

The Synergy of Educational Technology Advancement and Human Capabilities in the Era of Society 5.0

Ikhfi Imaniah^{1*}

¹University of Muhammadiyah Tangerang

Abstract. In the field of education, the synergy between the industrial revolution 4.0 and society 5.0 gives a new perspective in the learning process. Education nowadays transcends location and time and may take place without the need for a classroom. Education is becoming more open and accessible, which implies that technological improvements might make it easier for us to carry out the learning process. Furthermore, a pandemic has just evolved, which not only has a detrimental influence but also delivers advantages. The presence of a pandemic in learning necessitates the ability of academics and learners to respond to these changes. By utilizing technological advances in learning, the industrial revolution 4.0 and society 5.0, as well as the pandemic, developed a synergy that increases individuals' ability to adapt fast to changes that occur. Rapid technology advancements must be compatible with the skills and adaptability of individuals who operationalize technical outcomes. This research shows that technology is not a tool that can replace humans in their roles, but the existence of more advanced technology may make human life easier, particularly in the field of education, so that education can be more adaptive to the times and more imaginative in planning its demands. Society 5.0 is a period in which technology is integrated with human beings. As a result, developments in information technology must be matched with a supporting educational curriculum in order to produce people with soft skills that can compete globally

1 Introduction

The Indonesian people are confronted with the 4.0 Industrial Revolution, which is a topic of discussion in many fields. However, the difficulties have now reached the 5.0 Industrial Revolution era (Alvarez-Cedillo et al., 2019; Ellitan, 2020; Hikmat, 2022; Rahmawati et al., 2021; Rumbidzai Muzira & Maupa Bondai, 2020). H-UTokyo Lab. was founded in June 2016 following an agreement between the University of Tokyo and Hitachi. Its purpose is to pioneer a new form of industrial-academic partnership known as industry academia collaboration (Deguchi et al., 2018). The Lab creates and communicates a vision for achieving "Society 5.0" and pursues a novel form of research and development intended

* Corresponding author: ikhfi.imaniah@umt.ac.id

to address social challenges and make the vision a reality. Under the vision of Society 5.0 and the elements thereof, Japanese government has vowed to go beyond the industry 4.0 in order to be more accommodative to the digital and disruptive environments. On the education aspect, for example, the Japanese government has been trying to cut the barriers between subjects and disciplines as an important adjustment to prepare the super-smart future or Society 5.0 (Hayashi, 2019; Kumorotomo, 2020).

In Japan, with its technologically advanced society and well-developed people resources, such reorientation should be quite simple. However, within Indonesia's more conventional educational system, such techniques may be difficult to implement. Technology is a sociocultural factor that impacts every activity, action, and human behavior. The power of technology is to transform the patterns of human relationships and interactions. Today's technology developments are distinguished by more advanced instruments in the domains of information and communication, satellites, biotechnology, agriculture, medical equipment, and genetic engineering (Pedersen et al., 2020). The rise of a digital society in numerous aspects of life demonstrates technological advancement (Hilbert, 2020; UN Secretary-General's High-level Panel, 2020). The world's communities and governments compete to master advanced technology as a sign of progress, power, wealth, and prestige.

Because of the usage of information and communication technologies, the function of educational technology in teaching is more important than ever. They recognize the value of educational technology through the use of numerous programs for distant education, the Internet, educators, and students themselves (Adedoyin & Soykan, 2020; Alifia, 2020; Azzahra, 2020; Engzell et al., 2021; Fachriansyah, 2020; Fishbane & Tomer, 2020; Heng, 2021; Imaniah, 2020; Sikirit, 2020; Subekti, 2020; Vlachopoulos, 2020; World Economic Forum, 2020; Yarrow & Bhardwaj, 2020). The question is whether universities and educators are prepared for and aware of the benefits of using technology in education. Educational technology is the systematic and structured application of contemporary technologies to improve educational quality.

It is a systematic approach to conceptualizing, executing, and evaluating the educational process, i.e., learning and teaching, and it aids in the implementation of current educational teaching practices (Amarullah & Imaniah, 2020; Berk, 2009; Bilik, 2020; Imaniah, 2019; Imaniah & Gunawan, 2017; Pradesh et al., 2016; Rajagopalan, 2019). It encompasses instructional materials, methodologies, and work and relationship organization, as well as the conduct of all participants in the educational process. Undoubtedly, education involves learning such as knowledge, skills, and attitudes. Developing responsible individuals actually involves using knowledge, skills, and attitudes to the benefit of all of those without disadvantage to any individual or organization which has responsibility.

Thoughtfulness is fundamental to a stable and sustainable society; individuals who are critical thinkers and can actively contribute to the future are needed in an open society. Society exists as a social system that changes dynamically with the times. The problems of change that are spreading in society from the Era of Industry 4.0 to the Era of Society 5.0 are much too complex and difficult to navigate (Althabhwani et al., 2022; Aquilani et al., 2020; Dwiningrum, 2021). Yet, it is also crucial to have a generation of productive people who can and do contribute to the overall well-being of society. These are the key characteristics that most civilizations value in an education system, although they have yet to be universally or uniformly adopted in many education systems.

However, the following issues were raised in this paper is on: 1) How the education system can collaborate to form a complete system, namely the capable of strengthening the new literacy movement, e.g., digital literacy, technology literacy and human literacy; and 2) How the educational technology advancement integrated on human capability.

2 Literature Review

The advancement of science and technology has brought in the fourth industrial era. A period dominated by cyber systems, big data, artificial intelligence, robotics, and other technologies (Althabhwai et al., 2022; Berawi, 2019; Deguchi et al., 2020; Dwiningrum, 2021; Onday, 2019; Paschek et al., 2022; Potočan et al., 2021). As a result of this evolution, several established professions began proceed disappear. The disruptive innovation phenomenon arose as a result of this phenomena. To deal with this problem, university teaching must likewise evolve. Including the needs of future generations in the process of accessing lecture content.

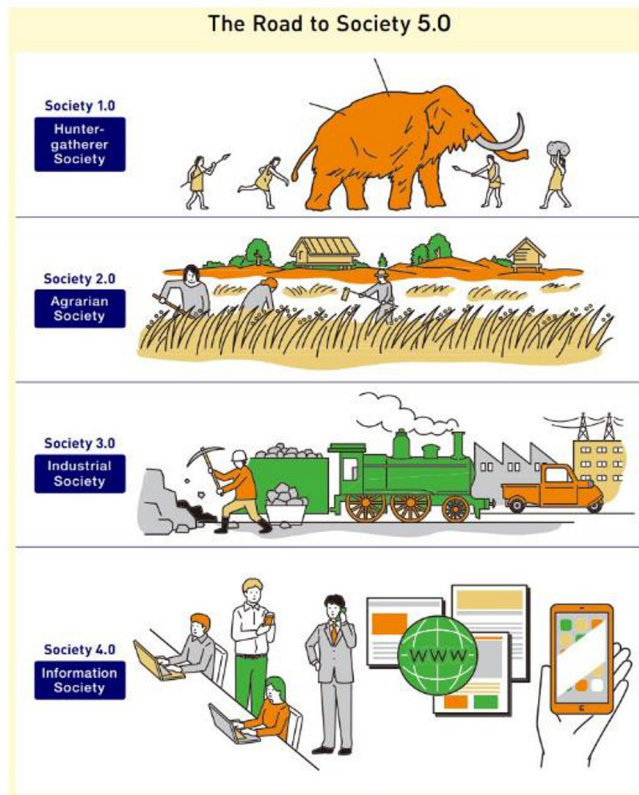


Fig. 1. The Road to Society 5.0 (Wahyudi, 2019)

As we seen figure 1., nowadays we live in a digital era where advancements in technology have seeped into various sectors of our economy, and education has not been left behind. These revolutions have eliminated the need to carry stacks of books to school, have decreased educator’s workload, as well as, made learning more efficient (Imaniah, 2020; Saykili, 2019; Smedley, n.d.). Technology has dramatically impacted the distribution of information in classrooms. Instead of whiteboards and blackboards, interactive panels were used to help educators communicate varied information using three-dimensional technology that combines both picture, movement, and sound, making the process of sending knowledge more entertaining and easier for students.

In addition to utilizing electronic boards instead of paper books to study educational curriculum with video, audio, and animated movies that improved communication and

information exchange between students and educators. The institution must adopt these technologies thoroughly in order to fully realize their great potential for knowledge generation and dissemination (Amarullah & Imaniah, 2020). So, given the rate at which technology is advancing, we can safely assert that technology today has a major position in the field of education.

Technology has transformed how students learn, what they want to learn, how they interact in classrooms, and, as a result, how Bachelor's and Master's degree courses are taught. Previously, the classical educator at the whiteboard offered knowledge for students to passively produce and learn. Students are adopting technology to have more influence over their education, which has transformed this.

Digital technologies are becoming an increasingly significant element of the curriculum in university all across the world (Amarullah & Imaniah, 2020; Imaniah, 2020; Kellow, 2018; UN Secretary-General's High-level Panel, 2020). Students may learn at their own speed and take up greater responsibility for their studies with these tools. They can also work with other students from across the world to share ideas and information. Educators may utilize the platform to build classes that are personalized to individual requirements, and students can access information from anywhere on any device, all without ever leaving the classroom.

The growth of technology has an impact on many disciplines, including education. Information and communication technologies can assist people strengthen their intellectual abilities, critical thinking skills, problem-solving abilities, and communication abilities (Adil, 2021; Ellitan, 2020; Gladden, 2019; Mansbach, 2015; Sá et al., 2021; Wahyudi, 2019).

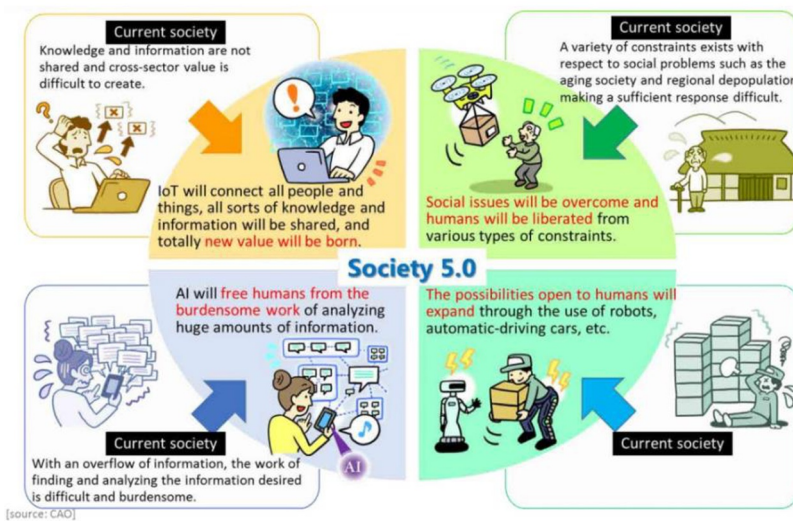


Fig. 2. The Society 5.0 Era (Wahyudi, 2019)

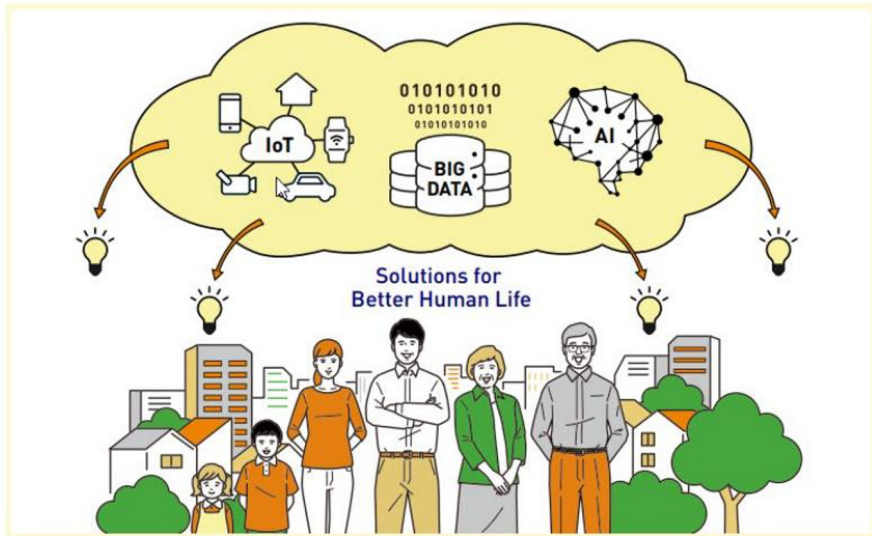


Fig. 3. Community Live in Society 5.0 (Wahyudi, 2019)

Figure 2 shows that the industrial revolution 4.0 and society 5.0 are quite similar, with the exception that society 5.0 makes more intentional use of technology. If the fourth industrial revolution modernizes individuals by providing them with access to technology, society 5.0 becomes an intrinsic element of this technology in humans (Aquilani et al., 2020; Berawi, 2019; Dwiningrum, 2021; Gladden, 2019; Wahyudi, 2019). Several things must be prepared in order to stay up with civilization 5.0 (figure 3), particularly in the education area, so that such obstacles are not a hindrance, but rather a stimulus for being really prepared to usher in a new era in which technology and people may humanize humans. With the birth of society 5.0, it is expected to create technology in education that does not change the role of teachers or instructors in teaching moral education and is exemplary for students. However, applying soft skills and hard skills cannot be replaced with sophisticated tools and technology (Dotsika & Watkins, 2017; Gladden, 2019; Hikmat, 2022).

High-quality education demonstrates the presence of a group of people who are technologically advanced, peaceful, and focused on positive attributes (Darmaji et al., 2019; Shahroom & Hussin, 2018). In the fourth paragraph of the 1945 Constitution, education is also employed as a driving force for culture and habits, signifying that teaching the nation's life is a type of solid burden in reaching virtue for the Indonesian government (International Commission of Jurists, 2022). Education has evolved swiftly alongside the advancement of technology (Gürdür Broo et al., 2021). This may be attributed to systems and learning techniques that are supported by digital world technology. This progression is distinguished by the determination of the globalization era.

This globalization determination is characterized in the era 5.0 (Fukuda, 2020). Because of the influence of the 4.0 revolution, the industrial revolution 5.0 arose. Society 5.0 is a society in which every demand must be tailored to the lifestyle standards of each community, and where products and services are of high quality and provide a sense of comfort to all. Indonesia has entered a digitalization and automation age (Hikmat, 2022). However, not everyone in society is aware of the implications of these developments. The specifics of the adjustment are still being negotiated.

The sociocultural period 5.0 is a response to societal concern over the end of the industrial revolution. 4.0 refers to the period of civilization in which technology will progressively replace human labor, resulting in fewer job prospects. 5.0 is projected to be able to close the gap between social and economic challenges over the next ten years or so (Deguchi et al., 2020; Hikmat, 2022; Togo & Gandidzanwa, 2021). The emphasis of expertise in twenty-first-century education is now recognized as the 4Cs, which comprise creativity, critical thinking, communication, and cooperation.

Furthermore, educators must have 21st-century life skills such as leadership, digital literacy, communication, emotional intelligence, entrepreneurship, global citizenship, teamwork, and problem-solving ability (Gürdür Broo et al., 2021; Holroyd, 2022; Mansbach, 2015; McAdoo, 2019; Pedersen et al., 2020; Wahyudi, 2019).

In short, educators in the twenty-first century must be educators who value students before themselves and take the initiative to make improvements in their students' life experiences.

3 Methodology

This study used the qualitative research method to examine existing information (Guest et al., 2020). This process focuses in understanding query as humanistic or idealistic approach. A qualitative research method known as interpretative phenomenological analysis, which has two basic tenets: first, that it is rooted in phenomenology, attempting to understand the meaning that individuals ascribe to their lived experiences, and second, that the researcher must attempt to interpret this meaning in the context of the research (Cohen et al., 2007; Pócza & Dobos, 2018).

The researchers have some knowledge and expertise in the subject of the research means that they have considerable scope in interpreting the participant's experiences.

The data obtained in this study came from previous studies or studies as secondary data. After the data is collected, the next step is to analyze the existing data. The results of the analysis will provide the desired conclusion by the researcher.

4 Findings and Discussions

4.1 The Capable of Strengthening the New Literacy Movement on Education in the Era of 5.0

Six core literacy abilities are necessary to thrive in this era of civilization 5.0, including data literacy, or the ability to read, analyze, and use massive amounts of information, i.e., big data in the digital world (Buchholz et al., 2020; Hartanto et al., 2020; Lestari & Santoso, 2019; McAdoo, 2019; Radovanović et al., 2020; Romadhianti et al., 2021; Sá et al., 2021) Then there's digital literacy, which is understanding how machines work, and technological applications like coding, for example. Artificial intelligence, machine learning, engineering concepts, and biotechnology are among examples. Finally, human literacy encompasses the humanities, communication, and design. educators in a civilization 5.0 must be digitally literate and capable of thinking creatively.

Gladden (2019), "The human beings who are members of Society 5.0 will also find their bodies, minds, and daily life experiences transformed through the application of futuristic technologies" (p. 5). In this process of shaping Society 5.0 as a digital society, digital literacy is vital to foster involvement and stimulate social equity (Azzahra & Amanta, 2019; Hilbert, 2020; Pedersen et al., 2020; Rodriguez-Hevía et al., 2020; Sari, 2021) (Figure 3).

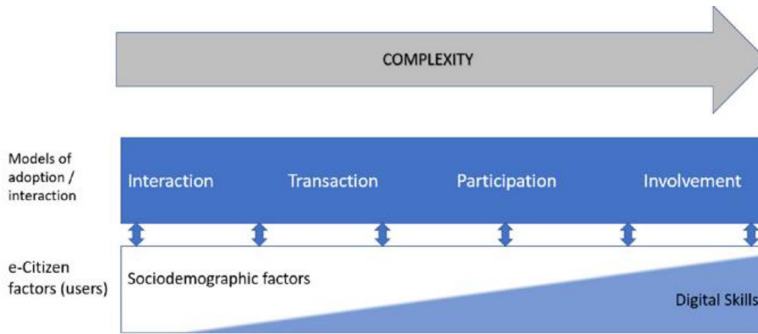


Fig. 3. Growing Importance of Digital Skills in Complex Models of Adoption (Source: Rodriguez-Hevia et al. (2020, p. 4)

A systematic overview of the components of digital literacy regarding (i) digital consumption (Kanungo et al., 2022); (ii) digital competencies (Oberländer et al., 2020); and (iii) digital security (Cojocariu et al., 2020). This overview is depicted in Table 1.

Table 1. The Components of Digital Literacy

Component	Examples
Digital consumption (use of online services for life, educational and professional activities)	Desktop and mobile Internet; online media; online stores; remote banking services; email; online voting; social networks; public and entertainment services
Digital competencies (effective use digital technology)	Searching for information and its critical perception; creating content and its placement in the global network; financial transactions based on online services; using the functionality of social networks
Digital security (Internet security at technical and socio-economic levels)	Reliable protection of personal data; legal content; compliance with ethical and legal standards; data storage; backup

Adapted from (Cojocariu et al., 2020; Kanungo et al., 2022; Oberländer et al., 2020)

The swift change from face-to-face to virtual learning during the COVID-19 pandemic has proven why digital literacy is important. Moreover, American Library Association (ALA), digital literacy is the ability to use information and communication technologies to find, evaluate, create and communicate information, requiring both cognitive and technical skills (McAdoo, 2019). Consequently, digital literacy for future educators when it comes to their initial education and laying the foundation for their professional engagement that will follow the trend of global development and the growing need for e-learning.

Now that we have pointed out the possible contribution and importance of digital literacy of students-future educators for the efficient preparation of students for life and work in the future, it is also relevant to mention potential ways of “embedding” digital competence, the basis of digital literacy, in organizational strategies. Instructional practices for digital literacy can be adapted to these following activities:

a. Keeping a media-use diary: use a diary, keep record of media choices, reflect on decisions about sharing and publishing information.

- b. Using information search and evaluation strategies: finding, evaluating and sharing content from a variety of sources which helps students make choices about the quality and relevance of information.
- c. Reading, viewing, listening and discussing: active interpretation of texts helps students acquire new ideas, perspectives and knowledge, dialogue and sharing help deepen understanding and appreciation.
- d. Close analysis of the nature of content: encourages students to use critical questioning to examine the author's intent he/she had during content creation and sharing.
- e. Cross-media comparison: comparing two different texts about the same topic helps students develop critical thinking skills.
- f. Simulation and role-playing: playful activities promote imagination and decision-making skills, and they support students' reflective thinking about choices and consequences.
- g. Multimedia composition: every message (composed using a combination of language, images, sound, special effects) has a certain goal. Teamwork and collaboration enhance creativity and deepen respect for diversity.

4.2 The Educational Technology Advancement integrated on Human Capability in the Era of 5.0

Society 5.0 is expected to incorporate six categories of participants whose analogues existed in earlier non-technologically post humanized societies and which are not necessarily mutually exclusive (for further details, see (Gladden, 2019) (Table 2).

Table 2. Six types of potential entities that may come to be participants in or members of Society 5.0

1	“Natural” biological human beings	Possess an ontic fundament, sensory-emotional “soul”, and intentional «I» whose structures and dynamics are considered unextraordinary for human being; are those that have not been qualitatively transformed by post-humanization.
2	Artificially augmented human beings	Have been granted non-human additions to their ontic fundament or extraordinary powers over their environment: is still a true human being; however, it has undergone some significant alteration or enhancement in its capacities.
3	Metahuman beings	Possess a qualitatively transformed ontic fundament: One whose entire body has been transformed in a way that gives it a different quality from the body of a natural biological human being.
4	Epihuman beings	Built on multiple linked human ontic fundaments: to describe an entity that is somehow “built” or “rests” upon ordinary human beings.
5	Parahuman beings	Possess a non-human ontic fundament but some human-like characteristics: an entity that possesses an ontic fundament whose materials, structures, processes, or systems are not directly dependent on the sort of ontic fundament associated with a natural biological human body but which nonetheless displays significant human-like characteristics.
6	Nonhuman beings	Do not possess a sensory-emotional system or intentional system that gives the impression of being significantly human-like: an entity that does not possess a sensory-emotional system or intentional system that gives the impression of being significantly human-like.

Adapted from (Gladden, 2019)

The Jisc model below illustrates the idea that proficiency in ICT (Information and Communication Technology) is a core element, whilst other skills overlap and build on its capability, and overarching it all is people digital identity and wellbeing (Jisc, 2016).

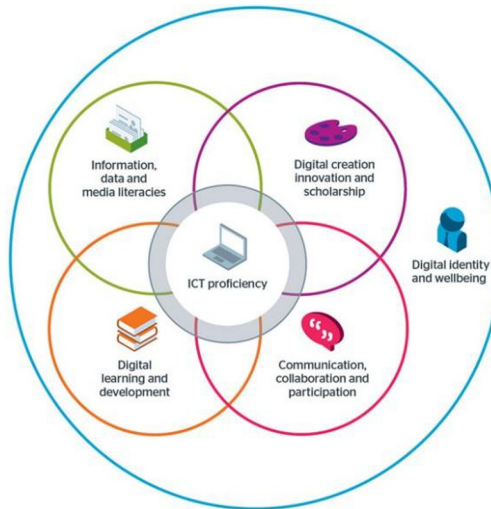


Fig. 4. The Six Elements of Digital Capabilities

Table 3. Framework of Six Elements of Digital Capabilities

ICT proficiency (Functional skills)	
ICT proficiency	<p>The use of ICT-based devices, applications, software and services.</p> <p>The confident adoption of new devices, applications, software and services and the capacity to stay up to date with ICT as it evolves. The capacity to deal with problems and failures of ICT when they occur, and to design and implement ICT solutions.</p> <p>An understanding of basic concepts in computing, coding, and information processing.</p>
ICT productivity	<p>The use of ICT-based tools to carry out tasks effectively, productively, and with attention to quality.</p> <p>The capacity to choose devices, applications, software and systems relevant to different tasks, having assessed their benefits and constraints; to adopt and where necessary adapt digital tools to personal requirements such as accessibility.</p> <p>The capacity to work fluently across a range of tools, platforms and applications to achieve complex tasks.</p> <p>An understanding of how digital technology is changing practices at work, at home, in social and in public life</p>
Information, data and media literacies (Critical use)	
Information literacy	<p>The capacity to find, evaluate, manage, curate, organize and share digital information.</p> <p>The capacity to interpret digital information for academic and</p>

	<p>professional/vocational purposes, and to review, analyze and re-present digital information in different settings. A critical approach to evaluating information in terms of its provenance, relevance, value and credibility.</p> <p>An understanding of the rules of copyright and open alternatives e.g., creative commons; the ability to reference digital works appropriately in different contexts.</p>
Data literacy	<p>The capacity to collate, manage, access and use digital data in spreadsheets, databases and other formats, and to interpret data by running queries, data analyses and reports. The practices of personal data security.</p> <p>An understanding of how data is used in professional and public life; of legal, ethical and security guidelines in data collection and use; of the nature of algorithms; and of how personal data may be collected and used</p>
Media literacy	<p>The capacity to critically receive and respond to messages in a range of digital media – text, graphical, video, animation, audio - and to curate, re-edit and repurpose media, giving due recognition to originators. A critical approach to evaluating media messages in terms of their provenance and purpose.</p> <p>An understanding of digital media as a social, political and educational tool, and of digital media production as a technical practice</p>
Digital creation, problem solving and innovation (Creative production)	
Digital creation	<p>The capacity to design and/ or create new digital artefacts and materials – such as a digital writing, digital imaging, digital audio and video, digital code, apps and interfaces, web pages.</p> <p>An understanding of the digital production process, and basics of editing and coding.</p>
Digital research and problem-solving	<p>The capacity to use digital evidence to solve problems and answer questions, to collect and collate new evidence, to evaluate the quality and value of evidence, and to share evidence and findings using digital methods.</p> <p>An understanding of digital research methods; an understanding of different data analysis tools and techniques</p>
Digital innovation	<p>The capacity to adopt and develop new practices with digital technology in different settings (personal and organizational; social and work-based); to use digital technologies in developing new ideas, projects and opportunities.</p> <p>An understanding of innovation, enterprise and project management in digital settings</p>
Digital communication, collaboration and participation (Participation)	
Digital communication	<p>The capacity to communicate effectively in digital media and spaces such as text-based forums, online video and audio, and social media; to design digital communications for different</p>

	<p>purposes and audiences; to respect others in public communications; to maintain privacy in private communications; to identify and deal with false or damaging digital communications.</p> <p>An understanding of the features of different digital media for communication, and of the varieties of communication norms and needs.</p>
Digital collaboration	<p>The capacity to participate in digital teams and working groups; to collaborate effectively using shared digital tools and media; to produce shared materials; to use shared productivity tools; to work effectively across cultural, social and linguistic boundaries.</p> <p>An understanding of the features of different digital tools for collaboration, and of the varieties of cultural and other norms for working together.</p>
Digital participation	<p>The capacity to participate in, facilitate and build digital networks; to participate in social and cultural life using digital media and services; to create positive connections and build contacts; to share and amplify messages across networks; to behave safely and ethically in networked environments.</p> <p>An understanding of how digital media and networks influence social behavior.</p>
Digital learning and development (Development)	
Digital learning	<p>The capacity to participate in and benefit from digital learning opportunities; to identify and use digital learning resources; to participate in learning dialogues via digital media; to use learning apps and services (personal or organizational); to use digital tools to organize, plan and reflect on learning; to record learning events/data and use them for self-analysis, reflection and showcasing of achievement; to monitor own progress; to participate in digital assessment and receive digital feedback; to manage own time and tasks, attention and motivation to learn in digital settings.</p> <p>An understanding of the opportunities and challenges involved in learning online; an understanding of own needs and preferences as a digital learner (e.g., access, media, platform and pedagogy).</p>
Digital teaching	<p>The capacity to support and develop others in digitally-rich settings, to teach, to work in a teaching or curriculum team, to design learning opportunities, to support and facilitate learning, to be pro-active in peer learning, all while making effective use of the available digital tools and resources.</p> <p>An understanding of the educational value of different media for teaching, learning and assessment; an understanding of different educational approaches and their application in digitally-rich settings.</p>
Digital identity and wellbeing (Self-actualizing)	

Digital identity management	<p>The capacity to develop and project a positive digital identity or identities and to manage digital reputation (personal or organizational) across a range of platforms; to build and maintain digital profiles and other identity assets such as records of achievement; to review the impact of online activity; to collate and curate personal materials across digital networks.</p> <p>An understanding of the reputational benefits and risks involved in digital participation.</p>
Digital wellbeing	<p>The capacity to look after personal health, safety, relationships and work-life balance in digital settings; to use digital tools in pursuit of personal goals (e.g., health and fitness) and to participate in social and community activities; to act safely and responsibly in digital environments; to negotiate and resolve conflict; to manage digital workload, overload and distraction; to act with concern for the human and natural environment when using digital tools.</p> <p>An understanding of the benefits and risks of digital participation in relation to health and wellbeing outcomes.</p>

Adopted from (Jisc, 2016)

The framework can be used in any educational setting. Uses of the framework include: 1) to support discussion and build consensus about the capabilities required in a digital organization, perhaps in order to develop a local framework or a locally adapted version of this framework; 2) to plan or review staff/educational development, for example ensuring that framework elements are included in professional development activities for teaching staff; 3) to plan or review a curriculum, though note that this generic model will need to be adapted carefully to the demands of the subject area and course outcome. One approach has been to produce each element as a prompt card with ideas for digital activities on the reverse. Another has been to encourage staff and students in a faculty or school to devise their own version of the framework for use in the curriculum; 4) to structure and signpost development opportunities, for example developing playlists of digital content mapped to the framework, or signposting a workshop program; 6) to design digital badges and award them to staff and/ or students undertaking certain development activities or demonstrating certain practices; 7) to map digital expertise across different staff roles within a team, department, or the organization as a whole, identifying gaps and recognizing where digital expertise adds value.

As technology is constantly changing it's a really good idea to reflect on our own digital capabilities. We should make time to develop those skills that we might not be as confident with or that we are likely to use more of in the future.

5 Conclusions

Industry 4.0 and Society 5.0 share an emphasis on creating and implementing technologies such as the Internet of Things (IoT), Artificial Intelligence, and Big Data. The concepts of Industry 4.0 and Society 5.0 vary in that Industry 4.0 focuses on creating and employing technology for efficiency and commercial operations, whereas Society 5.0 focuses on social issues. At the same time, Society 5.0 is focused on creating and deploying technologies to improve way of life. The fulfillment of the Community 5.0 idea contributes to the achievement of the Sustainable Development Goals (SDGs). Educational institutions can

use the following strategies; increased productivity in the sectors of research, service, and innovation-based research, such as universities, can contribute to the establishment of the Smart City/Smart Campus idea. Strengthening national and international collaboration, as well as implementing competence training on a national and worldwide scale, to increase the number of graduate profiles that meet the demands. In short, education 5.0 is a phenomenon that occurs in response to the requirements of the 5.0 industrial revolution, in which people and robots interact to produce solutions, solve various issues, and find innovative possibilities for modern human existence.

References

1. O. B. Adedoyin, E. Soykan, Covid-19 pandemic and online learning: the challenges and opportunities. *Interactive Learning Environments*, **0(0)**, 1–13 (2020)
<https://doi.org/10.1080/10494820.2020.1813180>
2. M. Adil, Role of Information Technology in Communication, *Tech Stonz* (2021)
<https://techstonz.com/role-information-technology-communication/> (Last accessed 21.04.2023)
3. U. Alifia, COVID-19 is widening Indonesia's education gap (2020)
<https://rise.smeru.or.id/en/blog/covid-19-widening-indonesia's-education-gap> (Last accessed 21.05.2023)
4. N. M. Althabhwani, Z. A. Zainol, P. Bagheri, Society 5.0: A New Challenge to Legal Norms. *Sriwijaya Law Review*, **6(1)**, 41–54 (2022)
<https://doi.org/10.28946/slrev.Vol6.Iss1.1415.pp41-54>
5. J. Alvarez-Cedillo, M. Aguilar-Fernandez, R. Sandoval-Gomez, T. Alvarez-Sanchez, Actions to be taken in Mexico towards education 4.0 and society 5.0. *International Journal of Evaluation and Research in Education*, **8(4)**, 693–698 (2019)
<https://doi.org/10.11591/ijere.v8i4.20278>
6. A. Amarullah, I. Imaniah, Critical Analysis of University Students' Need: The Role of the University on Language Learning in Digital Age. *Asian EFL Journal*, **27(5.2)**, 237–250 (2020)
7. B. Aquilani, M. Piccarozzi, T. Abbate, A. Codini, The role of open innovation and value co-creation in the challenging transition from industry 4.0 to society 5.0: Toward a theoretical framework. *Sustainability (Switzerland)*, **12(21)**, 1–21 (2020)
<https://doi.org/10.3390/su12218943>
8. N. F. Azzahra, Addressing Distance Learning Barriers in Indonesia Amid the Covid-19 Pandemic. *Policy Brief*, **2**, 1–8 (2020)
9. N. F. Azzahra, F. Amanta, Policy Brief No. 11 Promoting Digital Literacy Skill for Students through Improved School Curriculum. Center for Indonesian Policy Studies, **1(11)**, 14 (2019)
10. M. A. Berawi, Managing Nature 5.0 in industrial revolution 4.0 and society 5.0 era. *International Journal of Technology*, **10(2)**, 222–225 (2019)
<https://doi.org/10.14716/ijtech.v10i2.3084>
11. R. Berk, Teaching Strategies for the Next Generation. *Transformative Dialogues: Teaching & Learning Journal*, **3(2)**, 1–23 (2009)
12. M. O. Bilik, The issue of teachers' professional competence and pedagogical competence in English teaching-learning process. *English Teaching Journal: A Journal of English Literature, Linguistics, and Education*, **8(1)**, 1–7 (2020)
<https://doi.org/10.11591/etj.v8i1.6490>

13. B. A. Buchholz, J. DeHart, G. Moorman, Digital Citizenship During a Global Pandemic: Moving Beyond Digital Literacy. In *Journal of Adolescent and Adult Literacy*, **64(1)**, 11–17 (2020)
14. L. Cohen, L. Manion, K. Morrison, *Research Methods in Education*. In *Professional Development in Education (Sixth Edit)*. Routledge (2007)
<https://doi.org/10.1080/19415257.2011.643130>
15. A. C. Cojocariu, I. Verzea, R. Chaib, *Aspects of Cyber-Security in Higher Education Institutions*, Springer Proceedings in Business and Economics, 3–11 (2020)
https://doi.org/10.1007/978-3-030-44711-3_1
16. D. Darmaji, M. Mustiningsih, I. Arifin, Quality Management Education in the Industrial Revolution Era 4.0 and Society 5.0 (2019)
17. A. Deguchi, C. Hirai, H. Matsuoka, T. Nakano, K. Oshima, M. Tai, S. Tani, *Society 5.0 AAPeople-centric Super-smart Society* (2018)
18. A. Deguchi, C. Hirai, H. Matsuoka, T. Nakano, K. Oshima, M. Tai, S. Tani, What is society 5.0? In *Society 5.0: A People-centric Super-smart Society*, Springer Singapore 1–23 (2020) https://doi.org/10.1007/978-981-15-2989-4_1
19. F. Dotsika, A. Watkins, Identifying potentially disruptive trends by means of keyword network analysis. *Technological Forecasting and Social Change*, **119**, 114–127 (2017)
<https://doi.org/10.1016/j.techfore.2017.03.020>
20. S. I. A. Dwiningrum, *Strengthening resilience for learning transformation and anticipatory education in the era of society 5.0. Educational Innovation in Society 5.0 Era: Challenges and Opportunities: Proceedings of the 4th International Conference on Current Issues in Education (ICCIE 2020)*, Proceedings of the 4th International Conference on Current Issues in Education (2021)
21. L. Ellitan, Competing in the Era of Industrial Revolution 4.0 and Society 5.0. *Jurnal Maksipreneur: Manajemen, Koperasi, Dan Entrepreneurship*, **10(1)**, 1 (2020)
<https://doi.org/10.30588/jmp.v10i1.657>
22. P. Engzell, A. Frey, M. D. Verhagen, Learning loss due to school closures during the COVID-19 pandemic. *Proceedings of the National Academy of Sciences of the United States of America*, **118(17)** (2021) <https://doi.org/10.1073/PNAS.2022376118>
23. R. Fachriansyah, COVID-19 crisis opportunity for education reform in Indonesia. *The Jakarta Post* (2020) www.thejakartapost.com/news/2020/08/12/covid-19-crisis-opportunity-for-education-reform-in-indonesia.html (Last accessed 21.04.2023)
24. L. Fishbane, A. Tomer, As classes move online during COVID-19, what are disconnected students to do? (2020) <https://www.brookings.edu/blog/the-avenue/2020/03/20/as-classes-move-online-during-covid-19-what-are-disconnected-students-to-do/> (Last accessed 24.05.2023)
25. K. Fukuda, Science, technology and innovation ecosystem transformation toward society 5.0. *International Journal of Production Economics*, **220**, 107460 (2020)
<https://doi.org/https://doi.org/10.1016/j.ijpe.2019.07.033>
26. M. E. Gladden, Who will be the members of Society 5.0? Towards an anthropology of technologically posthumanized future societies. *Social Sciences*, **8(5)** (2019)
<https://doi.org/10.3390/socsci8050148>
27. G. Guest, E. Namey, M. Chen, A simple method to assess and report thematic saturation in qualitative research. *PLoS ONE*, **15(5)** (2020)
<https://doi.org/10.1371/journal.pone.0232076>

28. D. Gürdür Broo, U. Boman, M. Törngren, Cyber-physical systems research and education in 2030: Scenarios and strategies. *Journal of Industrial Information Integration*, **21**, 100192 (2021) <https://doi.org/https://doi.org/10.1016/j.jii.2020.100192>
29. D. Hartanto, P. W. Prasetyo, I. Maryani, E. A. Maharani, I. Puspitasari, D. A. Putri, O. R. Aji, W. E. Purwanto, Developing digital module for human literacy and technology literacy. *International Journal on Education Insight*, **1(1)**, 29 (2020) <https://doi.org/10.12928/ije.v1i1.2086>
30. Y. Hayashi, How Japan is Preparing its Students for Society 5.0. *Foreign Policy Magazine* (2019)
31. K. Heng, Exploring the Impacts of COVID-19 on Education in Southeast Asia : COVID-19 on education in southeast Asia : challenges (2021)
32. H. Hikmat, The Readiness of Education in Indonesia in Facing The Society Era 5.0. *Jurnal Basicedu*, **6(2)**, 2953–2961 (2022) <https://doi.org/10.31004/basicedu.v6i2.2526>
33. M. Hilbert, Digital technology and social change: the digital transformation of society from a historical perspective . *Dialogues in Clinical Neuroscience*, **22(2)**, 189–194 (2020) <https://doi.org/10.31887/dens.2020.22.2/mhilbert>
34. C. Holroyd, Technological innovation and building a ‘super smart’ society: Japan’s vision of society 5.0. *Journal of Asian Public Policy*, **15(1)**, 18–31 (2022) <https://doi.org/10.1080/17516234.2020.1749340>
35. I. Imaniah, Microteaching as a learning effective teaching. *Asian EFL Journal*, **24(4)** (2019)
36. I. Imaniah, COVID-19 Pushes Universities to Switch to Online Classes: Are They Ready? In S. E. P. Djahimo (Ed.), *Women’s Voices*, 67–80, Deepublish (2020)
37. I. Imaniah, Y. I. Gunawan, *Teaching English as Foreign Language (Teaching and Learning Strategies)* (2017)
38. International Commission of Jurists, 1945 Constitution of the Republic of Indonesia (1945, 2002) (2022) <https://www.icj.org/se-asia-security-law/1945-constitution-of-the-republic-of-indonesia-1945-2002/> (Last accessed 26.06.2023)
39. Jisc Digital capabilities: the 6 elements defined ICT proficiency Digital creation, scholarship and innovation (creative production) (2016)
40. R. P. Kanungo, S. Gupta, P. Patel, V. Prikshat, R. Liu, Digital consumption and socio-normative vulnerability. *Technological Forecasting and Social Change*, **182**, 121808 (2022) <https://doi.org/https://doi.org/10.1016/j.techfore.2022.121808>
41. J. M. Kellow, Digital technologies in the New Zealand curriculum. *Waikato Journal of Education*, **23(2)**, 75–82 (2018) <https://doi.org/10.15663/wje.v23i2.656>
42. W. Kumorotomo, Envisioning Agile Government: Learning from the Japanese Concept of Society 5.0 and the Challenge of Public Administration in Developing Countries (2020)
43. S. Lestari, A. Santoso, The Roles of Digital Literacy, Technology Literacy, and Human Literacy to Encourage Work Readiness of Accounting Education Students in the Fourth Industrial Revolution Era. *KnE Social Sciences*, **3(11)**, 513 (2019) <https://doi.org/10.18502/kss.v3i11.4031>
44. J. Mansbach, Using Technology to Develop Students’ Critical Thinking Skills. *School of Professional Studies* (2015) <https://dl.sps.northwestern.edu/blog/2015/09/using-technology-to-develop-students-critical-thinking-skills/> (Last accessed 26.06.2023)
45. E. F. McAdoo, What is Digital Literacy and How to Use it in the classroom. *Graduate Programs for Educators* (2019)

46. M. Oberländer, A. Beinicke, T. Bipp, Digital competencies: A review of the literature and applications in the workplace. *Computers & Education*, **146**, 103752 (2020) <https://doi.org/https://doi.org/10.1016/j.compedu.2019.103752>
47. O. Onday, Japan's Society 5.0: Going Beyond Industry 4.0. *Business and Economics Journal*, **10(2)**, 161–170 (2019) <https://doi.org/10.1017/9781108617208.018>
48. D. Paschek, C.-T. Luminosu, E. Ocakci, Industry 5.0 Challenges and Perspectives for Manufacturing Systems in the Society 5.0. In A. Draghici & L. Ivascu (Eds.), *Sustainability and Innovation in Manufacturing Enterprises: Indicators, Models and Assessment for Industry 5.0*, Springer Singapore, 17–63 (2022) https://doi.org/10.1007/978-981-16-7365-8_2
49. S. M. Pedersen, M. F. Pedersen, J. E. Ørum, S. Fountas, A. T. Balafoutis, F. van Evert, F. van Egmond, A. Knierim, M. Kernecker, A. M. Mouazen, Chapter 6 - Economic, environmental and social impacts. In A. Castrignanò, G. Buttafuoco, R. Khosla, A. M. Mouazen, D. Moshou, & O. Naud (Eds.), *Agricultural Internet of Things and Decision Support for Precision Smart Farming*, Academic Press, 279–330 (2020) <https://doi.org/https://doi.org/10.1016/B978-0-12-818373-1.00006-8>
50. K. Póczy, G. Dobos, Research methodology. In *Constitutional Politics and the Judiciary: Decision-making in Central and Eastern Europe* (2018) <https://doi.org/10.4324/9780429467097-2>
51. V. Potočan, M. Mulej, Z. Nedelko, Society 5.0: balancing of Industry 4.0, economic advancement and social problems. *Kybernetes*, **50(3)**, 794–811 (2021) <https://doi.org/10.1108/K-12-2019-0858>
52. H. Pradesh, I. Attacks, S. Bhagat, S. State, P. Technical, Teaching & Academic, 9182880120(M) (2016)
53. D. Radovanović, C. Holst, S. Banerjee Belur, R. Srivastava, G. Vivien Hounghonon, E. le Quentrec, J. Miliza, A. S. Winkler, J. Noll, Digital literacy key performance indicators for sustainable development. *Social Inclusion*, **8(2)**, 151–167 (2020) <https://doi.org/10.17645/si.v8i2.2587>
54. M. Rahmawati, A. Ruslan, D. Bandarsyah, The Era of Society 5.0 as the unification of humans and technology: A literature review on materialism and existentialism. *Jurnal Sosiologi Dialektika*, **16(2)**, 151 (2021) <https://doi.org/10.20473/jsd.v16i2.2021.151-162>
55. I. Rajagopalan, Concept of Teaching. *International Journal of Education*, **7(2)**, 5–8 (2019) <https://doi.org/10.1111/j.1467-9752.1973.tb00470.x>
56. L. F. Rodriguez -Hevia, J. Navío-Marco, L. M. Ruiz-Gómez, Citizens' involvement in e-government in the European Union: The rising importance of the digital skills. *Sustainability (Switzerland)*, **12(17)** (2020) <https://doi.org/10.3390/SU12176807>
57. R. Romadhianti, Y. Wulandari, R. Dewi, K. Sari, Acceleration of Strengthening Digital Literacy in the Era of Society 5.0. **54**, 297–305 (2021) <https://doi.org/10.23887/jpp.v54i2>
58. D. Rumbidzai Muzira, B. Maupa Bondai, Perception of Educators towards the Adoption of Education 5.0: A Case of a State University in Zimbabwe. *East African journal of education and social sciences*, **1(2)**, 43–53 (2020) <https://doi.org/10.46606/eajess2020v01i02.0020>
59. M. J. Sá, A. I. Santos, S. Serpa, C. M. Ferreira, Digital Literacy in Digital Society 5.0: Some Challenges. *Academic Journal of Interdisciplinary Studies*, **10(2)**, 1–9 (2021) <https://doi.org/10.36941/ajis-2021-0033>

60. K. A. K. Sari, COVID-19 Infodemic : Underlining the importance of digital literacy skills. *Phpmajournal.Org*, **9(1)**, 1–2 (2021) <https://doi.org/10.15562/phpma.v9i1.320>
61. A. Saykili, Higher Education in The Digital Age: The Impact of Digital Connective Technologies. *Journal of Educational Technology and Online Learning*, January 2019, 1–15 (2019) <https://doi.org/10.31681/jetol.516971>
62. A. A. Shahroom, N. Hussin, Industrial Revolution 4.0 and Education. *International Journal of Academic Research in Business and Social Sciences*, **8(9)** (2018) <https://doi.org/10.6007/ijarbss/v8-i9/4593>
63. D. Sikirit, Learning from home during the COVID-19 pandemic. Unicef. (2020) <https://www.unicef.org/indonesia/coronavirus/stories/learning-home-during-covid-19-pandemic> (Last accessed 26.06.2023)
64. J. Smedley, (n.d.). Modelling the impact of knowledge management using technology. *Digital Enterprise Computing (DEC 2017)* <https://edtechmagazine.com/higher/article/2020/04/how-university-faculty-embraced-remote-learning-shift> (Last accessed 26.06.2023)
65. A. S. Subekti, Covid-19-Triggered Online Learning Implementation: Pre-Service English Teachers' Beliefs. *Metathesis: Journal of English Language, Literature, and Teaching*, **4(3)**, 232 (2020) <https://doi.org/10.31002/metathesis.v4i3.2591>
66. M. Togo, C. P. Gandidzanwa, The role of Education 5.0 in accelerating the implementation of SDGs and challenges encountered at the University of Zimbabwe. *International Journal of Sustainability in Higher Education*, **22(7)**, 1520–1535 (2021) <https://doi.org/10.1108/IJSHE-05-2020-0158>
67. UN Secretary-General's High-level Panel. *The Impact of Digital Technologies* (2020) https://www.un.org/sites/un2.un.org/files/2019/10/un75_new_technologies.pdf (Last accessed 26.06.2023)
68. D. Vlachopoulos, Covid-19: Threat or opportunity for online education? *Higher Learning Research Communications*, **10(1)**, 16–19 (2020) <https://doi.org/10.18870/hlrc.v10i1.1179>
69. E. Wahyudi, The Future of Humanity and the World of Technology -- Society 5.0. *DataDrivenInvestor* (2019) <https://medium.datadriveninvestor.com/the-future-of-humanity-and-the-world-of-technology-society-5-0-6e4dd5952bae>
70. World Economic Forum, The COVID-19 pandemic has changed education forever (2020) <https://www.weforum.org/agenda/2020/04/coronavirus-education-global-covid19-online-digital-learning/> (Last accessed 28.06.2023)
71. N. Yarrow, R. Bhardwaj, Indonesia's education technology during COVID-19 and beyond. World Bank (2020) <https://blogs.worldbank.org/eastasiapacific/indonesias-education-technology-during-covid-19-and-beyond> (Last accessed 28.06.2023)