jexed

Journal of ExoTechnology and Education
Vol. 1, No. 2, 2025

Online ISSN: 3079-7950

Author: Prof. Erna Oliver

Affiliation
Department of Christian Spirituality, Church History and Missiology, UNISA, Pretoria, South Africa

ORCID link
https://orcid.org/0000-0003-3606-1537

Correspondence to
Prof. Erna Oliver

E-mail
olivee@unisa.ac.za

Dates
Received: 1 July 2025
Revised: 30 October 2025
Accepted: 21 November 2025
Published: 1 December 2025

How to cite
Oliver, E. (2025) 'The six fourth revolutions world we are living in,' *jeXed* 1(2), 33 pages. https://doi.org/10.36615/e9tar604

Article includes
☒ Peer review
☐ Supplementary material

Data availability
☒ Open data set
☒ All data included
☐ On request from author/s
☐ Not available
☐ Not applicable

Editor/s
Dr. Irene Lubbe

Funding
No funding was received for this article.

Conflict of interest
None.

The SIX Fourth Revolutions World we are Living in

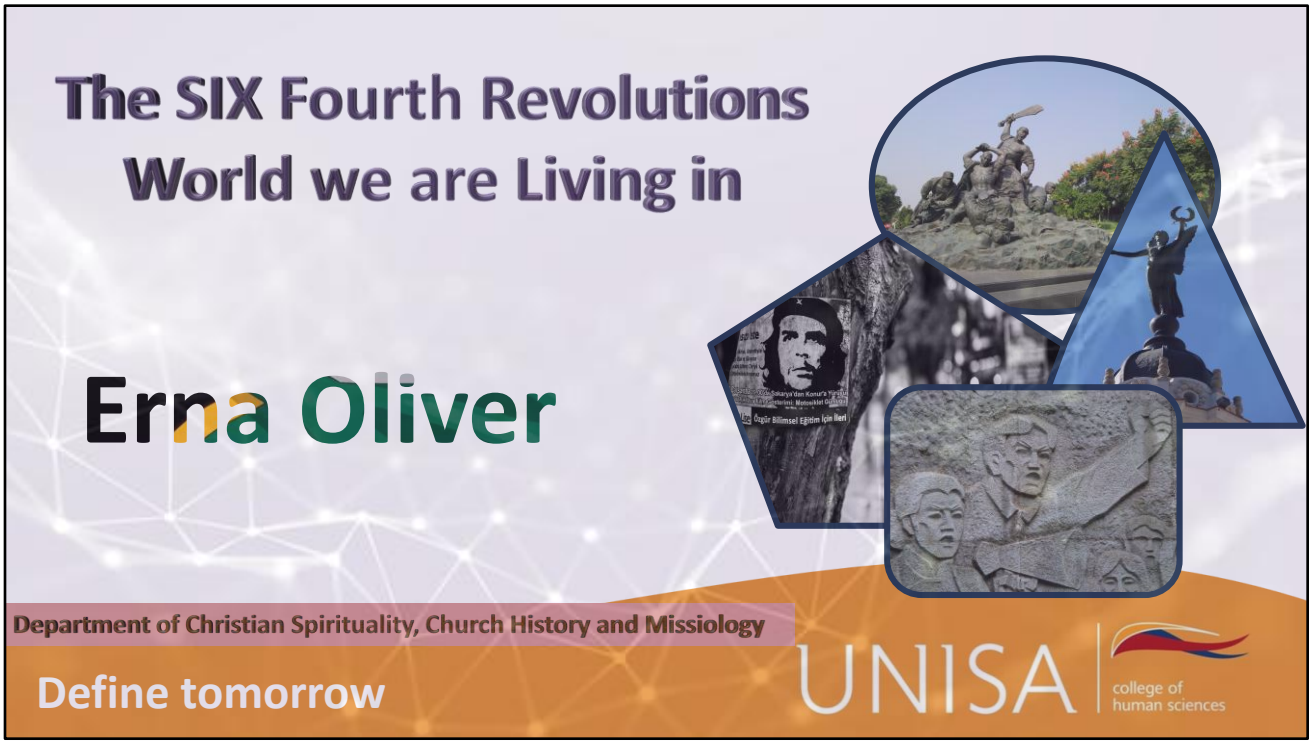
Erna Oliver

YouTube Link: https://youtu.be/VWRm9xNynXc

Abstract

The 21st century society is experiencing fast-paced chaotic change and a human identity crisis. Although the focus is generally on the Fourth Industrial Revolution when seeking reasons for this disruption, there are at least five other major fourth revolutions that co-facilitate uncertainty and cognitive dissonance. They are the communication revolutions, human self-understanding revolutions, education revolutions, the revolutions in society, and those that happened in Sociology. This synoptic, descriptive presentation provides background information on the development of these six major fourth revolutions. The aim is to promote and enhance knowledge and understanding, specifically in the Global South regarding the historical development of the subsequent revolutions, and shortly points towards the advantages and disadvantages of these global trends.

Keywords: Fourth industrial revolution; fourth communication revolution; education 4.0; fourth revolution in self-understanding; fourth revolution in sociology; fourth revolution in society.



Most people know about the fourth industrial revolution that is causing constant change and disruption in society. However, there are also other major fourth revolutions that are adding to the complexities, change, and chaos we are experiencing as part of our fast-paced, ever evolving 21st-century lives. These revolutions bring sudden, radical and often disruptive change to the established order that eventually leads to new establishments. During the revolution or change phase, humans often experience cognitive dissonance and even anxiety due to being drawn from their comfort zones. So, why is it important to have a clear knowledge and understanding of the historical developments and current influences of these rotations? These revolutions are shaping our environments (work, social, economic, political and ecological) and our identity. The historical 'laboratory of human experiences' provide us with evidence of how people in similar disruptive times managed to adapt, assist us to interpret confusing developments within specific contexts and allow us to connect cause and effect to navigate current complexities.

The Six Revolutions

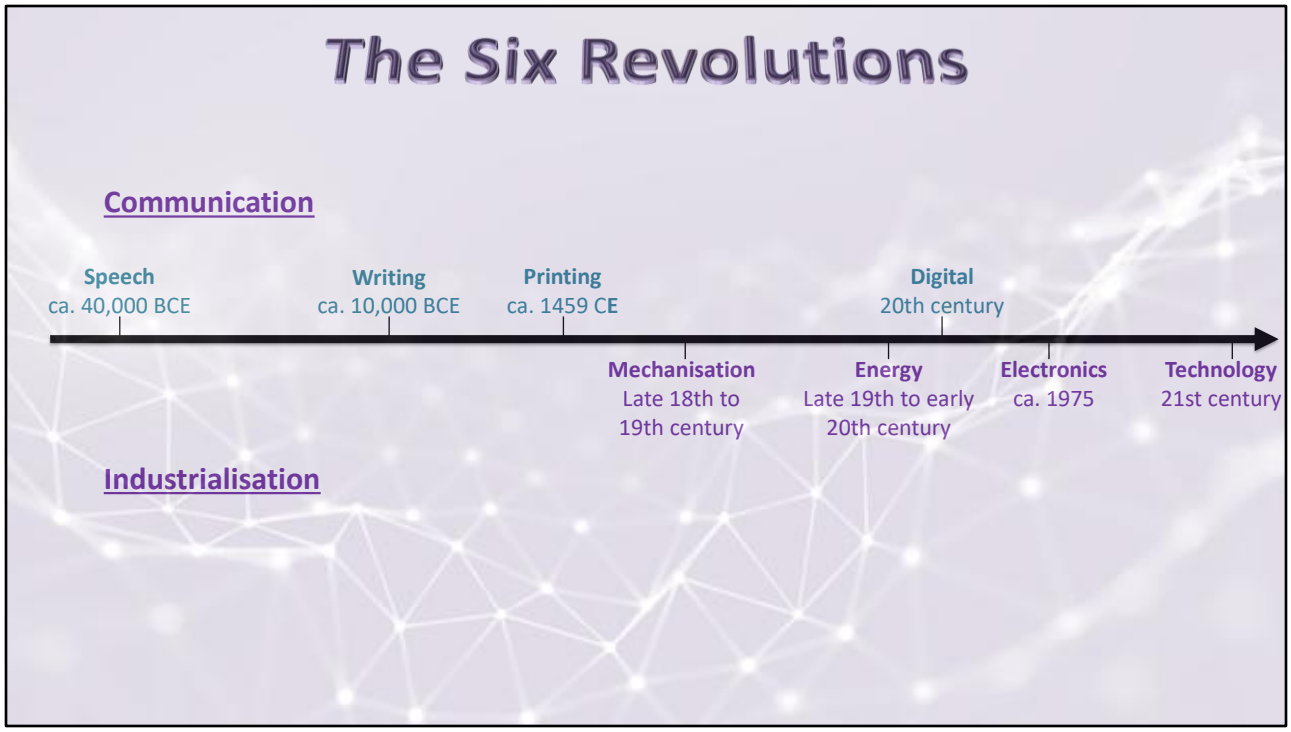
Revs	Communication (Harnad, 1991)	Sociology (Castro, 2006; West, 2021)	Society (Levy, 2005; Narvaez Rojas, Alomia Peñafiel and Loaiza Buitrago, 2021)	Human self-understanding (Floridi, 2014; Weinert, 2009)	Education (Kulik, 1984; Gerstein, 2014)	Industry (Schwab, 2016)
1st	Speech (± 40,000 BCE)	German, Dutch, English: Religion (16th century)	Hunter-gathering (1.8 million years BCE to 10,000 BCE)	Copernicus (1473-1543)	Educator-centred, passive education (18th to 19th century)	Mechanisation (late 18th to early 19th century)
2nd	Writing (± 10 000 BCE)	French: Social (1789-1799)	Agriculture (10,000 to early 18th century)	Darwin (1809-1882)	Interaction, collaboration (late 20th to early 21st century)	Energy (late 19th to early 20th century)
3rd	Printing (in the West) (± 1459 CE)	Russian: Economic (1917-1923)	Industry (Mid 18th century to early 20th century)	Freud (1856-1939)	Student-centred, blended (early 21st century)	Electronics (last quarter of 20th century)
4th	Digital (from early 20th century)	Western: Culture, social, and personal freedom (1960s-2020)	Information (late 20th century)	Turing (1912-1954)	Individualistic and sustainable (current)	Technology (21st century)
			5th Revolution Society 5.0 Japan (Ferreira and Serpa, 2018).	**5th Revolution(?)** Luciano Floridi (21st century)		**5th, 6th, and 7th Revolutions**

There are at least six major fourth revolutions, including the effects of their individual predecessor revolutions that are influencing society. The oldest being the communication revolutions and the youngest is represented by the Industrial revolutions. The other four major revolutions include the education revolutions, the revolutions in human self-understanding, the revolutions that developed society and the revolutions in sociology.

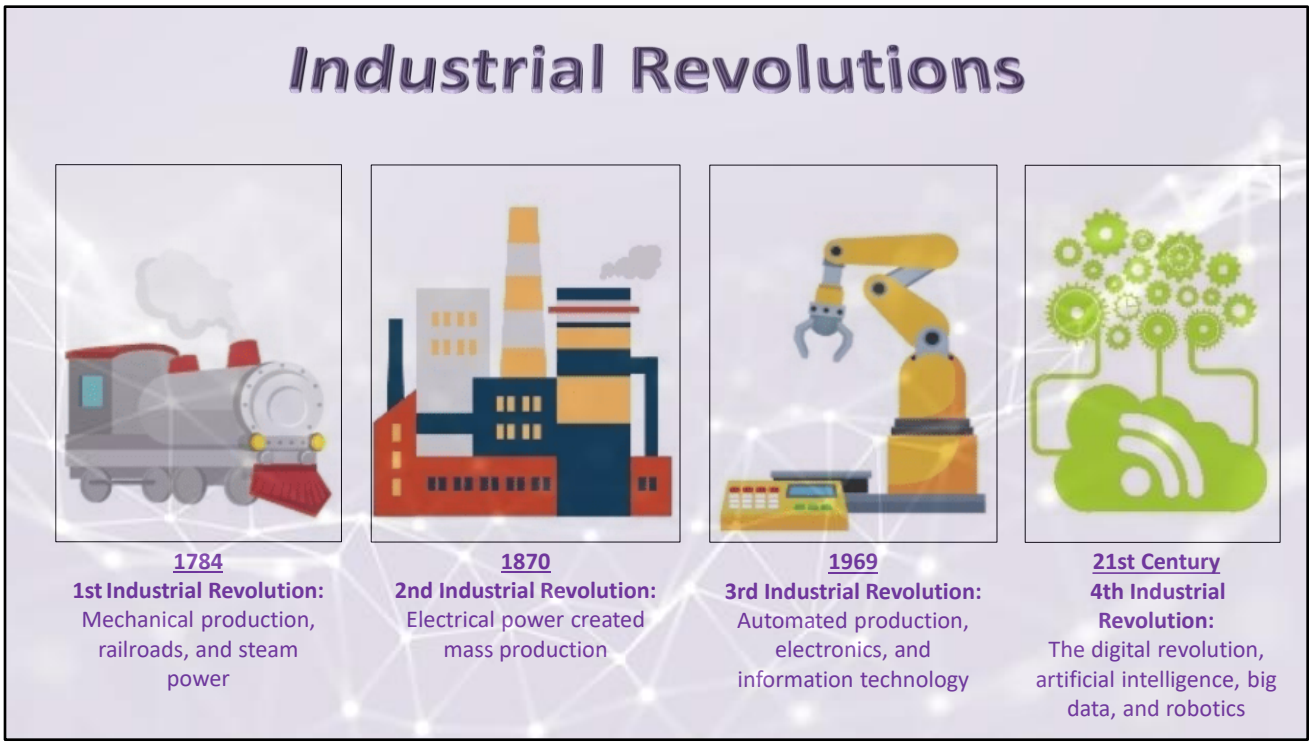
We must also keep in mind that the world is moving towards the next stage or even stages of some of these revolutions. The concepts of the fifth industrial revolution (human-machine collaboration), the sixth industrial revolution (focusing on sustainability and environmental impact) and the seventh industrial revolution (the development of natural organic artificial intelligence – NOAI systems) are already developing (Abdulrazaq *et al*., 2025, p. 42; Ruiz Estrada, 2024).

In line with the rapid developments in some of the fourth revolutions, like communications, industry, and civilisations, Japan is currently implementing Society 5 which uses high-speed IT infrastructure that includes cloud computing, data centres, networks, and big data to manage municipal infrastructures to provide intelligent water-, transport-, and energy networks as well as digital healthcare. The aim is to develop a super smart, automated, and independent society (cf. Medina-Borja, 2017; Cabinet Office, 2016). In stark contrast to these developments, the Global South is still coming to grips with most of the earlier revolution stages. For example, Africa is seemingly to a large extent still trapped in the second industrial revolution due to geohistorical and geopolitical issues (Oliver, 2022, p.1). It is therefore important that the Global South is informed about and motivated to engage with these revolutionary developments.

Although it would provide interesting and important research results, the extensive and detailed overlaps, inter-revolution influences, and the current role that the fourth revolutions play in specific countries are beyond the scope of the current research that provides only an introductory historical overview of the six major fourth revolutions to promote knowledge and understanding and positive strategies for interaction with the disruptive changes humans have to cope with.



Some of these revolutions developed over thousands of years while others, like the social and industrial revolutions developed within a few centuries. Of course, these revolutions did not happen in isolation from each other. They often overlap – especially during the later revolutions – and stimulate new developments, both positive and negative, in other revolution fields. For example: The first industrial revolution moved society from agriculture to industry, and the second industrial revolution overlapped with the start of the fourth communication revolution that brought cinema, radio, and the telegraph into use, while on the negative side, it also increased unemployment. Ever since this combination hit society, life is regulated by money and the clock.

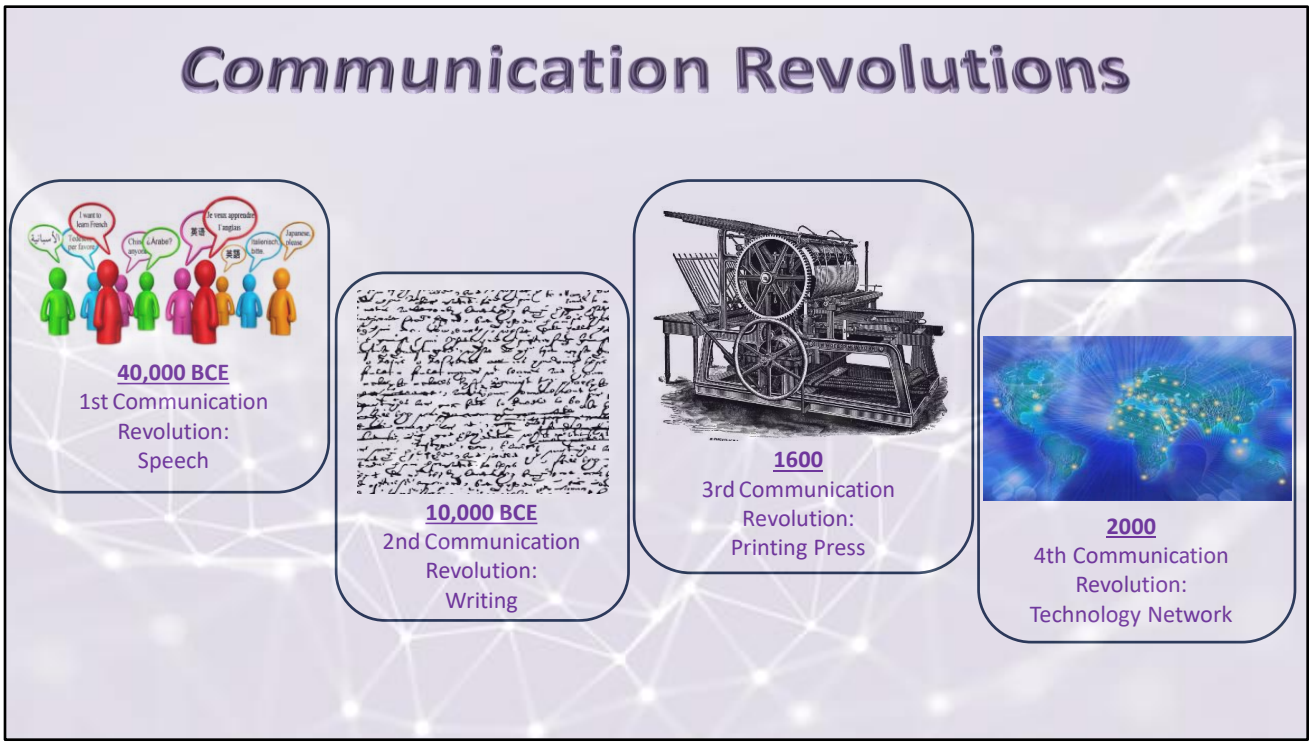


The industrial revolutions started in the late 18th century in Britain when three important processes made transition possible (Narvaez Rojas *et al*., 2021, p. 4 of 16): First, the invention of machines for manufacturing and production on a large scale; second, the ability to generate energy for use in industrialised transport such as trains and ships powered by steam engines; and third, the use of organised labour to work in (textile) factories and mines. The first industrial revolution moved society from agriculture to industry and was fueled by coal and iron. Results from this change include population growth, urbanisation, mass employment options, and also the exploitation of workers.

Less than a hundred years later, the second industrial revolution revolved around the employment of electricity, gas, and oil as sources of energy, as well as the Bessemer process which enabled mass production of cheap steel. Together with advances in processing chemicals and the mentioned energy sources, production time and costs decreased significantly which caused the second industrial revolution to boost and internationalise the economy, while opening opportunities for long distance and international transportation networks that could quickly and efficiently move ideas and people around the world (Narvaez Rojas *et al*., 2021, p. 4 of 16).

Another hundred years passed, after which the third industrial revolution brought the transition from mechanical and analog electronics to digital technology that introduced computers, robots, and the internet, while nuclear power was introduced as a source of energy. Programmable logic controllers (PLCs) and robotics further promoted automation (Desoutterttools, 2022). While the internet and computers made life and work easier, the speed of change increased significantly, while the world shrank into a well-connected village.

Only about fifty years later the fourth industrial revolution brought a shift towards renewable energy (solar, wind, and geothermal) and brought artificial intelligence (AI), machine learning, robotics, as well as blockchain and quantum computing within reach of ordinary people. This resulted in the dissolving of boundaries and the fusion of physical, digital, and biological worlds. The focus was on smart industry, big data, and the internet, while aiming for complete automation through cyber-physical systems (Narvaez Rojas *et al*., 2021, p. 4 of 16), of which Society 5.0 in Japan is moving towards.



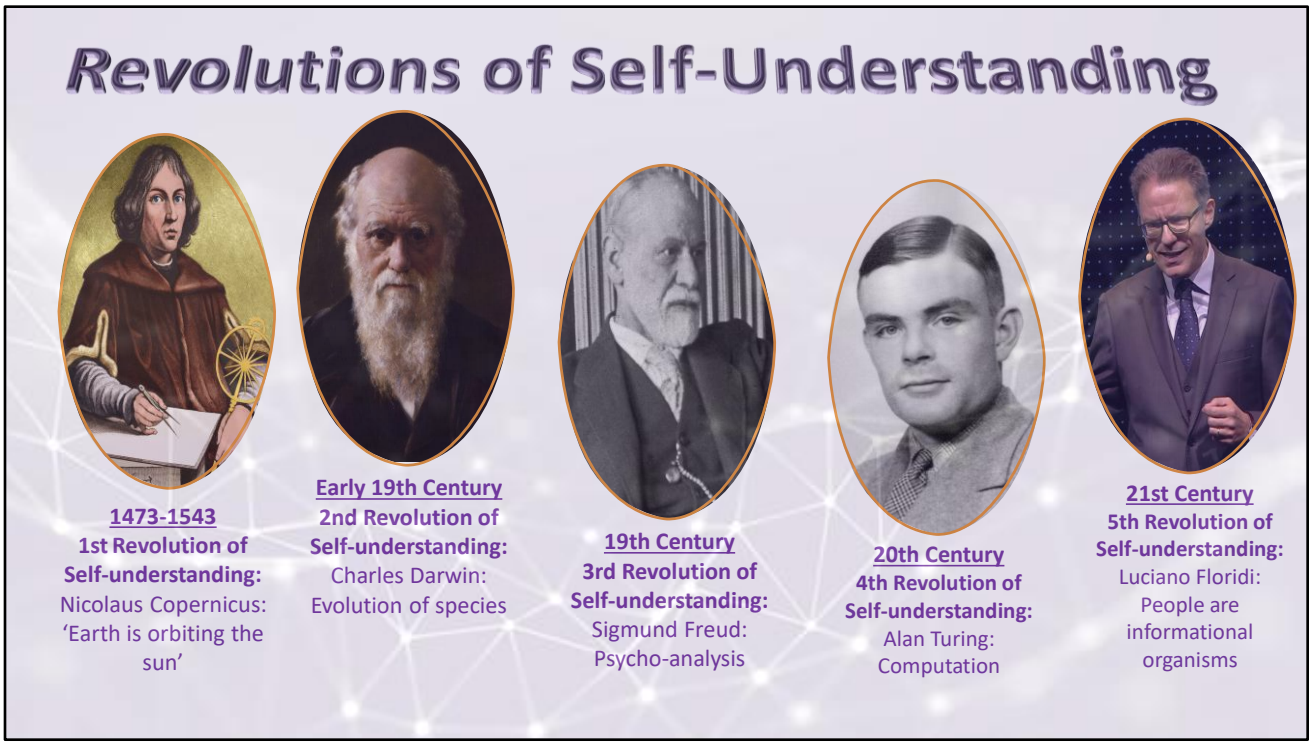
Dating back over thousands of years, the communication revolutions developed slowly and with much longer intervals than the young industrial revolutions.

Before people developed speech as the first communication revolution, they had to use actions, gestures, sounds, and art to convey ideas and information (Harnad, 1991). The translation of sound into visuals, called 'cross-modality information transfer' enabled humans to transfer symbolic thinking abilities into sounds, speech, and language (Miyagawa, Lesure and Nóbrega, 2018). The development of language, about 40,000 year before the common era opened a different and advanced way of interaction between people. Language promoted the transfer of abstract ideas and made it possible to transfer traditions, rituals, messages, belief systems, and taboos orally from one generation to the next.

Pictures and pictographic scripts preceded the development of written communication but by about 10,000 BCE, writing was invented independently in China, the Near East, and Mesoamerica (Schmandt-Besserat, 2014). This denoted the second major breakthrough in human communication skills and added recorded history to the communication toolkit. It provided a system of standardised recordings with wide accessibility that allowed people to communicate over longer distances and asynchronously.

Although printing is used in China since the 7th century (Wolfson-Ford, 2021), the Western World only experienced the advances of this type of technology in communication from the mid-1400s through mass production provided by the printing press. The result was mass literacy and education as well as quick and cheap ways to spread ideas and news (Lemelson-MIT, n.d.).

The fourth communication revolution converged media and technology, resulting in virtual reality, augmented reality, and AI-powered algorithms that offer immersive and interactive experiences while reducing the world to a connected global village. Technology-based communication is contributing to the blurring of lines between the physical, digital, and biological components of society (Schwab, 2016).



We now come to the interesting developments in human self-understanding that took place over the last seven centuries.

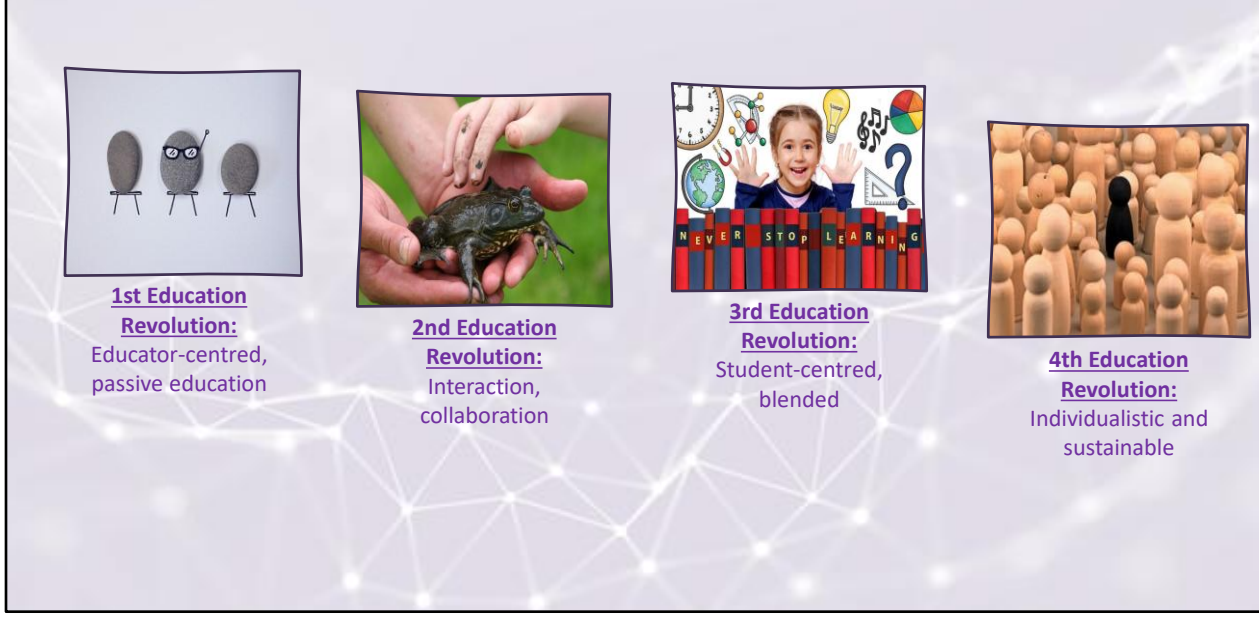
According to Floridi (2014), the first revolutionary change in human self-understanding was instigated by Copernicus (1473-1543). Copernicus' finding that earth is orbiting the sun and not the other way round, 'displaced the earth from the centre of the universe' and forced people to reconsider their role and place in both the solar system and creation (Floridi, 2014, p. 87).

The second major discovery about ourselves and our relationships was brought about by the work of Darwin (1809-1882) who displaced us from the 'centre of the biological kingdom' by showing that some species have evolved (and are still evolving) over time through natural selection (Floridi, 2014, p. 89).

The psycho-analytic work of Freud (1856-1939) brought a 'radical displacement from our Cartesian certainties' (Floridi, 2014, p. 90). '[T]oday we acknowledge that we are not immobile, at the centre of the universe (Copernican revolution), that we are not unnaturally separate and diverse from the rest of the animal kingdom (Darwinian revolution), and that we are far from being Cartesian minds entirely transparent to ourselves (Freudian or neuroscientific revolution)' (Floridi, 2014, p. 90).

Alan Turing (1912-1954), the father of AI, re-conceptualised human self-understanding through machine intelligence (Gou, 2015).

Floridi himself can be considered the father of the current developing fifth revolution in human self-knowledge. He claims that 'we are not Newtonian stand-alone and unique agents, we are informational organisms (inforgs), mutually connected and embedded in an informational environment (the infosphere) which we share with other informational agents, both natural and artificial' (Floridi, 2014, p. 94).



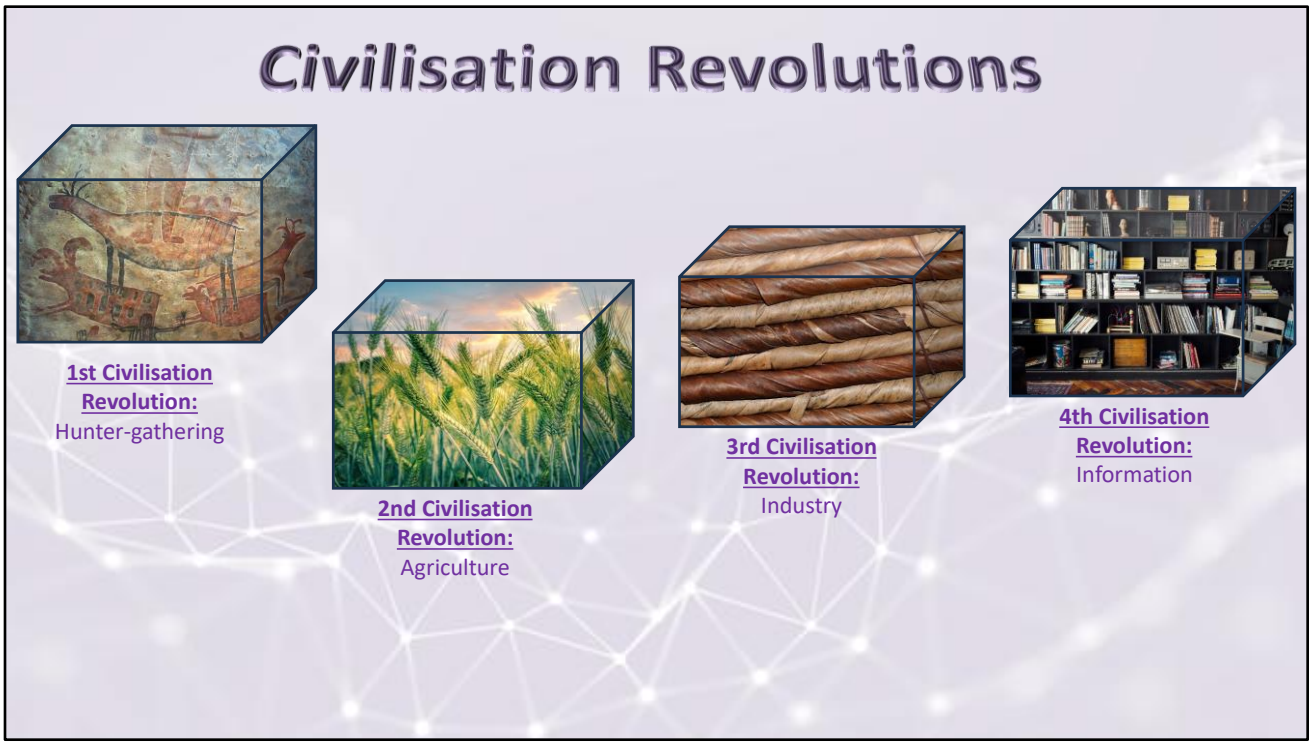
Education and training are aspects closely linked with human development and form part of human history since the earliest human development.

During the first education revolution – during the 18th and 19th centuries – that formalised instruction and training, education 1.0 was done in an authoritarian educator-centred lecturing passive learning style, focused on mass education. Education 1.0 addressed the needs of the agricultural community (Mukul and Büyüközkan, 2023). The focus was on teaching students the ability to master reading, writing, and basic mathematic skills, using non-interactive media.

New education strategies improved learning experiences during the second education revolution in the 20th century to include interaction between educators, subject specialists, and students, through using both synchronous and asynchronous communication methods (Huk, 2021, p. 38), focusing on communication, contribution, and collaboration. Education 2.0 focused on mass education of the industrial community (Mukul and Büyüközkan, 2023).

Education 3.0 shifted the focus to student-centredness with educators acting as guides and facilitators and a constructivist approach and individualised learning that revolved around knowledge creation, critical thinking, and problem-solving. Education broke free from restrictions such as time and space while content became freely available. The focus was on students becoming active connectors, creators, and constructivists through supporting self-learning (Mukul and Büyüközkan, 2023).

Education 4.0 uses AI and smart technology to further encourage individualised lifelong, lifewide, and on-demand learning in support of creativity, innovation, and problem solving while developing future-fit skills, competencies, and adaptability. The main education responsibility is transferred to the students. Currently, education is experimenting with the use of generative AI while the focus is on the sustainability of human life and the future of the planet. According to Hussin (2018, pp. 92, 93) the nine trends of Education 4.0 include personalised, unrestricted learning – any time and any place; students will have choices on how to learn through more project-based and hands-on learning and data interpretation. During education 4.0, students are experiencing alternative assessment methods, their opinions are considered in curriculum designing, and they become independent learners.



Next, we explore the revolutions that happened regarding human development. The hunting and gathering civilisation started to craft tools and divide tasks, while fire was used for protection, light, heat, and food preparation (Narvaez Rojas *et al*., 2021, p. 5 of 16).

The moment that agriculture development started to progress, people had the option to abandon the nomadic lifestyle to settle and focus on farming at locations where resources were readily available. These more permanent settlement options of the Neolithic period brought larger numbers of people together which led to the specialisation of trade and new career opportunities. Economy, politics, and religion became important aspects of control.

The industrial society corresponded with production massification through factories and machines that replaced manual labour (Hornborg, 2015, pp. 863-867). As a result, people started earning money in exchange for labour. Social class structures started to emerge because economic differences were defined by the material goods each person and family possessed. This evolution significantly changed the thinking patterns of people. The population grew despite severe exploitation and before long the concept of human rights developed.

Linked to the developments of the fourth communication revolution, civilisation transformed through the introduction of information. Webster (2002, p. 7464) identifies six terms that define the information civilisation, namely 'technology, culture, spatial, occupational, economic, and the primacy of theoretical knowledge.' Things, people, and places got connected through the use of technology (Narvaes Rojas *et al*., 2021, p. 6 of 16). In this age, technologies simplified the acquisition and use of information. This is more noticeable in social, cultural, and economic activities because these activities are centred around people and interconnecting technological innovations that allow information to flow quickly and accurately all over the world.

The information revolution provides global information access and interaction among individuals using information and communication technologies. People and technology can instantly connect while search engine and large language models (LLMs) provide instant answers to questions and open access to huge amounts of knowledge and misinformation. Additionally, social media keep people informed on world news and real-time happenings, while distributing fake news and false information. The technological features of the information society strengthened the power of governments to regulate the economy, military advantages and strategies, and provided control over the information systems and content.

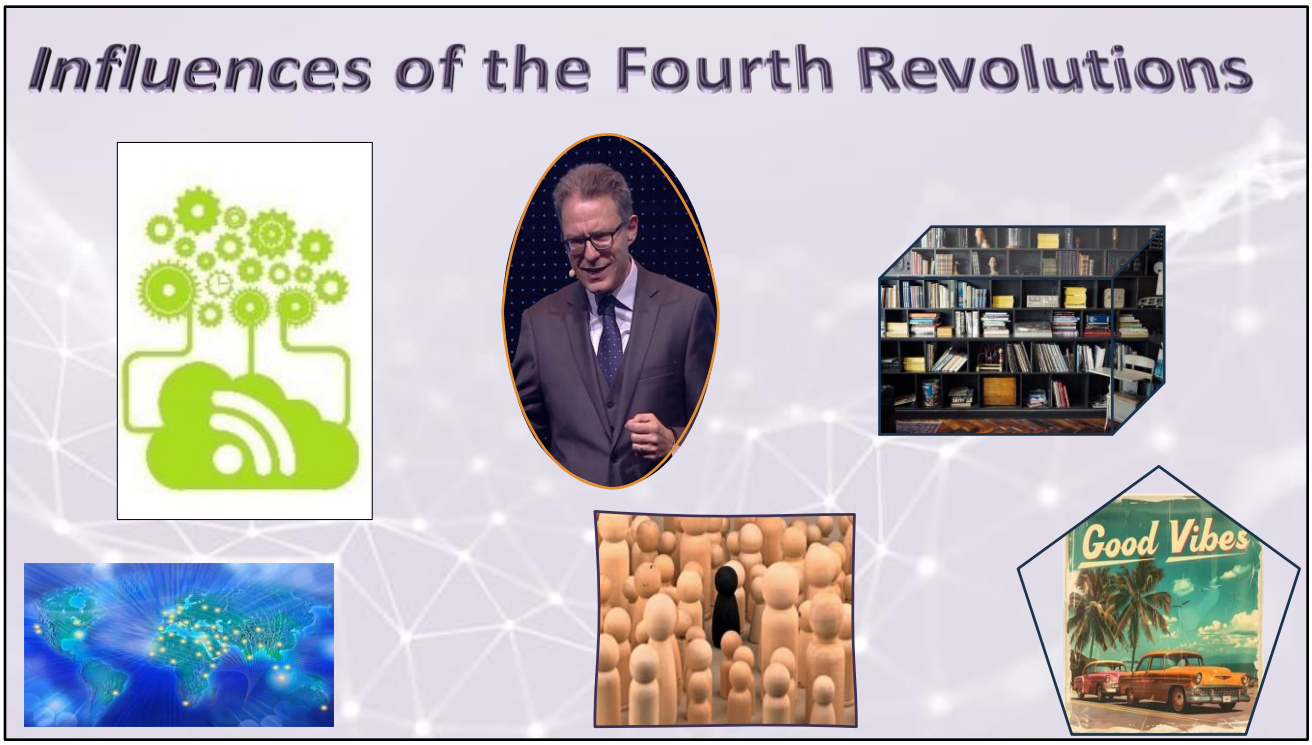
Social revolutions typically originated in specific locations such as countries or a specific lifestyle that soon spread to other counties and groups, often altering global perspectives and lifestyles.

The Protestant Reformation movement dramatically transformed the religious, political, and cultural landscape of Europe. It led to the creation of a new branch of Christianity and stimulated the rise of national churches, a surge in religious wars, and significant changes in society including shifts in power and the role of religion in society. The German, Dutch, and English religious revolutions set the stage for the modern era (Van Niekerk, 2020, p. 2 of 12) by encouraging religious pluralism, challenging traditional hierarchies, and fostering alternative perspectives about faith, governance, and human rights (including religious freedom).

The French Revolution was a period of radical social and political upheaval in France that overthrew the monarchy while establishing a republic. It was driven by social inequalities, economic hardship, and Enlightenment ideals, leading to the termination of the feudal system and the rise of nationalism (Seebohm, 1889, pp. 17-46). Enlightenment ideas about natural rights, popular sovereignty, and the separation of powers fueled revolutionary sentiment that resulted in a profound impact on France and the world, spreading ideas of liberty, equality, and nationalism. It also led to the development of modern political ideologies and influenced subsequent revolutions and social movements (Wilde, 2019).

The Russian Economic Revolution brought the end of the Russian empire as Russia's involvement in World War I fueled widespread dissatisfaction with the Tsarist government (Encyclopedia Britannica, 2025). The subsequent collapse of the Tsarist regime and the rise of the Bolsheviks and its aftermath had a huge impact on global political thought and the development of socialist and communist movements.

In Western culture, the period from the 1960s to 2020 was marked by significant social and personal freedom revolutions, driven by movements advocating for equality and individual rights, while challenging traditional norms. This era witnessed shifts in attitudes and laws concerning race, gender, sexuality, and political participation, culminating in a more inclusive and diverse society, though not without ongoing controversies (West, 2021). The internet and social media have played a growing role in shaping public discourse and activism, both facilitating and complicating the ongoing push for social change. The rise of neoliberalism, with its emphasis on individual responsibility and free markets, also influenced the social and political landscape, sometimes creating tensions with the goals of social justice movements (UpKeep, n.d). The idealisation of Western culture brought strong opposition from non-Western societies that push-back through movements such as Africanisation, decolonisation, nationalism, cultural preservation movements, etc.



It is clear that the combination and the reciprocal influences of the six major fourth revolutions are shaping and reshaping all aspect of life on earth. Although the fourth industrial revolution is considered the main influencer and instigator of change, the other major revolutions are also playing important roles in change and development.

The industrial revolutions enhanced the development of civilisations by stimulating the establishment of transport and communication networks and power grids while reducing production costs and changing consumption patterns, time management, and career opportunities, to name but a few. On the negative side, the industrial revolutions brough environmental problems such as pollution and recourse depletion. The human impact includes labour exploitation and human rights issues, urbanisation, and the formation of social classes.

The revolutions that changed civilisations contributed to the shaping of political structures, economic systems, social norms, and technological advancement, resulting in urbanisation, social hierarchies, and legal systems while contributing to the long-term negative effects of pollution, resource depletion, and climate change.

The social revolutions all had significant influences on society. The Enlightenment and Reformation promoted scientific inquiry built upon reason and logic and a growing sense of individualism. The French Revolution stimulated radical social change while the Russian economic revolution reshaped the political and economic landscape. It inspired revolutionary movements and nationalism and instigated ideological conflict between communism and capitalism for many years to come. The Western cultural revolution promoted ideas of democracy, individual rights, and personal autonomy.

The communication revolutions brought global interconnectedness but also caused information overload, potential social isolation, and privacy concerns. The revolutions in education and training, driven by societal and technological shifts, are transforming the way in which knowledge is created, assessed, disseminated, and applied. The revolutions in human self-understanding are reshaping the way in which humanity views itself and its place in the world and the universe.

All of these bring us to the conclusion that there is no escape from or avoiding change, and although humans tend to prefer stability and comfort zones, the accelerating pace of change will continue into the future and require flexibility and adaptability. In order to become more open, flexible, and adaptable to constant change, it is important to know and understand not only the current state of change and disruption but also the history behind these developments. This enables us to see patterns that can assist with predictions of future developments and provides lessons that can prevent future mistakes and guide future choices.

Regarding the industrial revolutions, the Global South's position is complex. It is characterised by historical exploitation dating from the second and third industrial revolutions when the South was used as sources of cheap raw materials and labour. This led to a persistent development gap between North and South, while the current focus is to 'leapfrog' towards sustainable energy, advanced communication systems, and work towards inclusivity (Rashied and Bhamjee, 2020, p. 95).

The Global South's position on the digital communication revolution is marked by a dual perspective: On the one hand it provides an opportunity for socio-economic development and a voice to challenge traditional narratives, but it also presents challenges regarding digital sovereignty, infrastructure disparities, and potential 'digital colonialism.' 'The developing countries aim to leverage digital technologies for inclusive growth and achieving Sustainable Development Goals, but emphasize the need for self-sufficient digital capacity and fair global governance structures' (Besada, 2024).

The social revolutions impacted the Global South by shaping the global systems of colonialism, followed by anti-colonial nationalism and post-colonial development, and by introducing universal ideologies like capitalism, democracy, and socialism (cf. Mbembe, 2000, p. 66). The legacy of colonial rule continued the intellectual colonisation of the Global South at the hands of dominant Western powers (Young, 2001, p. 91).

The developments of civilisations brought the development of permanent settlements, more sustainable food supplies, and urbanisation that at the same time led to increased pressure on the environment. Access to education and connectivity improved with digital colonialisation (e.g., data harvesting) as the flipside of the coin (IEEE, 2025).

Although the initial developments regarding human self-understanding had minimal impact on the Global South, the consequences of the European explorations and concept of 'survival of the fittest' was used to justify racism, eugenics, and 'civilizing mission' (Fiveable 2024). Despite its Eurocentric origin, psychoanalytic theory (Freud) has been adopted and adapted by the Global South to deal with the 'psychic trauma of colonialism' (Sikuade, 2012). The digital revolution brought connectivity and development but also a digital divide and dependency.

The revolutions in education presented the Global South with both significant opportunities for development and critical challenges related to equity and infrastructure. Opportunities arose for more flexible learning and global interaction. However, the digital divide still presents challenges due to a lack of infrastructure, consistent electricity, and internet connectivity and costs (Cole, 2024).

In essence, the six major fourth revolutions provided both challenges and opportunities. The Global South must navigate these challenges by adapting the ideas to local contexts, implement them as tools in promoting Africanisation, decolonisation, nationalism, cultural preservation, and economic empowerment.

References

Abdulrazaq A., Aisha S.S., Abubakar A.U., Amina I., Jamilu Y.A. and Muhammad A.B. (2025). 'The key benefits of the 6th and 5th Industrial Revolutions,' *Global Journal of Research in Engineering & Computer Sciences,* 5(2):42-47. https://doi.org/10.5281/zenodo.15131976

Amin Patwary, I. (2024). How the agricultural revolution changed the course of human civilization in the Neolithic Period. Available at: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.researchgate.net/profile/Irfan-Amin-Patwary/publication/384445813_How_the_Agricultural_Revolution_Changed_the_Course_of_Human_Civilization_in_the_Neolithic_Period/links/66f9a7f7906bca2ac3d487a3/How-the-Agricultural-Revolution-Changed-the-Course-of-Human-Civilization-in-the-Neolithic-Period.pdf. (Accessed 4 January 2025).

Besada, H. (2024) *South-South cooperation can power the Global South's digital future*. 8 November 2024. Available at: https://blogs.lse.ac.uk/africaatlse/2024/11/08/south-south-cooperation-can-power-the-global-souths-digital-future/#:~:text=Digital%20technologies%20are%20revolutionising%20economies,and%20investment%20in%20digital%20infrastructure. (Accessed 14 November 2025).

Cabinet Office. (2016) Society 5.0: What is Society 5.0? Available at: https://www8.cao.go.jp/cstp/english/society5_0/index.html#:~:text=In%20the%205th%20Science%20and,and%20physical%20space.%22%20In%20order. (Accessed 7 November 2025).

Castro, D. ed. (2006) *Revolution and revolutionaries: Guerrilla movements in Latin America*. Lanham: Scholarly Resources.

Cole, L. (2024) *Empowering education: The transformative role of technology in Africa*. UNESCO. Available at: https://www.iicba.unesco.org/en/empowering-education-transformative-role-technology-africa#:~:text=Investments%20in%20digital%20infrastructure%2C%20the,can%20promote%20equality%20in%20education. (Accessed 14 November 2025).

References

Desoutterttools. (2022) From the First Industrial Revolution to Industry 4.0. Available at: https://www.desouttertools.com/industry-4-0/news/503/industrial-revolution-from-industry-1-0-to-industry-4-0. (Accessed: 15 May 2025).

Encyclopedia Britannica. (2025) Russian revolution: Russian history (1917). https://www.Britannica.com/even/Russian-Revolution. (Accessed 31 October 2025).

Ferreira, C.M. and Serpa, S. (2018) 'Society 5.0 and social development: Contributions to a discussion,' *Management and Organizational Studies,* 5(4):26-31. https://doi.org/10.5430/mos.v5n4p26

Fiveable. (2024) *Social Darwinism – History of Africa – 1800 to present*. Available at: https://fiveable.me/key-terms/africa-since-1800/social-darwinism. (Accessed 14 November 2025).

Floridi, L. (2014) *The 4th Revolution: How the infosphere is reshaping human reality*. Oxford: Oxford University Press.

Gerstein, J. (2014) *Moving from Education 1.0 through Education 2.0 towards Education 3.0*. ScholarWorks: Boise State University, pp. 83-98. Available at: https://scholarworks.boisestate.edu/cgi/viewcontent.cgi?article=1104&context=edtech_facpubs#:~:text=Education%201.0:%20A%20Pedagogical%2C%20Essentialist,size%2Dfits%2Dall%20education. (Accessed 15 November 2025).

Gou, T. (2015) 'Alan Turing: Artificial intelligence as human self-knowledge,' *Anthropology Today,* 31(6):3-7. Royal Anthropological Institute. https://doi.org/10.1111/1467-8322.12209

Harnad, S. (1991) 'Post-Gutenberg galaxy: The Fourth Revolution in the means of production of knowledge,' *The Public Access Computer Systems Review,* 2(1):39-53.

Hornborg, A. (2015) Industrial societies. In Wright, J.D. ed.: *International Encyclopedia of the Social & Behavioral Sciences.* 2nd ed. Amsterdam: Elsevier, pp. 863-867. https://doi.org/10.1016/B978-0-08-097086-8.12200-7

References

Huk, T. (2021) 'From education 1.0 to Education 4.0 – challenges for the contemporary school,' *The New Educational Review,* 66:36-46.URL: https://czasopisma.marszalek.com.pl/images/pliki/tner/202104/tner6603.pdf. https://doi.org/10.15804/tner.21.66.4.03

Hussin, A.A. (2018) 'Education 4.0 made simple: Ideas for teaching,' *International Journal of Education & Literacy Studies,* 6(3):92-98.

IEEE (Institute of Electrical and Electronics Engineers). (2025) *Impact of the digital divide: economic, social, and educational consequences*. IEEE Connecting the Unconnected. Available at: https://ctu.ieee.org/blog/2023/02/27/impact-of-the-digital-divide-economic-social-and-educational-consequences/#:~:text=The%20digital%20divide%20also%20has,improve%20outcomes%20for%20all%20individuals. (Accessed 14 November 2025).

Kulik, J.A. (1984) The fourth revolution in teaching: Meta-analysis. Paper presented at the annual meeting of the American Educational Research Association, 68th New Orleans Conference, Los Angeles, 23-27 April 1984.

Lemelson-MIT. (n.d.) Johann Gutenberg. Movable type printing press. Available at: https://Lemelson.mit.edu/resources/johann-Gutenberg. (Accessed 8 January 2025).

Levy, J. (2005) 'The Fourth Revolution: What's behind the move from brute force to a brain force economy?' *The Journal for Transdisciplinary Research in Southern Africa*, June 2005:64-65.

Mbembe, A. (2000) *On the Postcolony*. Berkeley: University of California Press.

Medina-Borja, A. (2017) Smart human-centered service systems of the future. In Kazuo, I., Kimura, Y., Takashima, Y., Bannai, S. and Yamada, N. eds.: Future services & societal systems in Society 5.0. Tokyo: Center for Research and Development Strategy, Japan Science and Technology Agency, pp. 235-239.

References

Miyagawa, S., Lesure, C. and Nóbrega, V.A. (2018) 'Cross-modality information transfer: A hypothesis about the relationship among prehistoric cave paintings, symbolic thinking, and the emergence of language,' *Frontiers in Psychology,* 9(115). 9 pages. https://doi.org/10.3389/fpsyg.2018.00115

Mukul, E. and Büyüközkan, G. (2023) 'Digital transformation in education: A systematic review of education 4.0,' *Technological Forecasting and Social Change*, 94(5). 122664. 20 pages. https://doi.org/10.1016/j.techfore.2023.122664

Narvaes Rojas, C., Alomia Peñafiel, G.A. and Loaiza Buitrago, D.F. (2021) 'Society 5.0: A Japanese concept for a superintelligent society,' *Sustainability,* 13. 6567. 16 pages. https://doi.org/10.3390/su13126567

Oliver, E. (2022) Introduction. In Oliver, E. ed.: *Global initiatives and higher education in the Fourth Industrial Revolution*. Auckland Park: UJ Press, pp. 1-24.

Rashied, N. and Bhamjee, M. (2020) 'Does the Global South need to decolonise the Fourth Industrial Revolution?' *Lecture Notes in Electrical Engineering,* 674:95-110.

Ruiz Estrada, M.A. (2024) *The Seventh Industrial Revolution (IR 7.0)*. 19 pages. 8 February 2024. SSRN. Available at: https://ssrn.com/abstract=4720983. (Accessed 20 January 2025).

Schmandt-Besserat, D. (2014) The evolution of writing. In Wright, J. ed.: *International Encyclopedia of Social and Behavioral Sciences.* Amsterdam: Elsevier, pp. 1-15.

Schwab, K. (2016) *The Fourth Industrial Revolution: What it means, how to respond*. World Economic Forum. Available at: https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/. (Accessed 2 January 2025).

Seebohm, F. (1889) *The era of the Protestant Revolution*. New York: C. Scribner's Sons.

References

Sikuade, A. (2012) 'Fifty years after Frantz Fanon: Beyond diversity,' *Advances in Psychiatric Treatment,* 18(1):25-31. https://doi.org/10.1192/apt.bp.110.008847

The editors of Encyclopaedia Britannica. (2025) Russian revolution: Russian history (1917). 21 July 2025. Available at: https://www.britannica.com/event/Russian-Revolution. (Accessed 18 August 2025).

UpKeep. (n.d.) A brief history of the Industrial Revolution and its impact on modern business. Available at: upkeep.com/learning/four-industrial-revolutions/. (Accessed 15 August 2025).

Van Niekerk, F. (2020) 'Reformation and scientific revolution: Historical coincidence or continual renewal?' *In die Skriflig,* 54(2). a2538. 12 pages. https://doi.org/10.4102/ids.v54i2.2538

Webster, F. (2002) Information society. In: *International Encyclopedia of the Social & Behavioral Sciences,* pp. 7464-7468. Available at: https://www.sciencedirect.com/science/chapter/referencework/abs/pii/B0080430767043345?via%3Dihub. (Accessed 20 June 2025). https://doi.org/10.1016/B0-08-043076-7/04334-5

Weinert, F. (2009) *Copernicus, Darwin, and Freud: Revolutions in the history and philosophy of Science*. Hoboken: Wiley-Blackwell.

West, E. (2021) *The West's cultural revolution is over: The return of censorship, speech codes and taboos suggests society returning to normal*. UnHerd. 9 July 2021. Available at: https://unherd.com/2021/07/the-wests-cultural-revolution-is-over/. (Accessed 8 January 2025).

Wilde, R. (2019) *The French Revolution, its outcome, and legacy*. ThoughtCo. Available at: https://www.thoughtco.com/consequences-of-the-french-revolution-1221872#:~:text=Key%20Takeaways,spread%20across%20Europe%20and%20beyond. (Accessed 16 August 2025).

References

Wolfson-Ford, R. (2021) The history of printing in Asia according to library of congress Asian collections – Part 1. Available at: https://blogs.loc.gov/international-collections/2021/06/the-history-of-printing-in-asia-according-to-library-of-congress-Asian-collections-part-1/. (Accessed 13 June 2025).

Young, R. (2001) *Postcolonialism – an historical introduction.* Cambridge: Cambridge University Press.

Disclaimer: All the pictures used in this presentation originate from the Internet and the authors claim no right of possession on them.