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Challenges in Equipping Learners for the Fourth Industrial Revolution: School Leaders' and Teachers' Powerlessness

Ntombenhle Sylvia Mlangeni[a] & Sadi Seyama-Mokhaneli*[b]

* Corresponding author
Email: sseyama@uj.ac.za

a. Ekurhuleni West College, South Africa.

b. University of Johannesburg, Auckland Park Campus, South Africa.

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ABSTRACT

The work landscape is evolving with the advent of the Fourth Industrial Revolution (4IR), potentially rendering current jobs obsolete and necessitating new skills or retraining of existing occupations for future employment. This revolution is disrupting nearly every sector, including education, highlighting the need for education to address issues like unemployment, poverty, and inequality. However, to adequately prepare learners, this can only be achieved with sufficient material and human resources. Understanding these dynamics is crucial in determining whether school leaders and teachers possess the power or autonomy to develop the necessary knowledge, skills, and competencies to empower learners for the 4IR. Power, the ability to achieve organizational objectives, is essential for school leaders and teachers responsible for information and communication technologies in schools to acquire the resources and competencies needed for the 4IR. Drawing on critical theory, this qualitative study explores how school leaders and teachers experience powerlessness due to the challenges they encounter in preparing learners for the 4IR. Semi-structured interviews facilitated participants' reflections and meaning-making of their experiences in this regard. The critical analysis of data yielded themes that underscore the complexities of preparing learners for the 4IR in underserved contexts ill-equipped for such endeavours: time constraints; teacher uncertainty; insufficient infrastructure, incapacitating influence of powerful top management; and detrimental control of district circuits. Participants felt constrained within their job descriptions, lacked the freedom to exert authority over their work, and faced obstacles in making independent decisions and implementing necessary changes.

KEYWORDS

4IR; digital skills; learner preparation; power; powerlessness.

INTRODUCTION

Multiple studies validate the necessity for a broad skill set in response to the Fourth Industrial Revolution (4IR) (Makgato, 2019). The Organization for Economic Co-operation and Development [OECD] (2018) identifies the necessary skills for this technological revolution as "cognitive and metacognitive skills such as critical thinking, creative thinking, learning to learn, and self-regulation; social and emotional skills such as empathy, self-efficacy, and collaboration; and practical and physical skills such as using information and communication technology devices" (p. 5). Furthermore, additional skills needed include "cloud computing, 3D printing, and coding/programming/robotics" (Makgato, 2019, p. 7). In South Africa, school leaders and teachers faced significant obstacles in offering sufficient remote or online education to their learners during the COVID-19 pandemic (Soudien et al., 2021). Learner preparation for the 4IR necessitates resources like internet connectivity and network capacity, which remain inaccessible to most learners in the country's township and rural schools (Mhlanga & Moloi, 2020). The education of many learners from disadvantaged communities suffered, leaving them at a disadvantage, indicating a bleak outlook for their future amid the rapid advancement of technological learning. Soudien et al. (2021) note that learners from underprivileged communities could not communicate with their teachers, hindering their ability to pursue education from home.

A primary apprehension revolved around teachers' capacity to conduct online instruction without the requisite digital competencies (Soudien et al., 2021). Teachers expressed concern over the insufficient training opportunities in digital competencies necessary for online instruction. Many school leaders and teachers feel ineffective in such situations, lacking the authority to obtain essential resources needed to equip learners for the 4IR (Seyama, 2021). Notably, learners missed out on acquiring critical digital competencies crucial for contemporary and future employment development and opportunities. Hindered in their ability to act autonomously in addressing and adapting to the demands of preparing learners for 4IR, leaders and teachers experienced feelings of detachment and disconnection from their roles.

Powerlessness is the privation of autonomy and involvement in a work environment (Chervie, 2015). It follows when individuals find themselves in circumstances where they are unable to act – they cannot make independent decisions and implement those decisions to achieve particular outcomes. However, when people are enabled, they have choices and are the initiators of their own actions (Chervie, 2015). Embedded in autonomy is participation, which pertains to the extent or scale of influence an individual possesses in shaping planning, administration, and operational decisions (Ashforth, 1989). Autonomy and participation play crucial roles in organizations by fostering active engagement among their members (Gagné & Bhave, 2011), granting individuals feelings of inspiration and emancipation. Makoelle and Makhalemele (2020) submit that South Africa's hierarchical and bureaucratic educational structures and systems limit teachers' agency, hindering their ability to exercise autonomy. Drawing on critical theory for a theoretical foundation, the study sought to answer the research

question, “What are school leaders’ and teachers’ experiences of powerlessness in preparing learners for the 4IR?”

The paper is structured as follows: There is a brief overview of the South African school’s complex context of providing quality future-fit education for all, followed by an examination of the literature on preparing learners for the 4IR and the related threats and opportunities. The next section engages a literature review on power, work alienation, and powerlessness in organizations, leading to the engagement of the underpinning assumptions of critical theory and its relevance in exploring powerlessness. The following part encapsulates the methodological explication, proceeding with the discussion of findings. Lastly, the conclusion synthesizes the paper’s arguments, implications, limitations and recommendations for future research.

LITERATURE REVIEW

Preparing learners for the 4IR: A South African perspective

The South African government has undertaken efforts to equip learners for the 4IR. Through partnerships with corporate entities and the integration and adaptation of successful practices from abroad, encouraging steps are being taken to prepare South African learners, teachers, and school leaders and managers for the 4IR.

Operation Phakisa in ICT education

In 2015, ministers Jeff Radebe and Angie Motshekga inaugurated Operation Phakisa, an ICT education initiative orchestrated by the government’s Department of Planning, Monitoring, and Evaluation [DPME] (2017). This initiative is designed to prepare learners for the 4IR by equipping teachers with training and supplying schools with essential resources (DPME, 2017). Its strategy includes revolutionizing teaching, learning, and administrative processes to pivot the education sector towards a more data-centric approach (Kwet, 2017).

Key achievements include (Kwet, 2017, p. 1):

- Schools received mobile trolleys equipped with technology tools including tablets, laptops for teachers, printers, a projector, a server, wireless access points, and an e-beam to support digital learning.
- Educational content is broadcasted through partnerships with TV broadcasters like DSTV, OVHD, Starset, and Mindset, via a dedicated education channel.
- A collaboration with Intel and the Department of Telecommunications and Postal Services provided ICT skill training to 258 district officials.
- Partnerships with Microsoft and Education, Training and Development Practices Sector Education and Training Authority enabled extensive ICT skills training for teachers, with 6,394 teachers receiving ICT training, 21,375 undergoing basic computing training, and 3,517 teachers advancing their ICT skills, aiming to improve the integration of ICT in education.

These measures target the five critical areas identified by Operation Phakisa for transforming education: “internet connectivity, devices, teacher professional development, digital content development and distribution, and E-administration” (DPME, 2017).

4IR threats and opportunities to education

Change is a constant force, presenting both threats and opportunities. The existing educational landscape in South Africa is cause for concern, and the 4IR should not be viewed as a panacea for its shortcomings. Instead, it could empower learners from diverse backgrounds, providing them with opportunities to thrive in the workforce and society.

Threats: Inequality and the digital divide

Approximately four billion individuals worldwide lack internet access, indicating significant disparities in connectivity (Sunganya, 2017). This digital divide reflects broader racialized socio-historical inequalities. The 4IR is poised to perpetuate this pattern, as those with financial means will be better positioned to obtain the necessary infrastructure to participate (Kayembe & Nel, 2019). The COVID-19 pandemic further underscored socio-economic disparities, particularly in disadvantaged schools, where the lack of resources hindered the transition to online learning during lockdowns (Mhlanga & Moloi, 2020). While some institutions were able to adapt, others were forced to close until restrictions eased, widening the gap between schools with and without adequate facilities.

Threats: Lack of funding and infrastructure

Sunganya’s (2017) research highlighted the issue of insufficient funding as a significant hurdle for the education sector. Despite allocations in the national budget, the resources needed to provide high-quality, sustainable tools for all learners to engage in the 4IR are considerable (Kayembe & Nel, 2019). The gap in infrastructure, particularly in rural and township schools, presents a major obstacle (Nhlumayo, 2024). Kekana (2019) cites Professor Nosisi Feza, who points out that South Africa should prioritise resolving its immediate problems over succumbing to the allure of the 4IR. The absence of third industrial revolution infrastructure, like computers and printers in rural schools, must be addressed before these communities can realistically participate in the 4IR (Nhlumayo, 2024).

Opportunities: Collaboration as an opportunity for education

Partnerships between stakeholders, including private companies and government entities, offer promising avenues for addressing social exclusion through education (Kekana, 2019). These collaborations can facilitate the acquisition of 4IR skills for their learners by enabling schools with limited resources to secure sponsorships. Nhlumayo (2024) highlights the efficacy of the triple helix model, which underscores the synergy between higher education, businesses, and government, emphasizing its importance in the context of the 4IR. Bakar and Rashid (2015) found that educational collaborations with companies can equip learners with specific occupational skills by enhancing the quality of graduates entering the workforce. During the national COVID-19 lockdown, the government facilitated remote learning through radio and

television broadcasts, partnering with broadcasting companies like DSTV and SABC (Mhlanga & Moloi, 2020).

Power

Power plays a crucial role in organizations as it motivates or persuades individuals to undertake actions they might not otherwise pursue (Anderson & Brion, 2014). Consequently, it ensures that people fulfil their assigned performance duties, contributing to achieving the organization's overall strategic objectives. Various scholars note that defining power is challenging (Anderson & Brion, 2014). The varied interpretations of power depend on factors such as level, context, and resource distribution (Dundon et al., 2017). However, power is traditionally characterized as an unequal influence over desired outcomes and resources (Joshi & Fast, 2013). De Wit et al. (2017) observe that power operates in several ways, including upward control (subordinates' influence over superiors), lateral control (peer influence), and downward control (supervisory influence). Power can be communicated individually or collectively, protecting or advancing specific interests and influencing decisions directly and indirectly (Dundon et al., 2017).

The construction of power by those in authority can take different forms. De Wit et al. (2017) suggest that individuals may employ structural and psychological power. Conversely, Kovach (2020), drawing from French and Raven's (1959) power dynamics, argues that power can be established either formally or informally. Structural power pertains to the visible control of valuable resources, such as the ability to administer rewards or penalties or possession of crucial knowledge (Kovach, 2020). Psychological power encompasses aspects like conscious evaluation of one's influence capacity (sense of power) and an unconscious network of power-related notions (De Wit et al., 2017).

Kovach (2020) revisits the foundational work on power by French and Raven (1959), highlighting five primary types: referent, expert, legitimate, reward, and coercive power, and categorizes them into formal or informal power structures. Robbins and Judge (2013) expand this framework by introducing information and connection power, classifying all types based on their nature as soft or hard power, and their potential positive or negative impacts. Referent, expert, connection, and information powers are seen as forms of informal power, with referent power arising from an individual's ability to gain respect and admiration, expert power coming from specialized knowledge or skills, connection power building on valuable relationships, and information power on quicker or just access to information than others. Power is seen as a crucial tool for managing relationships, resolving conflicts, and boosting organizational performance (Joshi & Fast, 2013).

Workplace alienation and powerlessness

Work alienation is identified as a gap between employees' job role perceptions, their work environment, and their expectations for autonomy and professional advancement, leading to dissatisfaction with their careers and failure to meet professional standards (Aiken & Hage,1966; Tummers et al., 2014). It occurs when individuals see their jobs merely as a source of income, disconnected from other life aspects or workplace involvement opportunities (Sarros

et al., 2002). Stemming from Marx's theories, alienation includes a detachment from the work itself and workplace relationships (Aiken & Hage, 1966). It is believed to result from socio-structural factors within the organizational context that limit personal autonomy and decision-making, with organizational characteristics like centralization and formalization cited as contributing factors (Sarros et al., 2002). Centralization is a hierarchical authority structure determining the degree of participatory decision-making within an organization—tasks are assigned with superiors' intervention and the extent of participation in policy and goal setting (Aiken & Hage, 1966; Sarros et al., 2002)). In this study, centralization refers to the top-down decision-making process by government and national education departments for schools, leading to the powerlessness of those down the hierarchical ladder.

Powerlessness is characterized by a lack of involvement and independence (Ashforth, 1989), arising when employees feel disconnected from their work because of limited control over their job responsibilities (Tummers et al., 2014). Dagli and Averbek's (2017) examination of the link between teachers' organizational conduct and work alienation revealed a positive correlation between negative teacher behavior and powerlessness. This suggests that teachers may respond negatively if they perceive a lack of autonomy in their workplace. Furthermore, powerlessness can stifle self-expression as individuals cannot exert control and find significance in their work tasks (Dagli & Averbek, 2017). Sarros et al.'s (2002) findings highlight how powerlessness restricts employees' ability to influence their work. Similarly, autonomy and participation are highlighted as crucial in organizations, fostering engagement and instilling a sense of empowerment in individuals (Gagné & Bhave, 2011).

THEORETICAL FRAMEWORK

Critical theory

Critical theory emerged from the Frankfurt School, a group of scholars who aimed to develop Marxist studies in Germany in 1923 (Kincheloe & McLaren, 2011). The Frankfurt School sought to address the challenges posed by the industrialized economy and the increasing power of capitalism through multidisciplinary intellectual engagement (Garlitz & Zompetti, 2021). Mass production played a pivotal role in shaping their theory, as they observed how it perpetuated the ideologies of those in power (Garlitz & Zompetti, 2021). Their focus was on studying the societal conditions leading to social change and exposing the harmful psychological impacts of contemporary capitalism, particularly its cultural and ideological aspects (Kincheloe & McLaren, 2011).

Horkheimer argues that traditional theory failed to challenge societal norms and power structures due to its lack of an interdisciplinary perspective (Harris, 2014). Unlike traditional researchers, who focus on describing and analysing phenomena to recreate or reinforce existing realities, critical researchers aim to reveal and dismantle oppressive social power dynamics (Murphy & Fleming, 2010). They aim to spur actions that liberate individuals from these constraints (Kincheloe & McLaren, 2011).

Critical theory, as a socio-political framework, acknowledges that reality is shaped by the dominant discourse of power across various aspects of culture, society, politics, economy, class, gender, race, and ethnicity (Garlitz & Zompetti, 2021). It scrutinizes how power dynamics lead to oppression in society and questions the normalization of oppressive structures (Harris, 2014). It aims to raise awareness about injustices such as inequality and discrimination while advocating emancipation (Murphy & Fleming, 2010). Three key components of critical theory are hegemony, ideology, and linguistic or discursive power. Hegemony examines the utilization of power within society, particularly how dominance is established through ideology (Kincheloe & McLaren, 2011). Ideology instils uncritical faith in systems like capitalism, which critical theorists aim to critique as it perpetuates what Marx termed "false consciousness" (Bohman, 2021). These ideologies are reinforced through language, and critical theory seeks to challenge and transform misconceptions and ignorance into informed consciousness, thereby highlighting the potential for change (Bohman, 2021).

Several studies emphasize the importance of education in readying learners for the 4IR. However, these studies overlook whether educational institutions empower teachers to prepare learners adequately. Teachers and school leaders often lack autonomy and are marginalized in decision-making processes. Therefore, critical theory is crucial in research to amplify the voices of marginalized groups, a perspective traditionally overlooked in conventional research.

METHODOLOGY

The study drew on the critical social constructivist paradigm which challenges hegemonic prevailing norms and opens possibilities for envisioning different ways of living by questioning mainstream views (Asghar, 2013). This paradigm examines how meanings are constructed and linked to various social identities, influencing specific interpretive frameworks that enable certain outcomes while preventing others (Børsen, 2020). The research employed a generic qualitative design to understand individuals' daily activities and significance (Creswell & Poth, 2018). It also allows participants to engage authentically, enabling the researcher to capture detailed and meaningful insights (Creswell & Poth, 2018), thereby accessing participants' subjective, unique experiences and viewpoints.

The study received ethical approval from the university's ethics committee (September 2022, number Sem 2-2022-044) and the provincial Department of Education. Using purposive sampling, the researcher selected 10 participants from a group of teachers and school leaders enrolled in an online coding and robotics course, based on their active involvement in ICT departments and their role in teaching 4IR skills. These participants were considered to have valuable insights due to their prominent roles in ICT initiatives at their schools (Creswell & Creswell, 2018). They were all certified teachers, working in various educational settings including rural, public, and private schools, aged between 25 to 45 years, with teaching experience ranging from two to 20 years.

Table 1.

Participants' Biographical details

Pseudonym	*Gender*	*Years*	*Years in education*	*Qualification*	*Rank*
A.	Male	28	5	B.Ed. Degree	ICT Coordinator
B.	Female	32	5	B.Ed. Honours	Assistant Principal
C.	Male	32	7	B.Ed. Honours	STEM Teacher Traineer: Anglo America
D.	Male	45	20	Honorary Doctorate	ICT Co-ordinator
E.	Female	28	5	B.Ed. Honours	Teacher
F.	Female	28	6	B.Ed. Degree	IC Co-ordinator
G.	Male	25	2	B.Ed. Degree	ICT Co-ordinator
H.	Male	25	2	B.Ed. Degree	Teacher
I.	Female	35	8	B.Ed. Honours	Teacher
J.	Male	30	6	B.Ed. Honours	Teacher

Source. Own research.

The potential participants were initially contacted through phone calls and text messages. The researchers employed semi-structured interviews, allowing flexibility and depth in probing participants' responses. By enabling participants to express their experiences in their own words, semi-structured individual face-to-face interviews facilitated the generation of rich, credible research findings aligned with qualitative research principles. The interviews were recorded, transcribed verbatim, and checked by participants and the supervisor. Findings were interpreted through the theoretical framework, with insights drawn directly from participants' voices and presented as quotations to ensure the trustworthiness of the research.

The study employed thematic analysis to examine the data detailing participants' experiences. According to Braun and Clarke (2006), thematic analysis is instrumental when the goal is to delve into or unpack participants' lived realities. This approach aligns with the study's objective to explore the feelings of powerlessness and the obstacles educators encounter in equipping students for the 4IR. Thematic analysis was conducted in three phases (Creswell & Creswell, 2018): the initial phase involved compiling, where data was collected and organized; this was followed by disassembling, where the data was broken down, coded and categorized into significant segments; and the final phase was reassembling, where these categories were contextualized and interpreted in terms of their overarching themes, presented below as findings.

The study ensured trustworthiness by following principles of credibility, dependability, transferability, and confirmability (Merriam & Tisdell, 2016). Credibility was established through member checks, where participants validated their responses using interview transcripts and emerging themes, acknowledging data subjectivity. Transferability was addressed by providing

a comprehensive study overview, including sample details, interview settings, and procedures, enhancing applicability to similar contexts. Confirmability was achieved through participant verification of transcripts to maintain data accuracy, while emphasizing participant voices maintained the study's authenticity and integrity.

FINDINGS

The challenges school leaders and teachers face in implementing technology-driven education, particularly when preparing for the 4IR, are multifaceted. School leaders and teachers were confronted with a lack of job autonomy and participation in the difficult setting of inadequate resources and limited digital skills for preparing learners for the 4IR. The following key themes were identified: time constraints; teacher uncertainty; insufficient infrastructure; incapacitating influence of powerful top management; and detrimental control of district circuits.

Time constraints

Participants reflected on the time impact of online and traditional classroom teaching methods on learner engagement levels. While online instruction requires less direct teaching time compared to in-person sessions, significant time is consumed in administrative tasks, including setting up necessary online infrastructure and training teachers for online delivery. A common concern among participants was the challenge of integrating 4IR technologies into existing teaching schedules, questioning if the current allocation of time allows for learners' effective knowledge and skill acquisition:

> *"There's no time to teach coding and robotics in the timetable, which means that the way I do it during contact time, I'm going to teach the learners, and then after school, that's when I'm able to teach this coding and robotics."* Participant G (teacher)
>
> *"We are restricted in things like the timetable. Sometimes you look, and you see that this kid needs help with basic things like typing skills and navigating a computer, and yet the timetables say it's now time for social skills.* Participant B (assistant principal)
>
> *"I think teaching using technology is also a double-edged sword. It saves a lot of time because you get to the classroom now - it saves time than writing on the board once done, but it consumes time when preparing."* Participant D (ICT coordinator, teacher)
>
> *"While technology simplifies many tasks, preparing for classes still demands a lot more time and energy."* Participant I (teacher)

Participants acknowledged the influence of technology-enhanced education on curriculum and scheduling, noting that while digital instruction can sometimes save time, the preparation and administrative tasks require more effort. In addition, the existing timetable constraints made it challenging to incorporate 4IR-specific knowledge into the curriculum, limiting teachers' and administrators' ability to make curriculum adjustments.

Teacher uncertainty

As the educational landscape evolves and teachers transition from traditional methods to new approaches, many experience anxiety and apprehension. Technological advancements have heightened uncertainty, particularly among older teachers, while younger teachers adapt more readily to ICT use. Participant C noted that they and their colleagues often feel the need to build confidence in using technology, especially when faced with learners who are more proficient with it:

> *"And there are still teachers who are not confident enough to implement what they've learned in their training. Some teachers are willing to do the work but have problems with implementation. It's not about what we are saying to the teachers, or it's about the willingness of teachers to embrace… 4IR. Most of them do say that they love this - this is a good thing."* (ICT teacher trainer)

There is a noticeable generational gap in technology adoption among teachers. Most participants, around 90%, were young and had been teaching for less than five years, many of whom held ICT coordinator positions. This highlights the need for older teachers to exhibit greater willingness and confidence in embracing technology. During training sessions, it was observed that older teachers often defer to their younger counterparts who assume leadership roles. Participant E, a teacher and ICT coordinator, highlighted this issue, noting:

> *"Most teachers still believe technology is for the youth."*

Participant A, who had served as an ICT coordinator for five years, described the breadth of responsibilities associated with their role because most older teachers lack ICT competencies:

> *"I'm the coordinator for ICT in this school. I'm responsible for everything that has to do with ICT in the school, from your internet connectivity. If it's down, I have to ensure there is Internet connectivity. I am also responsible for the administration that has to do with ICT devices given to learners."*

Participant F, a teacher, reflected on the resistance to change encountered during training sessions, noting:

> *"Of course, there were a lot of backlashes because of how we become resistant to change at first, then finally get accepted. I noticed through the training that some older teachers felt that learning some applications was a waste of time."*

The teachers' generation divide is evident in the adoption of technology leaving the younger generation taking the lead in serving as ICT coordinators. The older generation are the laggards, placing more ICT responsibility on their younger teachers. This underscores the importance of older teachers displaying more readiness and assurance in embracing technology.

Insufficient infrastructure

Participants highlighted the challenge of insufficient infrastructure, noting that it hinders schools and learners from competing on an equal footing with those having the resources to equip their learners for 4IR advancements. A significant barrier nationwide is the limited access to internet connectivity, which is crucial for equipping learners with the necessary tools for the

4IR. This issue affects urban and rural schools, but rural schools face a more acute challenge, significantly hindering their efforts to impart 4IR knowledge and skills to their learners. Two participants reported the following hindrances:

> *"Again, there is the issue of Internet connectivity at home, and most parents do not have Wi-Fi at home as they are not working. Since I'm teaching in a rural village, I…find that when you want to do some stuff online, let's say on Teams, or you want to have a virtual meeting with your kids, you can't. If you want to explore something or even expose them to international opportunities virtually, we find that they always complain about data."* Participant D (teacher, ICT coordinator)
>
> *"For example, the first thing they must do at my school or around the community where I work is electricity. There is no electricity for some of the homes."* Participant F (teacher)
>
> *"We are supposed implement 4IR, however, we struggle with electricity."* Participant H (teacher)

Addressing the question of the adequacy of government efforts in providing quality devices to schools, participants pointed out that despite government efforts, the quality of the resources supplied often falls short:

> *"Like I'm saying, quality is compromised. That's the major challenge I had to face in preparing these learners because if you're going to prepare them, you need to show them something that must be appropriately made for them to understand and use quality products. The product has been compromised and is a huge blow on its own."* Participant A (teacher, ICT coordinator)
>
> *"Within the service provider, there's a lack of quality. Quality assessment is poor. It's not on point because buying a Dell or HP laptop will last for a long time. But after a year, these laptops are not working. You take it back, and then it takes time to come back again."* Participant G (teacher)

The integration of the 4IR technologies such as the Internet of Things, robotics, coding, and artificial intelligence into education necessitates robust infrastructure. However, participants faced numerous inadequacies – unstable internet connectivity and electricity supply, and poor-quality devices.

Incapacitating influence of powerful top management

Numerous participants expressed frustration over not being involved in decision-making processes, highlighting the impact of these decisions on their daily responsibilities since they are directly affected. Participant D recounted how the principal's approach to leadership significantly hampers his ability to excel within his own school, leading him to share his expertise and collaborate with other schools instead. He shared his thoughts on the diminishing sense of autonomy following the demise of the former principal:

> *"So, back then, I used to have all the freedom to act. Even during the meetings, I'll always be given a place to voice my opinion. And now, since we have a new principal, I'm not sure if she wants us to feel she is in charge.... Sometimes, I feel like I don't have the*

freedom to act. But then, even if I didn't have freedom, I would instead do it with people who didn't know me because I'm doing many things. So, I would visit a different district to run those trainings – and invite different circuit managers. Sometimes, my school makes it a point to make one feel like they are not welcome to do a lot of stuff. … Like I said earlier on, I feel like they're being threatened…" (teacher, ICT coordinator)

Participant B, serving as an assistant principal in a private school, expressed that the central school administration holds the highest authority in shaping the operational dynamics of the school. He explained:

"Sometimes, as the people working on the ground, you may see and understand things very differently from how they may be seen high above, and a lot of the time you cannot do anything about it. So yeah, I felt quite powerless quite a lot."

Participant C expressed a sense of powerlessness when he finds himself sidelined by top management, despite holding a position on the School Governing Body (SGB) that theoretically grants him involvement in decision-making processes.

"Well, we know the politics. You find that your seniors feel you are a threat to them. Sometimes, I'm shocked that I am an SGB member, but I'm not part of the decision-making team. Because most things just come to me as a report to say we have done this and that. I don't get an opportunity to be approached for input. But then I understand because it's the kind of politics we have with this call." (ICT coordinator)

Participant A expressed feeling exploited by top management, who would sometimes overload him with tasks, leaving him feeling powerless and overburdened by his workload.

"I don't know; sometimes, you might feel like someone is taking advantage of you. I'm very receptive when it comes to being corrected. … I always view things positively. And if someone is crushing my ideas, I always want to see things from their point of view.... Maybe at that moment when it happened, I did feel powerless. (teacher, ICT coordinator)

Participants observed that job descriptions and titles can create a dynamic where those in higher positions may only consider the ideas of their subordinates if they perceive a benefit to themselves, believing their status grants them the authority to decide. Participant D shared:

"They need to understand that they are the management, which is their responsibility. So, there's no way a CS1 teacher can come and occupy their responsibilities. However, then I feel they need to give the teachers an opportunity. In most of these schools, I believe they don't progress because a lot of people with expertise are not given an opportunity." (teacher, ICT coordinator)

Numerous participants expressed frustration at being left out of decision-making processes, noting the direct impact on their daily tasks, and feeling overwhelmed by work. They decried how job titles seem to grant senior leaders' undue authority, and how this and the principals' leadership styles limit their potential and autonomy.

Detrimental control of district circuits

Participants highlighted the significant influence that district offices, through the officials and the education department, exert over schools, limiting their autonomy and participation in decision-making processes. Participant A provided insight regarding this matter:

> *"There's not much freedom in our decisions or actions; we are quite limited by the policies and all those things."* (teacher, ICT coordinator)

Another governance issue contributing to powerlessness in schools is the delay in responses from district offices to equipment requests and the mismanagement of resources, leading to certain schools receiving resources while others in the same district do not. Participant F, a teacher in a rural school, mentioned their unsuccessful attempts to acquire the resources:

> *"It was 2020 when we ordered laptops. We don't have laptops, and I use my one. So, we ordered almost a full year of going back and forth, but no laptops. The purpose behind requesting laptops was to initiate computer education for the learners… It is quite challenging to implement things or put some effort while the districts and departments on their ends are not trying to assist."*

Participant G expressed concerns about the mismanagement of resources, particularly in how equipment is allocated to different schools and how budgets are designated for schools to procure such equipment:

> *"Corruption plays a role because there are some schools that get allocated nice budgets and get the necessary devices. While other schools are not allocated any, and you find out that schools are allocated this much money, even if the number of learners is the same"* (ICT coordinator)

Participant J complained of being frustrated and completely incapable of getting anything done**.** Participant A also voiced concerns about the district offices' slow and uninformed decision-making regarding implementing the 4IR in South Africa, leaving school leaders and teachers feeling powerless.

> *"They need to make good, informed, and proper decisions. I'm looking at the programmes where they distribute tablets in schools and all that. You can tell that quality is compromised somewhere; somehow, you understand in terms of these things. So, there's someone who heard something, but they have no idea what this is, so they decided without assessing everything."* (ICT coordinator, teacher)

Participants expressed frustration over district officials' authoritarian approach while lacking insights into 4IR needs in equipping schools and preparing learners. They also mismanage resources and lack the flexibility to address the unique needs of their schools, which hinders effective preparation for the 4IR. When schools cannot govern themselves, their freedom to act and make decisions is restricted, impeding progress in preparing learners for the 4IR.

Discussion of Findings

The 4IR demands that education systems equip learners with skills for the future workforce. School leaders, teachers, and stakeholders must proactively prepare learners for the evolving global economy (Alharthi, 2021). This entails active participation in decision-making, validation of decisions, and granting autonomy. Therefore, organizational power dynamics are pivotal in ensuring learners are ready for the challenges and opportunities of the 4IR. South African schools operate within a hierarchical structure, with power dynamics and accountability heavily influenced by bureaucratic systems. The Department of Education and district offices wield significant power, controlling policies and resources that trickle down to schools (Makoelle & Makhalemele, 2020). Principals, School Management Teams, and SGBs lead implementation efforts at the school level, while teachers have less power within this hierarchy. This hierarchical organization underscores the control that higher authorities exert over resources, shaping their influence on school leaders and teachers in the context of the 4IR.

The participants in the study noted various challenges and attitudes towards integrating technology and preparing learners for the 4IR. While some teachers were willing to embrace technological advancements, many struggled with confidence in implementing their training because of time constraints and generational attitudes towards technology. The study highlighted a general hesitancy among some teachers and school leaders (older generation) in adapting to the technological shifts introduced by the 4IR, aligning with PricewaterhouseCoopers' (2016) findings of widespread resistance to technological change among South African workers. It particularly noted older educators' lack of confidence in taking on ICT roles, pointing to a broader issue of limited ICT and 4IR expertise among educational staff (Yu, 2022). This challenge is part of a larger national concern over the shortage of skilled labour capable of navigating the 4IR landscape.

Furthermore, school leaders and teachers, in particular, faced difficulties due to delayed training in digital tools, and overall, there was a lack of sufficient support for teachers to acquire the necessary resources and skills for effective technology-integrated teaching and learning. The study highlighted a significant shortfall in ICT infrastructure in South African schools, affecting the integration of 4IR teachings. This gap challenges teachers and school leaders in preparing learners for the 4IR, with reported issues in accessing internet connectivity, digital devices, and even basic electricity. Mhlanga and Moloi (2020) suggest that the lack of technological resources prevents schools from adapting to 4IR advancements, disproportionately affecting disadvantaged students. This deficiency impacts their current learning and future opportunities for further education and employment in a 4IR-driven world.

Despite South Africa's superior ranking in ICT across Africa, characterized by high social media activity, internet reach, smartphone usage, fast download speeds, and extensive infrastructure (Gillwald et al., 2018 cited in Yu, 2022), the COVID-19 pandemic revealed significant shortcomings in the nation's ICT infrastructure and technology adoption, particularly among the general population (Amnesty International, 2020). Participants reported struggles with time constraints, insufficient infrastructure, inadequate electricity supplies and poor-quality devices.

Similarly, research by Masanago et al. (2022) indicates that teachers struggle with a lack of time to create digital teaching materials. In addition, time is often lost due to technical issues like device malfunctions or freezes, particularly in classes that rely solely on digital tools.

The research highlighted the commonly discussed issues within the South African educational system's inequality, where those at a disadvantage suffer from substandard education due to a lack of resources (both material and personnel) alongside ineffective management and leadership (Amnesty International, 2020). In addition, the prevalence of an autocratic leadership style has led to a situation where educators and school administrators feel disenfranchised, ignored, diminished, and devalued.

Despite recognizing the importance of technology, particularly for future job readiness, there remains a gap between acknowledging its value and effectively incorporating it into teaching practices. Participants' roles range from ICT coordinators responsible for managing technology infrastructure to teachers undergoing training to enhance their digital skills. Overall, the study highlights the complexities in navigating technological change within educational settings, emphasizing the need for support and resources to bridge the gap between intention and implementation. As Nhlumayo (2024) established, principals are not at the forefront of implementing ICT in schools. Their attitudes and lack of skills are a detriment to effective school implementation. Alharhi's (2021) examination of the impact of COVID-19 on education revealed that the shift to technology-driven learning necessitated a cooperative effort between school leaders, teachers, and parents. The pandemic highlighted the challenges all groups faced in adapting to online learning environments, including the need for proper infrastructure and supportive home settings for learners.

The study also outlined how the challenges of preparing learners for the 4IR have led to feelings of disempowerment among school leaders and teachers. They feel powerless, burdened with responsibilities yet lacking the autonomy to make impactful decisions – a situation exacerbated by the education system's top management. This lack of power and autonomy hinders their ability to plan and implement 4IR educational strategies effectively. According to Bailey (2022), while top management holds the decision-making authority and control over resources – which could ideally support and empower teachers in 4IR preparation – Fukweni (2022) observed that their approach often obstructs rather than facilitates constructive empowerment. Participants reported being overburdened with work, subjected to harsh criticism, and feeling belittled by top management, leading to disengagement and alienation from their work.

The study found that the autocratic leadership styles of some principals or heads of departments overly control teachers, limiting their ability to use their own experience and creativity in preparing learners for the 4IR. This excessive control diminishes their independence and ability to act. Parveen et al. (2022) discovered that many school leaders prefer autocratic styles, believing it helps them manage staff members who display disinterest or avoid important objectives crucial to the school's success. Furthermore, delays in responses from district offices

to equipment requests and mishandling of resources are significant governance issues contributing to a sense of powerlessness in schools. These problems create disparities within the same district, where some schools receive necessary resources while others do not, exacerbating inequalities and hindering effective school management and resource allocation.

Participants also felt disempowered in their interactions with district and head office management. They believed that the unique circumstances of their schools should be considered when implementing 4IR tools, advocating involvement in the planning and policy-making processes concerning their schools. Those in leadership roles experienced a sense of powerlessness, as they found some district policies ineffective for themselves and their learners. Tummers et al. (2014) research highlighted the challenges public employees face, including work pressure and the need to adapt to contentious policies – this could lead to decreased effort and eventual departure from their positions. Conversely, van Wyk and Waghid (2022) argue that the issue sometimes lies in policy implementation. They suggest that while school policies exist regarding 4IR integration into teaching, the lack of transparency in policy implementation leaves participants feeling powerless and frustrated.

CONCLUSION

The research delved into the difficulties school leaders and teachers encounter as they prepare learners for the 4IR. Using a critical theory perspective to address the research questions, the research enriched the understanding of the preparation for the 4IR and the phenomenon of powerlessness within workplaces and educational settings. The findings shed light on the obstacles faced by school leaders and teachers, illustrating how the hierarchical power dynamics in educational systems contribute to their sense of powerlessness. The study uncovered that a lack of autonomy – the liberty to act independently – and a lack of involvement in decision-making processes were pivotal factors hindering teachers and school leaders from fulfilling their roles effectively. Rendered voiceless, their contributions and insights were sidelined. The study further outlined how rigid and centralized decision-making processes within the education department and district offices exacerbated the challenges, including time constraints, teacher uncertainty, insufficient infrastructure, inadequate or unreliable internet and electrical services, and substandard equipment. In the context of restricted autonomy for school leaders and teachers, it is advised that district managers and some principals receive training on enabling professionals within their settings, particularly those skilled in ICT and the 4IR competencies. The ICT coordinators could implement effective strategies to support senior teachers who struggle with technophobia.

The study's qualitative approach limits the generalizability of its findings, yet the results offer valuable insights transferable to various contexts. The study's scope was limited by concentrating on participants from ICT departments, potentially overlooking other experiences. Involving a broader range of school leaders and teachers could provide additional insights into the dynamics of preparing learners for the 4IR. Future research could explore learners'

experiences regarding their schools' 4IR preparedness efforts. The study emphasized the significance of collaboration in preparing learners for the 4IR, suggesting that future studies could involve stakeholders beyond school leaders and teachers.

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