

# Sustainable Teaching Professional Ethics in the post-digital Era

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OIDA International Journal of Sustainable Development, Ontario International Development Agency, Canada.

ISSN 1923-6654 (print) ISSN 1923-6662 (online) [www.oidaijsd.com](http://www.oidaijsd.com)

Also available at <http://www.ssrn.com/link/OIDA-Intl-Journal-Sustainable-Dev.html>

**Abstract:** Sustainable teaching professional ethics in the post-digital era encompasses the principles and practices that educators must uphold to ensure responsible and ethical utilisation of technology while promoting sustainability and environmental consciousness. As technology plays a significant role in education, teachers must integrate sustainable teaching practices into their methods and incorporate digital tools ethically and responsibly. This paper explores policy and practices' implications for fostering sustainable teaching professional ethics in the post-digital era. It emphasises the importance of environmental awareness, digital citizenship, equity and access, privacy and data protection, ethical use of technology, critical thinking, and balancing digital and analogue learning. The paper also highlights the need for policy development, teaching profession and professional development, curriculum integration, access to technology, ethical use of data and privacy protection, collaboration, and ongoing evaluation and feedback. By addressing these aspects, educational systems can create an environment that fosters sustainable teaching professional ethics, preparing students to become responsible global citizens who prioritise sustainability and the ethical use of technology. Further research is warranted to investigate the challenges and effective strategies for integrating sustainability and digital ethics into teaching practices in the post-digital era.

**Keywords:** *digital era, ICT, professional ethics, Sustainable, teaching*

## Introduction

The present advancements in velocity, scope, and system influence are distinct and constitute the Fourth Industrial Revolution (4IR). The pace of advancement is unparalleled. In contrast to the preceding industrial revolutions, the 4IR is advancing exponentially. Furthermore, it disrupts numerous industries across various countries. The modifications will impact production, administration, and regulation (Kayembe & Nel, 2019; Oosthuizen, 2017; Schwab, 2016). The vast population of individuals connected to mobile devices, possessing unparalleled computing capabilities, storage capacity, and access to information, presents boundless opportunities. The opportunities are anticipated to be augmented by advancements in artificial intelligence (AI), autonomous vehicles, the Internet of Things (IoT), nanotechnology, robotics, autonomous vehicles, 3-D printing, biotechnology, quantum computing, energy storage, and materials science (He & Ni, 2022; Rotatori et al., 2020; Schwab, 2016). Artificial intelligence is utilised by various technological innovations such as autonomous vehicles, uncrewed aerial vehicles, digital assistants, language translation, and investment applications. Artificial intelligence has made significant advancements due to the exponential computer power and data growth. The data encompasses software designed to discover medicine and tools for predicting cultural preferences (Pauceanu, 2020; Rotatori et al., 2020; Schwab, 2016). The intersection of digital fabrication technologies and biology is a common occurrence. Professionals in the fields of engineering, design, and architecture are employing various advanced techniques such as computational design, additive manufacturing, materials engineering, and synthetic biology to enhance the performance of microorganisms, humans, consumer products, and architectural structures (Pauceanu, 2020; Rotatori et al., 2020; Schwab, 2016).

The employment of 4IR tools is evident in the education sector, specifically in the classroom setting. The integration of technology in the classroom is a significant consideration that is gradually being incorporated into the

advancement of the education system at all levels, from the elementary to the tertiary level. The integration referred to in the statement pertains to incorporating technical elements through knowledge transfer methods, including but not limited to platforms, learning materials, classroom arrangements, learning environments, and knowledge delivery (Alakrash & Razak, 2020). The implementation of 4IR tools in education has resulted in heightened student motivation. Thus, it is attributed to the provision of learner-centred activities and authentic learning materials, which surpass those offered by conventional teaching methods (Alakrash & Razak, 2020). Students have reported experiencing a more favourable learning environment, improved peer interaction, and increased participation in the learning process when utilising online learning platforms as opposed to traditional classroom settings (Alakrash & Razak, 2020). Therefore, online teaching and learning are smoother, more convenient, and more comfortable (Alakrash & Razak, 2020; Al-Shammari, 2020). Integrating 4IR tools in educational settings can effectively equip students with valuable skills, including creativity, problem-solving, critical thinking, and lifelong learning (Yusuf et al., 2019). An optimal learning experience can be fostered through a supportive and accommodating environment, complete with well-equipped facilities, facilitating an engaging and interactive learning process for students. The Internet and related amenities enable the expansion of educational opportunities beyond the conventional classroom setting (Alakrash & Razak, 2020). Although ICT tools offer advantages in the educational setting, they can impede learning when students use them for purposes other than academic pursuits (Alfallaj, 2020). The danger of using 4IR tools in school is that underage children risk seeing sexual and violent images, abuse, and corruption (Valentine & Holloway, 2009). There is also a risk of cyberbullying and algorithms being used for the wrong purpose (Cranmer et al., 2009). When students and teachers in school use ICT tools, algorithms are created. These are data sets about users, profiles, and website usage. Algorithms are created for markets to predict users' present and future preferences, but these algorithms can also fall into the wrong hands (Akgun & Greenhow, 2021). When users create algorithm, they create a data set that represents society's historical and systematic biases, ultimately transforming into algorithmic bias, which can result in different artificial intelligence (AI) platforms (Akgun & Greenhow, 2021).

The current national school curriculum lacks provisions for cyber-safety education, and there is a dearth of supporting material and training for ICT teachers in the country, leading to a deficiency in knowledge and skills about ethics and guidelines when using ICT tools in the classroom (Kritzinger, 2016). There is a pressing need for educational resources and direction to ensure that students know about online safety matters. Integrating cyber-safety into the curriculum is imperative to provide students with fundamental knowledge on the subject matter, as suggested by Kritzinger (2016). In a study conducted by Farhangpour et al. (2019), participants reported experiencing a diverse range of cyberbullying incidents, with sexual offences being the most prevalent. The individuals experienced adverse emotional and academic consequences to the point where some reported suicidal ideation. Despite the availability of advanced cyber technology to students in this rural high school, they lack the necessary skills to mitigate or manage its adverse consequences, resulting in isolation and distress (Farhangpour et al., 2019). Farhangpour et al. (2019) recommended establishing an anti-cyberbullying policy and making counselling services available in schools. Additionally, stakeholders who plan to incorporate e-learning into their educational programmes should include cyber safety and support mechanisms to ensure successful implementation.

### **Research question**

The following research question will be looked at:

How can educators effectively integrate sustainability principles into their teaching practices in the post-digital era?

### **Methodology**

The Arksey and O'Malley framework was utilised to conduct a scoping review. A systematic exploration was carried out across four bibliographic databases and the grey literature to identify scoping review studies. Scoping reviews as a method for consolidating research evidence has gained significant traction recently. The approach in question is considered to be of recent origin, and as such, a universally accepted definition or a definitive procedure has yet to be established (Arksey & O'Malley, 2005). A scoping review of a literature corpus can be particularly beneficial when the subject matter has yet to be extensively reviewed or is characterised by complexity or heterogeneity (Mays et al., 2001). Systematic reviews are frequently conducted to assess research endeavours' breadth, depth, and characteristics within a specific subject domain. These reviews ascertain the worth, potential range, and expenses of conducting a comprehensive systematic review. They are also used to synthesise and distribute research discoveries and pinpoint areas of research deficiency within the current literature (Pham et al., 2014).

The framework proposed by Arksey and O'Malley comprises six stages, with the final stage being discretionary. The process of conducting a literature review involves several steps. Firstly, the researcher must identify a broad research question. Secondly, they must conduct a comprehensive search for relevant studies. Thirdly, they must establish inclusion and exclusion criteria based on their familiarity with the literature. Fourthly, they must sift through the data, chart it, and sort it according to key themes. Fifthly, they must collate, summarise, and report the results, providing a descriptive and numerical summary of the data and a thematic analysis. Finally, the researcher may engage in a consultation exercise with key stakeholders to inform and validate their findings.

### **Step 1: Identify research questions**

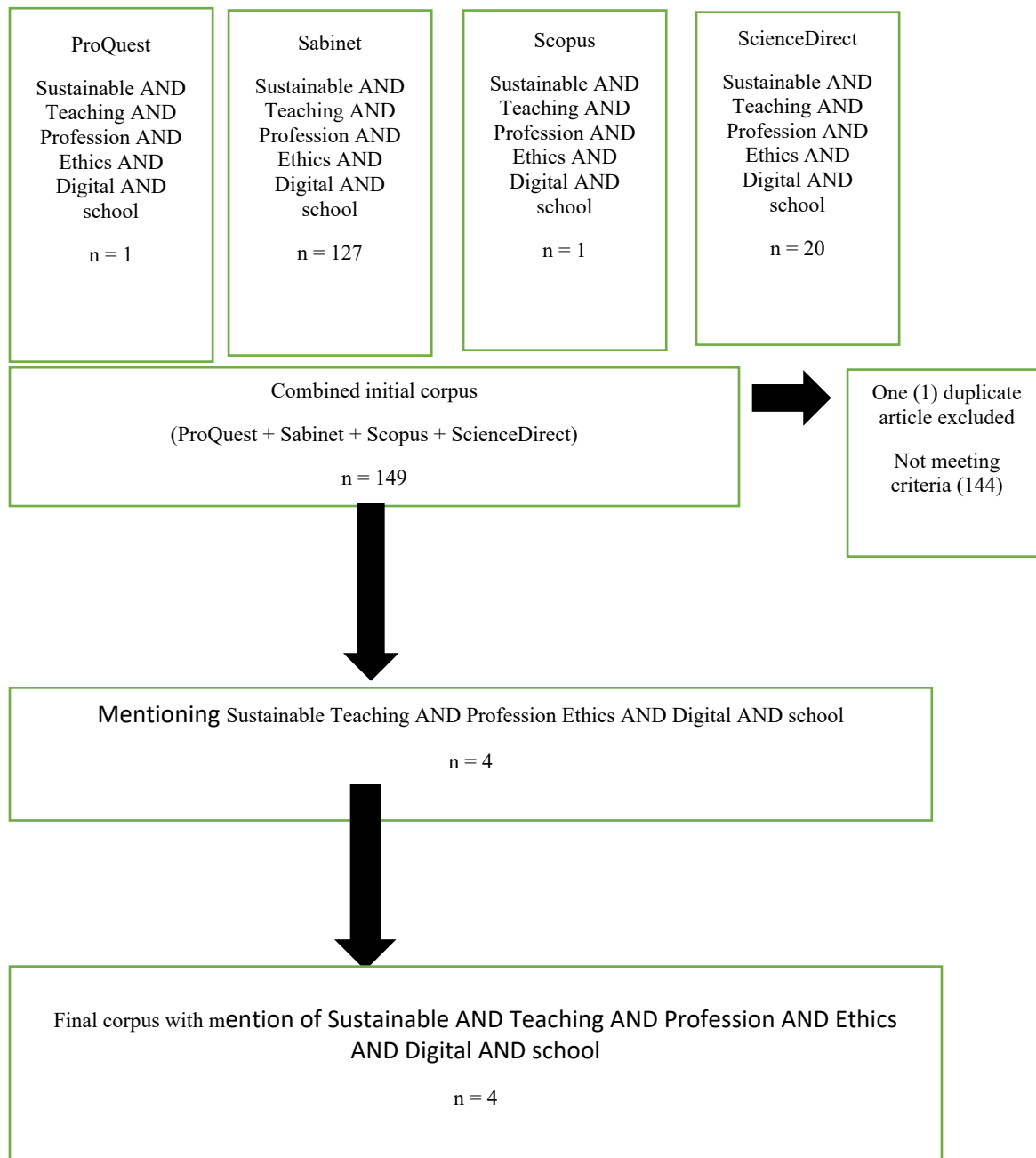
Following the methodology proposed by Arksey and O'Malley (2005), Mak & Thomas (2022), Munn et al. (2022), and Peters et al. (2020), the researchers initially established the research question that served as the foundation for the study. This step is fundamental in scoping reviews, providing a framework for subsequent process stages. The study is guided by a research question that seeks to identify the scholarly discourse or perception of scholars regarding sustainable teaching professional ethics in the post-digital era.

### **Step 2: Identification of pertinent studies**

The researchers systematically searched for relevant studies aligned with the research question guiding their study. An examination of the literature by Arksey and O'Malley (2005), Mak & Thomas (2022), Munn et al. (2022), and Peters et al. (2020) reveals that pertinent research investigations can be discerned through manual searches, a perusal of reference lists, or utilisation of various electronic databases. This study utilised four distinct databases to conduct a comprehensive search for relevant literature. The searched databases include ProQuest, Sabinet, Scopus, and Science Direct.

### **Step 3: Selecting relevant studies**

At this juncture of the investigation, the scholars established the criteria for the incorporation and exclusion of studies that will be taken into account for the analysis, following the guidelines stipulated by Arksey and O'Malley (2005) and Mak & Thomas (2022). The search terms were initially identified as "sustainable," "teaching," "profession," "ethics," "digital," and "school." On June 5th, 2023, a researcher conducted a search, which another researcher subsequently verified to ensure its reliability. The search on Sabinet yielded a result from 127 journals, but those journals were either on higher education or primary schools and focused more on teacher ICT skills and the lack of ICT equipment in schools. There were also only two articles on ethics. ProQuest retrieved one (1) article, Scopus retrieved eight (1) articles, and ScienceDirect retrieved twenty (20) articles, but they were not on ethics but on teacher ICT skills, pedagogy, and school ICT needs. A total of 149 articles were retrieved. Upon careful examination, it was discovered that 144 did not meet the criteria and were replaced, and one (1) needed to be duplicated. Figure 1 depicts a flowchart that illustrates the quantity of scholarly literature obtained, the potentially excluded articles for analysis, and the final corpus of four articles that were analysed for the study.



**Figure 1: A graphical representation depicting the number of articles searched and the resultant corpus**

#### Step 4: Charting the Data

The researchers developed the data extraction; the extraction categories were studies between 2018 and 2023; they should be from Africa and in English. Table 1, the data charting form adopted for this study, presents significant critical findings from the analysed literature.

**Table 1 A form for charting data is utilised to extract pertinent information from the literature that has been reviewed.**

Authors	Year of Publication	Key quotation(s)/ finding(s)
Olawumi & Muvuso	2022	“The integration of ICT with teaching, learning, and assessment lacks definitive policies.”
Oduor	2022	“Frequently, technological products are created without considering the requirements of individuals with disabilities, resulting in their continued marginalisation from society.”
Nkoane & Phori	2019	To effectively impart the requisite level of scholarly sophistication demanded in the 21st century, engaging in a critical examination of the epistemic framework is imperative. Additionally, ensuring equitable access to opportunities for success and upholding the principle of equality as enshrined in human dignity are crucial components of this endeavour.
Farhangpour et al.	2019	study's participants reported experiencing a diverse range of cyberbullying incidents, with sexual offences being the most prevalent. The individuals experienced adverse emotional and academic consequences to the point where some reported suicidal ideation. Despite the availability of advanced cyber technology to students in this rural high school, they lack the necessary skills to mitigate or manage its adverse consequences, resulting in isolation and distress.

Additionally, relevant scholarly sources were acquired, and an inductive content analysis was performed to facilitate the examination of the data following the protocols outlined by Mak & Thomas (2022) and Peters et al. (2005). The relevant literature was subjected to coding and categorisation, following the guidelines established by Mak and Thomas (2022). Consequently, themes were deduced. The produced themes have been clarified and elaborated upon in this investigation's "Discussion of Findings" segment.

### **Step 5: Collating, summarising, and reporting results**

In this study, the researchers employed the use of themes following codes and categories that were initially identified as put forward by Mak & Thomas (2022) to present the results. This is an attempt to provide an answer to the research question of the study. The identified generated themes from the reviewed relevant analysed literature are presented and explained using excerpts to support the discussion, which was considered necessary. Each identified theme and explanation is presented in the section "Discussion".

### **Discussion of findings**

The findings of the study are presented using the identified generated themes.

Research question: 1.How can educators effectively integrate sustainability principles into their teaching practices in the post-digital era?

### **Theme one: Lack of policies and ethics in place**

Specific policies or ethical guidelines. In the context of the digital age, the teaching profession needs more established regulations and guidelines to uphold ethical standards (Olawumi & Muvuso, 2022).

### **Theme two: Social exclusion**

Frequently, technological advancements are created without due consideration for the needs of persons with disabilities, leading to the perpetuation of their societal exclusion (Oduor, 2022).

### **Theme three: Need to uphold human dignity**

Conducting a thorough examination of the epistemic framework is imperative for effectively instilling the requisite degree of scholarly refinement demanded in contemporary times. Furthermore, guaranteeing fair and impartial access to opportunities for accomplishment and upholding the principle of equality as an inherent aspect of human dignity is indispensable constituents of this pursuit (Nkoane & Phori, 2019). Developing technologies related to the fourth industrial revolution in African societies requires implementing policies that consider four key factors. These factors include inclusiveness, which ensures that the needs of all individuals are met; affordability, which aims to bridge the gap between different socio-economic groups; respect for cultural identity to prevent cultural imperialism; and an ethical orientation that serves as a guiding principle for the creation of a society that prioritises human values (Nkoane & Phori, 2019).

### **Theme four: Cyberbullying incidents**

A diverse range of cyberbullying incidents, with sexual offences being the most prevalent. The individuals experienced adverse emotional and academic consequences to the point where some reported suicidal ideation. Despite the availability of advanced cyber technology to students in this rural high school, they lack the necessary skills to mitigate or manage its adverse consequences, resulting in isolation and distress.

### **Step 6 (optional): Consultation exercise**

The researchers did not undertake any consultation exercise, especially since it is considered optional by Mak & Thomas (2022) and Peters et al. (2005). as well as Arksey and O'Malley (2005). However, the researchers look forward to conducting a further study in this regard, enabling them to consult relevant stakeholders to provide insights capable of informing the findings from the scoping review.

### **Implications for Policy and Practices**

Implementing sustainable teaching professional ethics in the post-digital era requires a combination of policies and practices at various levels, including educational institutions, government bodies, and teacher training programs. Here are some implications for policy and practices in promoting sustainable teaching professional ethics:

1. **Policy Development:** Education policymakers should develop guidelines and frameworks that explicitly address sustainable teaching professional ethics in the post-digital era. These policies outline educators' expectations regarding integrating sustainability principles, promoting responsible digital citizenship, and ensuring equitable access to technology. The policies should also encourage ongoing professional development for teachers to enhance their digital literacy and ethical use of technology.
2. **Teacher Training and Professional Development:** Teacher training programmes must incorporate sustainable teaching professional ethics into their curriculum. This includes providing educators with the necessary knowledge and skills to integrate sustainability and digital ethics into their teaching practices. Professional development opportunities should be provided to help teachers stay updated with the latest trends and best practices in the post-digital era.
3. **Curriculum Integration:** Educational institutions should integrate sustainability and digital ethics into the curriculum across various subjects and grade levels. This ensures that students receive a consistent and comprehensive education on these topics. The curriculum should include explicit lessons and activities that promote environmental awareness, responsible use of technology, critical thinking, and media literacy.
4. **Access to Technology:** Policymakers and educational institutions should strive to ensure equitable access to technology for all students. This may involve providing necessary resources, such as devices and internet connectivity, to students needing access at home. Efforts should be made to bridge the digital divide and promote equal learning opportunities and participation opportunities.
5. **Ethical Use of Data and Privacy Protection:** Policies and practices should be established to safeguard student data and privacy. Educational institutions should implement strong data protection measures and ensure

teachers and staff are well-informed about privacy laws and regulations. Teachers should receive training on handling student data responsibly and using digital tools that prioritise data security.

6. Collaboration and Partnerships: Collaboration between educational institutions, government bodies, and relevant stakeholders is crucial for promoting sustainable teaching professional ethics. Partnerships with organisations in sustainability, digital ethics, and environmental conservation can provide educators with valuable resources, expertise, and support.
7. Ongoing Evaluation and Feedback: Regular evaluation and feedback mechanisms should be established to assess the effectiveness of policies and practices related to sustainable teaching professional ethics. This feedback loop helps identify areas for improvement, address emerging challenges, and ensure that the goals of sustainability and ethical use of technology are met.

By implementing these policies and practices, educational systems can create an environment that fosters sustainable teaching professional ethics in the post-digital era. This, in turn, prepares students to be responsible and ethical citizens equipped to address the challenges and opportunities of the digital age while promoting sustainability and environmental consciousness.

### Limitations

Scoping reviews are targeted at indicating gaps in published research evidence. The authors acknowledge that the reviewed literature was selected using four databases: ProQuest, Sabinet, Scopus, and ScienceDirect. The researcher discovered a gap in the literature. The literature on most databases mainly focused on the lack of ICT for schools, especially in rural schools, teachers' lack of ICT skills, teachers' pedagogy, an adaptation of ICT in education, teachers' motivation factors, and COVID-19.

### Ethical Consideration

As the research was secondary, it did not require the participation of any individuals and solely relied on the analysis of scholarly literature. The articles utilised in the study were adequately cited and supported with corresponding citations within the text.

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