

Basic School Leaders' Continuous Professional Development for the 4IR: A Systematic Literature Review across Africa

By Omotayo Adewale Awodiji & Suraiya Rathankoomar Naicker[±]*

The role of continuous professional development (CPD) in advancing basic school leaders in the context of the fourth industrial revolution (4IR) cannot be overemphasised in the actualisation of positive change in the school system. The 4IR transformed the nature of work across human endeavours, requiring school leaders to be trained and retrained. The study endeavoured to understand CPD approaches available in Africa for school leaders in 4IR. This study adopted a systematic review of the literature. Several bibliographic databases identified two thousand three hundred and fifty-three academic articles using the PRISMA protocol. Hence, the eleven studies on basic school leadership CPD in Africa were used. As a result of the review, CPD activities should focus on enhancing school leaders' abilities to manage, build teams, be professional, communicate effectively in interpersonal situations, and teach and assess. Furthermore, in-service training, cohort meetings, group learning/collegial learning, learning by exposure, formal leadership training for new principals, compulsory leadership courses through the leadership training centre, regular training, networking, and coaching, among others, could be used as CPD to prepare school leaders for the 4IR.

Keywords: continuous professional development, collegial training, education leaders, in-service training, 4IR

Introduction

Leadership plays a vital role in the actualisation of positive change in every organisation including the school. The current global changes call for improved leadership capacity to lead a sustainable system (Fry & Egel, 2021; Schein, 2015; Leadership and leadership for sustainability, n.d.; Rogers, 2011). The school like every other sector is faced with changes and globalisation (Wiseman, 2014). As part of the basic education system, educational leaders are responsible for leading continuous improvement of national curriculum framework (Nuttall et al., 2020). Therefore, educational leaders, involved in the routine administration of educational system need to take time to consider on their individual and professional development as leaders and administrators in the changing world (Cravens & Zhao, 2022; Norazana & Zabidi, 2021; Tran et al., 2020). The Fourth Industrial Revolution (4IR) brought about changes to career and institutional development. The rapid change of the 4IR transformed the nature of work across human endeavours. The presence of 4IR in

*Post-Doctoral Research Fellow, Department of Education Leadership and Management, Faculty of Education, University of Johannesburg, South Africa.

[±]Senior Lecturer, Department of Education Leadership and Management, Faculty of Education University of Johannesburg, South Africa.

Africa and other continents of the world is regarded as the great world-shaking shift in this generation and provides opportunities for enhancing human life (Ramaphosa, 2020). It is inevitable that “disruptive technologies like machine learning, artificial intelligence, and big data are changing the way we live, the way we work and do business, and the way we govern” (Ramaphosa, 2020). The 4IR is seen as an instrument of providing a solution to Africa’s challenge namely, access to quality and sustainable education (Kayembe & Nel, 2019; Ramaphosa, 2020; Xiaolan, 2020). Hence, basic school leaders must be abreast of this fact and harness possible approaches for placing the school at the centre, in the realisation of this goal.

The 4IR movement led to a shift from a handicraft economy-based approach to a machine economy-based approach (Ndung'u & Signé, 2020). Educational institutions are not left out of this rapid shift. Theories of professional development continue to evolve and remain focused on the tradition of integrating educators with the world of work based on the 4IR. Journeying through history reveals that humans have aspired to improve production (Lange, 2019; Melber, 2020; Brahim, 2020; Lin & Lukodono, 2021). During the First Industrial Revolution (IR), steam and waterpower were used to automate production operations. During the Second IR, the operations moved from the use of water and steam to electric power. While in the Third IR, advancements in electronics and information technology contributed to the automation of manufacturing and service provision (Brahima, 2020; Lin & Lukodono, 2021). The 4IR arose from the Third (IR), the digital revolution that has been gaining traction since the mid-twentieth century. It is distinguished by a convergence of technologies that blurs the distinctions between the physical, digital, and biological domains (World Economic Forum [WEF], 2017). Robotics, virtual reality, cloud technology, big data, artificial intelligence, the internet of things, and emotional intelligence have all contributed to the 4IR's development (Chao, 2017). Besides blurring the lines between physical, digital, and biological aspects of life, the 4IR marked by the integration of technologies.

In the era of 4IR and the impending transformation required, school leadership development is an essential strategy to increase teachers’ effectiveness and promote a knowledge-based education institution. The rapid change, development, and globalisation as a result of 4IR; have posed challenges to institutions of learning today as compared to the past. To remain relevant in terms of comparative advantages, institutions require agile, resilient, and adaptable leaders (Mdluli & Makhupe, 2017; Naidoo & Potokri, 2021). Such contemporary school leaders should possess goals and aspirations to place their institution on the global map through regular training and development of their workforce to navigate the unknown future. Somogyi (2021) contends that reflective learning skills, technological and intercultural competence should be given priority now, more than ever, for employees to navigate the 4IR terrain. For basic education to have a favourable comparative advantage and achieve its goals in 4IR, it requires a sound human capital development foundation, as people and knowledge serve as key drivers of today’s world (Rasool & Botha, 2011; Aliyu & Kabiru, 2014; OECD, 2017; Awodiji & Ijaiya, 2019). Educational institutions are sub-systems that embrace much of the nation's development and produce most of the skilled professionals required in the labour market (Mansoor, 2010; Awodiji, 2018). School leaders with regular continuous development programmes

tend to have better staff retention, higher job performance, increased productivity, and comparative advantages (Aliyu & Kabiru, 2014; Awodiji, 2018).

Basic school, being foundational education as a citadel of learning, cannot be left behind in the 4IR due to the need for primary relevant human capital required for the demand of the industry 4.0 society. Research has established needs for reskilling school leaders in the rapidly changing technological environment and to effectively lead schools for the 4IR era (Naidoo & Potokri, 2021). Naidoo and Potokri (2021) identified 4IR skills requires of education leaders and acknowledged the need for them to be better trained. Hence, the educational leaders' continuous professional development programme (LCPDP) cannot be jettisoned in the rapidly changing world. COVID-19 as a catalyst for change with the experience of "New Normal" demands retooling educational leaders' skills, knowledge, and competences. School administration has changed due to several influences including the pandemic, technology advancement, digitalisation, remote learning, and other 4IR attributes. Thus, the role of educational leaders at all levels of the system (school principals and their management teams, district education leaders, school supervisors, educational board members, local government education inspectors, department/ ministry of education officers among others) cannot be underestimated, which necessitates review on suitable approaches for leaders' CPD for the 4IR. Thus, this review focused on identifying existing CPD approaches available in Africa that can be used to advance basic school leaders (principals, deputies, headmasters, head of departments (HODs), and school management teams (SMTs) leadership skills requires for 4IR.

Research Question

The research question that formed the basis for this study is:

What continuous professional development approaches in 4IR are available for basic school leaders across Africa?

Literature Review

The Concept of Basic School Leadership

Education leadership is commonly understood as the act of influencing subordinates in schools with a primary aim to achieve educational goals (Bush, 2019; Connolly et al., 2017; Johnson, 2020; Daniëls et al. 2019). Leadership is described as "a process of influencing whereby an individual exerts intentional influence over others to shape activities and relationships in a group or organisation." (Bush & Glover, 2003, p. 3). School leadership in Africa has been conceptualised under ten models of leadership out of which three models (transformational, instructional and distributed) have been established in the literature (Bush & Glover, 2016; Shaikh et al., 2018; Mestry, 2021). A successful school leader focuses on learning, which is the primary objective of an educational institution (Bush & Glover, 2014). In terms of student successful learning outcomes, school leaders are second only to teachers (Gurr, 2019). Its thus requires school leaders to be possessed

with relevant skills that will enable them to achieve effective learning performance in their schools.

School leadership studies have revealed that school leaders come to the fore in ensuring effective school climate and student achievement (Witziers et al., 2003). For decades, educational leadership has been studied, resulting in a variety of leadership styles, such as instructional leadership, situational leadership, transformational leadership, distributed leadership, shared leadership, democratic leadership and team leadership (Harris, 2013; Zaccaro et al., 2001; Gupta et al., 2010; Terzi & Derin, 2016; Jones et al., 2016; Buch & Glover, 2003; Hallinger, 2003; Daniëls et al., 2019; Naicker & Mestry, 2013).

School leadership is conceptualised as emerging approach so that a diversity of administration methods can be employed to accomplish an educational institution's most significant key mission (Witziers, et al., 2003). Studies have recognised three elements of school leadership as defining the school mission, managing the instructional programme, and promoting a positive school learning climate (Witziers et al., 2003; Kokkinou & Markaki, 2015; Blackmore, 2013; Farrell, 2019). These dimensions led to other school leadership responsibilities, such as to frame goals, coordinate curriculum, monitor progress, and set expectations (Robinson, 2007; Macbeath & Dempster, 2009; Robinson, 2011; Cambridge Assessment International Education, 2017). In the attainment of these functions demands continuous development of school leaders in the changing world.

Leading in school usually involves influencing teachers and other stakeholders without relying on one person alone. The influence process should ideally result in an effective learning climate that all stakeholders (such as students, teachers, parents, and society) perceive as a benefit and ensures that all school organisational processes (such as monitoring the instructional process, managing personnel, and allocating resources) run smoothly (Daniëls et al., 2019). Therefore, basic school leaders are personnel saddled with instructional and administrative responsibilities by influencing others to attain the school's educational goals.

The Concept of Continuous Professional Development

Leadership development is central to attaining institutional goals (The Wallace Foundation, 2013). Globalisation and change call for training and retraining at all levels of the educational system. Continuous Professional Development (CPD) as philosophy and training enables human capital to improve instructional and professional performance, which keeps the school in their capability to continue and attain the level of increased potentials (Raza, 2010). CPD is an institution-wide concept that dates back centuries (Awodiji, 2021). CPD is conceptualised as prearranged, long-term programmes aimed to improve educational leaders' roles, promote student success, and support reflective practice (Fenwick & Pierce, 2002). According to Filipe (2014) CPD refers to those activities that enhance school leaders' competence, knowledge and skills in management, team building, professionalism, interpersonal communication, technology, teaching, and accountability (Herbert & Rainford, 2014). CPD is denoted as events targeted at improving the skills and knowledge of educational leaders through orientation, training, and assistance (Lessing & de Witt,

2007). CPD is the “deed taken to maintain, update and grow the knowledge and skills required for our professional role” (Institute of Training and Occupational Learning, n.d., p. 1). CPD is recommended as the emerging consciousness of educational leaders’ incompetence or lack of skill to operate according to expectations or laid-down standards (Steyn, 2008).

The CPD is described as the method of improving and strengthening the instincts, skills, abilities, competencies, and processes of school leaders that educational system requires to continue to exist, adapt, and thrive in a 4IR world (United Nations, n.d.). CPD is an educational approach offered to educational leaders to gain expert qualifications such as university degrees, formal coursework, conference participation, and informal learning openings established in preparation for identified needs in the changing world (Awodiji et al., 2020). CPD includes higher education training, conferences, workshops, mentoring, and more (Mathib, 2007; Tingle et al., 2017; Daniëls et al., 2019; Awodiji, 2021).

The CPD is further considered as a learning event, which necessitates a shift in educational leaders’ behaviour because of the knowledge and skills required for the changing world of work (Awodiji, 2021). CPD serves as a structure for assisting educational leaders to build their individual and functional skills, knowledge, competencies, and capabilities, thereby increasing value to them towards the attainment of educational objectives in the 4IR world (Isabirye & Moloji, 2013; Sarbeng, 2013; Ijaiya, 2017; Awodiji, 2021). CPD prepares educational leaders with the knowledge, skills, understanding, competencies, and access to information that empowers them to operate efficiently (Whittle et al., 2012). Moreover, CPD is regarded as actions that improve an educational leader’s expertise, competence, skills, knowledge, and attitudinal change (OECD, 2009; 2020), with the aim of increasing the quality of pupil learning (Asghar & Ahmad, 2014), and effective change management in the school system (Othman & Abd Rahman, 2013; Tsotetsi, 2013). Thus, in the context of this study, CPD is a proactive approach to career growth and skill enhancement. It is a lifelong journey of learning and self-improvement that helps school leaders stay competitive, adapt to change, and achieve their career goals in 4IR. CPD is a concept that pertains to the ongoing process of learning, skill development, and personal growth that school leaders engage in throughout their careers to make them fit for the 4IR.

The Concept of Fourth Industrial Revolution (4IR)

The Fourth Industrial Revolution (4IR), often called Industry 4.0, is a term coined to describe a new era of technological advancement that is transforming how we live and work. The 4IR combines digital, physical, and biological technologies to build on the first three revolutions. Here are some attributes associated with 4IR: Industry 4.0 integrates various technologies, including artificial intelligence (AI), robotics, big data, 3D printing, augmented reality, the Internet of Things (IoT), and blockchain (Abdulraheem-Mustapha, 2021; Ajani, 2021; Moloji & Mhlanga, 2021; Schwab, 2016; World Economic Forum, 2017; Xu et al., 2018). Innovation and efficiency are enhanced through the interconnection of these technologies (Ajani, 2021; Moloji & Mhlanga, 2021). The 4IR is driven by the digitalisation of virtually

every aspect of our lives and industries. It involves collecting and analysing massive amounts of data to make informed decisions and improve processes.

Moreover, 4IR features the Internet of Things (IoT), which consists of physical objects that collect and exchange data wirelessly through sensors, software, and connectivity (Atasoy, 2022; Letuma, 2022; Xu et al., 2018). This interconnected network allows for real-time data analysis and control, contributing to smarter and more efficient systems. AI and machine learning play a central role in 4IR by enabling machines and systems to learn from data, make decisions, and adapt without human intervention (Krafft et al., 2020; Parmiggiani et al., 2020). This leads to automation and predictive capabilities. Automation, driven by advanced robotics and AI, revolutionises manufacturing, logistics, and customer service (Bayode et al., 2019; Sima et al., 2020; Yusuf et al., 2020). Robots are becoming more capable and versatile, leading to improved productivity and cost-effectiveness (Ilori & Ajagunna, 2020; Xu et al., 2018). The vast amount of data generated by IoT devices and other sources is analysed to gain insights, identify patterns, and make data-driven decisions. This helps organisations optimise their operations, marketing, and customer experiences. Thus, 4IR systems are the integration of physical and computational components, which enable the monitoring and control of physical processes through digital means. They are at the heart of smart factories and autonomous systems. Whereas blockchain is used for secure and transparent transactions and data management. It has applications in supply chain management, financial services, and many other areas. In addition, Augmented Reality (AR) and Virtual Reality (VR) technologies enhance learning, training, design, and remote collaboration. They have applications in gaming, healthcare, and education (Fonariuk et al., 2023; Ilori & Ajagunna, 2020; Xiarewana & Civelek, 2020; Zhang et al., 2022).

The 4IR also encompasses advancements in biotechnology, including gene editing and personalised medicine (Krafft et al., 2020). These innovations are transforming education, transportation, communication, healthcare and agriculture. Industry 4.0 offers opportunities to improve sustainability by optimising resource usage, reducing waste, and monitoring environmental impacts (Gürdür Broo et al., 2022; Recalde et al., 2020; World Economic Forum, 2017). However, the 4IR brings challenges, such as concerns about job displacement due to automation, data privacy and security issues, and the need for regulatory frameworks to govern emerging technologies (Gürdür Broo et al., 2022; Uys & Webber-Youngman, 2019). It could be concluded that 4IR is a transformative phase in which the fusion of technologies reshaped industries, economies, and societies. It has the potential to greatly improve efficiency, productivity, and innovation while also posing complex challenges that need to be addressed for responsible and ethical development.

School Leaders' Continuous Development in the Fourth Industrial Revolution

As schools and society are constantly changing, preservice training is no longer a reliable basis for teaching long-term. Consequently, continuous professional development is essential for upgrading and updating educational leaders' skills, competencies and knowledge (Luneta, 2012; Lo, 2020a, b). A school-based leadership professional learning effort will be effective if it emphasises motivation, continuous

improvement, teamwork, and developing its professional learning culture (Fullan & Quinn, 2016). In the same vein, schools will be more effective when their leaders are kept up to date (Ahmadi & Keshavarzi, 2013; Daniëls et al., 2019). Modern educational trends are focused at developing productive schools. Modernised schools cannot exist without appropriately trained educational leaders (Daniëls et al., 2019). Without staying abreast with current developments and accepting professional advancement, educational leaders cannot be effective (Jovanova-Mitkovska, 2010). Netolicky (2016) argued that professional personalities and behaviour of educational leaders are influenced not just by formal education, but also by life experience.

In light of the changes and technological advancement that the 4IR placed on school leaders, as well as the increased complexity of the external factors such as the pandemic and other social forces, it is vital that they are provided with adequate training for their demanding roles (Bush, 2009). Changes like the 4IR cannot be easily imagined and implemented in a linear sequence. This is especially true when it comes to leading schools toward efficacy and sustainability (Leahy et al., 2021). Faced with change, the body of knowledge in educational leadership should be continually learning and updating its instructional leadership skills and knowledge (Luneta, 2012; Whittle et al., 2012). With the COVID-19 crisis that affected schools globally and brought about online learning, blended learning, social distancing, and other unusual activities, educational leaders need to reimagine and reskill their leadership approach. Scholars in the fields of the future of work and the future of learning proposed adopting the flipped classroom over traditional approaches is necessary. That is the transition from the stock of knowledge to the flow of knowledge (McGowan & Shipley, 2015; Yu, 2016). The fourth industrial revolution is characterised by automation, service delivery, cost efficiency, machine learning, artificial intelligence, learning optimisation, and emotional intelligence (World Economic Forum [WEF], 2017; Chao, 2017). Therefore, the need to train and retrain school leaders to acquire relevant skills to manage schools for the 4IR is important and futuristic.

Various skills should characterise any CPD programme for educational leaders in the dynamic and challenging world. Gray (2016) suggests that such skills and competencies should include equity leadership, soft skills, ownership of ICT processes and tools, hard work, creativity, critical thinking, people management, service-oriented, trans-disciplinary skills, and cognitive flexibility. Furthermore, Education Design Lab (2018) and Reaves (2019) recognised skill development areas for school leaders in the 4IR as initiative, collaborative approaches, creativity, problem-solving, critical thinking, empathy, oral communication, resilience, and intercultural fluency. Moreover, for basic school leaders to cope with 4IR, they are to be equipped with in-depth knowledge of teachers-learners, cultivating innovation, facilitating resources, engaging stakeholders, and the ability to maximise resources (Nkambule, 2020; Teacher American Association of Colleges of (P21) and Education and the Partnership for 21st Century Skills, 2010; Tigere, 2020).

There are CPD approaches for basic school leadership proposed in the literature, which include training, networking, direct instruction by experts or experienced persons, workshops, presentations, conferences, and symposiums (Mathib, 2007). Further approaches include university-based principal preparation programmes,

cohort or peer support meetings, and mentoring (Tingle et al., 2017). Bush et al. (2011) suggests contact sessions, mentoring, and networking, while Daniëls, et al. (2019) posits incidental and informal learning, intentional learning, and formal training. Kempen and Steyn (2016), and Reaves (2019) described CPD approaches for education leaders as an ongoing, system-wide and individual process as well as traditional learning through courses, speakers, or postgraduate study, collaborative learning, role models and anti-models, coaching, and social media as heutagogical approach (self-determined) learning.

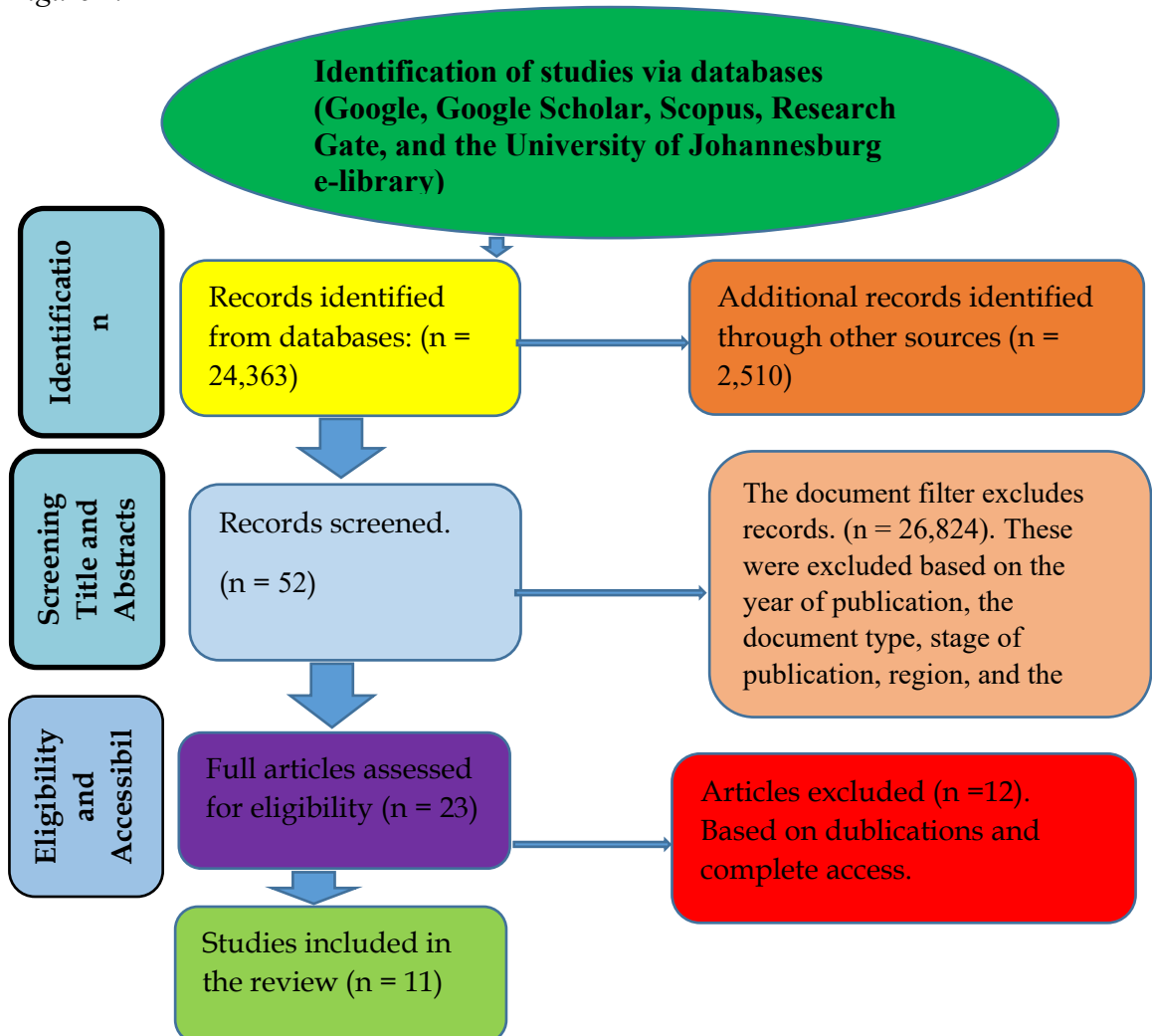
In summary, CPD for school leaders is crucial to the ability of educational institutions to adapt to the rapidly changing technology and knowledge landscape. Technology, artificial intelligence, automation, and big data are all part of the Fourth Industrial Revolution, which presents opportunities and challenges for education. School leaders play a pivotal role in navigating these changes and driving educational innovation. A critical component of their continuous development is integrating technology and digital literacy, data-driven decision-making, adaptive leadership, fostering innovation, global awareness, lifelong learning, ethical considerations, collaborative leadership, diversity and inclusion, resource management, critical thinking, problem-solving, agility, resilience, adaptability, communication, cyber security, and sustainability awareness. School leaders should be continuously trained in the 4IR, participate in workshops, network, and engage in self-directed learning opportunities. This will enable them to lead their institutions effectively in an ever-evolving educational environment.

Methodology

As a form of qualitative research, a systematic review was planned to fill a gap by considering the existing related empirical and theoretical literature (Durach et al., 2017; Hallinger, 2018). It is imperative to outline themes and phrases that would guide and provide relevant literature in the area of review (Nowell et al., 2017; Jansen, 2019). Therefore, the study adopted a systematic review approach (Hallinger, 2018; Bellibaş & Gümüş, 2019; Ahmed, 2020) to identify and create approaches of the school leadership continuous professional development literature in Africa. Thus, thematic analysis was done to identify the findings to answer the research question stated (Adewale et al., 2022; Bellibaş & Gümüş, 2019; Jacob et al., 2022). Hence, words or sub-themes related to leadership, basic school leaders, educational leadership, leaders' continuous professional development, professional development, and staff development were used. From this, various expressions and phrases were formed to incorporate into the inquiry terms when utilising the database. These keywords/themes explored include leadership, educational leadership, school leadership, instructional leadership, staff development, professional development, and mentoring.

Search Approaches

Figure 1. PRISMA of the Review



To generate existing empirical, theoretical, and related literature for the review on the basic school leadership CPD literature in Africa, it was important to investigate the data accessible through a wide range of stages, for example, visual library, the web, the utilisation of course readings, diaries, meeting procedures, government, and Non-Governmental Organisations (NGO's) reports for the study. Google, Google scholar, Scopus, Research Gate, and the University of Johannesburg e-library were used as search engines. Based on initial hits of 24,363 and 2,510, as shown in Figure 1, the limiters such as peer reviewed, report, thesis/dissertation, location (Africa), and English were applied, yielding a total number of 52 results. Selection of articles was based on content, timeliness, relevance, and accessibility; and the analysis of content and abstracts were used to make the decision.

A set of inclusion and exclusion criteria was used in to ensure the resources and bases were appropriate. Inclusion criteria required that all sources be indexed with the words "basics school leaders" educational leadership" "school leadership" "continuous professional development" and "leadership development" in both

abstracts and full texts. Literature from 2006 to 2021 was used in order to have a view of recent school leadership professional development progress in Africa.

The exclusion criteria are those characteristics or resources excluded from consideration due to publication dates, places of publication, teachers' development, tertiary institutions, and relevance to the study. Therefore, the study excluded literature before 2006. The literature was limited to Africa-based journal articles, books, thesis/dissertations, and reports for generalisation and implications of findings. Additionally, materials irrelevant to Africa were omitted from the study due to national and continental policies addressing issues differently. Furthermore, material that did not focus on the key components or themes was excluded from the study.

The database found 2,363 and 2,510 articles after a thorough search (Figure 1). Some documents were excluded based on the document filter's determination of the publication year, type, stage, school type, region, and publication language. However, others were included based on inclusion criteria. Consequently, only 11 articles qualified for inclusion. The PRISMA protocol (Figure 1) describes this.

Ethical Issues

In academic research, ethical considerations for maintaining individual privacy are paramount (Hallinger, 2018). The researchers, therefore, ensured that the exploration given is scientific, logical, and correct with the aim of providing information in the discipline of school leadership on continuous professional development for the 4IR in Africa to government officials, educational policymakers, school leaders, scholars, and others.

Considering the nature of the study, the available data was limited by ethical concerns. The researchers remained objective as much as possible in their review. While reviewing related literature on the subject matter, plagiarism issues were also taken into account. The thoughts were paraphrased and reconstructed in accordance with the current study. All the resources used were acknowledged using appropriate referencing style to avoid violating copyright laws (Santini, 2018; Calver, 2015).

Table 1. Results

Authors/ Year	Topic	Methodology	Theory used	Key Findings	Themes/Approaches
Uworwabayeho et al. (2020)	Developing the capacity of education local leaders for sustaining professional learning communities in Rwanda.	A Mixed method with triangulation (meta-analysis, surveys and from Focus Group Discussions (FGDs).	Theory of Change	(1)An improvement in the competencies (shared and transformational leadership), confidence, and commitment to roles and tasks of school leaders after CPD; (2)Leadership behavioural change (LBC)-(frequently arranging coaching and mentoring activities for teachers), and school leadership practices. (3)Improvement in school performance.	In-service training: leadership skills in education, professional ethics in education, moral education and human rights, and the management of extra-curricular activities, and emotional intelligence
Ebot-Ashu (2020)	Leadership and management preparation and development of school leaders in Cameroon.	Mixed method of case study design was adopted	Not available	(1) School leaders in Cameroon recognised that leadership training related to personal management (self-advancing skills), administrative leadership practices (financial management, strategic management, and public policy), and community relationship management may not likely prepare them as effective leaders. (2)School leaders seemed to be interested in developmental programmes with focus on pedagogical skills, school health and safety responsibilities.	Leadership learning and development, Conferences and workshops, Training on the Job, and Sharing best practices among school leaders through an informal network.
Sofu & Abonyi (2017)	Investigating school leaders' self-reported professional development activities in Ghanaian rural basic schools.	A concurrent mixed-methods approach was adopted to gather data from three groups of basic school leaders of one rural educational district in Ghana.	Not available	(1). Leadership development in Ghanaian basic schools is greatly dependent on casual learning, which is personal, hence failing to stimulate collaboration and innovation in leadership within the education system. (2). School leaders adopted informal and self-directed development initiatives in Ghana.	Workshops, seminars, forums, unstructured and non-intentional experiences, reading books, coaching and advice from colleagues and supervisors, visits to other schools, and formal university courses are all possible strategies for learning.
Usman (2016)	Professional development, instructional leadership, and learning transfer systems of leaders in Ghanaian basic schools	A mixed-methods concurrent approach was adopted to gather data from three groups of basic school leaders of one rural educational district in Ghana.		(1). Methods of informal and self-directed learning (2) Attending school meetings, visiting other schools, and reading personal materials, and (3) Mentoring from supervisors and peers, as well as workshops and on-the-job experiences	Meetings of school leaders, Workshops, seminars, and forums, learning on the job, Reading (books, newspapers, articles, magazines), Coaching/guidance/advice from colleagues and supervisors, Visits to other schools, Performance appraisal, and Formal university courses
Mestry & Singh (2007)	Continuing professional development for principals: A South African perspective.	A qualitative approach (interview, focus group, document analysis, and feed note compiled by Centre for Education and Policy Development (CEPD), on the delivery of the ACE programme.	Not available	(1)Shared leadership approach based on collegiality, (2)Provision of personal and professional growth opportunities, Improved stakeholders-relationships, (3)Delivery of the ACE curriculum, The benefits of cohort meetings, and (4)The benefits of continuous assessments.	Collegial leadership approach, Personal and professional growth, stakeholders-relationships, ACE programme, Leadership cohort meetings, continuous assessments for school leaders, and two years advance part-time programme.
Chikoko et al (2011)	Leadership development: School principals' portfolios as an instrument for change.	A qualitative research approach using sample from a cohort of the ACE (School Leadership) with 88	Portfolio Approach	(1)Self-understanding (understanding their strength, weakness, and achievements), (2)Value of principals' responsibilities, (3)Not diagnostic in the structure of their portfolio testimony, and	Group learning/collegial learning, learning by exposure, mentoring and induction, and value-based leadership development approach

		portfolio and document analysis were adopted.		(4)Reproductive instead of being transformational.	
Arikewuyo, (2009)	Professional training of secondary school principals in Nigeria: A neglected area in the educational system.	Review of literature on principalship development programme	Peter principle theory	(1)The need for formal leadership training for principals before assuming principalship,(2)Compulsory leadership programmes at the National Institute for Educational Planning and Administration (NIEPA) before they assume managerial positions	Leadership Training, Professional courses,
Mathib (2007)	The professional development of school principals.	A quantitative research approach adopting purposeful sampling technique was used to sample 600 respondents (200 principals, 200 Heads of Department, and 200 educators) in Bojanala East and Bojanala West Regions of Northwest Province, South Africa.	Professional isation	(1)Capacity building is made serious and important, while change management is weak, (2)Capacity building on linkages between school and its environment. (3)Creating structures for service delivery through self-expression, innovation, communication and motivation. (4)Provision of guidance to staff for optimum utilisation of their potential (5)Promoting teamwork among staff.	Training, Networking, and Coaching
VVOBrwanda (2019)	Integrating ICT in continuous professional development of teachers and school leaders and classrooms in Rwanda.	Report/Concept Note	Not applicable	(1)Inculcating Information and Communication Technology (ICT) into CPDP of school leaders and teachers in Rwanda with the aim of providing cost-effective, flexible, and (2)Individualised learning along with prospects to advance teachers and school leaders' digital literacy for quality education and knowledge-based economy.	National Open, Distance and eLearning; CPD Diploma Programme in Effective School Leadership; CPD Certificate Programme in Educational; Mentorship and Coaching for STEM SSLs/Heads of Department; Certificate Programme in Educational Mentorship and Coaching for School-Based Mentors (SBMs), and Sector Education Inspectors (SEIs)
Bush et al. (2011)	Preparing new principals in South Africa: The ACE School leadership programme.	Pilot study approach with the use of desk research, documentary analysis, observation, interview, surveys, and longitudinal case studies on different phases.	Not available	(1) ACE had impact on school leaders' managerial practices in terms of enhanced confidence, improved self-control, principal-educators' relationships, skills' development (ICT, problem solving, financial planning, and teamwork), school achievement and improvement, School-community relationships, and accountability.	Mentoring, Networking, Assessment, and Material/Module
Asheber et al. (2021)	Principals' perception of postgraduate diploma in school leadership programme as opportunity promoting educational leadership improvement in Madda Walabu University (Ethiopia): A qualitative inquiry.	A qualitative research approach of case study design was adopted. Semi-structured interview and focus group discussion with 16 participants (13 male and 3 female) who have participated in postgraduate diploma in school leadership programme was used.	Grounded theory	(1)The training has equipped the school leaders with instructional leadership competences. (2)Education policy and contemporary issues, management of educational change, (3)Improves professional knowledge of the principals and school effectiveness	Postgraduate Diploma in School Leadership (PGDSL), Module Content, Professional Knowledge, Skills and Attitudes

Data Analysis

This study utilised thematic analysis because it was a qualitative study that used a secondary research approach. The analysis is flexible and based on the review of literature on the area of concern to generate themes (Braun & Clarke, 2013). Thematically, the study identified related literature on the professional development of educational leaders in Africa to answer the research question.

Discussion

What are the continuous professional development programmes available for basic school leaders in literature across Africa? This study aimed to assess evidence based on CPD programmes for basic school leaders in the literature across Africa. The role of CPD in school leadership and development has long been researched globally. Thus, several reviews have been done on school leadership, but this study serves as one of the reviews that synthesises approaches of school leaders' CPD for change in the world of the 4IR. Findings from the review carried out as indicated in Table 1 established that CPD has been adopted to enhance or prepare educational leaders' capabilities for change in Africa (Mestry & Singh, 2007; Mathib, 2007; Arikewuyo, 2009; Chikoko et al., 2011; Bush et al., 2011; Sofu & Abonyi, 2017; Usman, 2016; VVOBrwanda, 2019; Uworwabayeho et al., 2020; Ebot-Ashu, 2020; Asheber et al., 2021).

Uworwabayeho et al. (2020), CPD enhances school leaders' competencies (shared and transformational leadership), confidence, and commitment to roles and tasks. Also, CPD, in terms of coaching and mentoring, was said to have promoted leadership behavioural change (LBC), leadership practices, and school performance. This finding is corroborated by Raza (2010) and Herbert and Rainford (2014), that CPD can improve instructional and professional performance, thereby promoting the school's potential for continued improvement. Therefore, the findings revealed that CPD could be advanced in terms of coaching, mentoring and sharing knowledge to empower school leaders with relevant skills for 4IR.

Moreover, Ebot-Ashu's (2020) study shows that general leadership CPD might not prepare them for effective self-advancing skills, administrative leadership practices, or community liaison activities. Education leaders, however, were found to be interested in CPD that focused on skills related to pedagogy and school health. This aligns with Omogyi (2021), who emphasises the importance of reflective learning, technological skills, and intercultural competencies in CPD for education leaders to navigate the 4IR terrain. Currently, in Ghana, basic school leaders rely heavily on casual personal learning, which prevents collaboration and innovation among school leaders. Thus, school leaders used informal and self-directed development initiatives as a form of CPD practices (Sofu & Abonyi, 2017). In addition, Usman's (2016) study reveals that informal, self-directed learning, school meetings, visiting other schools, reading personal materials, mentoring, and on-the-job learning experiences are forms of CPD adopted for school leaders in Ghana. This is supported by Daniëls et al. (2019) that incidental and informal learning, deliberate

learning, and formal training are forms of CPD that could promote leadership skills, knowledge and competency.

Moreover, Mestry and Singh (2007) submitted that collegiality as a basis for shared leadership provides school leaders with opportunities for personal and professional growth that will enhance stakeholder relationships and school development. In addition, value-based leadership development approach, change management, interrelationships between the school and the environment, innovation, communication, teamwork and motivation were found as the leadership continuous professional development approaches that will facilitate educational leaders' capacity (Mathib, 2007). This is inconsonant with (Fenwick & Pierce, 2002; Raza, 2008) findings that CPD programmes aimed to empower school leaders' roles, improve student success, and supportive reflective practice in the changing world. According to Filipe, (2014), CPD activities improve school leaders' competence, knowledge and skills in management, team building, professionalism, interpersonal communication, technology, teaching, and accountability.

Furthermore, Chikoko et al. (2011) showed that principals' self-understanding, with regard to understanding their strength, weakness, and achievements, and value responsibilities are the benefits derived from the ACE training in South Africa given as a form of CPD using portfolio approach. This implies that CPD will prepare school leaders with reflective insight about themselves for leading schools in fourth industrial challenge. Hence, the leaders' CPD is a structure for supporting school leaders to build their individual and functional skills, knowledge, competencies, and capabilities by increasing value to them towards the attainment of educational objectives in 4IR world (Isabirye & Moloji, 2013; Sarbeng, 2013; Ijaiya, 2017; Awodiji, 2021).

In the same vein, Arikewuyo's (2009) study in Nigeria identified the need for formal educational leadership training before assuming leadership training programme as a form CPD programmes at the National Institute for Educational Planning and Administration (NIEPA). This suggests that school leaders should be exposed to a formal training to prepare them for 4IR beside their initial qualifications. It was discovered that CPD content for educational leaders in Africa should focus on leadership skills, professional ethics, moral education and human rights, management of extra-curricular activities, and emotional intelligence (Uworwabayeho, et al., 2020). Also, personal management, administrative leadership practices, community relationship management and modern pedagogical skills (Ebot-Ashu, 2020) should be included in the CPD module. The findings corroborated with other scholars that CPD such as higher education training, conferences, workshops, mentoring, and more could be used to empower human capital for sustainable development (Mathib, 2007; Tingle et al., 2017; Daniëls et al., 2019; Awodiji, 2021). This implies that formal training such as further education, conferences, and mentoring can be adopted to equip school leaders with 4IR competencies.

Meanwhile, VVOBrwanda (2019) concluded that the adoption of confidence, self-control, leaders-educators relationships, digital literacy, skills development (ICT, problem-solving, financial planning, and teamwork), school-community relationships, and accountability will promote education leaders' development.

Bush et al. (2011) advocated that contact sessions, mentoring, and networking, among other approaches, will advance school leaders' skills and knowledge.

Lastly, instructional leadership competencies, professional knowledge, skills and attitudes, education policy and contemporary issues, management of e change are suggested to be inculcated in the leadership curriculum (Asheber et al., 2021). In the context of STEM vanguard as forerunner to the 4IR, Uworwabayeho et al. (2020) found that an upgrading in the school leaders' competencies, confidence, and commitment to roles and tasks increased capacity and leadership behavioural change with regularly coaching and mentoring activities for teachers and school leaders. Thus improved in school performance.

Thematically, CPD leadership literature for the African basic school leaders in this study revealed the following approaches (Table 1) as commonly used as leadership professional training courses, conferences, workshops, on-the-job training, informal networks, forums, seminars, book and journal readings, coaching, institutional/university-based courses, in-service training, networking, part-time/sandwich programme, collegial learning, mentoring, leadership cohort/peer meetings, induction, value-based training, post-graduate/certificate leadership training, self-directed learning, performance appraisal, stakeholders-relationship, and school-based mentoring programme among others. The existing studies corroborated that training, networking, direct instruction by experts or experienced persons, workshops, presentations, conferences, and symposiums are viable approaches to empowering school leaders (Mathib, 2007). Further approaches such as university-based principal preparation programmes, cohort or peer support meetings, and mentoring (Tingle et al., 2017), could be used for school leaders' acquisition of 4IR competencies. Bush et al. (2011) suggest contact sessions, mentoring, and networking, while Daniëls et al. (2019) posit incidental and informal learning, intentional learning, and formal training. Kempen and Steyn (2016), and Reaves (2019) described CPD approaches for education leaders as ongoing, which include courses, speakers, or postgraduate study, collaborative learning, role models and anti-models, coaching, and social media as self-directed learning.

In accordance with Awodiji et al. (2020), CPD provides school leaders with the opportunity to acquire expert qualifications, such as university degrees, formal coursework, conference participation, and informal learning opportunities, so they can be prepared to meet the changing needs of the global economy. Thus, these approaches can be advanced for equipping school leaders with 4IR leadership skills, competences, and knowledge.

Conclusion and Implications

This study has reviewed and analysed literature on school leaders' CPD in Africa and identified the approaches available in the continent that can be used to advance leaders' 4IR skills development. The study identified CPD approaches that could be adopted for preparing basic school leaders for 4.0. The common approaches identified are in-service training, cohort meetings, group learning/collegial learning, learning by exposure, and formal leadership training for new principals. Furthermore,

compulsory leadership courses through the leadership training centre, regular training, networking, coaching, National Open, and Distance and eLearning, diploma programme, certificate programme, mentorship, and postgraduate Diploma in School Leadership.

By implication, it is therefore concluded that CPD programmes for basic school leaders should be emphasised on improving school leaders' competence, knowledge and skills in management, team building, professionalism, interpersonal communication, technology, teaching, and accountability. Likewise, in-service programmes, cohort/peer meetings, group/collegial learning, exposure, formal leadership training for new education leaders, compulsory leadership courses through the establishment of leadership training centres, regular training, networking, and coaching among others could be used as approaches of CPD to prepare basic school leaders for the 4IR. Therefore, this study has provided a convergent CPD approaches that could be used in Africa to prepare school leaders with relevant 4IR knowledge and competencies to lead effective school.

Limitations

The study is limited in that there was no evidence for literature on CPD approaches for school leaders in North Africa, as all of the other regions of the continent were represented. There have also been a number of peer-reviewed articles published in other languages about leadership development approaches in Africa, especially in Francophone countries. Languages other than English were excluded from the review. It is therefore possible that the body of evidence is more extensive and complex than this review suggests. Moreover, this review does not assess the quality of the studies. Journal articles, books, thesis/dissertations, and reports based on Africa were used for generalisation and implications. We excluded studies that were not fully accessible. Based on these, further studies could be advanced using qualitative and quantitative research approaches to understand suitable techniques for school leaders to acquire the competencies required to lead in the 4IR.

References

- Adewale, S., Omodan, B. I., & Awodiji, O. A. (2022). A Systematic Review of Post-COVID-19 Pandemic Strategies to Improve Instruction of Technical and Vocational Education and Training in Nigeria. *E-Journal of Humanities, Arts and Social Sciences*, 3(11),19-35. <https://doi.org/10.38159/ehass.2022sp3113>
- Ahmadi, S., & Keshavarzi, A. (2013). A survey of in-service training programs effectiveness in teaching skills development from the view-point of students, teachers and principals of guidance schools in Shiraz. *Procedia - Social and Behavioral Sciences*, 83, 920-925.
- Ahmed, E. I. (2020). Systematic review of research on educational leadership and management in Muslim societies. *Educational Management Administration & Leadership*, 51(1), 52-74.

- Aliyu, M., & Kabiru, S. A. (2014). Assessment of management strategy on staff training and development in Nigerian polytechnics. *Global Journal of Human Resource Management*, 2(4), 95-102.
- Arikewuyo, M. O. (2009). Professional training of secondary school principals in Nigeria: A neglected area in the educational system. *Florida Journal of Educational Administration & Policy*, 2(2), 73-84.
- Asghar, J., & Ahmad, A. (2014). Teacher development: An overview of the concept and approaches. *Journal of Educational and Social Research*, 4(6), 147-160.
- Asheber, D., Ziyn, E., Garkebo, B., & Feyera, D. H. (2021). Principals' perception of postgraduate diploma in school leadership program as opportunity promoting educational leadership improvement in Madda Walabu University (Ethiopia): A qualitative inquiry. *The Educational Review, USA*, 5(11), 397-409.
- Awodiji, O. A. (2018). *Staff development policies, practices and lecturers' job performance in Nigerian and Pakistani Universities*. Unpublished Ph.D. Thesis. Ilorin, Nigeria: University of Ilorin.
- Awodiji, O. A. (2021). Staff development policy implementation: Implications for university administration in Nigeria. *Unizik Journal of Educational Research and Policy Studies*, 5, 317-345.
- Awodiji, O. A., & Ijaiya, N.Y. S. (2019). Comparative study of staff development practices and lecturers' job performance between Nigerian and Pakistani Universities. *The African Journal of Behavioural Research and Scale Development (AJB-SDR)*, 1(1), 124-133.
- Awodiji, O. A., Ogbudinkpa, I. C., & Agharanya, M. (2020). Teachers' professional development: A panacea to quality education in Nigeria. Available at: https://www.researchgate.net/publication/344380042_Teachers'_Professional_Development_A_Panacea_to_Quality_Education_in_Nigeria.
- Braun, V., & Clarke, V. (2014). What can "thematic analysis" offer health and wellbeing researchers? *International Journal of Qualitative Studies on Health and Well-being*, 9(1), 261-52.
- Bellibaş, M. Ş., & Gümüş, S. (2019). A systematic review of educational leadership and management research in Turkey. *Journal of Educational Administration*, 57(6), 731-747.
- Blackmore, J. (2013). A feminist critical perspective on educational leadership. *International Journal of Leadership in Education*, 16(2), 139-154.
- Brahima, A. (2020). Conceptual decolonisation, endogenous knowledge, and translation. In *Decolonisation of Higher Education in Africa*, 118-139. Routledge.
- Bush, T. (2019). Distinguishing between educational leadership and management: Compatible or incompatible constructs? *Educational Management Administration & Leadership*, 47(4), 501-503.
- Bush, T. & Glover, D. (2016). School leadership and management in South Africa: Findings from a systematic literature review. *International Journal of Educational Management*, 30(2), 211-231.
- Bush, T. Kiggundu, E. & Moorosi, P. (2011). Preparing new principals in South Africa: The ACE School leadership programme. *South African Journal of Education*, 31, 31-43.
- Calver, M. (2015). The importance of authors ensuring referencing and page proofs are correct. *Pacific Conservation Biology*, 21(3), 173.
- Cambridge Assessment International Education (2017). *Educational leadership*. Available at: <https://www.cambridgeinternational.org/Images/271192-educational-leadership.pdf>.
- Chao, R. (2017). *Educating for the fourth industrial revolution*. University World News. Available at: <https://www.universityworldnews.com/post.php?story=20171107123728676>.

- Chikoko, V., Naicker, I., & Mthiyane, S. E. (2011). Leadership development: School principals' portfolios as an instrument for change. *Education as Change*, 15(2), 317-329.
- Connolly, M., James, C., & Fertig, M. (2017). The difference between educational management and educational leadership and the importance of educational responsibility. *Educational Management Administration & Leadership*, 47(4), 504-519.
- Cravens, X. C., & Zhao, Q. (2022). Exercising instructional leadership with organisational management: a qualitative and comparative study of Chinese principalship. *Compare: A Journal of Comparative and International Education*, 53(7), 1225-1243.
- Daniëls, E., Hondeghem, A., & Dochy, F., (2019). A review on leadership and leadership development in primary education. *Educational Research Review*, 27, 110-125.
- Durach, C. F., Kembro, J., & Wieland, A. (2017). A new paradigm for systematic literature reviews in supply chain management. *Journal of Supply Chain Management*, 53(4), 67-85.
- Ebot-Ashu, F. (2020). Leadership and management preparation and development of school leaders in Cameroon. In M. Pontso, & T. Bush (eds.), *Preparation and Development of School Leaders in Africa* (pp. 131-150). Bloomsbury.
- Education Design Lab (2018). *21st Century Skills Badges*. Available at: <https://eddesignlab.org/the-labs-21st-century-skills-badges/>.
- Farrell, A. J. (2019). *Exploring the affective dimensions of educational leadership: Psychoanalytic and arts-based methods*. London, United Kingdom: Routledge.
- Fenwick, L. T. & Pierce, M. C. (2002). *Professional development of principals*. Washington DC: ERIC Digest.
- Filipe, H. P., Silva, E. D. Stulting, A. A., & Golnik, K. C. (2014). Continuing professional development: Best practices. *Middle East African Journal of Ophthalmology*, 21(2), 134-141.
- Fry, L. W., & Egel, E. (2021). Global leadership for sustainability. *Sustainability*, 13(11), 6360.
- Gray, A., (2016). *The 10 Skills you Need to Thrive in the Fourth Industrial Revolution*. Available at: <https://www.weforum.org/agenda/2016/01/the-10-skills-you-need-to-thrive-in-the-fourth-industrial-revolution/>.
- Gupta, V. K., Huang, R. & Nuranjan, S. (2010). A longitudinal examination of the relationship between team leadership and performance. *Journal of Leadership and Organisational Studies*, 17(2), 335-350.
- Hallinger, P. (2003) Leading Educational Change: Reflections on the Practice of Instructional and Transformational Leadership. *Cambridge Journal of Education*, 33, 329-352.
- Hallinger, P. (2018). A systematic review of research on educational leadership and management in South Africa: Mapping knowledge production in a developing society. *International Journal of Leadership in Education*, 22(3), 316-334.
- Harris, A. (2013). Distributed leadership: Friend or foe? *Educational Management Administration & Leadership*, 41(5), 545-554.
- Herbert, S., & Rainford, M. (2013). Developing a model for continuous professional development by action research. *Professional Development in Education*, 40(2), 243-264.
- Ijaiya, N. Y. S. (2017). *CREDIT's contribution to Unilorin human capital development*. University of Ilorin Bulletin News.
- Institute of Training and Occupational Learning (n.d.). *Continuing Professional Development*. Available at: <https://www.itol.org/wp-content/uploads/2014/06/ITOL-GUIDE-to-CPD.pdf>.
- Isabirye, A. K. & Moloi, K. C. (2013). Professional development and its implication for innovative teaching and learning in South African higher institution. *Mediterranean Journal of Social Sciences*, 4(14), 101-108.

- Jacob, U. S., Edozie, I. S., & Pillay, J. (2022). Strategies for enhancing social skills of individuals with intellectual disability: A systematic review. *Frontiers in rehabilitation sciences*, 3, 968314.
- Jansen, D. (2019, October 10). *How to write a literature review in 3 steps (Free template)*. Grad Coach. Available at: <https://gradcoach.com/how-to-write-a-literature-review/>.
- Johnson, N. N. (2021). Balancing race, gender, and responsibility: Conversations with four Black women in educational leadership in the United States of America. *Educational Management Administration & Leadership*, 49(4), 624-643.
- Jones, S. S., Jones, O. S., Winchester, N., & Grint, K. (2016). Putting the discourse to work on outlining a praxis of democratic leadership development. *Management Learning*, 47(4), 424-442.
- Jovanova-Mitkovska, S. (2010). The need of continuous professional teacher development. *Procedia - Social and Behavioral Sciences*, 2(2), 2921-2926.
- Kayembe, C. & Nel, D. (2019). Challenges and opportunities for education in the fourth industrial revolution. *African Journal of Public Affairs*, 11(3), 79-94.
- Kempen, M. & Steyn, G. M. (2016). Proposing a continuous professional development model to support and enhance professional learning of teachers in special schools in South Africa. *International Journal of Special Education*, 31(1), 32-45.
- Kokkinou, P., & Markaki, E. N. (2015). Distributed and moral leadership theories and the dimensions of educational leadership role. *Poster Session*. In *Student Excellence Conference, Greece*. Available at: https://www.medcollege.edu.gr/wp-content/uploads/2015/06/images_sec2015-presentations_Kokkinou-Panagiota-Markaki-Evaggelia_poster.pdf.
- Lange, L. (2019). The institutional curriculum, pedagogy and the decolonisation of the South African University. In *Decolonisation in Universities*, 79-99.
- Leadership and Leadership for Sustainability (n.d.). *Leadership for Sustainability in Higher Education*. Available at: <https://doi.org/10.5040/9781350006133.ch-001>.
- Lessing, A. & de Witt, M. (2007). The value of continuous professional development: teachers' perceptions. *South African Journal of Education*, 27(1), 53-67.
- Lin, C. J., & Lukodono, R. P. (2021). Sustainable human-robot collaboration based on human intention classification. *Sustainability*, 13(11), 5990.
- Lo, Y. Y. (2020a). An empirical study on professional development programmes for CLIL teachers. In *Professional Development of CLIL Teachers*, 113-140.
- Lo, Y. Y. (2020b). Theoretical models of professional development programmes for CLIL teachers. In *Professional Development of CLIL Teachers*, 95-112.
- Luneta, K. (2012). Designing continuous professional development programmes for teachers: A literature review. *Africa Education Review*, 9(2), 360-379.
- Mansoor, S. (2010). *Faculty development in higher education*. Available at: <http://www.pakistanherald.com/article/faculty-development-in-higher%20education>.
- Mathib, I. (2007). The professional development of school principals. *South African Journal of Education*, 27(3), 523-540.
- McGowan, H. & Shipley, C., (2015). *Work to learn: The future of work is learning*. Available at: <https://www.futureislearning.com/>.
- Mdluli, S., & Makhupe, O. (2017). Defining leadership competencies needed for the fourth industrial revolution: Leadership competencies 4.0. *Duke CE*, 1-13.
- Melber, H. (2020). Knowledge production and decolonisation — NOT only African challenges. *The Strategic Review for Southern Africa*, 40(1).
- Mestry, R. (2021). School leadership and financial management. In *School Leadership for Democratic Education in South Africa*, 231-246.
- Mestry, R. & Singh, P. (2007). Continuing professional development for principals: A South African perspective. *South African Journal of Education*, 27(3), 477-490.

- Naicker, S. R., & Mestry, R. (2013). Teachers' reflections on distributive leadership in public primary schools in Soweto. *South African Journal of Education*, 33(2), 1-15. <https://journals.co.za/doi/abs/10.10520/EJC134986>.
- Naidoo, V. & Potokri, O. C. (2021). Female School Leaders and the Fourth Industrial Revolution in South Africa. *International Journal of Innovation, Creativity and Change*, 15(10), 162-180.
- Netolicky, D. M. (2016). Rethinking professional learning for teachers and school leaders. *Journal of Professional Capital and Community*, 1(4), 270-285.
- Norazana, M. N., & Zabidi, A. R. A. (2021). Leadership as a priority area of school improvement. *Jurnal Pengurusan Dan Kepimpinan Pendidikan*, 34(2), 16-30.
- Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic analysis. *International Journal of Qualitative Methods*, 16(1), 160940691773384.
- Ndung'u, N., & Signé, L. (2020, February 7). *The fourth Industrial Revolution and digitization will transform Africa into a global powerhouse*. Available at: <https://www.brookings.edu/research/the-fourth-industrial-revolution-and-digitization-will-transform-africa-into-a-global-powerhouse/>.
- Nkambule, B. I. (2020). *Knowledge management application in township schools: a case study of emalaheni circuit 1, 2 and 3*. University of South Africa. Available at: <https://uir.unisa.ac.za/handle/10500/27219>.
- Nuttall, J., Henderson, L., Wood, E., & Trippestad, T. A. (2020). Policy rhetorics and responsabilization in the formation of early childhood Educational Leaders in Australia. *Journal of Education Policy*, 37(1), 17-38.
- OECD (2014). *Barriers to principals' participation in professional development*. Available at: <https://doi.org/10.1787/9789264196261-table148-en>.
- OECD (2017). *Policies addressing skills imbalances in South Africa in Getting Skills Right: South Africa*. Paris: OECD Publishing. Available at: <https://doi.org/10.1787/9789264278745-6-en>.
- Othman, A., & Abd Rahman, H. (2013). Innovative leadership: Learning from change management among Malaysian secondary school principals. *World Applied Sciences Journal*, 23(2), 167-177.
- Ramaphosa, C. (2020, February 7). *A national strategy for harnessing the fourth Industrial Revolution: The case of South Africa*. Brookings. Available at: <https://www.brookings.edu/blog/africa-in-focus/2020/01/10/a-national-strategy-for-harnessing-the-fourth-industrial-revolution-the-case-of-south-africa/>.
- Rasool, F., & Botha, C. J. (2011). The nature, extent and effect of skills shortages on skills migration in South Africa. *SA Journal of Human Resource Management*, 9(1).
- Raza, N. A. (2010). *The impact of continuing professional development on EFL teachers employed in federal universities in the United Arab Emirates*. Doctoral Thesis. United Kingdom: The University of Exeter.
- Reaves, J. (2019). 21st-Century skills and the fourth industrial revolution: A critical future role for online education. *International Journal on Innovations in Online Education*, 3(1).
- Robinson, V. (2007). *The impact of leadership on student outcomes: Making sense of the evidence*. Research Conference Paper. The Leadership Challenge: Improving Learning in Schools. Australian Council for Educational Research.
- Robinson, V. (2011). *Student-centred leadership*. San Francisco: Jossey-Bass.
- Rogers, K. S. (2011). Leading sustainability. In W. H. Mobley, M. Li, & Y. Wang (eds.), *Advances in Global Leadership*, 137-153. Emerald.
- Santini, A. (2018). The importance of referencing. *The Journal of Critical Care Medicine*, 4(1), 3-4.

- Sarbeng, I. B. (2013). Staff training and development interventions and teaching performance: Application of structural equation modeling. *International Journal of Human Resource Studies*, 3(4), 159-176.
- Schein, S. (2015). Ecological worldviews: A missing perspective to advance global sustainability leadership. *Journal of Management for Global Sustainability*, 3(1), 1-24.
- Shaikh, A., Bisschoff, C. A., & Botha, C. J. (2018). Measuring management and leadership competencies of business school educated managers in South Africa. *Journal of Business & Retail Management Research*, 13(2).
- Sofu, F., & Abonyi, U. K. (2017). Investigating the self-reported professional development activities of school leaders in Ghanaian rural basic schools. *Professional Development in Education*, 44(4), 521-538.
- Steyn, G. M. (2008). Continuing professional development for teachers in South Africa and social learning systems: Conflicting conceptual frameworks of learning. *Koers* 73(1), 5-31.2
- Teacher American Association of Colleges of (P21) and Education and the Partnership for 21st Century Skills (2010). *21st century knowledge and skills in educator preparation*. Available at: <https://files.eric.ed.gov/fulltext/ED519336.pdf>.
- Terzi, A. R. & Derin, R. (2016). Relationship between democratic leadership and organizational cynicism. *Journal of Education and Learning*, 5(3), 193-204
- Tigere, M. T. (2020). *Perceptions of school management teams on information and communication technology integration in township and rural secondary schools in Kwazulu-Natal*. University of South Africa. Available at: <https://uir.unisa.ac.za/handle/10500/27962>.
- Tingle, E., Corrales, A., & Peters, M. L. (2017): Leadership development programs: investing in school principals, *Educational Studies*, 45(1), 1-16.
- The Wallace Foundation (2013). *The school principal as leader: Guiding schools to better teaching and learning*. New York: The Wallace Foundation.
- Tran, H. N., Nguyen, C. D., Nguyen, G. V., Ho, T. N., Bui, Q. T. T., & Hoang, N. H. (2020). Workplace conditions created by principals for their teachers' professional development in Vietnam. *International Journal of Leadership in Education Theory and Practice*, 25(2), 238-257.
- Tsotetsi, C. T. (2013). *The implementation of professional teacher development policies: A continuing education perspective*. Doctoral Thesis. Bloemfontein: University of the Free State.
- Usman, A. K. (2016). *Professional development, instructional leadership, and learning transfer systems of leaders in Ghanaian basic schools*. Unpublished Doctoral Dissertation. University of Canberra.
- Uworwabayeho, A., Flink, I., Nyirahabimana, A., Peeraer, J., Muhire, I., & Gasozi, A. N. (2020). Developing the capacity of education local leaders for sustaining professional learning communities in Rwanda. *Social Sciences & Humanities Open*, 2(1), 100092.
- VVOB Rwanda (2019). *Integrating ICT in continuous professional development of teachers and school leaders*. VVOB Rwanda | Education for Development.
- Whittle, S., Colgan A., & Rafferty M. (2012). *Capacity building: What the literature tells us*. Dublin: The Centre for Effective Services.
- Wiseman, A. W. (2014). Globalization and changes in school governance. In *Second International Handbook on Globalisation, Education and Policy Research*, 681-693.
- Witziers, B., Bosker, R. J., & Krüger, M. L. (2003). Educational leadership and student achievement: The elusive search for an association. *Educational Administration Quarterly*, 39(3), 398-425.

- World Economic Forum (2017). *Accelerating workforce reskilling for the fourth industrial revolution: an agenda for leaders to shape the future of education, gender and work*. Switzerland: World Economic Forum.
- World Economic Forum (n.d.). *The fourth Industrial Revolution: What it means and how to respond*. World Economic Forum. Available at: <https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/>.
- Xiaolan, F. (2020). Opportunities and challenges of the fourth industrial revolution for Africa. In *Innovation Under the Radar he Nature and Sources of Innovation in Africa*, 303-314. UK: Cambridge University Press.
- Yu, M. (2016). On the Analysis about the feasibility of applying flipped classroom in college English writing. *International Journal of Education and Research*, 4(11), 239-246.
- Zaccaro, S. J., & Rittman, A. & Marks, M. A. (2001). Team leadership. *The Leadership Quarterly*, 12(4), 451-483.