Digital transformation in adult education: empowering global understanding and sustainable development

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Abstract

In the era of digital transformation, the intersection of adult learning, digital competence, global progress, and sustainable development emerges as a pivotal focus. This article dives into the complex interaction of these factors centering on the pivotal role of digital competence in advancing sustainable development goals through adult education. By exploring the dynamic landscape of technology and education, the paper investigates how enhancing digital competence among adult learners facilitates global understanding and fosters sustainable behaviors. The accessibility afforded by digital education empowers individuals at any life stage or circumstance to actively participate in lifelong learning, upskilling, and reskilling. The research systematically examines literature to capture the essence of the study, emphasizing the vital importance of digital competency for global understanding and sustainable development. It elucidates key concepts, unraveling the intricate relationship between digital transition, adult education, and the overarching pursuit of sustainability. This study posits hypotheses that underscore the critical role of digital competence in sparking global knowledge and catalyzing sustainable development within the dynamic realm of digital change. It contends that digital technologies, through personalized education, contribute significantly to the achievement of global sustainability goals. The findings accentuate how the digital revolution in adult education transcends conventional boundaries, leveraging technology to democratize knowledge and foster global collaboration. Empowered as change agents, learners equipped with both global awareness and sustainable skills have the potential to propel society towards a more interconnected and sustainable future. The study concludes with insights underscoring the profound link between digital competency, global awareness, adult education, and sustainable development, offering valuable guidance for educators, policymakers, and academics.

Keywords: digital learning; technology; adults; education; sustainability.

Introduction

As cultures grow more networked and technologically dependent, the capacity to manage digital tools and engage in cross-cultural dialogue becomes increasingly important. The objective of this paper is to investigate the critical role of digital competence in adult education, as well as its significant influence on building global understanding and

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supporting sustainable development. The research intends to highlight how increased digital competence among adult learners might empower them as catalysts for good global change by navigating the dynamic convergence of technology and education.

This study delves into three key themes, each framed as a theoretical research exploration:

1. Impact of digital competence on adult learners' global knowledge and international cooperation: the exploration for this first area is uncovering the ways in which enhanced digital competence influences adults, fostering a global perspective, and encouraging active involvement in international collaborations. The theoretical framework for this statement is that improving adult learners' digital proficiency leads to enhanced cross-cultural understanding and collaboration, hence contributing to a more integrated global society.

2.Impact of adult learners' digital competence on participation in sustainable development projects and practices, hence the exploration for this affirmation is probing into the role of digital competence in inspiring adult learners to actively participate in sustainable development initiatives and cultivate eco-friendly habits. The most plausible hypothesis derived from this statement is as it follows: the application of digital technology in adult education encourages learners to participate in environmentally conscious activities, supporting sustainable behaviors and contributing to the attainment of sustainable development goals.

3.The third statement would be trends and issues in integrating digital competence into adult education, so here, the exploration is about investigating the current dynamics and challenges involved in infusing digital competence into adult education, offering insights into the ever-evolving educational landscape. Therefore, the most reasonable assumption determined by this assertion is that collaboration initiatives among educators, policymakers, and academics to solve the problems of integrating digital competence in adult education result in enhanced digital inclusion and equitable access to education, resulting in more informed and empowered learners.

Moreover, this research employs a theoretical research framework to investigate the complex influence of digitalization on adult education. The research focuses on essential factors such as cultural and environmental awareness via critical analysis. Within the context of adult education, the theoretical lens incorporates the larger elements of globalization, collaboration, and sustainability. This study intends to give a detailed view of how digitalization affects these crucial areas by merging previous literature and theoretical concepts.

Theoretical research

For this study, the main purpose has been to undertake a theoretical research inquiry to provide a critical analysis and full synthesis of the impacts of digitalization on adult education. The attention was focused on important themes including globalization,

sustainability, cultural and environmental awareness. The goal of this theoretical research paper is to provide significant insights to the academic sphere by exploring the complex interactions that exist between adult learning, digital competency, and sustainable development. The integration and transformational influence of digital technology on the learning landscape is referred to as digitalization in adult education. It entails utilizing digital technology, platforms, and resources to enhance the educational experiences of adult learners.

The synergistic combination of adult education and digital technologies not only imparts tangible skills for today's workforce, but also fosters a broader understanding of diverse global perspectives, ultimately equipping learners with the knowledge to address complex challenges in an increasingly interconnected world. Digital technologies emerge as powerful weapons for adult learners to impact good change in the quest of sustainable development. Adult learners may use digital platforms to generate meaningful materials such as blogs, films, and podcasts that teach and inspire their communities about sustainable practices, education, economy, and environmental stewardship (Lee & Tak, 2022). The incorporation of technology into the life of the elderly has become an increasingly important concern in the modern day. As technology advances at an unparalleled rate, its effect extends across generations, including the elderly. While some older people may have difficulty adapting to new digital tools and platforms at first, technology provides a plethora of benefits that may dramatically improve their quality of life. Technology opens doors to opportunities that promote social connectivity, mental engagement, and overall well-being, from staying connected with distant family members via video calls to accessing online health resources, managing finances, and engaging in lifelong learning through online courses. Instructors must evaluate how technology might offer techniques more suited to adult learning to maximize learners' experiences and the efficacy of learning outcomes (Lambert, et al., 2014). Fostering digital competence in adult education has emerged as a critical requirement in an era where digital revolution is redefining the boundaries of information distribution and connectedness. This journey through the complexities of digital competency, global understanding, and sustainable development has shown the revolutionary potential that exists at their crossroads. Adult learners' capacity to harness digital technologies and critically engage with digital information becomes increasingly important as they traverse a complex and linked environment.

The goal for Europe is to secure digital sovereignty by providing equal benefits that are consistent with our values and way of life, which necessitates extensive efforts in the digital revolution and artificial intelligence, encompassing infrastructure, connection, data, legislation, and investment; thus, developing the service economy and incorporating digital services are both critical to this quest (European Council, 2019). Digital competence equips adult learners to be active contributors to a more inclusive, connected, and sustainable global community, from facilitating cross-cultural discourse to encouraging sustainable habits. In this quickly changing digital age, the need of

prioritizing digital competency in adult education is emphasized as a transformational force that may overcome the digital divide. According to the first statement from earlier, the investigation on the impact of expanded digital competence on adults is intended to provide light on paths that create a global perspective and encourage active participation in international partnerships. According to the theoretical paradigm, increasing adult learners' digital competency improves cross-cultural understanding and collaboration, hence contributing significantly to a more integrated global society.

In the pursuit of sustainable development, digital tools provide a formidable arsenal for adult learners to contribute to ecologically sensitive activities. Adults can develop sustainable lifestyles by using online resources ranging from interactive environmental courses to webinars on eco-friendly practices. Environmental awareness is gamified through mobile applications, which encourage people to track their carbon footprints and participate in challenges that promote healthy ecological habits. Furthermore, internet channels make it easier to spread information about local conservation activities, allowing adults to participate in grassroots campaigns and fight for environmental policies. Adult learners may take an active part in tackling global environmental concerns and crafting a more sustainable future for future generations by leveraging the possibilities of digital platforms. Technology may bridge generational barriers and allow older people to remain active participants in an increasingly digital world, enhancing their lives and benefiting the competence has emerged as a vital skill set for individuals to efficiently traverse the difficulties of the digital age in an era dominated by digital landscapes. Beyond sheer technical proficiency, digital competence comprises a wide range of abilities that enable people to engage, assess, and create in digital contexts.

According to *Open Educational Resource* (OER) some of the most important key policies shaping adult`s education at both the European Union and international levels are (Bahnaru, 2021):

1. *The ET 2020 Working Group on Adult Learning*, established by the EC, involves experts, social partners, and civil society members to promote Adult Learning through the EPALE Platform and National Coordinators.

2. 2. *The Digital Education Action Plan 2021-2027* aims for inclusive digital education, aligning with the skills Agenda's goal of boosting digital skills.

3. *The EU's New Strategic Agenda (2019-2024)* emphasizes investing in skills, education, innovation, and research.

4. *The 2016 Recommendation on Upskilling Pathways* which targets literacy, numeracy, and digital skills for adults.

5. *The 2011 European Council Resolution* emphasizes increased adult learning participation.

6. *The Belém Framework for Action* guides global adult literacy and lifelong learning.

Integrating digital competence into adult education is fraught with difficulties that necessitate careful analysis and smart methods, based on the fact that one of the most significant difficulties is bridging the digital divide, which occurs when discrepancies in

access to technology impede equitable learning opportunities for distinct demographic groups (European Commission, 2020). To address this, educators, policy sphere, and stakeholders must work together to offer inexpensive and widespread access to digital resources, hence closing the digital literacy gap between digitally literate and marginalized people. Furthermore, due to the rapid evolution of technology, educators must undergo ongoing training to stay current with the latest tools and approaches. Policymakers have a critical role in developing policies that encourage and promote educator professional development. Researchers, too, have a role in defining best practices and discovering effective techniques for integrating digital competence into curriculum. Ultimately, a collaborative effort between educators, policymakers, and researchers, partnerships, allocating resources and creating new sustainable strategies could overcome these challenges and pave the way for a digitally inclusive adult education landscape (United Nations Economic Commission for Europe Strategy for Education for Sustainable Development, 2012). According to the second statement from upper, this investigation focuses on the significance of digital competence in inspiring adult learners to actively participate in sustainable development activities and acquire environmentally friendly behaviors. The most plausible hypothesis emerging from this investigation is that the use of digital technology in adult education encourages learners to engage in environmentally conscious activities, promoting sustainable practices and significantly contributing to the achievement of sustainable development goals.

One of the most important book in the field aims that "*Radical environmental adult education interlinks environment, society economics, politics, and culture and offers participatory learning process, including critical thinking and community oriented learning*" (Filho, Azul, Brandli, Özuyar, & Wall, 2020), so this approach emphasizes active learning by encouraging individuals to think critically and connect with their communities in order to create a greater awareness of environmental concerns and potential solutions. Going forward, a vital question to be analyzed is why is the adult education in a digital world a global sustainability matter? The answer seems to be simple, but deep down, is way more complex than that. So, providing an answer, can be called that, because of its ability to solve multiple difficulties and support fair, long-term development on a global scale, adult education in a digital environment is a global sustainability issue. The digital revolution of adult education crosses geographical boundaries, giving people from all walks of life access to information, skills, and opportunities that are critical for their personal development and contributions to society. Adult education can effectively disseminate information on sustainable practices, environmental stewardship, and social responsibility by leveraging digital platforms, empowering learners to make informed choices that contribute to the preservation of our planet's resources and the mitigation of climate change. Moreover, the digital sphere fosters cross-cultural contacts and collaborative learning experiences, developing a feeling of shared responsibility for global concerns and encouraging collective action toward solutions. Because of the malleability of digital education, learners may customize

their learning paths, allowing them to gain knowledge in domains that directly affect sustainability, such as renewable energy, conservation, and circular economy activities. In essence, integrating adult education into the digital landscape not only provides individuals with the tools they require to be successful in an ever-changing job market, but it also fosters a collective consciousness that is critical for driving sustainable practices, fostering social cohesion, and ensuring generations to come live in harmony with our world.

On the other hand, a negative side of the technology integration is that adults and children alike are subject to cyberbullying and harassment, predatory behavior, and unsettling internet information. Everyday exposure to digital data, partly controlled by incomprehensible algorithms, raises evident concerns, and necessitates more critical thinking and the capacity to participate constructively and professionally in the digital world than ever before. Humankind faces an ever-changing demand for media literacy and a diverse set of digital skills and competencies, including safety, security, and privacy, but reaching the public and more sophisticated professions and industries remains a great struggle (European Commission, 2018). According to the last statement from the introduction, this investigation provides insights into the ever-changing educational landscape by investigating current dynamics and issues surrounding the incorporation of digital competence into adult education. The most logical assumption that can be drawn from this remark is that collaborative actions among educators, policymakers, and researchers targeted at overcoming obstacles in integrating digital competence result in increased digital inclusion and equal access to education. As a result of this joint effort, learners are more informed and empowered.

Digital revolution in education

The Digital Revolution, a transformative force reshaping the educational landscape, offers dynamic and inclusive learning environments that transcend traditional boundaries. To offer readers a comprehensive grasp of the disruptive tsunami spreading across educational fields, this section is explaining the core principles driving the digital revolution. The *Digital Revolution* is defined as the convergence of digital technologies, multimedia resources, and online platforms that democratizes access to education. It has not only reshaped traditional classroom environments, but it has also revolutionized the basic nature of how knowledge is acquired and transmitted. Technology in education is the most major educational revolution that the world has ever seen. The digital revolution emphasizes the crucial necessity of digital competence in adult education (Haleem , Javaid, Qadri, & Suman, 2023). It goes beyond simply knowing how to use digital tools and includes essential abilities like critical thinking, ethical online behavior, and adaptation to new technology. These skills are required for active participation in a linked digital society. The relationship between education, connectivity, and economic success is increasingly evident, particularly during the COVID-19 pandemic, therefore the

global access to digital technology can aid in crisis response, recovery planning, and enhancing education system resilience (UNESCO, 2020).

Moving ahead, to hypothesis validation and theoretical approach, the theoretical approach is designed to validate and reinforce the assumptions developed in this study. As the paper investigates the influence of the digital revolution on adult education, it will be analyzed how digital competence has arisen as a requirement for full participation in modern society. In the long run, the digital revolution's implications brought about profound changes in almost every element of modern life, including education. However, in addition to the enormous potential, difficulties such as guaranteeing equitable access, developing digital literacy, and fostering diversity must be addressed. The convergence of digital tools, multimedia resources, and online platforms not only democratizes access to education but also allows students, including adult learners, to actively engage with a wide range of information and opinions. Adult learners, with their different life experiences and origins, are particularly positioned to use digital technologies to deepen their awareness of global challenges and foster a global mindset.

The tremendous rate of digital revolution has transformed the way civilizations throughout the world function, influencing sectors such as communication, trade, economics, politics, and education. This transformational wave has spread to adult education, where digital competency has emerged as a critical requirement. As individuals navigate an increasingly linked environment, having digital skills has become a key need for full engagement in modern society. Digital competence includes not just the technical capacity to utilize digital tools but also critical thinking abilities to successfully analyze and use information, engage in ethical online conduct, and adapt to emerging technology. This convergence of technology and learning highlights the critical need for education systems to prioritize digital competence, providing adult learners with the tools they need to flourish in a digital-centric environment.

Despite the incredible potential provided by digital technology, this change also poses obstacles, such as ensuring fair access, encouraging digital literacy, and fostering inclusivity. Flexible and remote learning has been facilitated via online platforms, virtual classrooms, and interactive multimedia materials, democratizing education access and reaching learners beyond geographical barriers. With the introduction of digital textbooks, immersive simulations, and augmented reality technologies, pedagogical techniques have been transformed, providing learners with tailored and engaging educational experiences.

Digital competence for adult learners in the era of digital revolution

As the digital revolution reshapes the educational landscape, adult learners must be equipped with digital competence. Adult learners from various cultural and educational backgrounds traverse the digital world to fully participate in today's educational landscape. Digital competence, or the capacity to use, interpret, and evaluate digital

technology, is emerging as an essential talent for both personal and professional purposes. There are two characteristics of digital skills that are both vital for European nations' future social cohesion and prosperity. The first is the ability to simply function within the economy and society considering the pervasiveness of digital technology, while the second is the specific digital skills required by European enterprises to stay up with digital innovation and the constant disruption of work organization and procedures (Eit Digital, 2022). The misconception that prevails in our society claims that older people are unable to use technology and they are incapable of breaking into the newest cell phone or music player, dislike browsing online, and have never maintained a blog (González & Morales, 2019). Here, it can be added that all those stereotypes of younger and older learners should be rejected by policymakers and practitioners, because whatever their age, today's students see the usage of digital technology as an essential component of their higher education experience (Jelfs & Richardson, 2012). Excluded from the internet, these people have few options for obtaining a variety of information about events occurring in their nation and around the world and are forced to rely on local mass media, which can occasionally be biased and one-sided. Quality education must be inclusive and egalitarian, and it must enhance learning opportunities for all students (Glavič, 2020). In our current digital age of mobile and digital technology usage, adult learners' increasing use and dependence on these technologies has important implications for organizational and workplace policies that either support or impede successful self-directed learning processes (Curran, şi alții, 2019). Conversely, giving older individuals IT skills helps them battle the issue of uneven access to information sources, loneliness, and gives them new opportunities for social inclusion, moreover they could have the chance to stay informed and receive a variety of information about events taking place across the world, as well as to communicate with their family members and kids (DVV International, 2016).

As individuals traverse the digital domain, developing digital competence becomes essential to participating effectively in a linked society. Adopting a lifespan perspective brings us back to the issue of the learning needs that must be met at each stage of human development, as well as the shifting priorities of individuals and communities (local, national, and global) in which they live, particularly those important in addressing issues of poverty and sustainable development (Power & Maclean, 2011). Incorporating digital competency into adult education has substantial policy implications. Governments play a vital role at the worldwide level in creating an environment favorable to the smooth integration of digital technology into educational curriculum. Policymakers may encourage the development of digital education technologies, invest in educator professional development, and guarantee that all students have equal access to technology. Governments can also use digital platforms to disseminate information about conservation efforts, climate regulations, and green projects. The digital revolution has eliminated traditional educational hurdles, particularly for adult learners. Online platforms, courses, and resources give people all over the world access to high-quality

educational information, supporting lifelong learning regardless of geography, socioeconomic background, or time restrictions. Many adults with minimal education in most countries lacked fundamental proficiency in the use of ICT, but these skills were practically ubiquitous among adults with tertiary education. In terms of age, the ICT skills of the sample's people over 30 declines steadily (European Court of Auditors, 2021).

Adult learners may develop sustainable habits, environmental awareness, and social responsibility through digital education. Students obtain knowledge about sustainable living from online resources and participate in environmental situations through digital simulations. Global talks about social and environmental issues are facilitated by digital platforms, which build empathy, widen viewpoints, and inculcate a feeling of global citizenship. The merging of digital education with sustainability education enables adult learners to make informed decisions and accept responsibility for the well-being of the world.

Digital competence unleashed: navigating the modern era

Digital competency is now a necessary skill set that enables people to successfully manage the difficulties presented by the digital age that is consuming our modern world. The complexity of digital competence is explained in this part, which goes beyond technical expertise to include critical analysis, responsible digital involvement, and the capacity to discern truth from lie. Defining digital competence could be called that digital literacy gives people power in their personal and professional lives. Adults who are digitally competent are adept at utilizing online tools and courses for lifelong learning, navigating the digital world, and seeking employment possibilities. Digital competence encompasses a wide range of capabilities in addition to technical proficiency, allowing people to interact, evaluate, and produce in digital environments. For instance, it has been aimed that tablets and computers have the potential to become vital in linking older persons to health information, communication, and a sense of belonging to the outside world (Tsai, Shillair, Cotten, Winstead, & Yost, 2015). Furthermore, as remote work and internet collaboration grow more popular, digital competence is pivotal for adults seeking to actively participate in a digitally interconnected world, where it can be added the idea of civic participation of elderly, for instance, which can lead to an active ageing and more cohesive society.

Adding to that, digital learning is emerging as a catalyst for environmental sustainability, enabling creative approaches to raise awareness, modify behavior, and create a sense of environmental stewardship. Learners participate in sustainable habits and investigate a wide range of environmental concerns through interactive online classes and gamification approaches, developing responsibility and active advocacy for environmental sustainability. The integration of digital resources into conventional learning situations marks the educational transformation. Recent study highlights the transformative potential of digital technology in education, giving new routes for

information intake and skill development, from individualized learning experiences to global knowledge-sharing. Digital competence extends beyond technical capabilities in the context of adult education, because it covers digital literacy, information literacy, critical thinking, as well as the social and ethical dimensions of digital interactions. As technology advances, adult learners must be skilled not just in using digital devices, but also in selecting reliable content and engaging in acceptable online activities. While the digital revolution has erased traditional educational boundaries, difficulties remain, so physical infrastructure, age, and educational level all have a big impact on digital abilities. The growth of information and communication technologies (ICTs) has helped to bridge geographical gaps and stimulate international dialogue. The COVID-19 crisis, on the other hand, has worsened digital disparities, emphasizing the need for comprehensive solutions to promote fair access to digital learning. The COVID-19 pandemic aggravated this trend, because during the peak of the COVID-19 crisis in 2020, at least one-third of students worldwide did not have access to distant education (United Nations Educational, Scientific and Cultural Organization, 2022). Because of that global lockdown, e-learning has been used not just in higher education but also at lower levels and eventually e-learning in higher education has the potential to increase the quantity and quality of educational options available to college students, so the students will have easier and more accessible access to the educational process if e-learning is adopted in higher education (Gonzáles, Castillo, Pauca, & Chávez, 2022).

ICT can really encourage the participation of student categories that would not often interact in physical settings, while also favoring the development of individualized learning pathways based, for instance, on the beginning competences of various learner groupings. The ability to recognize competencies through the simulation of workplace scenarios made possible by ICT and, in particular, the promotion of digital literacy, which is a crucial transversal skill for occupations in the twenty-first century, has increased the relevance of learning (International Training Centre of the International Labour Organization, 2021). According to Søby, the following are the domains of digital competence: digital information, communication, material creation, security, and problem-solving (Søby, 2013). The author described categories of digital competence that represent a thorough awareness of the various talents required to properly traverse the digital realm, striving to provide individuals with the skills needed to survive in an increasingly linked and technologically driven society by stressing these sorts of competences. This paradigm goes beyond a simple list of technical abilities, diving into the complexities of responsible digital citizenship, critical thinking, and adaptation. Søby approach emphasizes the need of not simply adopting digital technologies, but of using them wisely and creatively to fully realize adults` potential for personal, professional, and social advancement.

Sustainable horizons: nurturing global connectivity through digital education

The potential for transformation towards a more inclusive, connected, and sustainable society is both hopeful and deep in the evolving environment of digital education. As we investigate this horizon, it becomes critical to clarify the principles behind this shift and frame our theoretical approach to confirm hypotheses with sound scientific reasoning. Digital education is a paradigm change brought about by technological improvements, opening the way for immersive virtual experiences, collaborative online platforms, and readily available instructional materials. It is a revolutionary force that offers immense potential for learners of all ages and backgrounds, shattering traditional educational barriers. Both development and sustainability are dynamic concepts and processes. Meanings and practices change as the world changes, as our abilities, knowledge, and capacities expand, and as communication and conversation improve. Different interests will collide and occasionally clash at every geographical scale, from the local to the global, but consensus and action can and will emerge only through discussion, debate, critical reflection, learning, and communication (Blewitt, 2008). The building of digital competence is at the heart of sustainable development project; hence this includes not just technical capacity to use digital technologies, but also the ability to bridge cultural barriers, promote empathy, respect, and engage in cross-cultural discourse. Individuals with digital competency may collaborate across geographical borders to address major sustainability concerns with a wide range of peers. Virtual platforms that promote information transmission, collaborative problem-solving, and resource pooling increase the possibilities of global collaboration. Individuals participating in debates, sharing best practices, and exploring novel solutions to global challenges through digital networks make transnational activities possible. Global competency education helps enhance cultural understanding and courteous relationships in increasingly varied communities (OECD, 2018).

The potential of global cooperation magnifies the collective efficacy of sustainability programs, bringing together a worldwide community devoted to achieving a more sustainable future. One of these is the new European Union policy called *The Digital Education Action Plan 2021-2027* initiative which identifies two key goals and fourteen supporting actions: priority number one is to create a high-performing digital education environment; and the priority number two is to improve digital skills and competences in readiness for digital transformation (European Commission, 2023). The digital revolution's democratization and enhanced accessibility provide persuasive evidence for its relevance. Adult learners across the world may now have access to high-quality educational content, breaking down old boundaries and enabling upskilling, reskilling, and lifelong learning. Individualized learning experiences are provided via digital platforms powered by adaptive algorithms and tailored material. This not only accommodates to a variety of learning capacities, but it also encourages inclusion, allowing learners from all walks of life to actively engage in the learning process. By

providing specialized training in areas such as renewable energy, environmental conservation, and social entrepreneurship, digital education becomes a catalyst for sustainable development. It promotes the notion of lifelong learning, allowing individuals to adjust their skills to changing social demands.

Digital competence in adult education: pioneering sustainable practices for global connectivity

Digital competence in adult education refers to a comprehensive set of abilities, knowledge, and attitudes that enable adult learners to navigate and use digital technology effectively for learning, communication, and involvement in a global society. It includes not just technical ability in using digital tools, but also critical thinking skills in evaluating online material, engaging ethically in digital settings, and adapting to changing technology. The focus of this subchapter is on how digital competence may pave the path for sustainable practices and create global connectedness in adult education.

In terms of adult education, digital skills, and keeping up with the modernity of rapid human growth, there are examples of incredibly effective techniques throughout the world, and this might serve as an example for other nations to emulate. Starting with South Korea, it is frequently mentioned as a country with high levels of digital competency. Its excellent technology infrastructure and extensive digital literacy have aided the economy's growth. Because of the country's emphasis on digital education and innovation, the number of tech people who actively participate in various digital activities and contribute to economic success has increased (Kring & Elder, 2022). Sweden is well-known for its strong digital infrastructure and dedication to digital inclusion. The Swedish government has made significant efforts in digital literacy and education projects. As a result, the population is well-equipped to engage in the digital economy and actively participate in civic discussions through digital platforms (OECD, 2018). Singapore is well-known for its digital readiness and the efforts for digital inclusion of vulnerable people. The government's efforts to promote digital literacy and education have resulted in a technologically aware population that contributes to the country's economic success. Citizens' participation in digital governance and civic projects demonstrates Singapore's emphasis on both digital proficiency and civic participation (Ministry of Communications and Information, 2018). *SkillsFuture* - a government-led effort aimed at preparing Singaporeans' mindsets and capacities for the automated economy - collaborates with higher education institutions but also operates the *Institute of Lifelong Learning*, where Singaporeans of all levels can attend specialized courses to learn new skills. As a result, labor interruption will be less socially disturbing and economically difficult. Furthermore, Singaporeans will be better equipped for the automated economy, which will benefit both people and the country's economy (Gleason, 2018).

Finland's education system places a high value on digital literacy and technology integration (UNESCO, 2023). This concentration has resulted in a digitally literate population that actively contributes to the knowledge-based economy of the country. Furthermore, digital tools are enhancing the Finnish heritage of participatory democracy by allowing citizens to participate in policy discussions and decision-making (Søby, 2015). Norway's robust economy and civic participation are inextricably tied to its high degree of digital proficiency. Investments in digital infrastructure and education in the country have resulted in a digitally proficient workforce that contributes to many areas of the economy, and the most important aspect is that the Norwegian citizens also take an active role in digital democracy, participating to policymaking processes (OECD, 2017). When it comes to Estonia, it is an excellent example of a country that has used digital competence to fuel economic growth and civic involvement. In the following some data will be presented that can create an overview of the level of development in terms of technology and digitalization at country level for Estonia. The government's "*e-Estonia*" effort has digitalized many governmental services, and the population's familiarity with digital technologies has resulted in increasing involvement in both economic and civic activities. A significant difficulty is developing computer literacy among the elderly, with many people over the age of sixty suffering because they do not have basic digital abilities, and here the cooperation and reciprocity have been critical to Estonia's e-revolution's success. By the late 1990s, all Estonian schools had gone online thanks to Tiger Leap (Tiger Leap Foundation is a government-backed technological investment organization), and significant expenditures had been made in computer networking and infrastructure, based on that, it is also well-known the joke "*E-stonia*" (UNESCO, 2023). According to the Digital Economy and Society Index (DESI), Estonia is ranked eighth in terms of human capital, 56% of the population has basic digital abilities, while 28% has advanced digital skills, it is also at the cutting edge of digital democracy and the country`s health system was already highly digitalized prior to the outbreak (European Commission, 2022).

The Netherlands is well-known for having a high percentage of internet penetration and digital literacy. Its residents actively participate in the digital economy, and its technologically sophisticated population adds to the country's strong economic success. Digital platforms are also widely utilized for civic involvement and public debate. Flexibility is also an important future element in the Netherlands, since individuals are expected to be able to balance learning with other activities such as employment, family care, and leisure time, implying that flexible education is required, but unfortunately, public educational institutions are still relatively underequipped to organize customized adult programs, so there is opportunity for development on this front (European Association for Education of Adults, 2011). The Dutch government wishes to enable a significant adult population of functional illiterates to pursue adult education and training. As a result, towns provide classes to assist individuals improve their reading, numeracy, and (basic) digital abilities. Municipalities decide whether the education is free or requires a donation and the municipalities often reimburse the costs of

participants for courses in reading, numeracy, and digital skills; students must pay a fee for Nt2 (Dutch as a second language) tests (Eurydice, 2023).

Canada`s emphasis on digital education and innovation has resulted in a workforce that is digitally proficient. A robust tech industry supports the country's economic growth, and Canadian residents are actively engaged in digital civic engagement, using online platforms to voice their ideas and participate in public debates. Uneven access to internet infrastructure and digital skills training in Canada's north, Indigenous, and other rural communities, as well as enterprises' persistent dependence on legacy technology, are all barriers to Canada's growth in the digital skills environment and employers should foster a culture of continuous learning and development in which their employees may continually update and maintain their digital abilities; and digital skills training in post-secondary education should be required and integrated into current curriculum (The Future Skills Centre, 2023). Into the bargain, another report from 2017 aims that due to a lack of uniform public sector education in digital literacy, a slew of commercial and non-profit groups has sprung up to provide courses for both children and adults, hence there is no standard for training or upskilling workers in digital skills and in 2010, Industry Canada said ("Digital Literacy and Essential Skills") that Canada falls behind in adult education, including workforce training and retraining (Brooksfield Institute, 2017).

Conclusions

Integrating digital transformation into adult education appears as a transformational force with far-reaching impacts in a period of rapid technological advancement. As a result, the goal of this study is to comprehensively analyze the complicated interplay between adult education, digital competence, and long-term growth. This research intends to provide important insights into the changing environment of adult education in the digital age by fostering a thorough understanding of the impact of digital competency on global awareness, international collaboration, and participation in sustainable practices. The main goal is to shine light on digital competence's revolutionary potential, directing educators, politicians, and academics toward informed methods for promoting a more connected, sustainable, and inclusive society. The research of digital competence in adult education reveals a transformational environment that goes well beyond technical capability. Several recommendations arise from the present research as the world traverse the intersections of technology, education, and sustainability.

As good-practices examples and recommendations it could be mentioned the investment in lifelong learning platforms where governments and educational institutions should prioritize investment into all of those. These platforms should be user-friendly, including a varied range of material, and be accessible to people of all ages and backgrounds. When it comes to integration of digital literacy programs it can be said that

policymakers should prioritize the integration of digital literacy programs at all levels of educational curriculum. This encompasses critical thinking, information literacy, and ethical issues in the digital domain, in addition to technical abilities. If we talk about collaborative programs then should be promoted the industry leaders, educational institutions, and policymakers should work together to establish programs that bridge the digital divide, ensuring equitable access to digital education resources for all demographics. Bringing the implications for theory into discussion, delving into the theoretical implications of this research reveals that digital competence in adult education serves as a foundation for larger theoretical conversations. More than that, the transformative potential of digital competence lights on up that the research stresses the transformative potential of digital competence as a catalyst for personal, professional, and social growth, rather than just a set of technical abilities. This transformational feature should be included in discussions of educational paradigms in theoretical frameworks. It also can be outlined that the theoretical implications highlight the significance of digital competence in breaking down conventional barriers to education, making it a potential equalizer in society. This calls into question existing theoretical models that fail to account for the influence of digital skills on social fairness. Regarding the dynamic interaction of digital competence and global understanding, the study opens possibilities for further research into the dynamic interaction of digital competence and global awareness. Future theoretical conversations should investigate how these notions interact to shape not just individual viewpoints, but also an increasingly integrated global society.

When all was said and done, the path to global understanding and sustainable development demands a determined effort to improve digital competency in adult education. The present theoretical study of digital competence in adult education reveals a diverse terrain with practical recommendations and significant theoretical consequences. As our world becomes more interconnected via digital platforms, developing digital competence becomes a critical step toward establishing a more peaceful and successful global society. In the future, acknowledging the transformational potential of digital competence will be critical in developing theoretical frameworks that effectively represent the dynamic character of education in the digital era.

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