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Connecting Academic Knowledge with Industry - Detachment from Reality

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Abstract

To enable a connection between the academic working context, the realities of the business sector, and the needs of our socio-economic and environmental system, we need to engage in a reflection that is closer to our world's diverse realities. We argue on the need to consider a more holistic approach towards education and a redefinition of the role played by teachers, students and researchers as learning environments become more complex, requiring alternative pedagogical frameworks that support students-learners, teachers-educators, and researchers. The starting point of this change is to understand the 21st century teacher and the potential need of a transition towards becoming educators. In our working context, an educator can be broadly understood as someone with a more holistic understanding of education and can facilitate learning processes that foster future-oriented mindsets that promote respect, diversity, and inclusivity within the umbrella of global citizenship. While often synonymous with the teacher, the term educator carries a wider connotation, encompassing anyone involved in the planning, delivering, or supporting of education, breaking away from the figure of the master who holds knowledge and reproduces it for the student with a need to enable co-creation, collaboration, participation and the knowledge exchange process. In this paper we consider the growing detachment between teachers and the reality of their learners/students, and the growing influence of economic pressures reflected on the industrial sector needs.

Keywords: Industry, Education, Economics, Educator, Change

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1 Introduction

Changes in the labour market and the dynamics that condition how the global economic and political systems are evolving require careful consideration of current trends defining Industry 4.0. Moreover, the transition towards a human-centric approach as demanded by Industry 5.0 within the context of unprecedented developments and advances in new technologies and the pressures emerging from the digital age, growing demands and pressures for developing digital competencies and skills require a reconsideration of existing educational models and systems (Culot et al., 2020; Grosse et al., 2023; Raja Santhi & Muthuswamy, 2023; Zhang et al., 2023). More specifically, the advent of the digital revolution, which involves rapid and constant technological evolution, requires rapid adjustment in the labour market. The historical transition started with the automation of previously manual tasks that created the demand for a new profile from the 21st-century professional, no longer centred on simply performing tasks without questioning methods, procedures, leadership roles, hierarchies and economic agendas (Rotatori et al., 2021). As this evolution cycle is inexorable and constant, professionals must constantly develop themselves to improve their skills and abilities to meet the demand for increasingly specialised functions (Hanewald & Ng, 2011; Knell, 2021; Su et al., 2022; Khang et al., 2023; Poláková et al., 2023).

This significant shift also applies to the academic world (Lazzeretti, 2022; Alenezi et al., 2023). Knowledge is now within reach of students' hands and can be accessed at the speed of typing in search engines and other media, such as the explosion of recent artificial intelligence and the impact that is having on how we approach learning and teaching environments (Alenezi, 2023; Kamalov et al., 2023). While the initial reaction from the academic world has been defined by significant levels of rejection and fear towards new technologies, it is critical to acknowledge that rapid change can drive chaos, confusion and rejection (Federspiel et al., 2023). Undoubtedly, there are major challenges ahead as the appropriate educational frameworks are defined to help academics transition towards new technologies and innovations to support their learning environments (Liu et al., 2020). This reality also requires a reorientation of the teacher's role in the educational process.

2 Education and Reality

The educator's role should be considered from a more holistic dimension, where the need to facilitate interactive, collaborative, diverse and inclusive learning environments takes priority (Pedler et al., 2020). The broader, interactive and collaborative nature of this new holistic vision brings new challenges as the learning and teaching dynamics require a change in responsibilities and understanding of different roles where educators must encourage the student's protagonism and initiative in the search for knowledge (Klapper & Fayolle, 2023). Learning environments need to provide adequate guidelines to help students to filter the massive amount of information available through the technology and also preparing oneself, the educator, to make use of such resources, not seeing them as enemies or associated with *"ivory tower"* positions where teachers, students and researchers status and role within the Higher Educational landscape emerges as being ill-defined leadings to tangible barriers between them (Kamila & Jasrotia, 2023; Nguyen et al., 2023; Pratama et al., 2023). Following these guidelines, the new educator will be able
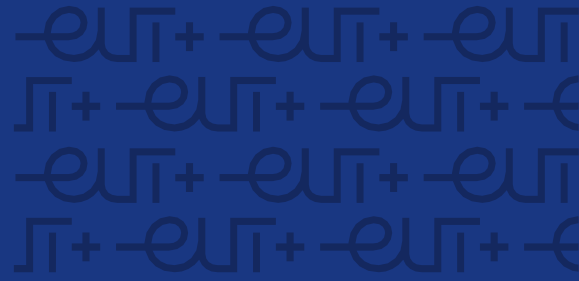
to form individuals firmly centred on concepts of ethics, resilience, critical thinking and initiative, enabling the professional under training to reach high levels of autonomy. Furthermore, the pedagogical working framework needs to consider the need for changes where education emerges as the umbrella that bring together researchers, students and teachers within the interchangeable nature of their roles and in alignment with the expansive circularity of learning processes as introduced by Morales et al., (2022) in their innovative Circular Pedagogy illustrated in Figure 1 below. Ultimately, we will be forming transformative individuals necessary for sustainable economic development (Moyer & Sinclair, 2020; Martínez-Peláez et al., 2023; Abulibdeh et al., 2024). Although there is limited scope in this paper to engage on a debate that consider the importance of the school in this context, as being responsible for improving technical skills and human competencies, the ideal model outlined above is far from being a reality at present, as we are very much conditioned and limited by existing education models that are lagging with regard to required changes in educational practices (Goulart et al., 2022). Furthermore, we are now taking a closer look or just referring to the existing qualitative hiatus and defining the differences between rich and poor nations and their educational needs that are quite often neglected and overlooked (Rogerson, 2020; Guido Saraceni, 2022).
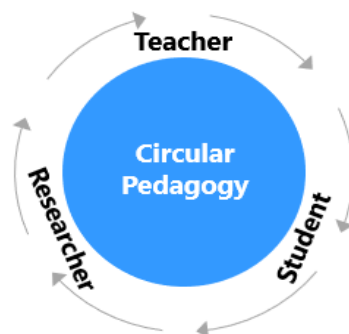

Figure 1. Understanding Circular Pedagogy. Source (Authors, 2023)

In delineating the educational disparities between affluent and less prosperous nations, several key distinctions become apparent. Firstly, resource allocation plays a pivotal role, with wealthier nations often having greater financial resources to invest in educational infrastructure, teacher training, and the development of advanced curricula. Infrastructure is another critical factor, where economically advanced nations boast state-of-the-art facilities, technology integration, and well-maintained learning environments. Conversely, less prosperous nations may struggle with inadequate infrastructure, insufficient facilities, and a lack of access to modern educational tools. Access to quality education is a fundamental discrepancy, with wealthier nations offering a broader range of educational opportunities, including higher education and vocational training. In contrast, economically disadvantaged nations may grapple with limited access to funding that help development cutting-edge facilities to support learning, particularly in rural areas, and face challenges in providing education beyond basic levels. Furthermore, socio-economic factors contribute to disparities, as wealthier nations often have a more robust social support

system, enabling students to focus on their studies without the burden of financial constraints. Conversely, in less affluent nations, economic challenges may lead to higher dropout rates, limited enrolment in higher education, and an overall diminished capacity to invest in the educational development of their population. In essence, the differences in educational disparities between rich and poor nations encompass a multifaceted interplay of financial resources, infrastructure, access, and socio-economic factors, collectively shaping the opportunities and outcomes within their respective education systems (Devkota, 2021; S. Wang et al., 2022; Feng et al., 2023; Carvalho & Dryden-Peterson, 2024; Vasconcelos et al., 2024). In addition, we need to be aware on the advantages enjoyed by advanced research centres and leading educational institutions that benefit from significant levels of funding that position as leaders, as they have comparative advantages that are not at the reach of the world less developed economies, where quite often less affluent economies classrooms are defined by students lack of access to basic learning materials and facilities where students do not even have chairs and tables to study (Sharma et al., 2020; Hanaysha et al., 2023).

3 Education to Challenge the Status Quo

To understand the importance of education, it is critical that we consider the growing gap and increasing detachment between academic knowledge and market reality. While we have the steamroller of technological advancement demanding a model of disruptive education, educational systems have not changed their programs and objectives to enable a richer model that moves away from the needs of the labour market (Bejaković & Mrnjavac, 2020; Lauder & Mayhew, 2020; Blažič, 2021). There seems to be a significant detachment between socio-economic and environmental needs as the tentacles of the corporate world dictate the fate of our educational models and systems. Whether innovation is one of the keywords of the 21st century, educational systems have failed to join this revolution (Maj-Waśniowska et al., 2023) and, consequently, do not seem to be up to the demands of a hyperactive and hyperconnected world and the challenges that are emerging as a result of environmental degradation, demographical changes, raising levels of violence, mental health issues, growing economic and political divide and their implications as they reshape how societies, communities and families interact (Robinson & Aronica, 2016; Lombardi, 2023; Masoomi et al., 2023).

Another relevant reason, and perhaps much more obscure, is linked to the use of education to maintain the status quo and how it can contribute to enhance inequalities, increase the growing socio-economic and environmental divide and to marginalise societies and individuals that cannot afford education (Ballew et al., 2020; Otto & Gugushvili, 2020; Jie et al., 2023). The reality of our educational models is defined by a broken and fractured system as illustrated in Figure 2 below. The economic demands materialised on employability skills are affected by the fast pace of development of technology and innovation that are leading to a digital divide that will be enhanced as education models, processes and systems are significantly detached from the needs of learners that are not only limited to the economic system and that require a more holistic understanding of social, economic, political and environmental roles and their interconnectedness.
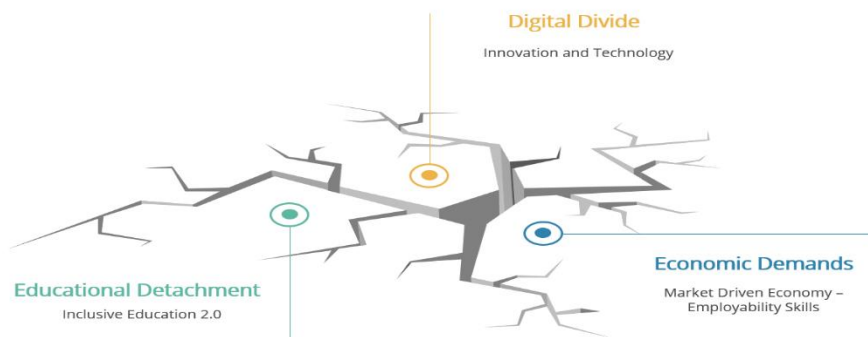
Figure 2. Educational System Fractures. Source: Authors (2023)

Within a very complex context, educational models need to become aware on how the curricula of educational systems are designed, and financed, by ruling elites and dictated by the needs of the labour market guided by the hand of transnational and multinational corporations interests (Costan et al., 2021; Gabriel et al., 2022; Mishrif et al., 2023). Furthermore, the world's leading universities need to maintain their dominant position, and this is fueled by the disparities regarding financial resources that are available to them when compared to other institutions. Without a doubt education is necessary for economic and social development, but it is also a threat to the powerful as it boosts critical thinking and inquiry processes that question dominant paradigms that seek to protect and perpetuate the privileges enjoyed by the few in detriment of collective and global gains (Weber, 2023). Therefore, access to education in turn can be used to nurture or prevent the development of critical thinking as a crucial skill for social mobility and the alternation of power (Ten Brinke & Keltner, 2022). The latter is far from being of interest to those in power. Interestingly, we have an impasse here because although education is essential to leverage even production techniques (Rosário & Dias, 2023), causing the specialisation of work to be followed by a reduction in its costs (Carroni et al., 2023), entry barriers to knowledge (imposed mainly for the cost of education) are desirable for maintaining the status quo (du Plessis & others, 2018). A clear contradiction of the capitalist system and one of its structural flaws, perhaps one of the germs of its disintegration (Wallerstein, 2023).
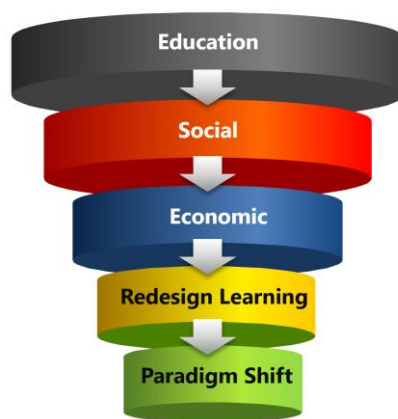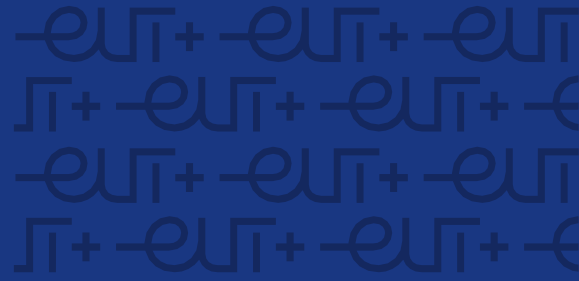

Figure 2. The Pillars of Inclusive Education. Source: Authors (2023)

In this regard, as illustrated in Figure 2 above, we must reconsider how we structure educational systems around dominant pillars and to what extent a paradigm shift might be possible.

4   The Continuous Evolution of Industry

Employers across all sectors constantly emphasise the importance of soft skills such as critical thinking, communication, and teamwork, which are difficult to replace with machines. Working in diverse, cross-functional teams to solve complex problems is becoming increasingly important in today's fast-paced corporate world, where employees must comprehend the significance of group patterns and interpersonal skills, such as compassion and tolerance. For example, "Project Aristotle" in Google sought to determine the factors contributing to effective teamwork. The results identified three key criteria: The first step is creating an environment where team members may freely express their ideas—a concept referred to as *"psychological safety."* Second, they must be dependable, which is defined as *"everyone doing their part."* A third element relates to teams and their ability to work efficiently, where teams need *"the framework and specificity"* so that they have well-defined objectives and strategies (Duhigg, 2016). Google strategy consisted of ensuring the implementation of all the outlined principles, ensuring that the teams performance aligned with these attributes. These teams have proven that correct cooperation can produce outstanding outcomes by consistently outperforming expectations in terms of both innovation and teamwork. In keeping with the previously stated requirement of cultivating collaborative learning settings, as UNESCO and the OECD emphasised, Google's 'Project Aristotle' ethos of psychological safety, reliability, and systematic clarity is worth pursuing. As an example of an atmosphere that fosters creativity, critical thinking, and problem-solving, consider Google's strategy for assembling high-performing teams (Duhigg, 2016; Ibarra, 2021). As another example, we can refer to a LinkedIn survey of worldwide executives of companies revealing that nine out of ten believe that *"soft"* skills, often known as *"human"* or *"durable"* skills, are becoming increasingly important. The core research findings show evidence of the importance of teamwork (collaboration) as the seventh most sought-after skill in 2024.

Furthermore, the essential competencies for employment have experienced a 25% transformation since 2015, and it is most likely that they will experience a minimum change of 65% by 2030 (Brodnitz , 2024). Accordingly the most in demand skills are identified as follows: communication, customer service, leadership, project management, management, analytics, teamwork, sales, problem-solving and research. Similarly, an alignment with the working context of knowledge development and proactive learning environments associated with a Circular Pedagogy (Morales et al., 2022), advocating for a dynamic educational approach centred on an expanding circular learning process. The authors argued that colleges and universities should foster the development of resilience, flexibility, and adaptability among learners. The continuous evolution of the industry and socio-economic landscape underscores the increasing significance of upgrading their skills facilitated by the rapid advancement of technology. Furthermore, the authors stated that the current educational system lacks the capacity to adequately equip students to confront the world's forthcoming ecological, social, and economic woes.

5 Conclusion

As the world continues evolving, we need to consider the role that our educational systems and models will play and how education must adapt to drive transformation and enable working environments that facilitate collaboration and the development of transferable skills. According to the OECD report on the *"Future of Education and Skills 2030"* (OECD, 2019) there is a growing emphasis on the significance of team-oriented and collaborative abilities, competencies and skills, which aid students in meeting the requirements of the contemporary labour market and promote the growth of soft skills such as problem-solving, critical thinking, and effective communication. The development of collaborative learning environments will contribute to encourage collaborative and participatory working environments towards a common goal and take turns as primary learners, helping them develop skills essential for individual achievement and the advancement of society as a whole. Educators can enhance students' communication and collaboration skills and foster cooperation by implementing collaborative projects, such as group projects and presentations, where students can discuss, listen, and respect opposing views, which mirrors the demands of contemporary professional environments (Taguma, 2020). This working paper explores the significance of collaborative learning in modern education, guided by insights from academia, global organisations, and industry perspectives that help examine real-world applications, and innovative potential of collaborative learning contexts to improve education systems.

6 References

Abulibdeh, A., Zaidan, E., & Abulibdeh, R. (2024). Navigating the confluence of artificial intelligence and education for sustainable development in the era of industry 4.0: Challenges, opportunities, and ethical dimensions. *Journal of Cleaner Production*, 437, 140527. https://doi.org/10.1016/j.jclepro.2023.140527

Alenezi, M. (2023). Digital Learning and Digital Institution in Higher Education. Education Sciences, 13(1). https://doi.org/10.3390/educsci13010088

Ballew, M. T., Pearson, A. R., Goldberg, M. H., Rosenthal, S. A., & Leiserowitz, A. (2020). Does socioeconomic status moderate the political divide on climate change? The roles of education, income, and individualism. *Global Environmental Change*, 60, 102024. https://doi.org/10.1016/j.gloenvcha.2019.102024

Bejaković, P., & Mrnjavac, Ž. (2020). The importance of digital literacy on the labour market. *Employee Relations: The International Journal*, 42(4), 921–932. https://doi.org/10.1108/ER-07-2019-0274

Blažič, B. J. (2021). The cybersecurity labour shortage in Europe: Moving to a new concept for education and training. *Technology in Society*, 67, 101769. https://doi.org/10.1016/j.techsoc.2021.101769

Brodnitz, D. (2024). The Most In Demand Skills for 2024). Accessed 10 February 2024, available online at: https://www.linkedin.com/business/talent/blog/talent-strategy/linkedin-most-in-demand-hard-and-soft-skills

Carvalho, S., & Dryden-Peterson, S. (2024). Political economy of refugees: How responsibility shapes the politics of education. *World Development*, 173, 106394. https://doi.org/10.1016/j.worlddev.2023.106394

Costan, E., Gonzales, G., Gonzales, R., Enriquez, L., Costan, F., Suladay, D., Atibing, N. M., Aro, J. L., Evangelista, S. S., Maturan, F., Selerio, E., & Ocampo, L. (2021). Education 4.0 in Developing Economies: A Systematic Literature Review of Implementation Barriers and Future Research Agenda. *Sustainability*, 13(22). https://doi.org/10.3390/su132212763

Culot, G., Nassimbeni, G., Orzes, G., & Sartor, M. (2020). Behind the definition of Industry 4.0: Analysis and open questions. *International Journal of Production Economics*, 226, 107617. https://doi.org/10.1016/j.ijpe.2020.107617

Devkota, K. R. (2021). Inequalities reinforced through online and distance education in the age of COVID-19: The case of higher education in Nepal. International Review of Education, 67(1), 145–165. https://doi.org/10.1007/s11159-021-09886-x

du Plessis, A. & others. (2018). Science Education in Schools and at Tertiary Level: Status Quo or Embracing Change? *Journal of Baltic Science Education*, 17(2), 184–186.

Duhigg, C. (2016). What Google learned from its quest to build the perfect team. The New York Times Magazine, 26(2016), 2016.

Federspiel, F., Mitchell, R., Asokan, A., Umana, C., & McCoy, D. (2023). Threats by artificial intelligence to human health and human existence. *BMJ Global Health*, 8(5). https://doi.org/10.1136/bmjgh-2022-010435

Feng, Y., Hu, J., Afshan, S., Irfan, M., Hu, M., & Abbas, S. (2023). Bridging resource disparities for sustainable development: A comparative analysis of resource-rich and resource-scarce countries. *Resources Policy*, 85, 103981. https://doi.org/10.1016/j.resourpol.2023.103981

Gabriel, F., Marrone, R., Van Sebille, Y., Kovanovic, V., & de Laat, M. (2022). Digital education strategies around the world: Practices and policies. Irish Educational Studies, 41(1), 85–106. https://doi.org/10.1080/03323315.2021.2022513

Goulart, V. G., Liboni, L. B., & Cezarino, L. O. (2022). Balancing skills in the digital transformation era: The future of jobs and the role of higher education. *Industry and Higher Education*, 36(2), 118–127. https://doi.org/10.1177/09504222211029796

Grosse, E. H., Sgarbossa, F., Berlin, C., & Neumann, W. P. (2023). Human-centric production and logistics system design and management: Transitioning from Industry 4.0 to Industry 5.0. *International Journal of Production Research*, 61(22), 7749–7759. https://doi.org/10.1080/00207543.2023.2246783

Guido Saraceni. (2022). Informational Opulence, Digital Divide and Poverty. *Humanities and Rights Global Network Journal*, 3(2). https://doi.org/10.24861/2675-1038.v3i2.72

Hanaysha, J. R., Shriedeh, F. B., & In'airat, M. (2023). Impact of classroom environment, teacher competency, information and communication technology resources, and university facilities on student engagement and academic performance. *International Journal of Information Management Data Insights*, 3(2), 100188. https://doi.org/10.1016/j.jjimei.2023.100188

Hanewald, R., & Ng, W. (2011). The digital revolution in education: Digital citizenship and multi-literacy of mobile technology. Mobile Technologies and Handheld Devices for Ubiquitous Learning: *Research and Pedagogy*, 1–14.

Ibarra, H. (2021). Five leadership skills for the future. Leader to Leader, 2021(100), 14-17

Jie, H., Khan, I., Alharthi, M., Zafar, M. W., & Saeed, A. (2023). Sustainable energy policy, socio-economic development, and ecological footprint: The economic significance of natural resources, population growth, and industrial development. *Utilities Policy*, 81, 101490. https://doi.org/10.1016/j.jup.2023.101490

Kamalov, F., Santandreu Calonge, D., & Gurrib, I. (2023). New Era of Artificial Intelligence in Education: Towards a Sustainable Multifaceted Revolution. *Sustainability*, 15(16). https://doi.org/10.3390/su151612451

Kamila, M. K., & Jasrotia, S. S. (2023). Ethical issues in the development of artificial intelligence: Recognising the risks. *International Journal of Ethics and Systems*, ahead-of-print(ahead-of-print). https://doi.org/10.1108/IJOES-05-2023-0107

Khang, A., Jadhav, B., & Birajdar, S. (2023). Industry revolution 4.0: Workforce competency models and designs. In Designing workforce management systems for industry 4.0 (pp. 11–34). CRC Press.

Klapper, R. G., & Fayolle, A. (2023). A transformational learning framework for sustainable entrepreneurship education: The power of Paulo Freire's educational model. The *International Journal of Management Education*, 21(1), 100729. https://doi.org/10.1016/j.ijme.2022.100729

Knell, M. (2021). The digital revolution and digitalised network society. *Review of Evolutionary Political Economy*, 2(1), 9–25. https://doi.org/10.1007/s43253-021-00037-4

Lauder, H., & Mayhew, K. (2020). Higher education and the labour market: An introduction. *Oxford Review of Education*, 46(1), 1–9. https://doi.org/10.1080/03054985.2019.1699714

Lazzeretti, L. (2022). What is the role of culture facing the digital revolution challenge? Some reflections for a research agenda. *European Planning Studies*, 30(9), 1617–1637. https://doi.org/10.1080/09654313.2020.1836133

Liu, Q., Geertshuis, S., & Grainger, R. (2020). Understanding academics' adoption of learning technologies: A systematic review. *Computers & Education*, 151, 103857. https://doi.org/10.1016/j.compedu.2020.103857

Lombardi, M. (2023). Digital Economy and Digital Divide. In S. S. Jodhka & B. Rehbein (Eds.), Global Handbook of Inequality (pp. 1–27). Springer International Publishing. https://doi.org/10.1007/978-3-030-97417-6_48-1

Maj-Waśniowska, K., Stanienda, J., & Wyrobek, J. (2023). Challenges for the education system in the era of the Fourth Industrial Revolution. In *Public Goods and the Fourth Industrial Revolution*. Taylor & Francis.

Martínez-Peláez, R., Ochoa-Brust, A., Rivera, S., Félix, V. G., Ostos, R., Brito, H., Félix, R. A., & Mena, L. J. (2023). Role of Digital Transformation for Achieving Sustainability: Mediated Role of Stakeholders, Key Capabilities, and Technology. *Sustainability*, 15(14). https://doi.org/10.3390/su151411221

Masoomi, B., Sahebi, I. G., Ghobakhloo, M., & Mosayebi, A. (2023). Do industry 5.0 advantages address the sustainable development challenges of the renewable energy supply chain? *Sustainable Production and Consumption*, 43, 94–112. https://doi.org/10.1016/j.spc.2023.10.018

Mishrif, A., Karolak, M., & Mirza, C. (2023). Bridging the Gap Between Gulf Higher Education and Labor Market in Industry 4.0. In A. Mishrif, M. Karolak, & C. Mirza (Eds.), Nationalization of Gulf Labour Markets: Higher Education and Skills Development in Industry 4.0 (pp. 319–332). Springer Nature Singapore. https://doi.org/10.1007/978-981-19-8072-5_13

Morales, L., Coetzer, J.-H., Barkoczi, N., Pop, L., Marian, C., & Flynn, P. (2022). A Circular Pedagogy for Higher Education. Technological University Dublin. DOI: 10.21427/74V5-DT69

Moyer, J. M., & Sinclair, A. J. (2020). Learning for Sustainability: Considering Pathways to Transformation. *Adult Education Quarterly*, 70(4), 340–359. https://doi.org/10.1177/0741713620912219

Nguyen, A., Ngo, H. N., Hong, Y., Dang, B., & Nguyen, B.-P. T. (2023). Ethical principles for artificial intelligence in education. *Education and Information Technologies*, 28(4), 4221–4241. https://doi.org/10.1007/s10639-022-11316-w

OECD. (2019). Future of Education and Skills 2030. https://www.oecd.org/en/about/projects/future-of-education-and-skills-2030.html

Otto, A., & Gugushvili, D. (2020). Eco-Social Divides in Europe: Public Attitudes towards Welfare and Climate Change Policies. *Sustainability*, 12(1). https://doi.org/10.3390/su12010404

Pedler, M., Hudson, S., & Yeigh, T. (2020). The teachers' role in student engagement: A review. *Australian Journal of Teacher Education* (Online), 45(3), 48–62.

Poláková, M., Suleimanová, J. H., Madzík, P., Copuš, L., Molnárová, I., & Polednová, J. (2023). Soft skills and their importance in the labour market under the conditions of Industry 5.0. *Heliyon*, 9(8).

Pratama, Muh. P., Sampelolo, R., & Lura, H. (2023). Revolutionising Education: Harnessing the Power of Artificial Intelligence for Personalised Learning. Klasikal : *Journal of Education, Language Teaching and Science*, 5(2), 350–357. https://doi.org/10.52208/klasikal.v5i2.877

Raja Santhi, A., & Muthuswamy, P. (2023). Industry 5.0 or industry 4.0S? Introduction to industry 4.0 and a peek into the prospective industry 5.0 technologies. *International Journal on Interactive Design and Manufacturing* (IJIDeM), 17(2), 947–979. https://doi.org/10.1007/s12008-023-01217-8

Robinson, K., & Aronica, L. (2016). Creative schools: The grassroots revolution that's transforming education. Penguin books.

Rogerson, S. (2020). The digital divide is a multi-dimensional complex. *Journal of Information, Communication and Ethics in Society*, 18(3), 321–321. https://doi.org/10.1108/JICES-05-2020-0060

Rosário, A. T., & Dias, J. C. (2023). How Industry 4.0 and Sensors Can Leverage Product Design: Opportunities and Challenges. *Sensors*, 23(3). https://doi.org/10.3390/s23031165

Rotatori, D., Lee, E. J., & Sleeva, S. (2021). The evolution of the workforce during the fourth industrial revolution. *Human Resource Development International*, 24(1), 92–103. https://doi.org/10.1080/13678868.2020.1767453

Sharma, H., Jain, V., & Mogaji, E. (2020). Defining developing countries in higher education context. Sharma, H., Jain, V. & Mogaji, E, 1–9.

Su, C.-W., Yuan, X., Umar, M., & Lobonţ, O.-R. (2022). Does technological innovation bring destruction or creation to the labor market? *Technology in Society*, 68, 101905. https://doi.org/10.1016/j.techsoc.2022.101905

Taguma, M., Gabriel, F., Meow Hwee, L. I. M., & Expert, O. E. C. D. (2020). Future of Education and Skills 2030: Curriculum Analysis. Organisation for Economic Cooperation and Development (OECD).

Ten Brinke, L., & Keltner, D. (2022). Theories of power: Perceived strategies for gaining and maintaining power. *Journal of Personality and Social Psychology*, 122(1), 53. https://doi.org/10.1037/pspi0000345

Vasconcelos, J. S., Rosário, N. do, Ribeiro, T., & Cordeiro, P. M. (2024). Popular knowledge as popular power: Struggle and strategy of the Emancipa popular education movement in Brazil. *Globalisation, Societies and Education*, 22(1), 122–137. https://doi.org/10.1080/14767724.2023.2290145

Wallerstein, I. (2023). The rise and future demise of the world capitalist system: Concepts for comparative analysis. In *Imperialism* (pp. 141–169). Routledge.

Wang, S., Wang, X., & Lu, B. (2022). Is resource abundance a curse for green economic growth? Evidence from developing countries. *Resources Policy*, 75, 102533. https://doi.org/10.1016/j.resourpol.2021.102533

Weber, E. T. (2023). Education for Technological Threats to Democracy. Contemporary Pragmatism, 20(1–2), 38–52. https://doi.org/10.1163/18758185-bja10065

Zhang, J., & Fu, B. (2023). Eco-civilisation: A complementary pathway rooted in theory and practice for global sustainable development. *Ambio*, 52(12), 1882–1894. https://doi.org/10.1007/s13280-023-01902-8

Ziolo, M., Filipiak, B. Z., Bąk, I., & Cheba, K. (2019). How to Design More Sustainable Financial Systems: The Roles of Environmental, Social, and Governance Factors in the Decision-Making Process. *Sustainability*, 11(20). https://doi.org/10.3390/su11205604

Zu, L. (2023). Overcoming Sustainability Challenges: The Role of Responsible Management and Leadership. In *Responsible Management and Taoism*, 1 (pp. 111–131). Emerald Publishing Limited. https://doi.org/10.1108/978-1-80262-789-320231010