SCHOOL LEADERSHIP DEVELOPMENT FOR SUSTAINABILITY IN THE POST-DIGITAL ERA

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Abstract

The role of school leaders must be balanced in attaining educational sustainability in the changing world. Millions of school students worldwide were affected by the COVID-19 shutdown, which accelerated the need for rapid digitalisation. The United Nations Sustainable Development Goals (SDGs) are embedded in 21st-century education. The ability to reorient students to the SDGs is key to achieving sustainable education in the post-digital era. This study examines school leadership development in a post-digital era from the sustainability perspective. To ensure sustainable education, school leaders must have relevant skills and competencies to lead schools in the post-digital age. In striving for a sustainable era, a school leader needs skills and knowledge to be an inspiring role model and motivator. School leaders must reorient students, teachers, and all relevant stakeholders according to SDG goals to achieve sustainable education. Hence, continuous school leadership development is essential to accelerating digital transformation using factors such as leadership style, strategic planning, and knowledge management.

Keywords: School Leaders, Leadership Development, Educational Sustainability, Post-Digital, Digitalisation, SDGs

Introduction

The world's sustainability challenge is borne out of the many challenges facing humanity's ability to sustain technology and the earth's ecosystem (Rosen, 2018). Sustainability is primarily recognised in the concept given in the Brundtland Report as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Michelsen & Fischer, 2017, p. 136). Sources of sustainability challenges include water, energy, minerals, food, waste management, pollution, and climate change. As a result, there has been a systemic drive to ensure sustainability on the planet (Mensah, 2019). The drive towards sustainable development in the modern political system began in the 1950s when the inhabitants of the northern and western parts of the world began discussing the challenges of a civilisation pattern guided by technological and industrial advancements, which may sometimes be harmful to the environment (Barbosa et al., 2014). The Sustainable Development Goals (SDGs) were formally established through the commitment of nations' governments in 2012 during the United Nations (UN) Rio +20 summit in Brazil (Chin et al., 2019). The summit aimed to "reverse the destruction of our natural and social habitats and to achieve a more balanced and equitable pathway towards the well-being of all" (UN, 2019, p. 56).

The agenda of sustainable development set by the UN recognised the role of education and the necessary steps to ensure sustainability in education. The agenda thus captured the necessity of education as "critical for promoting sustainable development and improving the capacity of the people to address environment and development issues" (Burmeister & Eilks, 2013; UNCED, 1993). Thse place of education in achieving sustainability is emphasised by the understanding that education is instrumental in enabling individuals to become responsibly engaged citizens making positive contributions to develop the global society sustainably (Michelsen & Fischer, 2017). In a similar vein, sustainable development and the pursuit of sustainability are integrated into the characteristics of the general mandate of education (Rauch & Steiner, 2006). Therefore, sustainability gives credence to education's purpose, which is to contribute to the development of a society reflectively and responsibly for a sustainable future.

The term "Education for Sustainable Development" (ESD) was created as a part of Agenda 21 (UNCED, 1993), which recognises the role of education in promoting sustainable development and improving people's capacity to tackle environmental and developmental challenges. In 2015, the UN implemented the 2030 Agenda and the concerted 17 Sustainable Development Goals (SDGs), which lay out the specific intersection of education and the drive towards sustainable development. The established SDG4, which stands for quality education, reiterates ESD and, in its seventh goal (4.7), states that:

> By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and

appreciation of cultural diversity and culture's contribution to sustainable development (Ferrer-est & Chalmeta, 2021, p 2).

However, the new normal in the technological evolution of the world has drastically changed interactions and communalised knowledge, thus setting up a new challenge for the world education system to meet the needs of the 21st century (Malik, 2018).

The COVID-19 lockdown, which affected numerous sectors in countries worldwide, revealed the lack of adequate infrastructure and intelligent applications in crucial areas such as innovative education, smasrt transportation, driverless vehicles, smart cities, manufacturing, and homes (Civelek & Xiarewana, 2020). Furthermore, COVID-19 resulted in the shut-down of schools across the globe affecting millions of learners, thereby creating pressure on the need for rapid digitalisation of education (Douse, 2021). Thus, it raises concerns about the leadership of schools which has yet to evolve in dealing with the challenges that young people face in the 21st century (OECD, 2009; Malik, 2018), mainly through the lens of sustainability. To meet the challenges of school leadership in the post-digital era, school leadership, in which the tenets of sustainability are entrenched, is highly important. This type of school leadership is expected to be resilient, adaptive, flexible, self-reliant, and intelligent (Burns et al., 2015). Hence, school leadership can only be up to date when it adequately caters for the challenges learners face in the 21st century.

Education for the 21st century ought to be infused with the ideals of the SDGs. Thus, leadership in educational institutions should demonstrate upward leadership to influence the state's policy, lateral leadership to ensure knowledge transfer through collaborations with other schools, and institutional leadership to ensure a supportive and warm environment for the staff (Munby, 2020). Understudying these dynamic demands of 21st century educational leadership is the necessity of an evolving sustainable leadership development that is deliberately focused and strategic over time (Conway, 2015). A new generation of challenges makes leadership development practices inadequate (Iordanoglou, 2018). This study discusses the issues surrounding school leadership development through the lens of sustainability in the post-digital era.

Concept of School Leadership Development

School leaders have prominent roles in determining the overall educational outcomes of schools. It has been suggested that the quality of school leaders is correlated to students' academic success (Tingle et al., 2017). Therefore, it is implied that beyond the contributions of teachers, the school leader has roles that, if maximised, can translate to positive outcomes for learners. Educational leadership is broadly defined as a process of influence school stakeholders to promote an effective learning environment (Hitt & Tucker, 2016; Huber, 2004; Rigby, 2014). School leadership research describes how school leaders shape student achievement through various practices (Hitt & Tucker, 2016). The stakeholders, such as teachers, learners, parents and society, experience all the organisational processes in the school, such as monitoring of the

instructional process, management of the school personnel and allocation of resources to ensure effective running of schools (Daniëls et al., 2019). From a more encompassing perspective, school leadership consists of teachers entrusted with the responsibility of leading the classrooms, the heads of departments and other leading professionals whose activities in the school determine the outcome of instructional processes (Hauge & Norenes, 2014). Hence, it can be concluded that the concept of school leadership is not universally defined. Instead, researchers focus on specific aspects of concern, which are traced to school leaders' activities. This study considers the concept of school leadership from a narrower perspective, which determines school leadership based on monitoring the school processes, determining and allocating resources, and managing the school personnel for effective educational outcomes.

School leadership is an essential element of the school system's functioning due to the role of school principals or heads in strengthening teachers' professional engagements, consequently promoting instructional practices that influence students' achievement (Jayapragas, 2016). Hence, school leaders determine which action a school is embarking on and which direction the school will follow. School leadership structures are examined based on instructional, situational, distributed, and transformational leadership theories (Daniëls et al., 2019). Understanding the leadership structures based on each theory provides a sound framework for defining school leadership. Instructional leadership explains a leadership structure operating the top-bottom approach where principals control and coordinate instruction (Daniëls et al., 2019).

On the other hand, transformational leadership describes a shared leadership model that focuses on collaboration among staff and principals rather than the bottom-top method (Aas, Brandmo, 2016). Distributed leadership is an approach where goals are achieved through communicating missions and goals, proper alignment of structures and resources to support students, actively learning among staff and promoting innovation in teaching and learning (Heck, R., & Hallinger, 2010). The integration of the existing leadership theories led to the leadership strategies of modern times (Daniëls et al., 2019).

School leadership development (SLP) is measured using various metrics such as human capital, executive leadership, instructional leadership, school culture and strategic operations (Tingle et al., 2017). Five forces of leadership recognise leadership in terms of educational, technical, human, symbolic and cultural (Jayapragas, 2016). The concept of "Leadership for Learning" (LL) was developed to meet up with the challenges of instructional leadership (Daniëls et al., 2019). Hence, the concept is integrated with eight dimensions, including a vision for learning, curricular programme, communities of learning, assessment programme, instructional programme, organisational culture, advocacy and resource acquisition and use (Daniëls et al., 2019). Developing leadership capacity in an individual over time has been defined by the term capacity (Miles & Scott, 2019). To lead effectively, a leader needs both the qualities and the abilities to work effectively with others (Negandhi et al., 2015). Effective Leadership Development (LD) is a longitudinal and dynamic process that takes time and many

resources to implement and bear positive outcomes (Joseph-Richard et al., 2021). According to Thi Hoang Yen et al. (2021), the first stage of effective School Leadership Development (SLD) starts when an individual is a teacher until he/she reaches the principal position. Hence, SLD is a career-long process that instils leadership traits among school heads and achieves sustainable educational outcomes. Developing leadership capacity in an individual over time has been defined by the term capacity.

The LD process can be tied to the school principal or the generality which is of school leadership. A SLD process focused on the school principal begins with pre-service training, practical training for first-year principals, training through leadership practice at school, cultivation through the school leader network and participation in training for subordinates or newly appointed school leaders (Thi Hoang Yen et al., 2021). However, this leadership process is only applicable when leadership development coopts teachers who later become school principals (Tingle et al., 2019). Ensuring the efficacy of teachers and principals in solving educational challenges in their schools is determined by the SLD programmes. As a result, SLD prepares teachers and leaders to aspire to lead the school's post-digital educational realities (Fusarelli & Fusarelli, 2018). Church and Rotolo (2010) believe that LD must be driven by internal and external assessment for an educational system to see significant change. Thus, SLD is the process of enhancing a school leader with the ability, competencies and skills to lead effectively.

Educational Sustainability

Sustainable development is stratified into three major pillars: economic sustainability, social sustainability and environmental sustainability (Mensah, 2019). Economic sustainability consists of resource utilisation, production and consumption that ensures equitability while considering other aspects of sustainability (D'Amato et al., 2017; Klarin, 2018). Environmental sustainability is the attempt to protect the environment and conserve life on land, air and water (D'Amato et al., 2017). In contrast, social sustainability ensures equity, participation, empowerment, institutional stability and cultural identity (Mensah, 2019). Social sustainability is an aspect of development that focuses on enhancing people's lives through equitable wealth distribution, less reliance on non-renewable energy and better education (Rosen, 2018). Therefore, educational sustainability is one of the units of social sustainability since education is concerned with developing talents through training to empower people and replace current employees in the future (Kotob, 2015). Education is an integral part of the tools to achieve sustainability because, in the first instance, it fosters, among people of all ages, the awareness, attitudes, knowledge, skills, values and actions to take in ensuring the protection and conservation of the environment. In another instance, education encourages economic sustainability, which promotes equity, social justice and inclusion through the development of talents to increase prosperity, competence, and civic skills and allow for meaningful participation in society (Ferrer-est & Chalmeta, 2021).

Educational sustainability is recognised in the SDGs as an agent of transformation through which individuals can be imbibed with the skills, knowledge, values and attitudes to make positive contributions to the SDGs (UNESCO, 2017). Before the formal adoption of the SDGs in 2015, sustainability was from the perspective of environmental preservation and was the focus of many countries (Rauch & Steiner, 2006). Thus, gave birth to environmental education (EE), which was based on issues such as recycling, saving water, waste separation, reducing plastic usage and saving energy (Rauch & Steiner, 2006). A shift from EE also culminated in education for sustainable development. Education for sustainable development (ESD) or educational sustainability is an approach towards empowering learners to embark on conscious decisions and responsible actions to achieve economic viability, environmental integrity and a just society both in the present and future generations (Kropinova & Krasnov, 2021; UNESCO, 2017). ESD, one of the UN's agents in achieving the SDGs, presents a new challenge to educational managers due to the requirement of restructuring the curriculum, programmes, policies and practices (Ferrer-est & Chalmeta, 2021). As a result, ESD is strategically connected to achieving the trio of individual transformation, societal transformation and technological advances by 2030 (Kropinova & Krasnov, 2021).

In achieving the objectives of its formulation, educational sustainability is imbibed with the constructivist tradition in which students create knowledge, participate in an interactive learning environment and address real environmental challenges (Marouli, 2021). The major issues surrounding educational sustainability are lack of knowledge or awareness about the principles of sustainable development, resistance to change, poor perception of sustainability, lack of resources, overcrowded curriculum and lack of support from the senior management (Ferrer-est & Chalmeta, 2021). Thus, to attain educational sustainability requires the development school leaders with relevant skills and capacities that will provide them with the opportunity to lead sustainable schools.

Leading Schools in Post-Digital Era

There is a rapid globalised change in the work world due to technological and scientific advances, global economic challenges and social changes (Seinhaus, 2022). While the service industry is expanding worldwide, there is a gradual elimination of human activities in manufacturing industries that used to be labour-intensive in the 20th-century (Malik, 2018). As a result, the 21st-century work environment demands a newer form of expertise than what it took to be employed in the 20th-century. Hence, global citizens in the 21st-century workplace environment are expected to be individuals who can use a wide range of electronic technologies to synthesise and apply information, think creatively and critically solve problems through collaborations and cross-cultural approaches to education (Malik, 2018; van Laar et al., 2020). These, therefore, demand a different education system from the traditional knowledge-imputing education the world is used to and leadership skills set for the new era.

Post-digitalisation, or the post-digital era, is currently under development but is nonetheless defined as the displacement of analogue technologies to digital and virtual technologies (Hueso-Romero et al., 2021). Post-digitalisation "implies pervasive and ubiquitous digitalisation" (Parmiggiani et al., 2020, p. 587). "post-digital means paradise—a society in which we can escape digital technology's surveillance technology and our growing digital shame" (Parmiggiani et al., 2020, p. 587). Post-digital education in the post-pandemic period involves self-directed and self-regulated learning, virtualisation and hybridisation of classrooms, assessment in the form of personalised feedback, universal connectivity and emphasis on learners' responsibility and schools' roles in strengthening the social process (Douse, 2021). The new normal, created by ESD, triggers innovation and changes in school, which school leaders must be fully prepared to develop (Rauch & Steiner, 2006). A significant aspect of school leadership heavily affected by this gap includes school development and management practices, which are still in their infancy.

The post-digital era is marked by the ubiquity of digital and computerised technologies, permanent connectivity and a technology-inclined social system which has become imbibed into the global culture (Hueso-Romero et al., 2021). The post-digital era is an age of intelligent systems and machines. Artificial Intelligence (AI) is becoming integrated into industrial production and healthcare services and a part of the education system. According to Douse (2021), education has moved to a point where developers are now tasked to develop AI tools which claim to teach better than teachers or augment teachers' capacity for maximum instructional efficiency. The use of AI tools such as ChatGPT will influence learning and assessments and is unavoidable requiring leaders to be responsive and adaptive. For instance, the work of Nguyen (2022) shows that ChatGPT would avail students reasonable and free accessibility to enabling tools for the completion of academic tasks in a stress-free manner. However, concerns yet remain on the part of educators who are of the opinion that ChatGPT would encourage laziness, lack of critical thinking and academic theft among students (Nguyen, 2022). Suffice to state that as much as Chart GPT is to be considered useful and laudable, caution is to be taken where necessary and possible to avoid the tool being an instrument promoting laziness and academic disintegrity. Meanwhile, the COVID-19 pandemic heightened the world's gradual move to a post-digital world where massive open online courses (MOOCs) and virtual and hybrid learning spaces became the order of the day (Savva & Souleles, 2020). With the new system, teachers and learners can visit, discover, collaborate, and learn in creative harmony together (Douse, 2021). As a result, learners are no longer seen as passive recipients of instructions. Instead, they collaborate with a leadership system willing to play a supportive role, providing a stimulating environment for learners to share experiences and learn together (Douse, 2021).

It is essential to critically explore the changing nature of education within the spaces of institutions of learning especially considering the "…new pedagogies that draw on the potentialities of technology, the flow of data, and the massive amount of academic material that

can be accessed online" (Lamb et al., 2022, p.1). According to Lamb et al. (2022), one of the reasons for the exploration of the changing nature of education in this era is based new practices brought about by the outbreak of the COVID-19 pandemic. Suffice it to state that the pandemic has fast-forwarded expected happenings in the digital and post-digital era in the field of education. Thus, Rapanta et al. (2021) state that "…COVID-19 pandemic has presented an opportunity for rethinking assumptions about education in general … (p. 715)." In congruence, Singh et al. (2021) view it from the angle of promoting hybridity and blended forms of learning. Örtegren (2022) study showed that training teachers to adapt and function appropriately following the demand of the post-digital era is paramount. However, challenges affecting the preparation of teachers for such an era include issues such as lack of time and unclear degree objectives (Örtegren, 2022). "Leading for learning, emotional intelligence, critical thinking, communication and ethics, collaboration, decision making and problem solving, digital dexterity and entrepreneurial" are key school leadership competencies required for leading sustainable schools in the post-digital era (Kin et al., 2020).

Similarly, Grushka, et al. (2022), alluding to the post-digital era, state that "Classroom culture faces an existential threat to the traditional ways of teaching and engaging student learning- for teachers to reassess their *strategies is going to be hugely challenging* (p. 20, italics added for emphasis). The preceding implies that while there are possibilities in the post-digital era, there are challenges and supposedly likely impossibilities just like any other era. However, for institutions of learning to be relevant and align with the post-digital era, there is a need to rethink revise current practices, and develop school leaders. For instance, according to Lamb et al. (2022), alluding to the work of Lamb and Ross (2021), the Twitter conversation is considered a useful tool concerning lecture capture technologies. Meanwhile, Lamb et al. (2022), hold the view that it is of value and hence valid to understand and consider social media as one of the educational environments, thus, adopt its practices for useful educational purposes. Lubicz-Nawrocka and Owen, (2022) call for a revision of the curricula guiding teaching and learning in learning institutions. As part of student engagement, curriculum co-creation is required. Through dynamic interaction between staff and students, curriculum content, structure, and processes are developed. Students' learning experiences inform and influence this interaction (Lubicz-Nawrocka & Owen, 2022; Bovill, 2020; Lubicz-Nawrocka, 2019). For instance, Lubicz-Nawrocka and Owen (2022), alluding to the need for and benefit of curriculum and co-creation, state that "Curriculum co-creation and student-staff partnerships *promote high levels of student and staff engagement, which often occur through staff inviting students to take more active roles in shared decision-making*" (p. 794). Thus, it shows the need to revise the curricula guiding activities in learning institutions.

Surmise to state that there is a need for adjustments to the changes experienced in the post-digital era. Thus, by extension, adjustments are envisaged in how institutions of learning are to be led during the era. Moreover, according to Readytech (n.d), leadership in the digital era differs from regular traditional leadership. Hence, "Digital leaders need a level of fluency with

technology. Rather than outsourcing everything wholesale to a vendor or an IT team, they need to be comfortable with what best practice looks like and the potential for technology within the organisation (par. 13)." Therefore, it suggests that leaders' roles before the post-digital era differ from what is expected during the post-digital era. This accounts for the next section, which presents the implications and needs for school leadership development to ensure sustainable development.

Implications of school leadership development for sustainable development in the Post-Digital Era

School leadership is pivotal to sustainable community development (Mogaji & Newton, 2020) especially considering the roles expected to be performed by learning institutions in enhancing desired progress (Harber & Mncube, 2011). This corroborates the words of President Nelson Mandela, cited by USAID (2013), which states that "education is the most powerful weapon which you can use to change the world (par. 1)." This suggests the potency of education in enhancing sustainable development in society. In this instance, school leaders' role(s) becomes critical. School leadership development is critical to maintaining intra-school relationships and the school's relationship with the community and other stakeholders (Fusarelli & Fusarelli, 2018). Khumalo (2019) the view that school leaders such as principals have the capability in their position to "…promote *the culture of commitment* and therefore a foundation for sustainable development is laid (p. 22)." Thus, if well managed, school leaders can be an antecedent to the desired sustainable development (Khumalo, 2019). This accounts for the need for school leaders to be well-trained, oriented, reitrained, and capacitated to support the promotion of sustainable development in the post-digital era beginning from the institutions of learning that they lead, the host communities and their environs.

A review of the work of Desfandi & Maryani (2016) shows that, for schools to be well positioned to be able to contribute to sustainable development in the communities, their leaders are expected to have a high level of commitment towards the community, be good role models and motivators. Meanwhile, according to Kanyimba et al. (2015), the happenings in the institutions of learning are aligned with the sustainable development policy(s). Thus, policies aiding sustainable development in the communities must be reviewed and made to function congruently with learning institutions' practices. This accounts for the reason why scholars such as Zwolińska et al. (2022), González (2021), and Veinovic (2017) call for the revision of curricula of institutions of learning. Hence, school leaders' roles go beyond school activities if they are to promote and lead for sustainability in the community. Therefore, the success of a school in achieving its educational and community objectives lies in ready, effective leadership. Considering the dynamism in the world of post-digital education and sustainability, several implications can be drawn for school leadership development. Firstly, school leaders should ensure post-training development and continuation of learning (Thi Hoang Yen et al., 2021). This will initiate a leadership development process of adaption to new challenges and new learning situations in schools. Continuous leadership development is important to create a

dynamic environment that is productively engaged in accelerating digital transformation, using leadership factors such as leadership style and approaches, strategic planning and knowledge (Ziadlou, 2021).

The emergence of ESD and the digitalisation of the societal implies a new leadership system for educational institutions. According to Mogaji & Newton (2020), sustainable education requires that school leaders are capable of managing changes needed for reorientation of students in line with the goals of the SDGs. These changes are integrated into the procedures, plans, curriculum, policies and goals (Mogaji & Newton, 2020). Therefore, SLD must imbibe in their programmes sustainability actions and values that encourage inclusion, collaborative learning, problem solving and reflective process (Burns et al., 2015). Hence, sustainable school leadership of the current epoch is expected to involve facilitation rather than instructional leadership of the traditional sense. Leadership attributes that recognise collaboration and community building among teachers and learners tend to prepare learners to be enthusiastic and active citizens ready to thrive in an interconnected world (Marouli, 2021).

Previously, school learning outcomes were based on factors other than teachers' and school leaders' characteristics. In modern times, however, school leaders now take accountability for learning outcomes for students and teachers (OECD, 2009). Therefore, leadership development experts and policymakers must design plans to recognise teachers' and other school leaders' individual preferences and aspirations (Avidov-Ungar, 2016). The recognition of preferences and individuality is a prerequisite to fulfilling the ideals of sustainability, which the school leaders would transfer to the staff and students in their schools.

According to Munby (2020), specific post-digitalised leadership skills needed in schools include problem-solving and practical leadership skills such as chairing a meeting, providing supportive and challenging feedback to colleagues, holding difficult conversations, communicating in large groups and building trust in a team. For Conway (2015), sustainable leadership have certain leadership principles which must be inculcated into SLD programmes. These leadership principles include students' relationship with the school leaders, promotion of diversity, leadership resourcefulness, proactive leadership and social justice. Thus, school leaders are to be equipped with relevant competencies such as ICT related skills, emotional intelligence skills, collaborative skills, resilience skills, adaptive and human relation skills, critical thinking skills, computational skills, problem-solving, and creativity skills to lead schools for sustainable development in the post-digital era.

Conclusion

In sustainable education, students create knowledge, participate in an interactive learning environment and address real-world environmental issues in post-digitised world. A post-digital world is one where intelligent systems and machines provide sustainable education services using artificial intelligence (AI) and other technologies. A successful SLD process requires time and many resources to implement and bear positive results. As a result, SLD involves developing the abilities, competencies, and skills of school leaders to bring possible transformation in changing world of technologies. With digital and computerised technologies omnipresent, permanent connections, and a technology-inclined social system infused into global cultures, the pre-digital era has been profoundly transformed. School systems are an integral part of the changing world, thus, to ascertain sustainable education, school leaders require relevant skills and competences to lead schools in the post-digital world. A good school leader must have skills and knowledge to be a good role model and motivator in a sustainable era. In order to achieve sustainable education, school leaders must be able to reorient students according to SDG goals. Therefore, continuous SLD is crucial to create an environment that accelerates digital transformation using factors such as leadership style, strategic planning, and knowledge management.

The study is limited to theoretical and philosophical views; thus, empirical studies can be carried out to validate the role of leadership development on sustainable schooling in the post-digital era. Also, systematic reviews can be done to ascertain the level and nature of leadership development in the post-digital epoch. Lastly, further research can be conducted in order to find a leadership development model/s that are viable to prepare school leaders for educational sustainability.

References

Aas, M., & Brandmo, C. (2016). Revisiting instructional and transformational leadership. *Journal of Educational Administration, 54*(1), 92–110. https://doi.org/10.1108/JEA-08-2014-0105

Avidov-Ungar, O. (2016). A Model of Professional Development: Teachers' Perceptions of Their Professional Development. *Teachers and Teaching: Theory and Practice, 22*(6), 653–669. https://doi.org/10.1080/13540602.2016.1158955

Barbosa, G. S., Silva, G., & Politécnica, E. (2014). A Conceptual Review of The Terms Sustainable Development and Sustainability. *International Journal of Social Sciences, III*(2), 1–15. https://www.iises.net/download/Soubory/soubory-puvodni/pp-01-15_ijossV3N2.pdf

Burmeister, M., & Eilks, I. (2013). An understanding of sustainability and education for sustainable development among German student teachers and trainee teachers of chemistry. S*cience Education International, 24*(2), 167–194. ERIC. Retrieved October 2022. https://files.eric.ed.gov/fulltext/EJ1015833.pdf

Burns, H., Vaught, H. D., & Bauman, C. (2015). Leadership for sustainability: Theoretical foundations and pedagogical practices that foster change. *International Journal of Leadership Studies, 9*(1), 88-100. http://www.regent.edu/acad/global/publications/ijls/new/home.htm

Chin, C. K., Munip, H., Miyadera, R., Thoe, N. K., Ch'ng, Y. S., & Promsing, N. (2019). Promoting education for sustainable development in teacher education integrating blended learning and digital tools: An evaluation with exemplary cases. *Eurasia Journal of Mathematics, Science and Technology Education, 15*(1), 1–17. https://doi.org/10.29333/ejmste/99513

Civelek, M. E., & Xiarewana, B. (2020). Effects of COVID-19 on China and the world economy: Birth pains of the post-digital ecosystem. *Journal of International Trade, Logistics and Law, 6*(1), 147–157. https://ssrn.com/abstract=3611537

Conway, J. (2015). Sustainable leadership for sustainable school outcomes: Focusing on the capacity building of school leadership. *Leading and Managing, 21*(2), 29–45. https://research.usq.edu.au/item/q34y4/sustainable-leadership-for-sustainable-school-outcomes-focusing-on-the-capacity-building-of-school-leadership

D'Amato, D., Droste, N., Allen, B., Kettunen, M., Lähtinen, K., Korhonen, J., Leskinen, P., Matthies, B. D., & Toppinen, A. (2017). Green, circular, bio economy: A comparative analysis of sustainability avenues. *Journal of Cleaner Production, 168*, 716–734. https://doi.org/10.1016/j.jclepro.2017.09.053

Daniëls, E., Hondeghem, A., & Dochy, F. (2019). A review on leadership and leadership development in educational settings. *Educational Research Review, 27*, 110–125. https://doi.org/10.1016/j.edurev.2019.02.003

Desfandi, M., Maryani, E., & Disman, D. (2016, August). The role of school principal leadership in implementation of eco school program as the effort to support sustainable development. In *6th International Conference on Educational, Management, Administration and Leadership* (pp. 197-200). Atlantis Press. https://doi.org/10.2991/icemal-16.2016.40

Douse, M. (2021). Let the learners lead: The worldwide transition into post-digital age, post-pandemic education. *Educational Planning, 28*(4), 63–75. Eric. Retrieved November 12, 2022. https://files.eric.ed.gov/fulltext/EJ1338310.pdfhttps://files.eric.ed.gov/fulltext/EJ1338310.pdf

Ferrer-est, M., & Chalmeta, R. (2021). Integrating Sustainable Development Goals in educational institutions. *The International Journal of Management Education, 19*(March). https://doi.org/10.1016/j.ijme.2021.100494

Fusarelli, B. C., & Fusarelli, L. D. (2018). Leadership development in rural schools : An innovative training model. *Literacy Information and Computer Education Journal, 9*(1), 2842–2847. https://infonomics-society.org/wp-content/uploads/licej/published-papers/volume-9-2018/Leadership-Development-in-Rural-Schools-An-Innovative-Training-Model.pdf

González, E. P. (2021). Toward education for sustainable development: Lessons from Asia and the Americas. *In Curriculum and learning for climate action* (pp. 291-308). Brill. Leiden, The Netherlands: Brill. doi: https://doi.org/10.1163/9789004471818_019

Grushka, K., Lawry, M., Chand, A., & Devine, A. (2021). Visual borderlands: Visuality, performance, fluidity and art-science learning. *Educational Philosophy and Theory*, *54*(4), 404-421. https://doi.org/10.1080/00131857.2020.1859368

Harber, C., & Mncube, V. (2011). Is schooling good for the development of society?: The case of South Africa. *South African Journal of Education*, *31*(2), 233-245. https://doi.org/10.15700/saje.v31n2a483

Hauge, T. E., & Norenes, S. O. (2014). School leadership and educational change : Tools and practices in shared school leadership development. *Journal of Educational Change, 15*, 357–376. https://doi.org/10.1007/s10833-014-9228-y

Heck, R., & Hallinger, P. (2010). Collaborative leadership effects on school improvement: Integrating unidirectional- and reciprocal-effects models. *The Elementary School Jour- Na, 111*(2), 226–252. https://www.journals.uchicago.edu/doi/epdf/10.1086/656299

Hitt, D. H., & Tucker, P. D. (2016). Systematic review of key leader practices found to influence student achievement: A unified framework. *Review of Educational Research, 86*(2), 531–569. https://doi.org/10.3102/0034654315614911/FORMAT/EPUB

Hueso-Romero, J. J., Gil-Quintana, J., Hasbun, H., & Osuna-Acedo, S. (2021). The social and transfer massive open online course: Post-digital learning. *Future Internet, 13*(5), https:/m/doi.org/10.3390/fi13050119

Iordanoglou, D. (2018). Future trends in leadership development practices and the crucial leadership skills. *Journal of Leadership, Accountability and Ethics, 15*(2), 118-129. https://doi.org/10.33423/jlae.v15i2.648

Jayapragas, P. (2016). Leaders in education program: The Singapore model for developing effective principal-ship capability. *Current Issues in Comparative Education (CICE), 19*(1), 92–108. https://doi.org/10.52214/cice.v19i1.11537

Joseph-Richard, P., Edwards, G., & Hazlett, S. A. (2021). Leadership development outcomes research and the need for a time-sensitive approach. *Human Resource Development International, 24*(2), 173–199. https://doi.org/10.1080/13678868.2020.1815155

Kanyimba, A. T., Katewa, E. N., & Claassen, P. (2015). The contribution of education for sustainable development to transformational leadership among selected Namibian school principals. *Open Journal of Social Sciences*, *03*(03), 186-196. https://doi.org/10.4236/jss.2015.33028

Khumalo, S. S. (2019). The role of transformational school leadership in promoting teacher commitment: An antecedent for sustainable development in South Africa. *Discourse and Communication for Sustainable Education*, *10*(2), 22-32. https://doi.org/10.2478/dcse-2019-0015

Kin, T. M., Kareem, O. A., Musa, K., Ghouri, A. M., & Khan, N. R. (2020). Leading sustainable schools in the era of Education 4.0: Identifying school leadership competencies in Malaysian secondary schools. *International Journal of Management in Education, 14*(6), 580–610. https://doi.org/10.1504/ijmie.2020.110690

Klarin, T. (2018). The concept of sustainable development: from its beginning to the contemporary issues. *Zagreb International Review of Economics & Business, 21*(1), 67–94. https://doi.org/10.2478/zireb-2018-0005

Kotob, F. (2015). What Is Sustainability? (Issue November 2011, pp. 1–14).

Kropinova, E., & Krasnov, E. (2021). Students, the next steps for the baltic universities' cooperation in accordance with the development of education and the upbringing of students. In E. V Krasnov & D. V Gaeva (Eds.), *Innovations and Traditions for Sustainable Development* (pp. 109–126). https://doi.org/10.1007/978-3-030-78825-4

Lubicz-Nawrocka, T., & Owen, J. (2022). Curriculum co-creation in a postdigital world: advancing networked learning and engagement. *Postdigital Science and Education, 4*(3), 793–813. https://doi.org/10.1007/S42438-022-00304-5/METRICS

Lubicz-Nawrocka, T. M. (2019). "More than just a student": How co-creation of the curriculum fosters third spaces in ways of working, identity, and impact. *International Journal for Students as Partners*, *3*(1), 34-49. https://doi.org/10.15173/ijsap.v3i1.3727

Malik, R. S. (2018). Educational challenges in 21st century and sustainable development. *Journal of Sustainable Development Education and Research, 2*(1), 9–20. https://doi.org/10.17509/jsder.v2i1.12266

Marouli, C. (2021). Sustainability education for the future? Challenges and implications for education and pedagogy in the 21st century. *Sustainability (Switzerland), 13*(5). https://doi.org/10.3390/su13052901

Mensah, J. (2019). Sustainable Development: Meaning , history , principles , pillars , and implications for human action : Literature review principles , pillars , and implications for human action : Literature review. *Cogent Social Sciences, 5*(00). https://doi.org/10.1080/23311886.2019.1653531

Michelsen, G., & Fischer, D. (2017). Sustainability and education. In M. von Hauff & C. Kuhnke (Eds.), *Sustainable Development Policy: A European Perspect* (1st Editio, pp. 135–158). Routledge. https://doi.org/https://doi.org/10.4324/9781315269177

Miles, J. M., & Scott, E. S. (2019). A new leadership development model for nursing education. *Journal of Professional Nursing, 35*(1), 5–11. https://doi.org/10.1016/j.profnurs.2018.09.009

Mogaji, I. M., & Newton, P. (2020). School leadership for sustainable development: A scoping review. *Journal of Sustainable Development, 13*(5), 15. https://doi.org/10.5539/jsd.v13n5p15

Munby, S. (2020). The development of school leadership practices for 21st century schools. *European Journal of Education, 55*(2), 146–150. https://doi.org/10.1111/ejed.12394

Negandhi, P., Negandhi, H., Tiwari, R., Sharma, K., Zodpey, S. P., Quazi, Z., Gaidhane, A., Jayalakshmi N, Gijare, M., & Yeravdekar, R. (2015). Building interdisciplinary leadership skills among health practitioners in the twenty-first century: An innovative training model. *Frontiers in Public Health, 3*(October), 1–7. https://doi.org/10.3389/fpubh.2015.00221

Nguyen, N. (20 December 2022). *ChatGPT: A threat to education? (Opinion).* Feedback Fruit. https://feedbackfruits.com/blog/chatgpt-a-threat-to-education-opinion

OECD. (2009). Improving school leadership: The Toolkit.

Örtegren, A. (2022). Digital citizenship and professional digital competence — Swedish Subject teacher education in a postdigital era. *Postdigital Science Education, 4*, 467–493. https://doi.org/10.1007/s42438-022-00291-7

Parmiggiani, E., Teracino, E. A., Huysman, M., Jones, M., Mueller, B., & Mikalsen, M. (2020). Oasis 2019 panel report: A glimpse at the "post-digital." In C*ommunications of the Association for Information Systems* (Vol. 47, Issue 1). https://doi.org/10.17705/1CAIS.04727

Rapanta, C., Botturi, L., Goodyear, P., Guardia, L., & Koole, M. (2021). Balancing technology, pedagogy and the new normal: Post-pandemic challenges for higher education. *Postdigital Science and Education, 3*(3), 715–742. https://doi.org/10.1007/s42438-021-00249-1.

Rauch, F., & Steiner, R. (2006). School development through education for sustainable development in Austria. *Environmental Education Research, 12*(1), 115–127. https://doi.org/10.1080/13504620500527782

Rosen, M. A. (2018). Issues, concepts and applications for sustainability. Glocalism: J*ournal of Culture, Politics and Innovation, 3*, 1–21. https://glocalismjournal.org/wp-content/uploads/2019/02/Rosen_gjcpi_2018_3.pdf

Savva, S., & Souleles, N. (2020). "Education without borders": addressing online learning and inclusion through the lens of Museum Affinity Spaces (MAS). *Cultural management and policy in a post-digital world–navigating uncertainty*, 183. ENCATC: Belgium https://www.encatc.org/media/5620-ebook-of-proceedings_encatc-annual-congress-2020_final.pdf

Seinhaus, N. (2022). Of "Lighthouses", "Living Labs" and the "Wisdom of the Crowd" - Social responsibility beyond research and teaching (an NGO perspective). In Higher Education in the World Report 8 Special Issue New Visions for Higher Education towards 2030. www.guni-call4action.org

Sergiovanni, T. J. (2009). *The principalship: A reflective practice perspective.* Pearson. https://www.pearson.com/en-us/subject-catalog/p/principalship-the-a-reflective-practice-perspective/P200000001816/9780133261714

Singh, J., Steele, K., & Singh, L. (2021). Combining the best of online and face-to-face learning: hybrid and blended learning approach for COVID-19, post vaccine, & post-pandemic world. *Journal of Educational Technology Systems, 50*(2), 140–171. https://doi.org/10.1177/00472395211047865

Thi Hoang Yen, D., Phuong Huyen, N., Thi Duong, N., Huy Hoang, N., H Y, D. T., & H, N. P. (2021). The process of developing leadership competencies for high school principals- insights from vietnamese case. E*ducational Sciences: Theory & Practice, 21*(2), 27–43. https://doi.org/10.12738/jestp.2021.2.003

Tingle, E., Corrales, A., & Peters, M. L. (2019). Leadership development programs: investing in school principals. *Educational Studies, 45*(1), 1–16. https://doi.org/10.1080/03055698.2017.1382332

UN. (2019). Global Sustainable Development Report 2019: The Future is now – science for achieving sustainable development. In Global Sustainable Development Report 2019. United Nations. https://sdgs.un.org/gsdr/gsdr2019

UNCED. (1993). Agenda 21: Programme of action for sustainable Development; Rio declaration on environment and development ; statement of forest principles: The final text of agreements negotiated by governments at the United Nations Conference on Environment and Devel. United Nations Conference on Environment and Development Rio de Janeiro, Brazil. 1992, 3–14. https://sustainabledevelopment.un.org/content/documents/Agenda21.p

UNESCO. (2017). *Education for sustainable development goals: learning objectives*. United Nations Educational, Scientific and Cultural Organization Publishing. https://unesdoc.unesco.org/ark:/48223/pf0000247444 https://unesdoc.unesco.org/ark:/48223/pf0000247444

USAID. (2013, April 23). *Education: The most powerful weapon for changing the world | USAID impact*. USAID Impact | The Official Blog of the U.S. Agency for International Development. https://blog.usaid.gov/2013/04/education-the-most-powerful-weapon/

van Laar, E., van Deursen, A. J. A. M., van Dijk, J. A. G. M., & de Haan, J. (2020). Determinants of 21st-Century skills and 21st-Century digital skills for workers: A systematic literature review. *SAGE Open, 10*(1), 1–14. https://doi.org/10.1177/2158244019900176/FORMAT/EPUB

Veinović, Z. (2017). The curricula revision in the context of education for sustainable development: From the perspective of two primary school subjects' curricula. *Zbornik Instituta za pedagoska istrazivanja, 49*(2), 191-212. https://doi.org/10.2298/ZIPI1702191V

Ziadlou, D. (2021). Strategies during digital transformation to make progress in achievement of sustainable development by 2030. In L*eadership in Health Services*. Emerald Publishing Limited. https://doi.org/10.1108/LHS-08-2020-0056

Zwolińska, K., Lorenc, S., & Pomykała, R. (2022). Sustainable development in education from students' perspective—Implementation of sustainable development in curricula. *Sustainability*, *14*(6), 3398. https://doi.org/10.3390/su14063398