From Legislation to Human Flourishing: Unveiling the Characteristics of Digital Well-Being by Taxonomy Development from an EU Perspective

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Abstract: With pervasive digitalization, human well-being is intimately connected with the condition of the information environment and the digital technologies that shape human interaction with it. With the increased exposure to technologies like Artificial Intelligence, concerns about well-being grow. However, there is no thorough understanding of the conditions necessary to enhance digital well-being, particularly from a legislative perspective. The European Union (EU) addresses this through various guidelines and regulations for a more trustworthy and human-centered approach. This study translates EU directives into practical, holistic advice via taxonomy development, helping practitioners assess their adherence to digital well-being characteristics and as a dynamic resource encouraging innovation and creation in promoting digital well-being goals. By advancing awareness and supporting human flourishing in the digital age, this research contributes to the ongoing Information Systems research discourse on critical challenges like human-technology symbiosis and well-being, especially in Human-Computer Interaction and Human-Centered AI research.

1 INTRODUCTION

The digital landscape has evolved significantly, and digital technologies increasingly shape our everyday lives. As these technologies become more embedded in society, human well-being is increasingly entangled with the information environment and digital tools humans interact with. Technological advancement, while linked to human progress (Stahl et al., 2021), raises ethical concerns about its potential to limit human flourishing (Hylving et al., 2024). Research highlights the adverse impacts of digitalization, including stress and social disconnect (Hylving et al., 2024; Rövekamp, 2019). Further, rapid advancements in artificial intelligence (AI) (Maslej et al., 2024) present both opportunities and uncertainties, particularly concerning human well-being, including out-of-control robots, biased decision-making, disinformation, and challenges to human rights (Shneiderman, 2020). Especially regarding the emergence of AI technology, with its still unclear impact on users' well-being (Bentley et al., 2024; Burnell et al., 2023; Capel and Brereton, 2023), is driving paradigm shifts towards human-centeredness in human-computer interaction (HCI) and human-centered artificial intelligence (HCAI) research (e.g., including challenges like human-technology symbiosis, well-being, eudaimonia which demands authentic and meaningful activities, and democracy) (Shen et al., 2022; Stephanidis et al., 2019).

Despite the extensive exploration of digital well-being in Information Systems (IS) research (Burr et al., 2020), there remains a lack of comprehensive understanding of the conditions required to enhance digital well-being (Hylving et al., 2024). Notably, the role of legislation in shaping digital well-being is often overlooked. Legal frameworks offer a structured approach to addressing digital well-being challenges, especially given the increasing regulation in this field over the past few years. However, the complexity of digitalization legislation poses challenges for practitioners (Cleven and Winter, 2009). This complexity makes it difficult for them to

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gain a holistic understanding of digital well-being, limiting their ability to develop effective strategies for improvement in their enterprises. Given the rising global digital connectivity, it is increasingly relevant to acquire an adequate level of digital awareness[1]. In this light, it is crucial to simplify and clarify the complex legislation related to digital well-being and provide a thorough understanding of its relevant components in a holistic overview.

This study addresses this gap. It aims to enhance digital awareness by proposing a compelling and timely exploration of digital well-being in the form of a digital well-being taxonomy, informed by legislation, often neglected in IS research (Butler et al., 2023). Specifically, when scanning legislation from a global perspective throughout this study, EU legislation was found to provide an ideal foundation for developing a taxonomy for digital well-being that has the potential to be universally applicable due to its proven global influence and alignment with universally relevant ethical principles. The "Brussels Effect" (Bradford, 2020) demonstrates how EU regulations often become de facto global standards as companies and nations adopt them. Additionally, the EU is a clear frontrunner in addressing digitalization challenges, with more comprehensive frameworks than many other nations, which often lack comparable standards. These, such as the AI Act and Ethics Guidelines for Trustworthy AI, emphasize trust, human-centeredness, and the common good, offering a valuable foundation for conceptualizing digital well-being. Focusing on the EU's well-established, globally influential legislation ensures the taxonomy is robust and potentially further applicable beyond Europe. The term directives throughout this study includes guidelines as well as regulations. Guidelines set objectives for member states to implement through national laws, while regulations are binding across all member states. The following research question is put forth for examination via taxonomy development:

RQ. *Based on globally recognized EU directives, which characteristics within a digital well-being taxonomy promote digital well-being and human flourishing in an information society, particularly in Europe and beyond?*

In proposing the resulting taxonomy, this study offers various contributions: It adds value to the IS research community in HCI and HCAI contexts and practitioners in the EU, but also beyond, by providing a structured, user-friendly, and legislative-informed taxonomy that enhances understanding of digital well-being characteristics. The taxonomy provides a foundation for developing strategies, frameworks, or other artifacts in IS research and practice, including digital awareness training. Besides, this study has societal relevance by applying a social science focus to IS research – emphasizing the need for interdisciplinary approaches and recognizing social science's importance in understanding technology's broader impact on society (Akkermans, 2023). The paper is structured as follows: Section 2 reviews related research, particularly HCI and HCAI. Section 3 outlines the qualitative research methodology, followed by a presentation of findings in Section 4. Section 5 discusses the results, and the study concludes with a summary in Section 6.

2 RELATED RESEARCH

Within Positive Psychology, research on well-being and technology appeared (e.g., Biswas-Diener, 2011; Riva et al., 2012; Shen et al., 2022a). Technology can impact mental health, including smartphone addiction and challenges due to excessive social media use (Abhari and Vaghefi, 2022; Wacks and Weinstein, 2021). The COVID-19 pandemic accelerated these trends, as it forced our lives to take place online (Shen et al., 2022), and well-being in Europe fell to its lowest level in 40 years during the pandemic (Allas et al., 2020). Recently, digital well-being has received increased attention from scholars and tech enterprises (Burr et al., 2020), and society and IS research have reached a stage where the highest level of human experience can be pursued by prioritizing digital well-being (Shen et al., 2022). This shifts the HCI and HCAI community towards a genuinely human-centered approach with explicit goals of designing digital experiences that enable human flourishing, referred to in this study as digital well-being (Shen et al., 2022; Stephanidis et al., 2019). We refer to the following terms throughout this paper: Digital well-being encompasses the impact of digital technologies on physical, mental, and emotional health, as well as autonomy and a sense of belonging and support within a community (van der Maden et al., 2023; World Health Organization, 2024). Human flourishing, in this context, refers to the optimal continuing development of human beings' potential and the desire to live well as a human being in an

[1] Digital awareness is empowering individuals in the use of technology, focusing on using it correctly, effectively, and safely, fostering an understanding of the opportunities, and especially the risks, and developing a problem-solving mindset that ensures safe and sensible usage of technology (Vidal Ferré et al., 2021).

information society (Hylving et al., 2024; Shen et al., 2022). Thereby, this study focuses on societal well-being, which, in the context of this paper, also has impacts on an individual level (Burr et al., 2020). This is in line with existing scientific discussions in the field of HCI, which include challenges like well-being, health, eudaimonia, and human-technology symbiosis (Gorichanaz, 2024; Shen et al., 2022; Stephanidis et al., 2019). Usmani et al. (2023) further reinforce human-centeredness and argue for a harmonious coexistence between humans and technology, suggesting its significance for enhancing well-being and autonomy and creating a future where technology benefits humanity. Scholars emphasize the positive and dark side of technology: On the one hand, a growing number of research focus on the design and development of technologies to support well-being and human potential, called positive computing (Calvo and Peters, 2014). Besides models implementing principles of flourishing, positive computing, and eudaimonia into development concepts (Desmet and Pohlmeyer, 2013; Sander, 2011; van der Maden et al., 2023), value-sensitive design theorists propose incorporating values like well-being into the engineering of future social robots in HCI to enhance the well-being of users (Dennis, 2022). Another focus is developing socially responsible recommender systems that avoid filter bubbles and prioritize well-being (Bonenberger et al., 2022). On the other hand, HCI and HCAI research increasingly address the adverse impacts of technology, investigating various challenges, such as technostress (stress experienced by users due to IS) (Ragu-Nathan et al., 2008), impacts on democracy, as well as ethics, privacy, and security (Stephanidis et al., 2019).

The aim is to link back to digital well-being and how this paper contributes to ongoing research. What's missing in HCI is a legislative lens on digital well-being, despite growing legislative action, particularly in the EU, where there has been a notable rise in related directives. On this basis, this work focuses on a thorough understanding of well-being characteristics. Starting from an EU perspective is a valuable first approach, as it provides a solid foundation emphasizing various well-being aspects that have the potential to be universally applicable (Bradford, 2020). Identifying key characteristics one must be especially aware of within a digital well-being taxonomy could benefit developing interventions aimed at mitigating the adverse impacts of digitalization. In organizational training, the taxonomy could provide a structured foundation for designing training modules that address specific components of digital well-being. These modules could contribute to prevention strategies and programs, that have yet to be evaluated concerning content in mitigating adverse impacts of technology use (Rohwer et al., 2022).

3 METHODOLOGY

With the taxonomy development in this contribution, the aim is to provide a suitable method for analyzing and categorizing existing directives concerning digital well-being from a legislative perspective, advancing the understanding of this topic. To ensure methodological rigor, we based our taxonomy development on the method of Nickerson et al. (2013), adapting it to our needs.

Step 1: We first determined the meta-characteristic, which is the primary feature guiding the selection of characteristics for the taxonomy. The meta-characteristic, "the intersection of technology and its impact on well-being in legislation," was defined based on the taxonomy's purpose and target users, including researchers interested in well-being and human-technology symbiosis and practitioners pursuing digital well-being goals. Step 2: Next, we set conditions to terminate the iterative process. The method ended when both objective and subjective conditions were met. Objectively, this meant that each characteristic was unique within its dimension (no characteristic duplication); each dimension was unique within the taxonomy (no dimension duplication); no dimensions or characteristics were added in the last iteration; and no dimensions or characteristics were merged or split in the last iteration. Subjectively, the method ended when the taxonomy was determined to be concise, robust, comprehensive, extendible, and explanatory (Nickerson et al., 2013). Each iteration employed an empirical-to-conceptual or conceptual-to-empirical approach, checking pre-defined ending conditions. Four iterations were conducted before meeting all conditions, which was similar to the study of Grueneke et al. (2024). We detail our iterations in the following:

Iteration 1: To structure our research area and address the increasing number of documents in legislation, a conceptual-to-empirical approach was used to develop the initial taxonomy. We conducted a systematic literature review, selecting relevant directives following the guidelines of Webster and Watson (2002). Before conducting the review, we scanned some of the most recent directives in the field of this study's research from a global perspective to

determine the search term. These included, for example, the EU AI Act; EU AI Action Plan; Ethics Guidelines for Trustworthy AI; Digital Services Act Package; General Data Protection Regulation (GDPR); NIST AI Risk Management Framework; ISO: 42001 Artificial Intelligence – Management System (AIMS); UK AI Regulation White Paper; Singapore`s Approach to AI Governance; Artificial Intelligence and Data Act (AIDA) (Canada); US White House Blueprint for an AI Bill of Rights. Subsequently, EU directives were chosen for the taxonomy development because they have the potential to be universally applicable (see Section 1). They have a user-friendly and concrete framing compared to other directives, which often lack comparable standards. Besides, the EU directives strongly focus on societal well-being and ethical technology use, making them highly relevant for digital well-being, not only in the EU. For instance, one of the first sentences of the European Commission's (2019) Ethics Guidelines for Trustworthy AI follows the wording that *AI systems must be human-centered, and their use must be in the service of humanity and the common good to increase human well-being and freedom.* The EU provides a well-documented and practical approach to protecting and promoting digital well-being. Thereby, EU legislation is globally recognized, remaining an influential superpower shaping the world and its image (Bradford, 2020; European Parliament and Council of the European Union, 2024). Focusing on these directives ensures our taxonomy is built on solid and proven standards. We used the EU official website to identify relevant directives. Moreover, we searched sites managed by the EU publications office, specifically: EUR-Lex, EU-Publications, the official portal for European data (data.europa.eu); CORDIS, Portal of the Publications Office of the EU, and N-Lex. We additionally searched Google Scholar to include current developments. We also conducted a backward reference search. The scope was limited to directives until 2018, amid growing related legislation. We exclusively reviewed documents published in English. Within the search process, we selected the following keywords to ensure a comprehensive inclusion of directives specifically addressing the intersection of technology and its impact on well-being, as determined in the meta-characteristic in step 1: "('well-being' OR 'ethics' OR 'humans' OR 'human flourishing' OR 'awareness') AND ('digital' OR 'digitalization' OR 'artificial intelligence' OR 'technology' OR 'information and communication technology' OR 'internet' OR 'systems')." The search was conducted from April to May 2024. Organizing the information from the literature involved an iterative process, combining elements of content and thematic analysis (Bowen, 2009). Within content analysis, data related to the meta-characteristic was organized. It entailed scanning titles, abstracts, and a first-pass document review, identifying meaningful and relevant text passages or other data (Corbin and Strauss, 2008; Strauss and Corbin, 1998). The first-pass document review was conducted on 42 documents. In total, 11 directives, directly or indirectly related to digital well-being, were selected to be relevant to the research question and the meta-characteristic (see Table 1). These were lettered a-k for ease of reference throughout the study.

Table 1: Relevant EU directives with implications for digital well-being.

EU Directive	Reference	Short Summary
(a) Ethics Guidelines for Trustworthy AI	European Commission (2019)	An emphasis on several well-being-related principles and requirements for AI.
(b) The Assessment List for Trustworthy AI	European Commission (2020a)	A structured approach to assess the compliance of AI systems with specific guidelines.
(c) AI Act	European Parliament and Council of the European Union (2024)	The world's first legislation to regulate the use of AI; special risk categorization of AI systems.
(d) Digital Services Act	European Parliament and Council of the European Union (2022b)	Creating a safer digital space; protecting fundamental user rights; establishing a level playing field for enterprises.
(e) Digital Decade Policy Programme 2030	European Parliament and Council of the European Union (2022a)	A framework guiding all actions related to digital; ensuring all aspects of technology and innovation work for people.
(f) European Declaration on Digital Rights and Principles for the Digital Decade	European Commission (2023)	Promoting a sustainable, human-centric vision for digital transformation.
(g) Digital Education Action Plan 2021-2027	European Commission (2020b)	A vision of high-quality, inclusive and accessible digital education in Europe.
(h) Council Conclusions on Supporting Well-being in Digital Education	Council of the European Union (2022)	Conclusions on supporting well-being in digital education.
(i) Digital Workplace Strategy	European Commission (2018)	A strategic approach to designing and implementing digital working environments within organizations.
(j) Mental Health in the Digital World of Work	European Parliament (2023)	A report highlighting the impact of digitalization on mental well-being in the workplace.
(k) EU Strategic Framework on Health and Safety at Work 2021-2027	European Commission (2021)	A framework focusing on occupational safety and health in the evolving world of work.

With thematic analysis, patterns were recognized within the data, and the selected data was examined in more detail to uncover themes pertinent to the meta-characteristic (Bowen, 2009). These 11 directives from Table 1 yielded the basis for the first four dimensions and 48 characteristics, organized into individual and social digital well-being and learning and work context dimensions. Human-centeredness emerged as an overall layer of all topics. This process yielded the initial version of the taxonomy. After assessing the initial taxonomy, unstructured dimensions and overlapping characteristics were found, necessitating further refinement.

Iteration 2: An empirical-to-conceptual approach was used in the second iteration, involving a focus group of three research experts in HCI, social science, and AI and two practitioners in education and organizational contexts. They reviewed and discussed the initial taxonomy and provided relevant expert feedback, enabling the initial taxonomy review, enhancement, and further development. They helped identify new characteristics and adjust and remove dimensions. The critical insights from the focus group were recapitulated and analyzed, determining their suitability for the research topic. Subsequently, the relevant feedback was incorporated into the taxonomy. This resulted in a revised taxonomy version with adjustments mainly concerning several characteristics like information literacy or social support. Further, individual and social digital well-being were merged into a single dimension (social context), as social context implications could also be drawn to an individual level, which showed redundancies. Another iteration was required despite comprehensive improvements, as not all objective conditions were met.

Iteration 3: A conceptual-to-empirical approach was used, incorporating the author's expertise in HCI and well-being. This involved an intuitive approach, where the researcher applied her understanding of the characteristics to be classified to propose the digital well-being taxonomy based on the researcher's perceptions of what makes sense (Nickerson et al., 2013). Minor adjustments were made, involving significantly fewer revisions than the previous one, suggesting an increased explanatory strength and improved stability within the taxonomy (Grueneke et al., 2024). However, further iterations were needed to meet all conditions.

Iteration 4: The final iteration involved another conceptual-to-empirical approach and a workshop with four researchers in the HCI field to validate the taxonomy. The layer, dimensions, and characteristics were confirmed. Subsequently, the objective ending conditions were re-examined. It became evident that each characteristic was unique within its dimension, and each dimension was unique within the taxonomy. Thus, duplications did not exist. The characteristic "social support" was not duplicated and should be understood in two distinct ways in the respective dimensions. The overarching dimensions emerged from three different contexts of digital well-being: social, learning, and work, with various characteristics and sub-characteristics. The characteristics of the social context as the overarching dimension can also apply to the two named domains, as they are generally valid in social contexts. This follows Baier et al. (2023), who also incorporated non-exclusive characteristics to ensure the flexibility and relevance of the data. The fourth iteration did not require any further modifications of the taxonomy. Consequently, the taxonomy met all objective ending conditions. To ascertain the quality of the taxonomy, it was further tested against the subjective ending conditions, concluding that the taxonomy was appropriate. After evaluating the taxonomy in each of the four iterations, a final evaluation was performed, considering the final taxonomy's usefulness for the intended target groups and purpose (Nickerson et al. (2023). The purpose was to help researchers and practitioners understand digital well-being characteristics from a legislative-informed perspective and assess how their enterprises align with specific criteria, enabling deeper exploration of relevant characteristics. The assembled focus group of three researchers and two practitioners was consulted again to ensure the integration of the target groups' perspectives into the final taxonomy. They broadly confirmed the validity of the taxonomy. It revealed that every enterprise is different; therefore, in practice, the focus on specific characteristics of the taxonomy must also be re-evaluated depending on the use case. Practitioners can use the taxonomy to build digital awareness, evaluate well-being criteria, and promote innovation. For example, it was mentioned that the taxonomy could serve as a foundation for employee digital awareness training. Accordingly, the final taxonomy was obtained.

4 RESULTS

4.1 Digital Well-Being Taxonomy

Figure 1 presents the digital well-being taxonomy, providing characteristics and their representation in the 11 directives and a comprehensive explanation in Section 4.2, with references to the directives.

Taxonomy					EU Directives										
Dimensions	Human Centricity (Overall)	ID	Characteristics of Digital Well-being		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
Social Context (Overall Applicability)	Human Centricity	C1	Prevention of Harm		x		x	x	x	x	x	x	x	x	x
		C2	Risk Management/Awareness		x	x	x	x		x		x	x		x
		C3	Human Agency and Autonomy		x	x	x	x		x		x	x	x	
		C4	Human Oversight		x	x	x	x		x					
		C5	Technical Robustness and Safety	Resilience to Attack and Security (#5.1)	x	x	x		x	x					
				General Safety (#5.2)		x	x	x	x	x		x		x	x
				Accuracy (#5.3)	x	x	x		x	x					
				Reliability (#5.4)		x	x								
		C6	Privacy and Data Governance		x	x		x				x			
		C7	Transparency/ Accountability	Traceability (#7.1)	x	x	x	x	x						
				Explainability (#7.2)	x	x	x	x				x	x		
				Communication (#7.3)	x	x	x	x							
		C8	Information Literacy/Protection from Disinformation, Misinformation					x		x	x	x	x		
		C9	Social Justice	Diversity (#9.1)	x	x	x		x	x	x			x	
				Non-discrimination (#9.2)	x	x	x		x		x	x		x	
				Equality (#9.3)	x	x	x		x	x	x	x		x	
				Solidarity and Inclusion (#9.4)	x	x	x	x	x	x	x	x		x	
				Fairness (#9.5)	x	x		x	x	x	x	x			
		C10	Environmental Well-being/Sustainability		x	x			x	x	x				x
		C11	Impact on Society or Democracy		x	x	x		x	x	x				x
		C12	Physical and Mental Health							x		x	x	x	x
		C13	Social Belonging							x				x	
Learning Context		C14	Digital Competence/ Digital Literacy	Technical Skills (#14.1)					x		x	x			
				Train for Resilience/Critical Thinking (#14.2)											
				Security and Ethics (#14.3)							x	x			
				Social Competence (#14.4)							x	x			
				Creation Skills (#14.5)								x			
		C15	Social Interaction/Collaboration								x	x			
		C16	Innovative Digital Learning Enablers									x			
		C17	Social Support									x			
		C18	Differentiation/Individualization									x			
		C19	Quality Education Content									x			
Work Context		C20	Flexibility	Time Flexibility (#20.1)									x	x	x
				Mobility/Location Idependence (#20.2)									x	x	x
				Work-Life-Balance (#20.3)									x	x	x
				Adaptability (#20.4)		x							x		x
		C21	IT Environment	Integration (#21.1)									x		
				Standardization (#21.2)									x	x	
				Speed (#21.3)									x		
				Simplicity (#21.4)									x		
		C22	Occupational Health and Safety											x	x
		C23	Supportive Technologies for Well-being												x
		C24	Social Support										x		x
		C25	Collaboration/Knowledge Management										x		x

Figure 1: The characteristics of digital well-being: a novel taxonomy from an EU perspective.

4.2 Explanation of Characteristics

4.2.1 Social Context

C1. Prevention of Harm. Prevent any harm, e.g., prevention of harmful content (f); prohibition of AI systems that deploy subliminal techniques beyond a person's consciousness to materially distort a person's behavior in a manner that potentially causes that person or another physical or psychological harm (c). **C2. Risk Management/Awareness.** Promote digital risk awareness and prevention, support safe digital environments, and address challenges connected with digital risks, e.g., using digital social networks (h). Categorize AI systems into the following risk categories: Unacceptable risks that include cognitive behavioral manipulation of people or vulnerable groups, social scoring based on behavior, socioeconomic status, personal characteristics, biometric identification and categorization, and real-time and remote biometric identification such as facial recognition. High risks with regulation that cover AI used in critical infrastructure, AI that affects decisions about people's lives or significantly impacts the environment, and generative AI systems as well as basic AI models. Limited risks involving AI systems must comply with transparency requirements, including those that generate or manipulate image, audio, or video content, such as deepfakes (c). **C3. Human Agency and Autonomy.** Empower everyone to make their own informed choices online (f); assess possible influences of AI systems on individuals, particularly as the system guides, influences, or supports human decision-making (b). **C4. Human Oversight.** Enable humans to always intervene in an AI system (b). **C5. Technical Robustness and Safety.** *Resilience to Attack and Security (#5.1).* Protect the system from physical and cyber-attacks and assess the risks arising from abuse/deficiency (b). *General Safety (#5.2).* Assess potential risks from sloppy design practices (b). *Accuracy (#5.3).* Assess the effects that inaccurate predictions of a system would put forward (b). *Reliability (#5.4).* Put forward means to compensate for the system in case of failure and ongoingly validate it (reliability, fallback plans, and reproducibility) (b). **C6. Privacy and Data Governance.** Handle personal (user) data responsibly (privacy) (b); right to privacy and human dignity (j); assure the integrity of data quality and content (data governance) (b). **C7. Transparency/Accountability.** *Traceability (#7.1).* Assure that the principle of operation and the decisions of an AI system remain traceable (b); transparency about the fact that humans are dealing with an AI system (a). *Explainability (#7.2).* Encourage the user's understanding of an AI system's decisions (b), giving transparency and clarity. *Communication (#7.3).* Communicate possible risks and limitations of an (AI-) system to users and, if applicable, provide disclaimers (b). Involve and educate stakeholders throughout a system's life cycle (a). **C8. Information Literacy/Protection from Disinformation, Misinformation.** Protect people from disinformation and misinformation; tackle information manipulation (f); enhance rapid access to relevant information (i). **C9. Social Justice.** *Diversity (#9.1).* Enhance diversity; design data sets and algorithms so that results are fair regarding diversity and representativeness (b). *Non-discrimination (#9.2).* Ensure that the system can be used by everyone, including people with special needs or preferences (accessibility and universal design) (b). *Equality (#9.3).* Ensure access to digital resources and technologies for all individuals, regardless of their background, abilities, or circumstances, concerning factors such as accessibility, connectivity, and availability of digital equipment (g). *Solidarity and Inclusion (#9.4).* Ensure that nobody is left behind by digital transformation, making sure we make extra effort to include older adults, people living in rural areas, persons with disabilities, marginalized, vulnerable, or disenfranchised people, and those who act on their behalf (f). *Fairness (#9.5).* Create fair digital environments (f); this includes, for example, designing data sets and algorithms such that results are fair and unfair bias is avoided (b). **C10. Environmental Well-being/Sustainability.** Monitor and reduce environmental negative impacts (b). **C11. Impact on Society or Democracy.** Monitor and reduce the negative impact that a(n) (AI-) system may have on society and democracy (b). **C12. Physical and Mental Health.** Encourage practices and tools that promote a positive relationship with technology to enhance the overall quality of life. Digital technologies may induce stress and anxiety, affecting sleep and mental resilience. Excessive digital device use and ergonomic issues impact physical health, while social media use and constant connectivity influence mental health. The stress and mental strain that can arise from constant connectivity, information overload, and pressure to adapt to rapidly changing technologies is also known as technostress (j). **C13. Social Belonging.** Leverage technology to foster connections and social belonging to be mentally and emotionally healthy and feel like you belong to and are supported by a community.

4.2.2 Learning Context

C14. Digital Competence/Digital Literacy. *Technical Skills (#14.1).* Possess skills to effectively engage with the digital world and perform tasks related to information, communication, and problem-solving (g). *Train for Resilience/Critical Thinking (#14.2).* Create an awareness of potential threats in the digital world and foster the development of resilience and critical thinking skills as a proactive approach (h). *Security and Ethics (#14.3).* Engage ethics and safety with digital technologies, including cybersecurity skills and knowledge of AI algorithms' limits (h). *Social Competence (#14.4).* Develop personal and social competence, which may help learners to use digital social networks with less risk of emotional or social harm (h). *Creation Skills (#14.5).* Acquire the knowledge, skills, and competencies necessary to create, share, and use digital content and be aware of the rules related to intellectual property (h). **C15. Social Interaction/Collaboration.** Consider social interactions among learners and educators using technology in digital education systems (h). Crucial aspects involve cross-sector collaboration, new models for sharing digital content, and common standards for education. Exchange of knowledge and practices fosters cooperation (g). **C16. Innovative Digital Learning Enablers.** Support work with innovative education tools for enhanced learning, which could include gamification, educational solutions based on, e.g., extended reality technologies such as Augmented-/Virtual Reality, AI, learning analytics, and social networks, which respect an ethical and transparent approach, data privacy and nondiscrimination by design, while considering benefits and potential risks (h). **C17. Social Support.** Consider social support in learning a crucial role, especially regarding motivational aspects (e.g., family, digital parenting, educator role) (h), or even anonymous, through online settings. **C18. Differentiation/Individualization.** Differentiate between different learner groups; tailor education and training to individual needs through, e.g., algorithms (influenced by, e.g., health condition, special educational needs, and socio-economic background) (h). **C19. Quality Education Content.** Meet high standards of excellence, effectiveness, and relevance regarding educational materials and resources. Design quality education content to facilitate meaningful learning experiences and contribute to individuals' overall educational development. Consider a balance of digital and non-digital approaches (h).

4.2.3 Work Context

C20. Flexibility. *Time Flexibility (#20.1).* Individuals can choose when and how to work. Enabled by digital tools and remote setups, it allows for personalized schedules, promoting work-life balance and satisfaction (i). *Mobility/Location Independence (#20.2).* Implement a location-independent office concept with digital tools provided to staff, enabling location independence and working efficiently from the best suitable place. Shifting the nature of work from physical to virtual workspaces saves time through improved use of shadow time (e.g., commuting) and correlates with enhanced productivity (i). *Work-Life-Balance (#20.3).* Support balance between professional and private life (i). *Adaptability (#20.4).* Monitor the impact on the working environment and required skills and adapt (b). Allow different views of the digital workplace, be adaptive and flexible to different types of users, behaviors, and new technologies – from the simplest to the most complex ones – with the same building blocks and with the possibility of replacing or adding new ones easily (i). **C21. IT Environment.** *Integration (#21.1).* Seamlessly integrate the digital workplace with its collection of tools, systems, platforms, interfaces, programs, etc., allowing for a smooth and efficient user experience (i). *Standardization (#21.2).* Enable the potential integration of diverse building blocks from various sources. Standards drive cost reductions and low maintenance costs, facilitating rapid user learning (i). *Speed (#21.3).* Allow the processes for introducing new organizational elements to be fast enough to cope with user expectations; no long and heavy product management cycles (i). *Simplicity (#21.4).* Take it simple; simplicity facilitates the management of a corporate IT environment, reducing costs (i). **C22. Occupational Health and Safety.** Embrace an expansive and contemporary definition of occupational health and safety in the evolving digital workplace, e.g., focusing on AI-related challenges like the right to disconnect and biased algorithms causing discrimination. Advocate for transparent solutions through collaboration between employers and employee representatives. Address mental health issues, combat online harassment, and propose measures against workplace bullying and violence (j). **C23. Supportive Technologies for Well-being.** Provide workers, especially those with disabilities or older workers and their employers, with digitally enabled solutions, such as AI-based conversational agents, to support their health and well-being (k). **C24. Social Support.** Social support

and social networking can decrease stress factors in the workplace, such as technostress, isolation, or inadequate organization of (remote) work (j). **C25. Collaboration/Knowledge Management.** Facilitate collaboration and break silos by leveraging collaboration tools and social networking to allow the fast creation of focused groups across institutional boundaries. This enhances the organization's responsiveness to situations and crises, emphasizing improved collaboration, knowledge sharing, and fast communication. This facilitates faster creation and dissemination of knowledge, co-creation of information, and accessing pertinent data (i; k).

5 DISCUSSION

Based on relevant EU directives, this study proposes a novel digital well-being taxonomy, comprising 25 characteristics with sub-characteristics that promote human flourishing in an information society – particularly within the EU and with potential for broader applicability. The taxonomy provides valuable insights for both research and practice.

In *practice*, it offers a structured, accessible approach for non-legal practitioners, particularly in the EU, and beyond. Importantly, it does not function as a prescriptive list of digital well-being characteristics, but rather as a flexible tool that can be adapted to the specific needs and contexts of different enterprises. Given the diversity of organizational environments, the emphasis on characteristics must be reassessed according to the relevant use cases, as highlighted in the evaluation of the final taxonomy. Practitioners can utilize the taxonomy to enhance digital awareness by holistically understanding digital well-being characteristics, assessing well-being criteria, and formulating targeted strategies that align with digital well-being objectives while fostering innovation. For example, practitioners aiming to promote digital well-being may classify their enterprises according to the specific digital well-being characteristics they have implemented, thereby allowing for tailored strategies that address specific gaps or areas for improvement.

Furthermore, the taxonomy supports the development of effective frameworks, processes, and other artifacts in IS research and practice, such as interventions designed to mitigate the adverse impacts of digitalization, like digital awareness training. Preventative measures like these have not yet been thoroughly evaluated (Rohwer et al., 2022). The taxonomy provides a structured foundation for creating training modules focused on specific components of digital well-being, such as building resilience to technostress or combating misinformation (e.g., Carpenter et al., 2019; Szpitalak et al., 2021). We encourage experts to apply and evaluate the taxonomy, especially in the context of digital awareness training, to explore its potential to reduce the adverse impacts of technology on employee well-being.

In *theory*, IS research has extensively examined the role of technology in enabling human flourishing (Burr et al., 2020; Calvo and Peters, 2014) as well as the adverse impacts of digitalization (Abhari and Vaghefi, 2022; Bonenberger et al., 2022; Ragu-Nathan et al., 2008). However, it has frequently neglected to incorporate a systematic legislative approach, which has become increasingly relevant due to a notable increase in related legislative action. By integrating EU directives such as the Ethics Guidelines for Trustworthy AI and the Digital Services Act, the study extends current models of digital well-being in IS. It encourages scholars to engage more with legislative frameworks as integral components of technology design, not external constraints. In introducing the novel taxonomy, this contribution aligns with calls for interdisciplinary research approaches in HCI and HCAI, recognizing the importance of social science in understanding the broader impact of technology on society (Akkermans, 2023). This supports the ongoing shift from a techno-centric to a human-centric approach in IS research, contributing to the discourse on human-technology symbiosis and well-being (Gorichanaz, 2024; Stephanidis et al., 2019). The existing literature, including studies by Lanzl (2023) on the role of social support in reducing technostress in the workplace and Seidler et al. (2020) on the use of gamification to promote eco-sustainable behavior, can be mapped to the taxonomy as social support in the work context and environmental well-being/sustainability within the social context. This demonstrates its relevance for classifying research.

Future research should broaden the scope beyond Europe, as although this study provides a strong foundation, comparative analyses of legislative frameworks governing digital well-being across various regions could offer valuable insights. Investigating and comparing the fundamentals and principles embedded in different legislative contexts could inform practitioners seeking to provide IS services across diverse cultural landscapes. For example, Schwartz (2012) has compared values across different cultures and countries. Scholars could be inspired to do something similar in the context of legislation specifications of digital well-being. In

addition, exploring public discourses surrounding social interactions that influence perceptions of digital well-being may also yield deeper insights. Researchers should continue to evaluate and refine the taxonomy, exploring its characteristics in greater depth and considering it as a basis for design principles in IS to evaluate existing or new prototypes within design science research. Studies could also investigate individual prevention strategies for achieving digital well-being, like coping with technostress. Applying the taxonomy in practice is essential to enhance its validity. In the context of digital awareness training, we encourage researchers to empirically evaluate its efficacy as a foundation in forming training modules designed to mitigate the adverse impacts of technology on well-being. Moreover, future research could employ configurational theorizing (Gresov and Drazin, 1997; Shortell, 1977) and systems thinking approaches (Burton-Jones et al., 2015; Sarker et al., 2019) to better understand how different characteristics interact to shape digital well-being, providing a nuanced framework for examining complex societal and technical interactions. Given the multifaceted nature of digital well-being, characterized by a web of technical intricacies and societal implications, a singular or dyadic approach cannot capture its entirety. Instead, researchers should explore how diverse configurations can produce similar outcomes and how these are shaped by varying factors (Furnari et al., 2021; Misangyi et al., 2017). This study provides a comprehensive basis for further investigation and advocates for ongoing exploration and scholarly discourse on digital well-being and human flourishing, fostering greater digital awareness in an evolving digital landscape.

Limitations. The selected EU directives provide a solid foundation for deriving characteristics of digital well-being but are not exhaustive. Furthermore, ethical priorities may shift over time (Kortum et al., 2022), and the development of the taxonomy reflects the authors' expertise in an intuitive approach, introducing some subjectivity. To this, explanations concerning the taxonomy development, and its findings are provided to allow other researchers to follow and draw conclusions. Furthermore, the taxonomy's general nature allows broad application but may limit specificity in particular use cases. Future research should consider mapping digital well-being to specific use cases and contexts for more targeted applications.

6 CONCLUSION

This study introduces a digital well-being taxonomy grounded in EU legislation, comprising 25 key characteristics. It addresses the often-overlooked role of legislation in shaping digital well-being. By categorizing complex legislative aspects into clear, understandable characteristics, the taxonomy enhances digital awareness and provides a foundation for developing strategies and artifacts in IS research and practice that mitigate digitalization's adverse impacts, including digital awareness training. It is relevant for European scholars and practitioners, although the findings hold potential for wider application in global contexts. Furthermore, it opens new avenues for future research and highlights the importance of interdisciplinary approaches, integrating social science and legislation to address technology's broader impacts on well-being. By offering a structured approach to digital well-being from a legislative angle, this work addresses a gap in the field and encourages ongoing exploration in HCI and HCAI towards human flourishing in the digital age.

REFERENCES

Abhari, K., Vaghefi, I. (2022). Screen time and productivity: an extension of goal-setting theory to explain optimum smartphone use. *AIS Transactions on Human-Computer Interaction*, 14(3), 254–288.

Akkermans, H. (2023). The Social Responsibilities of Scientists and Technologists in the Digital Age Check for updates. *Introduction to Digital Humanism: A Textbook*, 65.

Allas, T., Chinn, D., Pal, E. S., Zimmerman, W. (2020). Well-being in Europe: Addressing the high cost of COVID-19 on life satisfaction. *McKinsey and Company.*

Baier, M.-S., Berger, S., Kreuzer, T., Oberländer, A. M., Röglinger, M. (2023). What makes digital technology? A categorization based on purpose. *Communications of the Association for Information Systems*, 52(1), 4.

Bentley, S. V, Naughtin, C. K., McGrath, M. J., Irons, J. L., Cooper, P. S. (2024). The digital divide in action: how experiences of digital technology shape future relationships with artificial intelligence. *AI and Ethics*, 1–15.

Biswas-Diener, R. (2011). Positive psychology as social change. Springer London.

Bonenberger, L., Graf-Drasch, V., Lanzl, J. (2022). How to Design More Empathetic Recommender Systems in Social Media, in *International Conference on Information Systems, ICIS 2022.*

Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal*, 9(2), 27–40.

Bradford, A. (2020). The Brussels effect: How the European Union rules the world. *Oxford University Press*, USA.

Burnell, R., Peters, D., Ryan, R. M., Calvo, R. A. (2023). Technology evaluations are associated with psychological need satisfaction across different spheres of experience: an application of the METUX scales. *Frontiers in Psychology*, 14, 1092288.

Burr, C., Taddeo, M., Floridi, L. (2020). The ethics of digital well-being: A thematic review. *Science and Engineering Ethics*, 26(4), 2313–2343.

Burton-Jones, A., McLean, E. R., Monod, E. (2015). Theoretical perspectives in IS research: from variance and process to conceptual latitude and conceptual fit. *European Journal of Information Systems*, 24(6), 664–679.

Butler, T., Gozman, D., Lyytinen, K. (2023). The regulation of and through information technology: Towards a conceptual ontology for IS research. In *Journal of Information Technology* (Vol. 38, Issue 2, pp. 86–107). SAGE Publications Sage UK: London, England.

Calvo, R. A., Peters, D. (2014). Positive computing: technology for wellbeing and human potential. *The MIT press.*

Capel, T., Brereton, M. (2023). What is human-centered about human-centered AI? A map of the research landscape. *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems*, 1–23.

Carpenter, J. K., Sanford, J., Hofmann, S. G. (2019). The effect of a brief mindfulness training on distress tolerance and stress reactivity. *Behavior Therapy*, 50(3), 630–645.

Cleven, A., Winter, R. (2009). Regulatory compliance in information systems research–literature analysis and research agenda. *International Workshop on Business Process Modeling, Development and Support*, 174–186.

Corbin, J., Strauss, A. (2008). Qualitative research. *Techniques and Procedures for Developing Grounded Theory*, 3.

Council of the European Union. (2022). Council conclusions on supporting well-being in digital education. *Official Journal of the European Union*.

Dennis, M. J. (2022). Social robots and digital well-being: how to design future artificial agents. *Mind & Society*, 21(1), 37–50.

Desmet, P. M. A., Pohlmeyer, A. E. (2013). Positive design: An introduction to design for subjective well-being. *International Journal of Design*, 7(3).

Eisikovits, N., Feldman, D. (2022). AI and Phronesis. *Moral Philosophy and Politics*, 9(2), 181–199.

European Commission. (2019). Ethics Guidelines For Trustworthy AI. https://digital-strategy.ec.europa.eu/en/library/ethics-guidelines-trustworthy-ai.

European Commission. (2020a). Assessment List for Trustworthy Artificial Intelligence (ALTAI) for self-assessment. https://doi.org/10.2759/791819.

European Commission. (2020b). Digital Education Action Plan 2021-2027 Resetting education and training for the digital age. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0624.

European Commission. (2021). EU strategic framework on health and safety at work 2021-2027 Occupational safety and health in a changing world of work. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021DC0323.

European Commission. (2023). European Declaration on Digital Rights and Principles for the Digital Decade. *Official Journal of the European Union*.

European Commission (Directorate-General for Digital Services). (2018). Digital Workplace Strategy. https://commission.europa.eu/publications/digital-workplace-strategy_en.

European Parliament, C. on E. and S. A. (2023). Mental Health in the Digital World of Work. *Official Journal of the European Union*.

European Parliament, Council of the European Union. (2022a). Decision (EU) 2022/2481 of the European Parliament and of the Council of 14 December 2022 establishing the Digital Decade Policy Programme 2030. *Official Journal of the European Union*.

European Parliament, Council of the European Union. (2022b). Regulation (Eu) 2022/2065 of The European Parliament And of The Council of 19 October 2022 on a Single Market For Digital Services and amending Directive 2000/31/EC (Digital Services Act). *Official Journal of the European Union*.

European Parliament, Council of the European Union. (2024). Proposal for a Regulation of The European Parliament and of The Council Laying Down Harmonised Rules On Artificial Intelligence (Artificial Intelligence Act) and Amending Certain Union Legislative Acts. https://artificialintelligenceact.eu/wp-content/uploads/2024/01/AI-Act-FullText.pdf

Furnari, S., Crilly, D., Misangyi, V. F., Greckhamer, T., Fiss, P. C., Aguilera, R. V. (2021). Capturing causal complexity: Heuristics for configurational theorizing. *Academy of Management Review*, 46(4), 778–799.

Gorichanaz, T. (2024). Toward Humanity-Centered Design without Hubris. *Extended Abstracts of the CHI Conference on Human Factors in Computing Systems*, 1–7.

Gresov, C., Drazin, R. (1997). Equifinality: Functional equivalence in organization design. *Academy of Management Review*, 22(2), 403–428.

Grueneke, T., Guggenberger, T., Hofmeister, S., Stoetzer, J.-C. (2024). *Association for Information Systems*. AI-Enabled Self-Regulated Learning: A Multi-Layer Taxonomy Development.

Hylving, L., Koutsikouri, D., Jensen, T. B. (2024). Introduction to the Minitrack on Human Flourishing in the Digital Era: Individual, Organizational, and Societal Possibilities and Pitfalls. *Proceedings of the 57th Hawaii International Conference on System Sciences*, 6412–6413.

Kortum, H., Rebstadt, J., Böschen, T., Meier, P., Thomas, O. (2022). Towards the operationalization of trustworthy AI: integrating the EU assessment list into a procedure

model for the development and operation of AI-systems. *INFORMATIK 2022*.

Krüger, N. T., Schütter, S., Zimmermann, I. (2023). Generation Z. Retrieved from https://www.bgf-institut.de/fileadmin/redaktion/downloads/gesundheitsberichte/aktuelle_Gesundheitsberichte/2023/Generation_Z_2023.pdf, on 02.04.2024.

Lanzl, J. (2023). Social Support as Technostress Inhibitor: Even More Important During the COVID-19 Pandemic? *Business & Information Systems Engineering*, 1–15.

Maslej, N., Fattorini, L., Perrault, R., Parli, V., Reuel, A., Brynjolfsson, E., Etchemendy, J., Ligett, K., Lyons, T., Manyika, J., Niebles, J. C., Shoham, Y., Wald, R., Clark, J. (2024). The AI Index 2024 Annual Report.

Misangyi, V. F., Greckhamer, T., Furnari, S., Fiss, P. C., Crilly, D., Aguilera, R. (2017). Embracing causal complexity: The emergence of a neo-configurational perspective. *Journal of Management*, 43(1), 255–282.

Nickerson, R. C., Varshney, U., Muntermann, J. (2013). A method for taxonomy development and its application in information systems. *European Journal of Information Systems*, 22(3), 336–359.

Ragu-Nathan, T. S., Tarafdar, M., Ragu-Nathan, B. S., Tu, Q. (2008). The consequences of technostress for end users in organizations: Conceptual development and empirical validation. *Information Systems Research*, 19(4), 417–433.

Riva, G., Baños, R. M., Botella, C., Wiederhold, B. K., Gaggioli, A. (2012). Positive technology: using interactive technologies to promote positive functioning. *Cyberpsychology, Behavior, and Social Networking*, 15(2), 69–77.

Rohwer, E., Flöther, J.-C., Harth, V., Mache, S. (2022). Overcoming the "Dark Side" of Technology—A scoping review on preventing and coping with work-related technostress. *International Journal of Environmental Research and Public Health*, 19(6), 3625.

Rövekamp, M. (2019). Einsamkeit im Digitalen: Vernetzt – und doch allein. Retrieved from https://www.tagesspiegel.de/wirtschaft/vernetzt--und-doch-allein-6607642.html, on 02/05/2024.

Sander, T. (2011). Positive computing. In *Positive psychology as social change* (pp. 309–326). Springer.

Sarker, S., Chatterjee, S., Xiao, X., Elbanna, A. (2019). The sociotechnical axis of cohesion for the IS discipline: Its historical legacy and its continued relevance. *MIS Quarterly*, 43(3), 695–720.

Schwartz, S. H. (2012). An overview of the Schwartz theory of basic values. *Online Readings in Psychology and Culture*, 2(1), 11.

Seidler, A.-R., Henkel, C., Fiedler, M., Kranz, J., Ixmeier, A., Strunk, K. S. (2020). Promoting Eco-Sustainable Behavior with Gamification: An Experimental Study on the Alignment of Competing Goals. *ICIS*.

Shen, J., Iandoli, L., Aguirre-Urreta, M. (2022). Human-Centered Design for Individual and Social Well-being: Editorial Preface. *AIS Transactions on Human-Computer Interaction,* 14(4), 446–460.

Shimkin, M. B. (1946). The World Health Organization. *Science*, 104(2700), 281–283.

Shneiderman, B. (2020). Bridging the gap between ethics and practice: guidelines for reliable, safe, and trustworthy human-centered AI systems. *ACM Transactions on Interactive Intelligent Systems (TiiS)*, 10(4), 1–31.

Shortell, S. M. (1977). The role of environment in a configurational theory of organizations. *Human Relations*, 30(3), 275–302.

Stahl, B. C., Andreou, A., Brey, P., Hatzakis, T., Kirichenko, A., Macnish, K., Shaelou, S. L., Patel, A., Ryan, M., Wright, D. (2021). Artificial intelligence for human flourishing–Beyond principles for machine learning. *Journal of Business Research*, 124, 374–388.

Stephanidis, C., Salvendy, G., Antona, M., Chen, J. Y. C., Dong, J., Duffy, V. G., Fang, X., Fidopiastis, C., Fragomeni, G., Fu, L. P. (2019). Seven HCI grand challenges. *International Journal of Human–Computer Interaction*, 35(14), 1229–1269.

Strauss, A., Corbin, J. (1998). Basics of qualitative research techniques. Sage Publications, Inc.

Szpitalak, M., Woltmann, A., Polczyk, R., Kękuś, M. (2021). Memory training as a method for reducing the misinformation effect. *Current Psychology*, 40, 5410–5419.

Usmani, U. A., Happonen, A., Watada, J. (2023). Human-centered artificial intelligence: Designing for user empowerment and ethical considerations. *5th International Congress on Human-Computer Interaction, Optimization and Robotic Applications (HORA)*, 1–7.

van der Maden, W., Lomas, D., Hekkert, P. (2023). A framework for designing AI systems that support community wellbeing. *Frontiers in Psychology*, 13.

Vidal Ferré, R., Alcober Segura, J. Á., Cervelló Pastor, C., Fernández Ferré, M., García Villegas, E., Yúfera Gomez, J. M. (2021). Creating digital awareness. *JITEL 2021: Libro de Actas: XV Jornadas de Ingeniería Telemática, A Coruña 2021*, 105–111.

Wacks, Y., Weinstein, A. M. (2021). Excessive smartphone use is associated with health problems in adolescents and young adults. *Frontiers in Psychiatry*, 12, 762.

Webster, J., Watson, R. T. (2002). Analyzing the past to prepare for the future: Writing a literature review. *MIS Quarterly*, xiii–xxiii.

World Health Organization. (2024). Constitution. Retrieved from https://www.who.int/about/governance/constitution, on 02/02/2024.