents which have not been mentioned in this form before and therefore a new category had to be created which in some occasions, made it difficult to categorise correctly. For instance, some participants stated that they occasionally feel that by simultaneously socially engaging online, that technology drives them further apart from

another. For that reason, a code was created named *'Technologies can put us further away from each other'*.

Typically, the average length of a fragment was 3 lines. Overall, 51 codes were gathered and a total of 12 code groups were obtained. From that basis, the 51 codes were then thematically analysed according to Braun and Clarke (2006), formed into six clustered different themes that could be used to answer the three research questions, which will be explained in the following.

Themes and meanings

In general, the participants reported on a variety of experiences concerning how they perceive the digital transformation in their everyday and professional life, but also what they felt to be important to increase their own digital well-being and what they imagined to be supported by their environment. Overall, six themes could be gathered from the information and data of the eight interviews. All themes that could be identified through the analysis of the interviews were summarized for this purpose in Table 2 in the *Result*s section with exemplary quotes of participants and are further described and elaborated.

Further, it emerged that the themes 2, 3 and also 4 were particularly well established for answering the main research question *'How does the digital transformation affect student's well-being as experienced by students?* These three themes summarized general digital experiences the students reported which were for instance primarily concerned with the lack of online safety, negative experiences online, but also the perceived importance of digital skills and the personal value of digitalisation in regards to the extent to which these influence their well-being within a digital context. In addition, Theme 5 was instrumental in answering the sub-question *'What strategies do students use to navigate the digital transformation in a way that enhances their well-being?'* which highlights the obstacles students face when it comes to digital well-being but also how they are tackled with individual strategies. Finally, the sixth topic, which emphasised the participants' reflection on their own digital well-being, allowed the third sub-question *'What do students need personally and from their environments to help them navigate the digital transformation in a way that enhances their well-being,* to be answered.

Results

Overview of the themes, related codes and quotes from the participants

Table 2
Overview of main themes, their related codes and typical quotes from the participants

Themes	Domains	Related codes	Quotes
1. The COVID-19 pandemic as opportunity for digital self-advancement	Influence of COVID-19 crisis on digital usage	CC19: Increased digital usage CC19: Gathering of new digital skills CC19: Increased need for (physical) social interactions CC19: Feelings of social isolation CC19: Negative emotions CC19: Difficulties adaptation digital shift CC19: Reflection on digital consumption	'I'm discovering many things online that I didn't know about. And a lot especially for social life, a lot of Apps or web based themes to develop your quality of your general knowledge.' 'I must honestly say regarding technology, I became more advanced in a sense to use technology all the time in order to update myself, to communicate with my teachers, communicate with my project members, instead of meeting up at Uni with the people.' 'Ever since we've got this situation that the current situation regarding Corona, I'm using the technologies more often to communicate to people on the professional side.' 'So now I'm just using my PC like almost 24/7.'
2. The lack of control over own data online creates feelings of uncertainty and resignation	General digital experiences	Lack of control over personal data Perceived importance on data protection Awareness of privacy online Uncertainty of privacy online Strategies on personal data protection Unawareness of privacy online	'I mean, it's difficult, you just rely on the terms and conditions of every portal, website you're log in to use. Yeah, they say it is private. But how can you weigh that? You don't know.' 'You don't even know what kind of information people can retrieve from you and what kind of information you actually give away to the people working with your data.' 'It's kind of scary that sometimes Google knows what interests me and then suggests me to buy' 'And when it comes to privacy, as you say, they try to monitor where the user goes. So, they are tracking. So, this affects the way people use these things. Yes, and that's becoming part of life.' 'I don't really mind on the other side.'

3. Negative events online are common and often formative, yet stimulate reflection	General digital experiences	E: Cyberbullying E: Cybercrime (Scams) E: Cybercrime (Being hacked) E: Dealing with fake news E: Dealing with information overload E: Hostile interactions online E: Stalking F: Unpleasant Feelings F: Fear F: Insecurity F: Paranoia	‘I actually know a person who actually stalked and hacked my phone. ‘It was like a social media platform that was in. At that time, it got hacked. And I would say it was kind of cyber bullying because the person or the persons that hacked my account, they basically changed all of my information and put up until they put a bunch of stuff on top of my account.’ ‘It was very, very disturbing. And I still remember it like yesterday, how frightened I was.’ ‘I was a bit shocked. I was like 'Wow that was traumatizing'. After that I was a bit paranoid to connect to any public Wifi.’ ‘The most important thing is: I learned, I learned a lot. Like I learned that, if I have other accounts online, then I need to be very careful.’
4. The significance of digital skills and the perceived value of the digital transformation	General digital experiences	Easy access to communication Easy access to information Simplicity and Efficiency Work opportunities Access to education Maintenance of normal life Perceived importance digital skills Developmental learning process to acquire digital skills Self-assessment digital skills Digital world as a support system	‘That’s so important, especially as a student, you have to be very skilled. And if not, I think that's very inhibiting to your functioning as a student. Yeah. And generally, I think not only as a student, but when I observe older adults who have not much skills in using technology or digital media, they have many difficulties, for example, my grandma, she always wants me to help her.’ ‘Very, very, very important, I think because they make your work so efficient. And you learn a lot. And then not only you increase your knowledge in stuff, but also you're able to teach others to do people that are not in need or that don't have the access that you get to be a very good way to also teach them.’ ‘But I also think with the digital area and new skills we are evolving to think more creatively and how to manage, like creative thinking and critical thinking. For instance, how to use really complex, systems like complex platforms that requires you to think complex in order to use that system.’ ‘I think knowing the digital advancements and digital advantages helped me to, for instance, connect better with a lot of people all around the world.’
5. Various obstacles on digital well-being are encountered with individual strategies	Impacting factors on well-being	MDW: Enhancing digital skills MDW: Certainty on privacy and security MDW: Going offline and taking breaks	‘I would say that the most crucial part that led to my well-being and contributes to my well-being, is the aspect of social interactions. Because I really need social interactions in my everyday life (...)’

		MDW: Increase social contacts MDW: Awareness creation MDW: Self-help DFDW: Digital gap DFDW: Cognitive overload due to heavy consumption DFDW: Difficulty to digitally adapt DFDW: Lack of control digital threats DFDW: Lack of privacy DFDW: Information overload DFDW: Effects on physical health DFDW: Through technology further away from each other	'So what I try to do is I put an alarm which reminds me after 30 minutes. Every time after 30 minutes, I walk, drink water, exercise.' 'Yeah, to limit that or even seek out some positive news.' 'So, for example, when you see that you are spending too much time online and you're getting a headache or you're getting anxious, maybe too then and, you know, just put away the phone for an hour or something like that. And. So, yeah, this balanced awareness kind of. And what can decrease the well-being, I think of it.' 'And I think that's a very difficult issue as well when people start on a different basis and start on a different level. And then I sometimes feel like that not knowing some skills can even damage one's self-esteem, because then you feel like everyone else is better than you and everyone else is advancing that technology.'
6. Reflection on own digital well-being and the need for digital awareness creation	Evaluation of own digital well-being	Self-assessment digital well-being Support from personal environment Support from professional environment	'I think so, because I would say that I'm quite aware of what I need regarding my yeah, my interaction with technology right now. And then I also know when to stop or what to look for. So, you know, and I'm usually I can do everything mostly that I want to do with digital media. So that's fine.' 'So, I got a proficient for this.' 'Yeah, there needs to be proper education and proper help or support so that everyone stays on the same level, because at the end of the day, we are still students and everyone should receive the same amount of help from the university.'

Note. CC19, Change COVID-19; E, Experiences; F, Feelings; MDW, Maintaining digital well-being; DFDW, Decreasing factors digital well-being

Description of the themes

1. The COVID-19 pandemic as an opportunity to digital self-advancement

Although the COVID-19 outbreak creates feelings of isolation and uncertainty in some of the questioned students, it seems that it also gives rise to the development of digital skills through greater digital use. Hereby, almost all participants stated that they had experienced a considerable increase in their digital consumption since the COVID-19 pandemic. Thus, one respondent stressed, for instance, that *'The amount of time that I spent on using technology increased. Like in the sense of using the internet, using any kind of technology or technological systems increased a* , whereas another participant stated that before the COVID 19 crisis, his digital life was more of a *'compliment, using it to ease your life (...), it was just a choice, a matter of choice and efficiency. But now it is the centre of your life'.*

Furthermore, it is noticeable that a lot of the students report on the discovery of new digital programmes, on the adaptation to the digital environment but also on the willingness to learn new systems, to gain new experiences of digital education but also communication alternatives. Since students were now spending more time at home online and additionally their study content was now offered online as well, students had to rapidly adapt to this new digital education alternative. It seems that the COVID-19 lockdown, accompanied by the profound digital shift of the University, could positively impact some students' digital skills development, as one participant expressed: *'I learned a lot of skills, on how to use all the different online platforms to make my work effective (...)'.* Thus, another participant discussed new discoveries he was able to make, '*I'm discovering many things online that I didn't know about. And a lot especially for social life, a lot of Apps or web based themes to develop your quality of your general knowledge'.* A further participant was as well able to reflected on her digital development she observed during the past weeks '*I must honestly say regarding technology, I became more advanced in a sense to use technology all the time in order to update myself, to communicate with my teachers, communicate with my project members, instead of meeting up at Uni with the people*'.

At the same time, however, there were difficulties for students to adapt to the almost entirely digital environment, one participant reported: *'I feel like I've become more and more tired from staring at the screen the whole time'*. Another participant also reported that: *'For me it was a half efficient and half not efficient because depending on your connection, you can miss out on a lot'* hence it was *'a huge adjustment'* for her to move her regular life into the digital sphere. These

particular examples show, however, that not every student was able to greatly benefit from the increasing digital use which was imposed upon them and not necessarily resulted in them enhancing their digital skills during the time of the COVID-19 lockdown either because they experienced physical symptoms by staying too long in front on a screen or due to the experienced lack of a stable internet connection resulting from the still remaining digital gap in different countries outside from Europe. As a student pointed out, when she moved back to her home country to Sint Maarten to be with her family due to the COVID-19 crisis, she was frequently encountered with an insufficient internet connection when she attempted to attend live lectures or had difficulty completing and submitting assignments.

2. The lack of control over own data creates feelings of uncertainty and resignation

Due to the increased digital use, also in the context of the COVID-19 crisis, a number of students revealed that they had become more aware of the issue of privacy and their personal data online. In general, this subject appears to pose a significant role for the majority of the questioned participants in terms of their perception of their interaction within a digital environment. Thereby however, a great number of students described how they are mainly exposed to the experiences of a lack of control over their own digital footprint, here for instance a student expressed: *'I mean, it's difficult, you just rely on the terms and conditions of every portal, website you're log in to use. Yeah, they say it is private. But how can you weigh that? You don't know'.* This lack of control frequently results from the dependency on certain digital sources the students need to use, such as the content on websites or the use of accounts: *'At first, you had the choice to not access this website to refrain from them. Just use the ones that you need or which are important for you. But now, you don't actually have a choice because you need those tools.'* Here it becomes especially clear that the participants find it difficult to act self-determined to protect their personal data online, similarly another participant describes this loss of control she perceives: *'At the same time, I mean, you cannot be very, very careful because you can't do anything'.*

Further, the participants seem to encounter and cope to the experienced lack of control over their digital footprint in different ways, as to some, this seems worrying: *'It just makes you feel insecure, kind of, because you know that everywhere, every side, they're syncing all the data, all the touches you make is being monitored.'* on having no insights and no influence on what information might be collected when they engage in their usual online activities, or like another

participant reveals on what information they disclose online and how this data could potentially be used: *'You don't even know what kind of information people can retrieve from you and what kind of information you actually give away to the people working with your data.'* However, some students in contrast responded rather differently to the uncertainty of their data indicating a considerable sensation of resignation, as one participant stated: *'So, yeah, just take the data. If the website wants my data (...), take it. I have no control over it'.* Moreover, it became noticeable that this resignation could also be reflected in feelings of detachment in regards to the issue of privacy, as one student described *'I don't really mind on the other side.'*

Nevertheless, the awareness and perceived importance of privacy on the internet is a significant issue for many participants and thus many are undertaking a number of precautions to protect their privacy and data online. Thus, for example, one participant reported: *'I just close my webcam and mute my mic, these are the only things I have control over'* or on another occasion he describes: *'I change my IP and sometimes I work with different IP addresses. Sometimes I try to hide my IP because of some information you see, use your location or use history. Based on the history they give you information (...)'.* Moreover, a different student explains *'I make sure to take a look at the cookies, for instance. Are they just for promotional purposes or for statistical purposes or whatever'.* Furthermore, another student described her personal precautions with regard to social media to protect her personal data on the internet: *'But I personally just try to be in the background so I'm not too much on social media or give away too much information that people can use against me eventually (...)'.* Here it becomes clear that the students adopted their individual precautions in order to protect their personal data online which can be covered by a wide range of different measures.

3. Negative events online are common and often formative, yet stimulate reflection

Negative experiences play an important role in dealing with digital media and almost all participants were unfortunately able to report on a wide range of unpleasant experiences. The most prevalent experiences the participants shared were thereby incidents like cyberbullying, cases like hacking attacks or online scams. Thus, a student expressed her experiences with privacy violations due to hacking and cyberbullying: *'I think it was either primary school or high school my 'high five' account (...) but, yeah, it was like a social media platform that was in at that time and it got hacked. And I would say it was kind of cyberbullying because the person or the persons that hacked*

my account, they basically changed all of my information and put up until they put a bunch of stuff on top of my account'. Further another participant shared his story about a hacking attempt on his computer: *'Something happened to me when I was in France. I was there on the public Wi-Fi. And then suddenly somebody took control over my computer. I couldn't do anything but I would see pages being opened, everything became red on my computer',* further another participant on that occasion referred to a privacy violation by a third person she had experienced: *'I actually know a person who actually stalked and hacked my phone'.* Here, it becomes noticeable that these experiences the participants shared were not just trivialities but actually experienced cybercrimes and that these evoked strong negative emotions such as distress, anxiety or apprehension, as one participant described *'It was very, very disturbing. And I still remember it like yesterday, how frightened I was'.*

However, these experiences could partly contribute to a change in their behaviour by making some of the participants much more careful in their digital activities online, in the same vein, however, these experiences gave a number of student's room for self-reflection on the potential threats within a digital environment.

4. The significance of digital skills and the perceived value of the digital transformation

All of the questioned participants were aware of the growing importance of digital skills in their private and professional lives. Further to that, some of them emphasized implications such as dependency or disadvantages in the future if one is unable to acquire and develop new digital skills, thus a student expressed: *'In general, it's extremely important (...) everything, like a lot of work-related fields are now using the internet or using any kinds of new platforms to interact with their employees. So, you need a lot of digital capabilities to meet those standards that people require you to have. So, if it's if you do not know how to use normal 21st century skills, you or it's pretty hard to find a job then'.* Further, another student also stresses her perspective on the importance of digital skills as a student: *'That's so important, especially as a student, you have to be very skilled. And if not, I think that's very inhibiting to your functioning as a student (...) and generally, I think not only as a student, but when I observe older adults who have not much skills in using technology or digital media, they have many difficulties, for example, my grandma, she always wants me to help her.*' Here it can be emphasized that the younger generation in particular may act as an advisory role for the older generation which is often is less sophisticated in terms of technology as

a result of their age and their lesser degree of involvement regarding technical subjects. This could also have an influence on their well-being.

In addition, all participants provided many examples where they acknowledged and appreciated the benefits and valued the omnipresence and the influence of the digitalisation in many areas of their lives, in regards to access to information, easier access to social interactions and information, work opportunities, the simplicity and efficiency the digitalization brought to their lives, or the maintenance of their normal lives during a global pandemic, as one student pointed out: '*The positive thing about the digital era is (...) the communication the ease of communicating with people around the whole world (...) Like, it just made globalisation easier. It made connecting to people millions of miles away from us easier. And it kind of forms a more global culture. And that's what I actually also like about the digital world, because everything is more accessible to you'.* Or how an international student defines the value of digitisation for himself: *'So, I think in a way, the digital world serves as a kind of support system, even if it serves as a support system at distance. So, when you feel as if you're alone, like for like I'm studying (…) and if you for example, if you tried to contact friends and if your friends are currently are busy and don't have time to get back to you, you can still contact your family that are further away, though'.* Moreover, another participant described: *'So I think the efficiency and the fact that we can still live our life with even crises like this is a very good thing (...) it's the technologies that are helping us to do this'.* This clearly shows that students appreciate the benefits and the merits of the digitalisation as such and the growing importance of their own digital skills in the future, but as well cherish the offers of a digital world can provide in these current and challenging global circumstances.

5. Various obstacles on digital well-being are encountered with individual strategies

When it comes to maintaining well-being in a digital environment, the perspectives of the participants differ widely and an immense number of potential factors are mentioned which can endanger the digital well-being of the respective participants. Factors are stated such as the insufficiency of control over privacy and especially online threats are raised as major impediments to well-being in a digital context as one participant points out: *'I think decreasing factors are unsureness about privacy'.* Another noted the lack against the investigation of digital crimes: *'This is the most the issue of security as well. Yeah, because in the days back in the days, if you have something happening in your house you could easily contact the police. But here [online], if*

something does happen…'. However, disproportionately, the problem of the perceived inferiority was identified in relation to the lack of digital skills, as a student expressed: *'And if you are not very skilled with it [digital technologies], I think that it can give you the feeling that you are dumb or something'* or as another participant described: *'But for those who do not have this common understanding of technology like for instance our parents, for them it would cost like maybe depression or stress or any other mental related issue'.* Additionally, participants described many other factors such as the feeling of social distraction, information overload, the digital gap or the feeling of cognitive overload due to heavy digital consumption as a student indicates: *'Being online right now, I became much, much more stressful because I need to deal with so many things at the same time. (...) The digital area, there are a lot of things that make it (...) a lot easier to be efficient and to be fast and to be productive. But that also comes with the cost of being really focused and not losing concentration (…) but because you are not able to focus on one thing that also increases your stress level. So, with all the digital and technological things that I faced over the few years, I noticed that I became a lot more stressed than before'.* Here it becomes apparent that there are often no clear boundaries between the digital workplace and the digital social space, which seem to disappear in the midst of home office possibilities, and that some participants feel strained by the cognitive overstimulation due to the constant digital usage.

At the same time, however, it becomes apparent that the participants possess strategies which help them to maintain their digital well-being and further equip themselves with self-help strategies to reduce the obstacles of their perceived decreasing factors on their digital well-being. On that occasion, many participants mentioned that it helps them to maintain their digital well-being for example by taking a break from the digital world and going offline for a while as one participant expressed: *'So what I try to do is I put an alarm which reminds me after 30 minutes. Every time after 30 minutes, I walk, drink water, exercise'* or another participant illustrated: *'Sometimes I try to go out, just cycle around like in the forest. I observe things outside.'* However, it is noticeable that very different methods seem to benefit the students to maintain their well-being within a digital environment. For instance, one participant described the essential role that social contacts played for her or another outlines the importance of sources of positive news for them.

6. Reflection on own digital well-being and the need for digital awareness creation.

Although a generally elevated level of self-confidence can be observed among almost all participants in terms of their digital well-being as well as their digital skills, the participants remain aware of hurdles such as the digital gap. Further, five participants reported having a score of 'capable' in relation to the domain of digital well-being according to the Jisc Discovery tool and three participants indicated having a score of 'proficient'. Hereby one student noted: '*I recognize myself under capable because it means I'm actually not under average, not above average but striking, like always learning or on the growing side'.* And another one illustrated: *'I found out that I was in between capable and proficient in it, which was very well. I would say it was a great discovery.'*

Furthermore, some students deliberately call for the involvement of educational institutions in the maintenance and encouragement of digital literacy, privacy and security awareness on the internet in relation to the subject of well-being within a digital environment. Here a student expressed: *'Yeah, I think that at university especially, some persons have problems to use programs like SPSS or Atlas. These programs are very important for example in my studies. And I wish that the university would give some courses to help us to learn skills in these programs and to use them effectively. This would be very helpful and nice, I think'.* Furthermore, another one pointed out: *'But I noticed sometimes that in regards to digital skills, if I don't really get when I have to work, for example, with a specific software or specific tool, which I have never used before. The expectation is there for me to already know how this works and how you know how to operate, does sometimes stress me like some. That way the university can have some more offers or make people aware of the offers of help that it can provide in understanding those types of programs. Some information on certain skills that you need to have (...)'.* In the same vein, also another participant mentions the suggestion of educational support: '*It can be academic support from the university. You can offer, for instance, workshops and how to use excel or whatsoever'.* And another student who explicitly addresses the issue of privacy online and thereby encourages academic institutions to become actively involved in raising the awareness: *'(...) it's like if the administration of university for example says don't use this platform because, you know, it has some leakage and privacy issues, then I know but until then I would use it since I would just trust it from that what I understand from the terms and conditions on web-sites.* Most students hereby generally agreed that there should be a greater involvement of educational institutions in raising awareness of issues such as digital skills, and issues like privacy online in regards to digital wellbeing, in order to enable

students to engage with these matters and provide them with information in the form of additional, voluntarily courses when needed, to become more confident in using the diverse and growing pool of digital media, technologies, systems and programs that they will need not only for your student work life but also for they professional life in the future.

Discussion

In order to answer the first research question, *'How does the digital transformation affect student's well-being as experienced by students?'* the study was able to reveal a multitude of different viewpoints, perspectives and personal stories of participants on how they perceive the impact of the digital transformation pose on their well-being. Students indicated for instance that the digital transformation is appreciated and valued as an opportunity for independent education at the academic and professional level. Especially the COVID-19 crisis highlighted a growing realisation of the rapid digital shift, which many students were confronted with and increasingly suffered from the isolation of the lockdown, but were nevertheless able to counteract these feelings through digital media offerings which allowed them for instance, to contact family and friends.

Further, students expressed a high degree of confidence in their digital skills and the importance of their overall value and preservation, particularly in order to adapt sufficiently to today's quickly changing digital literacy, but also to meet the needs of the future labour market. This in particular seems to help the participants to a subjectively increased sense of well-being, as it provides them with a greater sense of independence, such as older generations who often have to rely on others when confronted with digital, systems media or technologies.

At the same time, however, it is worth mentioning that some of the respondents experience a sense of distress in the way they perceive the rapid digital transformation processes around them. This ranges over a wide spectrum from digital exhaustion, the experienced digital divide and the challenge of digital adaptability, lack of control and uncertainty about privacy settings, the partial overburdening of general professional expectations, to influential negative experiences online.

When answering the second research question, *'What strategies do students use to navigate the digital transformation in a way that enhances their well-being?',* the study was also able to illustrated that the students are seemingly aware of the extent of the matter of their well-being within the time of the digital transformation and that they are evidently using strategies themselves that can assist them to enhance their own well-being. Since, as the previous paragraph shows, the interviewed students tend to display a high level of digital use, which, however, is also partly experienced with distress and negative emotions, as some of the students impressively portrayed.

These strategies are very individual and very wide-ranging. Students gave examples like taking a break from the digital world and going offline, improving their digital skills. Here, the majority of the participants indicated that it benefits them, for example, to take a walk, take regular

breaks from their digital workplace or to pursue a hobby and limit their general screen time in order to minimise excessive consumption and avoid headaches. It was also frequently mentioned by students that it would contribute to their own well-being if they kept their digital knowledge up to date and further educated themselves on certain tools for their private and professional usage. In addition, other individual approaches were mentioned by the students as well, such as seeking out for positive news, stress management through listening to music, writing down their negative feelings they are experiencing at the moment or for some it helped to socialise with friends on social media.

Finally, regarding the third research question *'What do students need personally and from their environments to help them navigate the digital transformation in a way that enhances their well-being?'* the study, concluded that even though it has been shown that students already use individual measures and strategies for themselves which help them to maintain or even enhance their well-being within the digital transformation, nevertheless they would welcome assistance from their environment to help them cope to navigate with the strains a digital environment can impose. Thereby, there was a consistent trend among some students to mention that it would help them if educational institutions were more committed to maintaining and promoting digital literacy, privacy and security awareness on the internet as well as providing more advice to ensure that students were given more guidance on matters regarding cybercrimes.

Interestingly, the suggestions of the students were mostly centred around the enhancement of digital skills. In the same vein, many students claimed thereby that from times to time they feel simply overwhelmed by the digital challenges that are sometimes imposed on them.

However, others consider it for instance as well crucial to raise a general sense of awareness on the part of the university, concerning the importance of well-being in the context of the digitalisation.

Discussion on the findings

Distinctly, based on the interviews, it became evident that the students in this study generally perceived and rated digital skills as a high priority. Not only within their professional work as a student at the University to operate relevant programs and systems, but also in their private life with media-relevant digital technologies. Digital skills were seen as indispensable for all participants together with their preservation. This is generally in line with previous research, where digital skills are embraced and made use most often by especially the younger generation, debated as *'digital natives' (*Prensky, 2001b), defined according to Bennett and Maton (2010) as individuals from rather affluent privileged socio-economic strata and higher educated sectors from which our students can also be counted, who generally enjoy wider access to these digital resources.

Besides that, all students experienced the sudden digital shift related to the current COVID-19 outbreak with a rapid increase in digital usage. A number of students indicated that this increased digital use, whether for University or personal use, had been profitable for them to discover new programs and to improve their digital skills. This seems to be partly consistent with current research. A moderate correlation between frequent digital usage and a simultaneously improvement in digital capabilities was also found in a study by Thompson (2013). Showing that productive habitual learning interaction can be created. This might lead to a better understanding of the digital technology with the tendency to acquire necessary characteristics, which are helpful to obtain digital skills. This productive habitual learning could result from an increased intrinsic interest on the part of the individual regarding digital technologies and which subsequently leads to the motivation to closer engage with the digital technology (Matzat & Sadowski, 2012). However, van Dijk and van Deursen (2014) also imply that apart from motivation, continuous effort also plays a crucial role for the necessary stimulation to obtain digital skills, which leads to an increasing cycle of motivation. This seems to be interesting since it has been argued by Kurelovic, et al. (2016) and Maier et al. (2012) that the frequent exposure for instance to rapid communication technologies like instant messaging, are associated with a decreasing learning performance, inhibition in multitasking attention span or information overload. Therefore, it must be considered that not the sole exposure to the elevation of digital usage, necessarily leads to an improvement in digital skills - as the research landscape shows, it appears that a number of various characteristics and factors seem to be essential if someone is able to acquire a set of digital skills. Thereby it can be also reasoned that students at Technical Universities might be more likely to appreciate Technology

and might enjoy the opportunity to learn new digital features, which might enable them to be motivate to expand their existing digital skill set, implying that it might arguably be more difficult to evoke a digital learning experience in individuals which possess a less strong curiosity or interest in digital technologies (Schreurs, Quan-Haase, & Martin, 2017).

However, the increased digital use does not seem to lead to a positive outcome for all participants in this study. In this context, some participants describe that they report physical symptoms such as headaches, fatigue or eye problems caused by staring at the screen. This symptomatology can be defined according to Bali et al. (2014) in this particular context to the *Computer vision syndrome,* which often results due to overstrain of the eyes by a display. Since especially the eyes perform particularly strenuous work when operating a computer screen, they have to make constantly changing adjustments to different brightness levels and distances. This can for instance lead to a lack of tear fluid or its excessive evaporation, causing damage to the cornea and conjunctiva, or in combination with unfavourable lighting, be a recurrent cause of headaches due to the extensive visual strain (Bali et al., 2014).

Further, as well other students seem to experience the digital transformation as challenging, not only because they encounter difficulties, but simply because they lack the digital capacities to adequately adapt to it and realize it, such as due a stable internet connection or adequate hardware, due to scarcity of resources and financial assets. Here Matzat and Sadowski, (2012) imply this digital insufficiency has been proven to lead to a disadvantageous experience for the respective individuals by depriving them of a wide range of access to information, entertainment, communication and transactional opportunities offered by a digital medium, which can be commonly referred to as the digital divide (Dijk & van Deursen 2014). Thus, meaning that beyond the rapid technological progress most pronounced between industrialised and developing countries, a large number of people are denied access to these technologies and the opportunities they offer. As the University of Twente is an international University, the issue of the digital divide should be taken into consideration. Especially since, students come from different regions of the world, including developing and emerging countries which are not characterized by the digital progress and in particular in times of the COVID-19 outbreak, where some students travelled back to their home countries, to offer the same opportunities to educate their students appropriately.

The second set of findings revealed that besides the increased digital usage during the COVID-19 crisis, participants have become more aware of the issue of privacy online and that they

further were facing a simultaneous lack of control over their personal data which lead to feelings of uncertainty among some students. According to Fire, Goldschmidt and Elovici (2014), these concerns are not unjustified as especially online social networks, such as Facebook, ultimately fall into disrepute due to privacy violations, not only with the systematic collection of personal information of their users, but with the further resale of the data to third party enterprises, which had been demonstrated with the *Cambridge Analytica Scandal*, raising considerable security burdens (Debatin, Lovejoy, Horn & Hughes, 2009; Lee, 2018; Schneble, Elger & Shaw, 2018). This creates mistrust among certain individuals and may impact their online behaviour including their well-being as they no longer feel comfortable in a trusted environment and do not have the feeling that they are being allowed to explore the digital realm. Apart from mistrust, however, a sense of resignation seems to prevail among a great number of users, similar to several of our participants, in which only convenience and advantages are appreciated but no risk is perceived in privacy violation within the digital sphere. While these individuals are still aware of the issue of privacy online, this contradiction between careless behaviour and concerns about the simultaneous lack of privacy can be described as a privacy paradox (Gerber, Gerber and Volkamer, 2018; Williams, Nurse & Creese, 2017). Thereby, reasons such as the privacy calculus theory states that users decide after a cost-benefit calculation whether to disclose personal data, lack of rationality such as past experiences and personality traits as well as incomplete information about the use of their data or the context-dependency of the privacy violation, are approaches trying to explain this phenomenon (Gerber, Gerber and Volkamer, 2018).

However, not only the opacity of the privacy of the data online seems to be a recurring subject worthy of reflection, but also the negative experiences online within a digital environment, which most of the participants reported on. Here, Lee, (2018) states that those unfortunately are not uncommon as the number cybercrimes, in forms of scams, hacks or the spread of misinformation, for example, has risen considerably in recent years and thus more and more users made unpleasant experiences and were exposed to a number of fraudulent behaviour online. Here it is usually still difficult to report these acts to the police or that victims of such cyber acts deliberately choose not to do so, as they feel too ashamed (Lee, 2018). This tends to leave individuals in a very vulnerable state by not only living through strong negative emotions, like shame, paranoia or fear, together with the consequence of for instance the loss of money, identity theft or information fraud dissolve in a changed behaviour, where many participants now appear

to be more cautious, more reserved and above all more suspicious when engaging online (Martin, 2018). These results can also be found in other relevant studies on this area, in which the main finding is a significant decline in the well-being of users when faced with similar sensitive experiences (Rainie et al., 2013). However, differently here in this study it was shown that not necessarily the participants indulge in their negative experiences but that their retrospective evaluation also raises a reflective viewpoint and helped some participants to regain their strength to adequately respond in the future to these digital threats.

Alongside these outcomes, it emerged that a great number of the participants were already using different strategies to preserve their well-being to overcome the obstacles posed by the progressive digitalisation experienced in both private and professional life. Hereby, they expressed that they attempt to maintain their digital skills up to date. According to current research, the continuous digital changes and expansion of information and communication technologies are increasingly leading to confusion and uncertainty among users, while acquired knowledge is quickly becoming obsolete, causing frustration and dissatisfaction. According to Lauber (2016) and Tarafdar, Tu, Ragu-Nathan, and Ragu-Nathan (2007), this emotional reaction can be classified under the so-called techno stress or digital stress, in which, for example, the user is overwhelmed by new technical devices or systems (Reinecke et al. 2016). Stress is thereby understood as a construct that arises from the interaction between an individual and the demands of a situation. Every stress reaction therefore has a distinct subjective component. One and the same stimulus is perceived in a certain situation can thus be of different significance for one person than for another (Reinecke et al. 2016; Shu, Tu & Wang, 2011). Similar experiences in regard to technostress are also mentioned by some of our participants as they frequently experience that their environment consciously holds an expectation of being personally responsible for the maintenance of their digital skills, which creates pressure on them, especially during their studies, since they are often confronted with digital programs or challenges that are particularly challenging to solve without prior digital proficiency.

The second frequently described method of avoiding digital stress and increasing well-being was for many students to go offline and take a break from the digital turmoil. Again, we are seeing a growing body of research being conducted, as with the increasingly blurred boundaries between digital work at home and the actual work that students, in particular, are regularly confronted with, it is difficult to set clear boundaries and, which often leads to overwork and

increased levels of stress (Leung, 2011). According to Leung, (2011) the more permeable the boundaries between work and private life are, the more likely it is to have negative consequences in terms of health, increasing the risk of fatigue and burnout. However, regular breaks can not only help to relieve the academic stress for a while, but also the virtual stress and to temporarily switch off. Here it is recommended according to Michel, Bosch, and Rexroth (2014) to undertake mindfulness exercises or even meditate or use other stress management interventions. In this context, it might be useful to provide a set of such courses for students offered by the educational institution. The results also revealed that there were several students who expressed a particular demand. Here one could contemplate additional or voluntary extracurricular courses, which, in addition to traditional digital skills training, students could learn methods to help them cope with (digital) stress and what they could potentially do to improve their well-being. In some companies, such work-life balance trainings have been attracting attention in recent years as research shows that these can reduce the risk of illness and absence of employees (Michel, Bosch, & Rexroth, 2014).

The extension of the initial theoretical framework

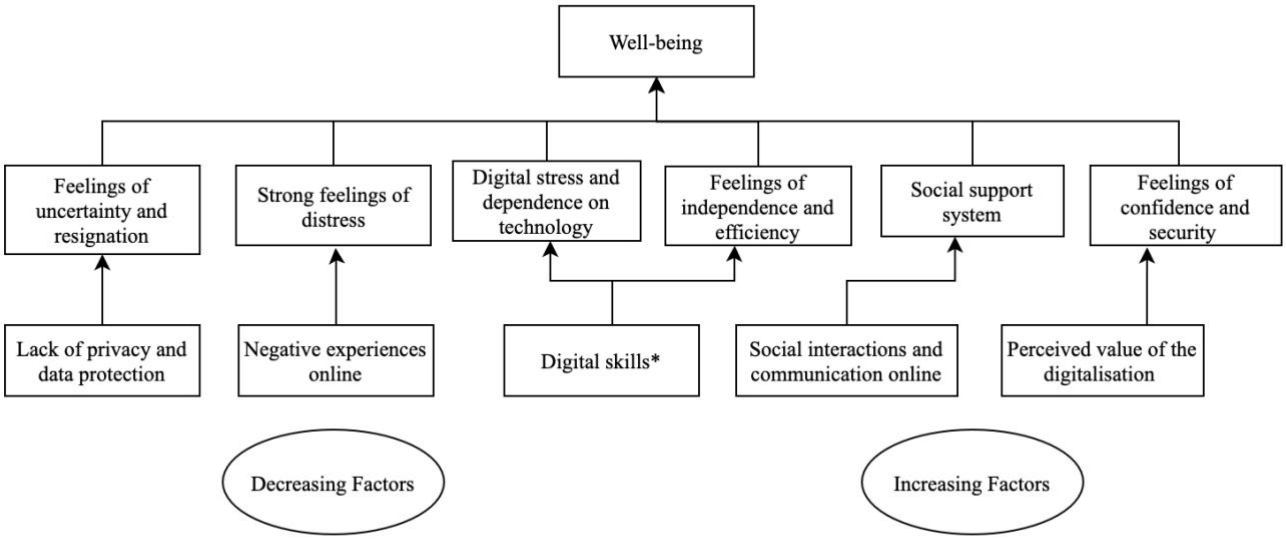

Figure 2. Model visualising six aspects within a digital environment and their relationship towards well-being in a decreasing or increasing manner

In order to demonstrate the link between the theoretical framework from the introduction and the results of this study, a model was created to illustrate and visualise these interconnections. Furthermore, it is also intended to be an extension of the initial theoretical framework. What becomes apparent in this model is that the essential aspects of the initial framework have been largely preserved, but that others could been added and that a more precise insight has been gained into the impact of the various aspects on well-being, which can be firstly separated into increasing and decreasing factors.

From there, three aspects arise for the decreasing factors which have been described in the theoretical framework. These are: *lack of privacy, negative experiences* online or previously described as online safety and *digital skills*. What is new, however, is that the results of the study have highlighted the more precise emotional effects that a negative influence on well-being might entail. According to the results of this study, the *lack of privacy and data protection* leads to feelings of uncertainty and resignation, negative online experiences also lead to strong feelings of distress. It should be noted that *negative experiences online* also include topics of the previous formulated aspect *access to information*, which contains issues such as fake news or information abundance. However, as the resonance to this topic was weaker than to the other aspects listed here in this particular study, this aspect was merged into this one since these experiences too bear negative feelings which can affect an individual's well-being.

Further, *digital skills* constitute a special case in the model, as the lack of digital skills can be categorized as a decreasing factor, as it leads to digital stress or techno-stress according to Reinecke et al. (2016), which manifests itself in the individual feeling dependent on the technology, which can lead to a negative experience with it, as the literature confirms, but also as the participants of this study repeatedly stated. As mentioned before, *digital skills* represent a special case in the model, since they can contribute to a decrease or an increase in well-being, depending on the particular scenario. Therefore, they are also marked with an abbreviation. According to the results of this study, possessing but also acquiring *digital skills* creates a high feeling of independence, competence and efficiency in many participants, which can contribute to an increase in well-being.

In addition, the aspect of *social interactions and communications online*, which had already been established in the initial theoretical framework, was considered to be an increasing factor, which according to the respondents, proved to be suitable as a social support system, which helped

them to increase their well-being. Last but not least, a new aspect could be gained from the findings concerning the *perceived value of the digitalisation*, which for example caused elevated feelings of confidence and security in the participants, as they realized the benefits of the digitalisation, which for example provided them comfort and efficiency in their everyday life and thus resulted in an increasing effect on their well-being.

In conclusion, it has been shown that this model combines theoretical approaches from literature and practical insights from research and is therefore able to summarize them profoundly. On this basis, further extensions can be developed and used to further the conceptualization of well-being within the digital transformation age or as well the terminology of digital well-being.

Strengths and Limitations

Since large parts of the present study were conducted during the COVID-19 outbreak, consequently a much smaller number of participants had been able to be recruited than initially intended, this applied to the online part of the study but also to the subsequent interviews. This resulted in the fact that although the diversity among the participants was considerable, as the proportion of women was greatly increased and foreign students were presented more frequently, however, an adequate gender ratio could not be maintained. Which significantly limited the generalizability, as the perspective of one gender was predominantly represented. However, with regard to the composition of the sample, an increased proportion being foreign and German study participants, resulted in a simultaneous lack of Dutch students being interviewed. Therefore, the current results can only be transferred to the Dutch student population to a limited extent in relation to their experienced well-being within the age of the digital transformation.

In addition to the composition of the sample, the severity of the experiences which the students have outlined in all clarity concerning the negative experiences made online also requires to be questioned, whether these can be considered as representative or whether these are individual tragic incidents which occur rarely. However, this would contradict the paper by Lee, (2018) who states that incidents of serious cybercrime have increased over the past decade and that certain target groups are more likely to be affected by crimes such as scams or identity theft. Therefore, this can only partially be classified as a direct limitation and further research is needed to determine the extent to which individuals are afflicted by negative experiences online and how this consequently affects their well-being.

A further limitation that appeared during the data analysis process was that significantly fewer students filled out the Digital Discovery Tool than had been previously stated. This was the case for almost half of the participants. This was most likely due to the fact that the participants had to log on to the Jisc website and create a separate account to access the tool instead of being automatically redirected. This may have caused many participants to lose their motivation to do so and the additional effort may have led to premature termination of the study. This is also in line with Reips, (2002) conducted research regarding the design of online studies, which actively influences the behaviour of participants. Here for instance, it was shown that participants were more likely to drop out from online studies more frequently if they needed to visit external sites, in order to continue with the initial study. However, due to security reasons related to SURF-context, it was not possible to provide direct automatic redirection to the Jisc *Digital Discovery Tool* in this study design, which led to the decision of the online study design which led to the creation of a separate account on the Jisc website.

Apart from the small number of interviewees, the interviews were recorded via Skype with the intention of a video call, but due to the unstable internet connection solely audio recordings had to be used, which made it difficult to record non-verbal activities, e.g. nods of the head, facial expressions or hand gestures, which could have been useful for later analysis. This Skype call, however additionally as well led to difficulties in acoustics due to improper connection difficulties to adequately understand the participants on some occasions.

Furthermore, no inter-rater reliability by a second-rater was provided with regard to the coding scheme employed, which had emerged from the eight interviews and which was utilised for the thematic analysis. Therefore, this limitation is as well acknowledged accordingly.

In conclusion, while the study was able to pick up on a wealth of different topics about digital well-being that make the construct more comprehensible and that can assist in the conceptualization, it still addressed the topic on the surface and lacked the ability to pursue some others in depth. For example, the topic of fake news or hostile confrontations like on topics about homophobia, in the context about negative experiences on the internet was mentioned repeatedly by some participants in connection with well-being. However, not all of these emerging topics could be explored equally, which can be seen as an unfortunate limitation of the current study.

A major strength of this study is that the participants were remarkably open and showed great trust in the researcher during the interview, providing valuable insights and input into their

personal experiences and life stories for the research. Although there were few interviews, these were very rich in detail. Where more than half of the participants revealed many alarming experiences which they were willing to disclose openly, but also mostly shared a broad range of ideas, suggestions and advice that helped them personally and could be beneficial for their fellow students as well as how to partially implement these ideas and suggestions institutionally. Which further indicates a keen interest and demand from students for such a resource can be regarded as a valuable response for the University of Twente. Conclusively, the wealth of insights they have provided will greatly facilitate obtaining a more clear and honest insight into a previously rather unexplored area of well-being within the digital transformation age and is therefore indispensably appreciated.

Recommendations

Undoubtedly, this study has proven that the subject of well-being within the digital transformation age covers a much broader field than previously assumed which goes significantly beyond topics like digital skills or information overload which we have seen from the interviews and includes aspects such as privacy related issues and negative experiences online. Therefore, it is explicitly recommended to dive deeper into these mentioned topics in regard to their impact on well-being, which have been touched upon in this paper but to explore them in greater depth. This can not only be helpful to create a more elaborate framework but to further the development of a uniform measurement tool which is primarily aimed at the construct of well-being within the digital transformation age of individuals.

Furthermore, as well different age groups regarding the topic of well-being within the digital transformation age should be placed more vividly into consideration, such as older populations or different social strata that engage in a different interaction with digital technology such as the students in this particular study. Their perspectives, beliefs and experiences would presumably offer revealing insights as they could include additional dimensions that could lead to a more uniform definition and operationalisation of the terminology of digital well-being.

As the current study revealed, several of the students had to cope with serious incidents in which they became victims of cybercrimes, where some of them stated that they would like to be better protected by the university, and that they would like to receive education on how to protect themselves better, but in addition to this, legal advice on cybercrime would be as well welcomed.

However, considering the state of well-being this does not seem to be sufficient as these experiences seem to be highly intrusive for many to encounter and are associated with many daunting emotions that threaten their well-being and quality of life. Therefore, in addition to education and training opportunities, it might be worth considering offering psychological counselling on concerns specifically related to such traumatic online experiences.

In addition, it has also become apparent that some students, although they feel largely confident with their digital skills, partly feel overwhelmed by the rapidly changing digital environment and in particular feel under pressure within their studies to meet expectations which they are confronted with and thus undergo stress. Some students have strategies to counteract this stress level however, it is worth considering the establishment of a contingent to increase the attention on digital stress relief and to implement positive psychological approaches such as mindfulness training, in order to increase resilience to reduce the overburdening of students in the future.

Conclusion

Conclusively, the digital transformation is still too often addressed in the context of entrepreneurial structures but rarely on the socio-psychological level. However, this study has made it clear that the digitalization is a globally structured phenomenon of our time, which is multifaceted and therefore cannot only be considered and evaluated on the socio-political and economic level only, but needs as well an agenda on the societal, psychological and educational level.

The present study provided an insight how the digital transformation affects the well-being of students, what strategies students use to navigate the digital transformation that help them to maintain and enhance their well-being but revealed as well, what their personal needs are and what they require from their environments that could assist them better to cope with the amount of changes the digitalisation poses on them. Moreover, this thesis was not only able to gain insight in the various experiences individuals are confronted within a digital environment but further investigate how this relates to well-being, which led to the gathering of new findings on the unique perspectives and experiences of students, thereby critically questioned the impact of the digital transformation on the individual's well-being and identifying gaps within the existing knowledge

on the subject of digital well-being. Therefore, this thesis contributes to further establishing this emerging field of research.

Essentially, this study may not only contribute to further research, but may fuel a collective discussion onto an institutional level on how students can be better supported in the future to improve their well-being and maintain their mental health. As besides the educational mandate, an educational institution ought to exhibit a degree of responsibility that intends in their mission to advance education to ensure that in the future their students not only benefit from the digitalisation, but also to assist them to become independent and confident digital citizens who can make a valuable contribution to a sustainable society.

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References

Bali, J., Neeraj, N., & Bali, R. (2014). Computer vision syndrome: A review. *Journal Of Clinical Ophthalmology And Research*, *2*(1), 61. doi: 10.4103/2320-3897.122661

Beetham, H. (2015). Thriving in a connected age: digital capability and digital wellbeing. Retrieved 5 February 2020, from https://www.jisc.ac.uk/blog/thriving-in-a-connected-age-digital-capability-and-digital-wellbeing-25-jun-2015

Bennett, S., & Maton, K. (2010). Beyond the "digital natives" debate: Towards a more nuanced understanding of students' technology experiences. Journal of Computer Assisted Learning, 26(5), 321–331. doi:10.1111/j.1365-2729.2010.00360.x

Bohlmeijer, E.T., Westerhof, G.J. (in press). A new model for sustainable mental health, Integrating well-being into psychological treatment. J. Kirby & P. Gilbert (Eds) Making an Impact on Mental Health and Illness. London: Routeledge

Burr, C., Taddeo, M. and Floridi, L. (2019). The Ethics of Digital Well-Being: A Thematic Review. *SSRN Electronic Journal*.

Binder, J., Howes, A., & Sutcliffe, A. (2009). The problem of conflicting social spheres: Effects of network structure on experienced tension in social network sites. Paper presented at Computer Human Interaction 2009, Boston, Massachusetts

Bitkom/Prognos AG (2013). *Digitale Arbeitswelt: Gesamtwirtschaftliche Effekte*. [online] Available at: https://www.prognos.com/uploads/tx_atwpubdb/140200_Prognos_BITKOM_Studie_Digitale_Arbeitswelt.pdf [Accessed 18 Feb. 2020].

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research In Psychology, 3(2), 77-101. doi: 10.1191/1478088706qp063oa

Campbell, D. (2004). Horrific Blindness: Images of Death in Contemporary Media. *Journal For Cultural Research, 8*(1), 55-74. doi: 10.1080/1479758042000196971

Cascio, W., Montealegre, R. (2016). How Technology Is Changing Work and Organizations. *nnual Review Of Organizational Psychology And Organizational Behavior*, *3*(1), 349-375. doi: 10.1146/annurev-orgpsych-041015-062352

Castellacci, F., & Tveito, V. (2018). Internet use and well-being: A survey and a theoretical framework. *Research Policy, 47(1),* 308–325. doi:10.1016/j.respol.2017.11.007

Chambers, F., & Sandford, R. (2018). Learning to be human in a digital world: a model of values fluency education for physical education. *Sport, Education And Society*, *24*(9), 925-938. doi: 10.1080/13573322.2018.1515071

Cheng, J., Bernstein, M., Danescu-Niculescu-Mizil, C., & Leskovec, J. (2017). Anyone Can Become a Troll. *Proceedings Of The 2017 ACM Conference On Computer Supported Cooperative Work And Social Computing - CSCW '17*. doi: 10.1145/2998181.2998213

Davidson, J., Livingston, B., Sampath, D., Liebald, B., Liu, J., & Nandy, P. et al. (2010). The YouTube video recommendation system. *Proceedings Of The Fourth ACM Conference On Recommender Systems - Recsys '10*. doi: 10.1145/1864708.1864770

Debatin, B., Lovejoy, J., Horn, A., & Hughes, B. (2009). Facebook and Online Privacy: Attitudes, Behaviors, and Unintended Consequences. *Journal Of Computer-Mediated Communication*, *15*(1), 83-108. doi: 10.1111/j.1083-6101.2009.01494.x

DeJonckheere, M., & Vaughn, L. (2018). Semistructured interviewing in primary care research: a balance of relationship and rigour. Retrieved 5 July 2020, from https://fmch.bmj.com/content/7/2/e000057

Dhir, A., Yossatorn, Y., Kaur, P., & Chen, S. (2018). Online social media fatigue and psychological wellbeing—A study of compulsive use, fear of missing out, fatigue, anxiety and depression. *International Journal Of Information Management*, *40*, 141-152. doi: 10.1016/j.ijinfomgt.2018.01.012

Diener, E. (2013). The remarkable changes in the science of subjective well-being. *Perspectives on Psychological Science, 8,* 663—666. http://dx.doi.org/10.1177/1745691613507583

Diefenbach, S. (2018). The Potential and Challenges of Digital Well-Being Interventions: Positive Technology Research and Design in Light of the Bitter-Sweet Ambivalence of Change. *Frontiers In Psychology*, *9*. doi: 10.3389/fpsyg.2018.00331

Dodge, R., Daly, A., Huyton, J., & Sanders, L. (2012). The challenge of defining wellbeing. *International Journal Of Wellbeing*, *2*(3), 222-235. doi: 10.5502/ijw.v2i3.4

Douglas, D. (2016). Doxing: a conceptual analysis. *Ethics And Information Technology*, *18*(3), 199-210. doi: 10.1007/s10676-016-9406-0

Eastin, M., & LaRose, R. (2006). Internet Self-Efficacy and the Psychology of the Digital Divide. *Journal Of Computer-Mediated Communication*, *6*(1), 0-0. doi: 10.1111/j.1083-6101.2000.tb00110.x

Eid, M., Larsen, R., (2008). *The science of subjective well-being.* New York, NY: Guilford.

Fire, M., Goldschmidt, R., & Elovici, Y. (2014). Online Social Networks: Threats and Solutions. *IEEE Communications Surveys & Tutorials*, *16*(4), 2019-2036. doi:10.1109/comst.2014.2321628

Frangonikolopoulos, C. (2012). Global civil society and deliberation in the digital age. *International Journal Of Electronic Governance*, *5*(1), 11. doi: 10.1504/ijeg.2012.047440

Fredrickson, B. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist,* 56(3), pp.218-226.

Fritz-Schubert, E., (2017). Lernziel Wohlbefinden. Entwicklung des Konzeptes "Schulfach Glück" zur Operationalisierung und Realisierung gesundheits- und bildungsrelevanter

Zielkategorien, 1. Auflage. *Leibniz-Institut für Bildungsforschung und Bildungsinformation, Frankfurt am Main,* 16-19

Gerber, N., Gerber, P., & Volkamer, M. (2018). Explaining the privacy paradox: A systematic review of literature investigating privacy attitude and behavior. *Computers & Security*, *77*, 226-261. doi: 10.1016/j.cose.2018.04.002

Glaser, B. , & Strauss, A. (1967). The discovery of grounded theory. *Chicago*: Aldine

Gross, E. F., Juvonen, J., & Gable, S. L. (2002). Internet Use and Well-Being in Adolescence. Journal of Social Issues, 58(1), 75–90. doi:10.1111/1540-4560.00249

Gui, M., Fasoli, M., & Carradore, R. (2017). "Digital Well-Being". Developing a New Theoretical Tool For Media Literacy Research. Retrieved 29 February 2020, from http://ijse.padovauniversitypress.it/2017/1/8

Hasan, H., & Linger, H. (2016). Enhancing the wellbeing of the elderly: Social use of digital technologies in aged care. *Educational Gerontology*, *42*(11), 749-757. doi: 10.1080/03601277.2016.1205425

Helsper, E., & Eynon, R. (2010). Digital natives: where is the evidence?. *British Educational Research Journal*, *36*(3), 503-520. doi: 10.1080/01411920902989227

Houghton, D., & Joinson, A. (2010). Privacy, Social Network Sites, and Social Relations. *Journal Of Technology In Human Services*, *28*(1-2), 74-94. doi: 10.1080/15228831003770775

Isaak, J., & Hanna, M. J. (2018). User Data Privacy: Facebook, Cambridge Analytica, and Privacy Protection. Computer, 51(8), 56–59. doi:10.1109/mc.2018.3191268

Jacobsen, W. C., & Forste, R. (2011). The Wired Generation: Academic and Social Outcomes of Electronic Media Use Among University Students. Cyberpsychology, Behavior, and Social Networking, 14(5), 275–280. doi:10.1089/cyber.2010.0135

Jisc (2020). Digital discovery tool. *Jisc Building Digital Capability Blog*. Retrieved 5 July 2020, from https://digitalcapability.jiscinvolve.org/wp/digital-capability-discovery-tool/

Jisc (2020). Our reports. Retrieved 29 June 2020, from https://digitalinsights.jisc.ac.uk/reports-and-briefings/our-reports/

Kaakinen, M., Keipi, T., Räsänen, P., & Oksanen, A. (2018). Cybercrime Victimization and Subjective Well-Being: An Examination of the Buffering Effect Hypothesis Among Adolescents and Young Adults. *Cyberpsychology, Behavior, And Social Networking*, *21*(2), 129-137. doi: 10.1089/cyber.2016.0728

Keyes, C. L. M. (1998). Social well–being. *Social Psychology Quarterly, 61,* 121-140.

Lauber, F. (2016). Negative Auswirkungen von Technostress auf die psychische Gesundheit von Mitarbeitenden eines Schweizer Telekommunikations Unternehmens. Retrieved 20 June 2020, from https://irf.fhnw.ch/bitstream/handle/11654/23759/Masterarbeit%202016_Lauber%20Fabian.pdf?sequence=1

Lee, N. (2018). Fake news, phishing, and fraud: a call for research on digital media literacy education beyond the classroom. *Communication Education*, *67*(4), 460-466. doi: 10.1080/03634523.2018.1503313

LeFebvre, L., Allen, M., Rasner, R., Garstad, S., Wilms, A., & Parrish, C. (2019). Ghosting in Emerging Adults' Romantic Relationships: The Digital Dissolution Disappearance Strategy. *Imagination, Cognition And Personality*, *39*(2), 125-150. doi: 10.1177/0276236618820519

Leung, L. (2011). Effects of ICT Connectedness, Permeability, Flexibility, and Negative Spillovers on Burnout and Job and Family Satisfaction. Human Technology, Volume 7(3), pp. 250-267. URN:NBN:fi:jyu-2011112211714. Retrieved 20 June from http://www.humantechnology.jyu.fi

Library, ICT-services & Archive (LISA) | University of Twente. (2020). Retrieved 30 June 2020, from https://www.utwente.nl/en/lisa/

Maier, C., Laumer, S., Eckhardt, A., & Weitzel, T. (2012). When social networking turns into

social overload: explaining the stress, emotional exhaustion and quitting behaviour from social network site's users. Retrieved 20 June 2020, from https://aisel.aisnet.org/cgi/viewcontent.cgi?article=1070&context=ecis2012

Martin, K. (2018). The penalty for privacy violations: How privacy violations impact trust online. *Journal Of Business Research*, *82*, 103-116. doi: 10.1016/j.jbusres.2017.08.034

Matzat, U., & Sadowski, B. (2012). Does the "Do-It-Yourself Approach" Reduce Digital Inequality? Evidence of Self-Learning of Digital Skills. The Information Society, 28(1), 1–12. doi:10.1080/01972243.2011.629023

Michel, A., Bosch, C., & Rexroth, M. (2014). Mindfulness as a cognitive-emotional segmentation strategy: An intervention promoting work-life balance. Journal of Occupational and Organizational Psychology, 87(4), 733–754. doi:10.1111/joop.12072

Mitchell, P., Roberts, T., Barton, P. and Coast, J. (2016). Applications of the Capability Approach
in the Health Field: A Literature Review. *Social Indicators Research*, 133(1), pp.345-371.

Nansen, B., Chakraborty, K., Gibbs, L., MacDougall, C., & Vetere, F. (2012). Children and Digital Wellbeing in Australia: Online regulation, conduct and competence. *Journal Of Children And Media*, *6*(2), 237-254. doi: 10.1080/17482798.2011.619548

Neufeind, M., O'Reilly, J., & Ranft, F. (2019). *Work in the digital age*. London: Rowman & Littlefield International.

OECD (2019). How's Life in the Digital Age? Opportunities and Risks of the Digital Transformation for People's Well-being, *OECD Publishing*, Paris, https://doi.org/10.1787/9789264311800-en

Prensky, M. (2001b). Digital Natives, Digital Immigrants: Do they really think different? On the

Horizon, 9 (6), 1-6. Retrieved at 20 June from http://www.marcprensky.com/writing/Prensky%20-%20Digital%20Natives,%20Digital%0mmigrants%20-%20Part2.pdf

Rapp, D., & Salovich, N. (2018). Can't We Just Disregard Fake News? The Consequences of Exposure to Inaccurate Information. *Policy Insights From The Behavioral And Brain Sciences, 5*(2), 232-239. doi: 10.1177/2372732218785193

Rainie, L., Kiesler, S., Kang R. Madden M., Duggan M., Brown S., Dabbish L., (2013) Anonymity, privacy, and security online. *Pew Research Center,* Retrieved at 20 June from https://www.pewinternet.org/wp-content/uploads/sites/9/media/Files/Reports/2013/PIP_AnonymityOnline_090513.pdf

Reinecke, L., Aufenanger, S., Beutel, M. E., Dreier, M., Quiring, O., Stark, B., Müller, K. W. (2016). Digital Stress over the Life Span: The Effects of Communication Load and Internet Multitasking on Perceived Stress and Psychological Health Impairments in a German Probability Sample. *Media Psychology,* 20(1), *90–115.* doi:10.1080/15213269.2015.1121832

Reips, U. (2002). Standards for Internet-Based Experimenting. *Experimental Psychology*, *49*(4), 243-256. doi: 10.1026//1618-3169.49.4.243

Robeyns, I. (2005). The Capability Approach: a theoretical survey. *Journal Of Human Development*, *6*(1), 93-117. doi: 10.1080/146498805200034266

Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. Journal of Personality and Social Psychology, 57(6), 1069–1081. doi:10.1037/0022-3514.57.6.1069

Schneble, C., Elger, B., & Shaw, D. (2018). The Cambridge Analytica affair and Internet-mediated research. *EMBO Reports*, *19*(8). doi: 10.15252/embr.201846579

Schoonenboom, J., & Johnson, R. (2017). How to Construct a Mixed Methods Research Design.

Kzfss Kölner Zeitschrift Für Soziologie Und Sozialpsychologie, *69*(S2), 107-131. doi: 10.1007/s11577-017-0454-1

Schreurs, K., Quan-Haase, A., & Martin, K. (2017). Problematizing the Digital Literacy Paradox in the Context of Older Adults' ICT Use: Aging, Media Discourse, and Self-Determination. Canadian Journal of Communication, 42(2). doi:10.22230/cjc.2017v42n2a3130

Sen, A.,(1993). Capability and well being. In Nussbaum and Sen, *The quality of life* (30–53). Oxford: Oxford University Press

Shah, A. (2019). Defining digital wellbeing - Jisc Building Digital Capability Blog. Retrieved 5 February 2020, from https://digitalcapability.jiscinvolve.org/wp/2019/09/03/defining-digital-wellbeing/

Shaping 2030 - Mission, Vision & Strategy. (2020). *University Of Twente*, 13-17. Retrieved at 1st February from https://www.utwente.nl/en/organization/about/shaping2030/documents/shaping2030-fulldocument.pdf

Shu, Q., Tu, Q., & Wang, K. (2011). The Impact of Computer Self-Efficacy and Technology Dependence on Computer-Related Technostress: A Social Cognitive Theory Perspective. *International Journal Of Human-Computer Interaction*, *27*(10), 923-939. doi: 10.1080/10447318.2011.555313

Student news & events | Discover your digital skills | Student Services. (2020). Retrieved 10 May 2020, from https://www.utwente.nl/en/education/student-services/news-events/news/2020/5/606947/discover-your-digital-skills

Tait, S. (2008). Pornographies of Violence? Internet Spectatorship on Body Horror. *Critical Studies In Media Communication*, *25*(1), 91-111. doi: 10.1080/15295030701851148

Tarafdar, M., Tu, Q., Ragu-Nathan, B. S., & Ragu-Nathan, T. S. (2007). The Impact of Technostress on Role Stress and Productivity. Journal of Management Information

Systems, 24(1), 301–328. doi:10.2753/mis0742-1222240109

Thompson, P. (2013). The digital natives as learners: Technology use patterns and approaches to learning. Computers & Education, 65, 12–33. doi:10.1016/j.compedu.2012.12.022

University of Twente (2020). Home | Facts & Figures. Retrieved 20 June 2020, from https://www.utwente.nl/en/facts-and-figures/#organization

Valenduc, G., & Vendramin, P. (2017). Digitalisation, between disruption and evolution. *Transfer: European Review Of Labour And Research*, *23*(2), 121-134. doi: 10.1177/1024258917701379

van Dijk, J., & van Deursen, A. (2014). Digital Skills. doi: 10.1057/9781137437037

van Petegem, K., Aelterman, A., Van Keer, H., & Rosseel, Y. (2007). The influence of student characteristics and interpersonal teacher behaviour in the classroom on student's wellbeing. Social Indicators Research, 85(2), 279–291. doi:10.1007/s11205-007-9093-7

van Laar, E., van Deursen, A., van Dijk, J., & de Haan, J. (2017). The relation between 21st-century skills and digital skills: A systematic literature review. *Computers In Human Behavior*, *72*, 577-588. doi: 10.1016/j.chb.2017.03.010

White, R., Imperiale, M., & Perera, E. (2016). The Capabilities Approach: Fostering contexts for enhancing mental health and wellbeing across the globe. *Globalization And Health*, *12*(1). doi: 10.1186/s12992-016-0150-3

Williams, M., Nurse, J., & Creese, S. (2017). Privacy is the Boring Bit: User Perceptions and Behaviour in the Internet-of-Things. *2017 15Th Annual Conference On Privacy, Security And Trust (PST)*. doi: 10.1109/pst.2017.00029

Wong, L. P. (2008). Data analysis in qualitative research: a brief guide to using NVivo. *Malaysian Family Physician 2008*, *3*(1), 14-20. Retrieved at 18th March from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4267019/

Zaviska, C. (2019). *Zukünftige Aufgaben und Handlungsfelder der beruflichen Weiterbildung im Kontext von Digitalisierung und Lebenslangem Lernen*. Bundesinstitut für Berufsbildung Presentation, Braunschweig.

Zeike, S., Choi, K., Lindert, L., & Pfaff, H. (2019). Managers' Well-Being in the Digital Era: Is it Associated with Perceived Choice Overload and Pressure from Digitalization? An Exploratory Study. *International Journal Of Environmental Research And Public Health*, *16*(10), 1746. doi: 10.3390/ijerph16101746

Appendix: A

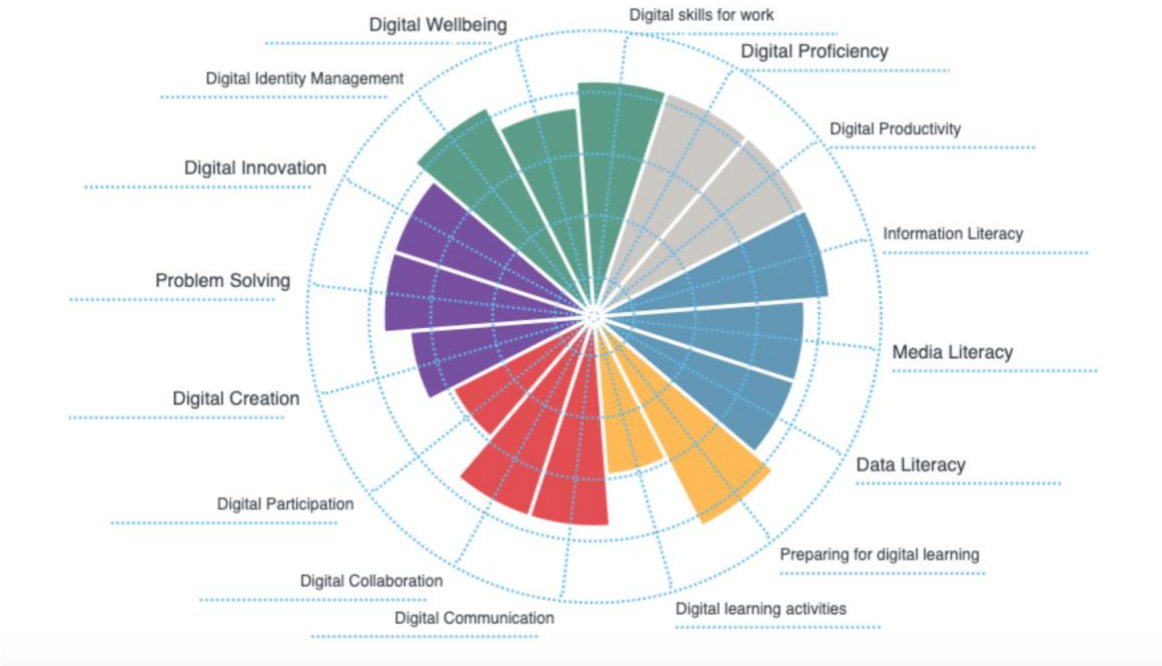

Figure 1. Example of an individual report of the *Digital Discovery Tool*

Appendix: B

Table 1.

Qualtrics questions

Questions
1. *In what study program are you currently enrolled?*
2. *What is the level of your education of your study program and in which year are you?*
3. *What is your nationality?*
4. *What is your gender?*
5. *How old are you?*
6. *Based on your personal insights-report, on how many digital-skills is your skill level: Poor (x), Developing (x), Proficient (x)*
7. *Digital skills have become a necessity in this digital age and even more so with the current COVID-19 crisis. To understand how this crisis is affecting the digital transformation and our students' digital wellbeing, we are conducting follow-up online-interviews (approx. 45min) with selected students. Would you be willing to participate and give us your perspective on digital-skills and the discovery tool or digital wellbeing? If you are selected, you will be contacted within four weeks and your participation will be rewarded with a voucher of your choice of 10EUR.*

Appendix: C

Interview Scheme

Welcome (...), to this interview. I would like to thank you for your participation. This interview will be about well-being within the digital age. This interview is mainly concerned with the experiences you make online and how these are related to your well-being. In order to identify views and opinions on the subject of digital well-being. Since this can be seen as a very recent topic as due to the COVID-19 crisis we are now more and more forced to shift our usual life almost completely into the digital space.

The interview consists of 15 questions covering 4 categories. Now, I would like to ask you for your consent that that interview will be recorded and the data will be used in this research. Also, I would like you to know that you can at any point withdraw from the study. How does this sound to you? Can we begin?

Table 2.
Interview scheme

Questions	Domains
1. Have you noticed a recent change since the COVID-19 Crisis, regarding your personal use of digital technologies or media in your everyday but also professional life (university, work, social life)? If yes, how would you describe your experiences with this change and how did it affect you?	Influence of COVID-19 crisis on digital usage
2. What role did digital media and technologies play in your everyday life before the COVID-19 crisis in comparison to at the moment?	
3. For many of us, the Internet is already an integral part of our lives. As a result there are increasingly discussions about privacy online. How important is privacy and the protection of your data online (e.g privacy settings, awareness of surveillance and digital footprint) to you and how does it affect your digital activities online?	General digital experiences
4. Some people make negative experiences online. Have you ever had experiences with cybercrime (e.g hacking, viruses, scams), negative confrontations online like trolling, cyberbullying, harassment or privacy violations (e.g stalking), in your daily digital use or witnessed something like that? If yes, how did it affect you?	
5. In today's digital world one is often confronted with an overload of information or sensitive graphic images and sometimes it is also not easy to decide which information is fake or not. How do you approach this unlimited access to information on the internet and how does this affect you?	
6. Do you feel a change in your social interactions with your friends and family through the increasing integration of digital media in our lives? If so what changes could you observe and how does this change affect you?	

7. Capabilities to navigate in the digital world today are becoming more and more essential. How important would you consider your digital skills in your private but also in your professional (e.g. university or work) activities with digital technologies such as websites, software or programs?	
8. So we talked about many of your diverse experiences you made online. Now I would like to know whether you see the benefits from the increasing shift into the digital world?	
9. Regarding your digital experiences you have just told me, do you think these have affected your well-being?	Impacting factors on well-being
10. What helps you to maintain or enhance your well-being in a digital environment?	
11. What factors do you think can contribute to it? What factors do you think can decrease it?	
12. What do you think would be helpful for you personally from your environment to increase your well-being online?	
13. In regards to the Jisc discovery tool you used prior to this interview, what was your score on the domain 'digital well-being'?	Evaluation of own digital well-being
14. Do you recognize yourself in this score?	
15. Was there anything you would like to say else or that you think I forgot to cover regarding this topic?	