

Distributed leadership as a potential strategy for the management of environmental education curriculum in secondary schools¹

Nonkanyiso Pamela Shabalala^{2*} 

²Department of Science and Technology Education, College of Education, University of South Africa, South Africa.

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Abstract

Environmental education plays a critical role in equipping learners with the knowledge and skills needed to address environmental challenges and promote sustainability. However, in South African secondary schools, the implementation of environmental education faces obstacles such as limited resources, curriculum constraints, and insufficient stakeholder involvement. This empirical research paper explores the potential of distributed leadership as a strategic approach to advancing environmental education. Distributed leadership emphasizes shared decision-making and collaboration and offers a transformative model for promoting environmental awareness and sustainability initiatives. The study analyses successful examples of distributed leadership globally and within South Africa to uncover its transformative possibilities. Furthermore, the paper examines the benefits of adopting distributed leadership in fostering environmental consciousness and action within the school community. Distributed leadership can lead to more effective environmental education interventions through stakeholder engagement and collaboration. The findings and recommendations from this research contribute to the advancement of sustainable environmental education strategies in South Africa and beyond.

1 Introduction

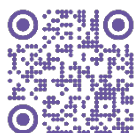
Leadership is a concept that individuals implement in both their personal and professional lives (Khan et al., 2020). For any organization to be effective and successful, leadership is one of the important factors. Leadership is the capacity to direct, motivate, and exert influence over others in order to accomplish a shared purpose or objective (Shabalala et al., 2023; Yukl, 2006). Leadership encompasses the act of adopting proactive measures, making informed choices, and offering guidance to a group or organization (Bruttel & Fischbacher, 2013). Based on the aforementioned definitions of leadership, it is clear that leadership is not limited to occupying a position of power.

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*  Contact: eshabapn@unisa.ac.za

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Instead, it encompasses a range of characteristics and actions that can be demonstrated in different situations and at different levels. Among the different leadership styles that are adopted in various organizations, distributed leadership has been found to be one of the most effective leadership styles to enable an organization to realise its goals. The concept of distributed leadership gained popularity in the early 2000s due to its ability to engage both formal and informal stakeholders (Spillane, 2006). As defined by Diamond and Spillane (2016, p. 147), distributed leadership is a theoretical framework researchers use to examine school leadership and management and practitioners and policymakers to assess and analyze these areas. Studies have shown that this leadership model benefits organizational conditions (Hallinger, 2011) and student accomplishment (Gumus et al., 2018; Louis et al., 2010). Distributed leadership is a concept that aims to redefine leadership in educational settings by examining how leadership responsibilities are shared among two or more leaders (Spillane, 2006). The concept of distributed leadership has gained prominence as a significant leadership model in educational environments, highlighting the significance of collective decision-making and cooperation among everyone involved. Nevertheless, scholarly literature indicates a discrepancy between the fields of distributed leadership (DL) and environmental education (EE) (Grant, 2017; Harris, 2008).

The DL approach acknowledges that leadership is not limited to hierarchical positions but may be demonstrated at several levels within the organization or community (Spillane, 2006). This leadership approach promotes consultation, collaborative decision-making, and shared leadership between the leader and the followers within an organizational setting (Shabalala et al., 2023). In the context of secondary schools, distributed leadership presents a promising alternative to traditional hierarchical leadership systems, promoting a more inclusive and empowering environment. Distributed leadership promotes a collaborative network that boosts collective learning and creativity by engaging various people in leadership positions (Harris et al., 2022). This leadership approach promotes a sense of ownership among teachers, learners, parents, and other stakeholders, resulting in a more participative and involved school community (Liu & Watson, 2020). Distributed leadership in educational contexts offers advantages that go beyond enhancing decision-making. Literature suggests that fostering a sense of ownership and commitment among stakeholders can enhance motivation and dedication to the organization's common goals (Harris et al., 2022). Additionally, distributed leadership improves communication and information dissemination, facilitating a more effective interchange of ideas and practices among school community members (Humphrey, 2010). Liu et al. (2023) argue that empowering teachers by involving them in collective decision-making responsibilities through DL has successfully brought about positive changes in schools. DL, in the context of schools, refers to the smooth and efficient communication between school administration and teaching staff, taking into account the active participation of different individuals in a manner that does not prioritize hierarchy (Torres, 2018).

Many schools use distributed leadership (DL) by assigning teachers various communal leadership responsibilities. This approach aims to mobilize and motivate teachers to actively participate in school matters (Hulpia et al., 2009; Harris et al., 2022). Conceptually, redistributing leadership responsibilities can enhance teachers' perception of schools and reduce the power distance between community members, resulting in positive changes in school management styles. In addition, distributed leadership fosters a culture of cooperation, dismantling barriers and hierarchies that could impede efficient problem-solving and creativity (Spillane, 2006; Humphrey, 2010). Distributed leadership supports a dynamic exchange of knowledge and skills, resulting in

improved education quality and the successful implementation of projects like environmental education interventions. On the other hand, distributed leadership offers a transformative leadership approach that promotes inclusivity and shared decision-making within educational settings. Integrating distributed leadership principles into environmental education interventions can effectively address the challenges faced when implementing EE and create a more engaged and sustainable school community.

Environmental education is important for providing learners with the required knowledge, skills, and values to tackle environmental concerns and promote sustainability (UNESCO, 1978; Tilbury et al., 2002; Tilbury, 2004). In South Africa, environmental education is integrated into the secondary school curriculum. However, the implementation of this education encounters challenges due to inadequate resources, curriculum limits, and insufficient involvement from stakeholders (Ham & Sewing, 1988; Tshautshau, 2013; Benjamin & Adu, 2019; Hebe, 2019). The lack of holistic involvement from various stakeholders poses another challenge (Shabalala, 2023). Environmental education requires the cooperation of teachers, learners, parents, community members, and local officials to establish a united effort to promote sustainable practices (Elliott et al., 2020). The effectiveness of environmental education activities might be compromised if there is no active engagement and support from all stakeholders involved. In response to these challenges, this study aims to investigate the potential of distributed leadership as a strategic approach to promoting environmental education in South African secondary schools.

Recent research explores the relationship between environmental education and distributed leadership, indicating that DL may be a viable method for implementing environmental education in schools. Harris and DeFlaminis (2016) assert that distributed leadership promotes a collaborative atmosphere favorable for environmental education's complex and interdisciplinary nature. Nevertheless, there is a lack of empirical research in this field. A study conducted by Shabalala et al. (2023) has found that hierarchical power relations hinder the implementation of environmental education. To address this issue, the study suggests that DL could be an effective option. Contrarily, Shabalala and Gumbo (2024) propose integrating African elements into the curriculum management in environmental education, utilizing the ubuntu philosophy to enhance the sustainability of environmental education projects in African communities. Distributed leadership is recommended to improve environmental education projects' sustainability by tackling the limitations of restricted institutional leadership perspectives (Reis & Guimaraes-Iosif, 2012). Nevertheless, studies suggest that certain educators and educational administrators lack a clear understanding of curriculum leadership within the framework of environmental education, potentially hindering its successful integration into the curriculum (Shabalala et al., 2023). Fazio and Karrow (2014) state that DL substitutes the concept of a singular "heroic leader" with a focus on collaborative groups. In addition, distributed leadership prioritizes the actions and exchanges between educators, learners, and support personnel, creating an environment that supports implementing school-wide environmental education programs (Fazio & Karrow, 2014). These studies jointly emphasize the capacity of distributed leadership to enhance environmental education's implementation and long-term sustainability.

This research aims to explore the potential of distributed leadership as a strategic approach to promoting environmental education in South African secondary schools. This study intends to provide insights into developing a more engaged and sustainable school community by exploring how distributed leadership can overcome the issues faced in implementing environmental education

1.1 Objectives of the study

1. To explore the concept of distributed leadership and its potential implementation in the context of environmental education.
2. To analyze the benefits of adopting distributed leadership strategies in promoting a culture of environmental consciousness and action within the school community.

2 Method

The study adopted a constructivist research paradigm because the researcher aimed to ensure that the viewpoints expressed by the participants were understood apart from the researcher's perspective (Kivunja & Kuyini, 2017). A qualitative research approach was employed to gain a deeper understanding of the phenomenon under exploration (Busetto et al., 2020).

2.1 Design

A descriptive case study research design was employed to allow for an in-depth exploration of the perceptions and experiences of stakeholders regarding environmental education and distributed leadership (Asper & Corte, 2019; Ajayi, 2017). The study adopted document analysis, observations, and individual semi-structured interviews to collect data from participants in their work environments (Dejonckheere & Vaughn, 2019). After receiving consent, the researcher audio-recorded all the semi-structured interviews with the above-mentioned participants. The semi-structured interviews allowed the researcher to probe for more specific data that could provide insight into the study, guided by an interview schedule. While, the researcher made field notes of all the observed activities in the field and during the analysis of documents, also guided by the observation and document analysis schedule.

2.2 Participants and procedure

Participants were chosen based on their roles and experiences, which included:

- Teachers who are actively teaching at different levels (Natural Sciences and Technology in grades 8 and 9).
- School management team members include Heads of Departments (HODs), deputy principals, and principals.
- Subject advisors based at the district office.

These criteria ensured that the sample included a variety of perspectives from individuals involved in different capacities within the education system. The diversity in roles allowed the researcher to gather significant data necessary to fulfill the study's aims and objectives (Creswell, 2015).

2.3 Study group and their roles

The sampled respondents included:

- Two teachers who taught Natural Sciences and one who taught Technology in grades 8 and 9.
- Members of the school management teams (SMTs) from three secondary schools (referred to as Schools A, B, and C).
- Subject advisors based at the district office.

2.4 Relationship between research purpose and study group

The research explored the implementation and impact of educational policies and practices within the UGU Education district. By selecting participants who were directly involved in the educational processes at different levels and roles, the researcher aimed to gain a comprehensive understanding of the dynamics at play. The variation in their experiences provided insights into

how different roles within the education system influenced the implementation and outcomes of educational policies. Pseudonyms replace the names of participants.

Table 1 Distribution of participants by school

School A	School B	School C
1. Mrs Sydney (School Principal)	1. Mr Mthunzi (School Principal)	1. Mrs Mkhize (School Principal)
2. Mr Kim (Head of Departments)	2. Mrs Chetty (Tech teacher)	2. Mr Knowles (Deputy Principal)
3. Mr Mkhungo (NS teacher)		3. Ms Khumalo (NS teacher)
Subject Advisors		
1. Mr Mofolo	Physical Sciences and Natural Sciences (Grade 8-12)	
2. Ms Nkosi	Technology (Grade 7-9)	

2.5 Data analysis

In this study, the data was thematically analyzed (Dawadi, 2020). The researcher acquainted herself with the collected data by thoroughly reviewing the transcriptions. During this familiarization process, the researcher used codes to categorize data from the transcriptions, facilitating the identification of key themes and categories. The interviews were conducted in either IsiZulu or English, depending on the preference and comfort of the participants. To ensure that language barriers did not affect the quality and accuracy of the data, all interviews conducted in IsiZulu were translated into English. This translation process was essential for maintaining consistency and comprehensibility in the analysis.

After translating the interviews and the analysis of documents, the data was organized into three main themes and six categories to facilitate the interpretation of the semi-structured interviews, document analysis, and observations (Squires et al., 2023). The organization of data into themes and categories helped draw meaningful insights and patterns relevant to the research objectives.

2.4.1 Determination of Themes and Categories

The process of determining the three themes and six categories involved several steps. The researcher initially coded the data by identifying significant phrases, concepts, and patterns in the transcriptions. This coding was done manually and iteratively to ensure thorough engagement with the data. After coding, the researcher reviewed the codes to identify broader patterns. These patterns were grouped into preliminary themes. At this stage, the focus was on capturing the essence of what the data was revealing in relation to the research objectives. The preliminary themes were further refined through multiple rounds of review and discussion. The researcher explored the coherence of the themes and ensured that they accurately represented the data. During this process, categories within each theme were identified. The final set of themes and categories was established after ensuring that they provided a comprehensive and coherent representation of the data. The three main themes were broad categories that encapsulated major aspects of the research findings, while the six categories provided more specific insights within each theme.

2.6 Validity, reliability, and ethical considerations

Upon conducting this study, the researcher adhered to the university’s ethical guidelines and qualitative research standards. Initially, the researcher applied for and obtained an ethical clearance certificate from the institution of affiliation to get consent to collect data. Thereafter, the researcher met with the participants to discuss the purpose of the study and obtain informed consent for their participation. The participants were made aware that their participation was voluntary and that they could withdraw from the study at any time without any consequences.

Furthermore, the respondents were assured of confidentiality, and their identities were protected by using pseudonyms.

To ensure credibility and trustworthiness, the analysis was validated through peer review. This involved comparing the transcriptions with the original voice recordings of the participants. The peer review process also included discussing the themes with colleagues and comparing interpretations. Feedback from this process was used to refine and finalize the themes and categories. All participants were given an opportunity to read the transcripts of their interviews. This step allowed participants to verify the accuracy of the transcriptions and provide any necessary clarifications. Additionally, expert opinions were incorporated to validate the thematic analysis further. This multi-faceted approach ensured the authenticity and reliability of the data.

The Methods section needs to include the research design or the type of the study (cross-sectional, longitudinal, survey, experimental, ethnographic, etc.), the description of the sampling procedure (including the description of the population), or the selection of the study group, data collection instruments and procedures, data analysis, and the issues of validity, reliability, and ethics.

3 Findings

The data presented above revolves around the theme of Distributed Leadership in the context of managing curriculum in secondary schools, with a particular focus on Environmental Education.

3.1 The concept of distributed leadership in environmental education

3.1.1 Familiarity with the concept of distributed leadership

During interviews, the participants were asked if they were familiar with the concept of distributed leadership and whether they applied it in their leadership practices. This question aimed to address the familiarity and use of distributed leadership styles among the participants, particularly in managing a multidisciplinary environmental education curriculum in schools. Data showed that participants expressed varying levels of familiarity with distributed leadership. For instance, Ms. Nkosi, a subject advisor, admitted, *“I do not know, I have never heard that there is such leadership. But by listening to the terminology, I understand it. It is the leadership where you distribute your work to other people.”* This response highlights a basic understanding formed through the explanation provided during the interview.

Similarly, Mr. Mofolo, another subject advisor, recognized the practice to some extent: *“Yes, to some extent, we have practiced them. Distributed leadership is where we give them some autonomy.”* He noted that while there are prescribed decisions, there are also areas where autonomy is allowed, aligning with the principles of distributed leadership. In contrast, Mr. Mthunzi, a principal, showed a deeper understanding: *“I am very much aware of distributed leadership. When you talk about distributed leadership, a part of instructional leadership is distribution because that is where you decentralize your powers to the individuals.”* He emphasized the need for monitoring, stating, *“To apply distributed leadership, monitoring needs to take place, and to do this, they submit reports to me.”*

Mrs. Mkhize, another principal, echoed this sentiment: *“Yes, I delegate some powers to the deputy principals,”* demonstrating a practical application of distributed leadership through delegation. Mrs. Chetty, a teacher, reflected on her experiences: *“Yes, I am familiar. It is just that the words are new to me. In the environment we are in, we are familiar with delegation. Even in our committees and other things you do, people have to learn from you, and you work together.”* Her response indicates an understanding of distributed leadership through practical, collaborative experiences. However,

not all participants were familiar with the concept. Mr. Mkhungo, a teacher, stated, *“I am not familiar with distributed and transformative leadership here in our school, not at all. I would say that even delegation from the principal does not take place.”* This response highlights a gap in the implementation of distributed leadership in his school context.

Despite the varying levels of familiarity, once the concept was explained, participants generally acknowledged its potential benefits in addressing the challenges of environmental education interventions. They recognized that shared decision-making and collaboration among teachers, administrators, learners, and community members could lead to more effective environmental education initiatives. These responses underscore the diverse understanding and application of distributed leadership among participants, reflecting both the potential and the challenges of implementing this leadership style in the context of environmental education.

3.1.2 Managerial leadership relationships

In Case One and Case Three, the observed relationships were highly hierarchical. Principals gave orders directly to the SMT (Deputy Principals and HODs), who then communicated with teachers. This structure indicated a top-down approach rather than a true distributed leadership model. For example, in these cases, principals communicated directly with SMT members, who then passed instructions to teachers regarding curriculum management. In contrast, Case Two presented a more collaborative approach. Here, staff members could report directly to the principal, facilitating a more open and orderly communication flow. The principal's interactions with school stakeholders indicated a cooperative environment. Various committees composed of teachers, SMTs, parents, and non-academic staff allowed for shared responsibilities and roles, exemplifying distributed leadership.

These observations reveal the varying degrees of distributed leadership across schools, highlighting the need for a more standardized approach to ensure consistent and effective implementation. Participants showed varying levels of familiarity with distributed leadership. After an explanation, participants acknowledged the potential benefits of distributed leadership in addressing the challenges of environmental education interventions. Shared decision-making and collaboration were recognized as effective for environmental education initiatives. The above narrative displays the participants' understanding and application of distributed leadership. Responses vary; some have a clear understanding, while others express uncertainty. Roles and responsibilities are distributed among different stakeholders, including teachers, administrators, learners, and community members.

3.2 Benefits of distributed leadership in fostering transformation

3.2.1 Ways to distribute roles to school stakeholders for transformation in schools

The study explored how school stakeholders distribute roles to bring about development and transformation within the institution. The findings demonstrate that distributed leadership in schools enhances stakeholder engagement and motivation. Distributed leadership promotes a sense of ownership and responsibility by involving various stakeholders in decision-making processes, leading to more sustained efforts in curriculum management. Collaboration and networking among stakeholders are perceived as crucial in creating a comprehensive and holistic approach to curriculum management.

3.2.2 Role distribution strategies

Participants shared various strategies for distributing roles within their schools. Ms. Nkosi, a subject advisor, explained her approach: *“When I am distributing roles, I say within the groups, although everyone is a leader in the group, there should be clusters from different circuits. A cluster leader is more of a coordinator whom they will come to with different topics.”* This method leverages the expertise within clusters, allowing leaders to guide others effectively. Similarly, Mr. Mofolo, also a subject advisor, highlighted the importance of empowering cluster leaders: *“We have cluster leaders in each circuit. We empower them. Then, they empower people within their cluster. The cluster leaders are teachers, so they come to me.”* This approach creates a cascading effect of empowerment and support throughout the school.

Mrs. Sydney described her strategy from a principal's perspective: *“We look at individuals since they are not the same. We delegate duties, but management duties we delegate to the SMTs.”* This tailored approach ensures that responsibilities are assigned based on individual strengths and capabilities. Mrs. Mkhize, another principal, emphasized a structured monitoring system: *“It depends because, as a curriculum manager, I have to interact with the HODs. I delegate at that particular time, maybe to ask them to do something where it is lacking or where I pick up that there is something wrong. In terms of the curriculum, I, as a principal, this is how we do it: I monitor deputy principals, deputy principal monitors HODs, and HODs monitor teachers.”* This hierarchy ensures accountability and continuous oversight.

Mr. Kim, a Head of Department (HOD), focused on leveraging experience: *“We look at the major subjects. We choose subject heads, the ones with experience then we give them duties since they are experienced so that they assist others who are not experienced.”* This method ensures that experienced teachers can mentor and support their less experienced colleagues. Deputy Principal Mr. Knowles mentioned a flexible approach: *“It depends on the time, maybe which role needs to be fulfilled at that time. We look at the strength of an individual if he/she can do one or two things, then you give him/her those roles to perform.”* This flexibility allows the school to adapt to changing needs and circumstances.

However, not all participants viewed the role distribution process positively. Mr. Mkhungo, a teacher, criticized the lack of clarity and protocol: *“Roles are distributed in a certain way, even though they are distributed, but the protocol is not followed. For example, you do not know who is responsible for certain things. So, I would say that leadership is autocratic because things are done in a manner in which ‘someone’ has thought will be right at that time.”* His experience highlights the challenges and potential pitfalls of poor implementation of distributed leadership. Ms. Khumalo, another teacher, pointed out the necessity of distributing roles based on subject expertise: *“Yes, the roles are distributed to us. Because you find that the HOD may be of science and is not familiar with one of the subjects that falls under science subjects. So that is why they need a subject head of that particular subject to help the HOD.”* This approach ensures that specific subject needs are addressed by knowledgeable individuals.

These varied approaches to role distribution demonstrate the benefits of distributed leadership in fostering a sense of engagement and responsibility among school stakeholders. By leveraging the strengths and expertise of different individuals, schools can create a more collaborative and effective environment for curriculum management and transformation.

3.2.3 Enhanced engagement and collaboration

In Case Two, the observed collaborative environment fostered enhanced engagement among

stakeholders. The presence of committees, such as those composed of teachers, SMTs, parents, and non-academic staff, allowed for shared decision-making and responsibilities. This environment promoted a sense of ownership and responsibility among stakeholders, leading to more sustained efforts in curriculum management. For example, the principal in Case Two personally engaged with the researcher and other stakeholders, demonstrating an organized and inclusive approach. This direct involvement and the structured committees facilitated a more holistic and comprehensive approach to curriculum management.

3.2.4 Incorporation of environmental education

In the classroom, teachers attempted to incorporate environmental education despite varying levels of resources. In Case One, Mr. Mkhungo used a mix of learner-centered and teacher-centered approaches to engage students in an experiment on starch production. This method encouraged active participation and responsiveness among learners. In Case Two, Mrs. Chetty demonstrated strong subject knowledge and used a predominantly learner-centered approach to teach about ecosystems. She checked prior knowledge and engaged students through questions and discussions. The varied teaching methods and active involvement of students exemplified the benefits of distributed leadership in fostering a collaborative and engaging learning environment.

3.3 Impediments associated with the application of distributed leadership when managing curriculum

3.3.1 Impediments of distributed leadership when managing curriculum in schools

This section explores the challenges faced when applying distributed leadership in managing the environmental education curriculum within schools. Since environmental education is integrated into other school subjects, the study focused on the challenges and opportunities perceived by subject advisors, principals, School Management Teams (SMTs), and teachers regarding implementing distributed leadership in curriculum management.

3.3.2 Challenges in curriculum management

Mrs. Sydney, a principal, highlighted the broad and complex nature of curriculum management: *“Curriculum management is a vast subject. It is not easy. It will always have challenges.”* She also noted that teachers often do not prepare adequately and sometimes undermine HODs, especially those who have transferred from other schools: *“Teachers do not prepare. Also, teachers undermine HODs, especially HODs who come from other schools to join our school.”* Mr. Mthunzi, another principal, pointed out the administrative challenges, particularly the heavy paperwork: *“Curriculum management is not done appropriately because paperwork is too much.”* He also mentioned the pressure from the education department to cover a stipulated amount of work within a given time frame, leaving the method of achieving this to the schools: *“The department expects us to cover that stipulated amount of work within a given time, how we do it is our problem; that is our challenge.”*

Mrs. Mkhize, a principal, discussed the difficulties some HODs face in holding teachers accountable: *“Some HODs fear teachers. You find that the HOD is scared to call a teacher, sit him/her down, and show/tell them that they are behind for two weeks and ask how the teacher will cover the work.”* This fear of confrontation can lead to lapses in curriculum coverage and accountability. Ms. Khumalo, a teacher, shared her struggles with the lack of information and support when she joined her school: *“When I came, it was difficult because when I was asking how far teachers have gone with learners, no one had information. I literally had to start from*

scratch, and it was difficult.” She emphasized the lack of assistance in managing the curriculum: “Even those who were teaching Natural Sciences had nothing to offer me. There was little assistance, if any. I had to find my way.”

Mr. Mofolo, a subject advisor, identified several challenges, including the excessive content that needs to be taught in a limited time and the uninteresting nature of some content: “*One of the challenges is too much content to be taught in a limited time, very little application; uninteresting content. Teachers should be teaching something that is interesting to them and learners.*” He also noted that the district’s focus on matric results can detract from a broader educational experience. The participants highlighted various impediments to distributed leadership in curriculum management, including the complex nature of curriculum management, lack of teacher preparation, excessive paperwork, accountability issues, lack of support and coordination, content overload, and the emphasis on matric results. These challenges underline the difficulties of implementing distributed leadership effectively in the context of environmental education.

3.3.3 Hierarchical structures and lack of open communication

During the observations in Cases One and Three, the hierarchical structure and lack of open communication were significant impediments. The top-down approach hindered the effective implementation of distributed leadership. For example, participants in these cases were cautious in their communication, indicating a lack of trust and openness. This environment can stifle innovation and collaborative efforts, which are crucial for successful distributed leadership.

3.3.4 Resource constraints and infrastructure issues

Resource constraints and varying classroom environments were notable challenges in the observed schools. In Case One, Mr. Mkhungo’s classroom lacked proper ventilation and cleanliness, essential elements for promoting health and environmental awareness. The reliance on traditional teaching materials, such as chalkboards and textbooks, limited the effectiveness of environmental education. In Case Two, while the classroom environment was better, the lack of visual aids and modern teaching tools posed challenges. Mrs. Chetty used the available resources effectively, but the disparity in infrastructure between schools highlighted the need for more equitable resource distribution to support distributed leadership and environmental education.

Through the document analysis, the CAPS document for Natural Sciences integrates environmental education through Indigenous Knowledge Systems (IKS), emphasizing Indigenous people’s historical and practical knowledge about the natural world. However, the document lacks explicit details on the roles of teachers and learners in promoting environmental education, indicating a gap in guidance for effective implementation. Curriculum management involves continuous assessment, which includes both informal and formal assessments. While the CAPS document describes these assessments, it does not clearly link them to environmental education content. This lack of clarity suggests a need for more explicit guidelines and support to ensure the effective integration of environmental education into the curriculum.

4 Discussion

This research provides insight into how Distributed Leadership (DL) is applied in secondary education within the context of curriculum management, with an emphasis on environmental education. O’Rourke and O’Brien (2024) state that the distributed leadership model was officially recommended as a new approach to leadership and management in post-primary schools by the

Irish Department of Education and Skills (DES) in 2018. Harris et al. (2022) mention that distributed leadership is one of the most influential and well-discussed ideas to emerge in the field of educational leadership. Hence, there is a need to incorporate it in the management of the environmental education curriculum., which is interdisciplinary and can benefit from the involvement of multiple stakeholders. Even though DL has been introduced in the education space as a leadership model that promotes shared, collective, and democratic leadership (Bolden, 2011), some stakeholders are not familiar with the concept of what they are practicing or what they should practice in their leadership. As alluded to in the first category (Familiarity with the Concept of Distributed Leadership), the respondent's familiarity with DL varied, as did their understanding and application. This diversity aligns with existing literature on the complex nature of leadership perceptions within educational settings (Leithwood & Mascal, 2008; Harris, 2008).

4.1 Familiarity with the concept of distributed leadership

4.1.1 Varied levels of understanding

The interviews revealed a spectrum of familiarity with the concept of DL among participants. While some, like Mr. Mthunzi and Mrs. Mkhize, demonstrated a deep understanding and practical application of DL through delegation and decentralization of powers, others, like Ms. Nkosi and Mr. Mkhungo, showed limited or no familiarity with the concept. Ms. Nkosi's basic interpretation of DL as a task-sharing leadership style is consistent with the ideas presented by Spillane et al. (2001) and Gronn (2000). Moonsamy (2010) also supports this understanding by defining DL as distributing roles and responsibilities to all stakeholders within a school. However, various scholars have expanded on the idea of Distributed Leadership. distributed leadership shows that it effectively improves school effectiveness in developed economies (Sasere & Makhasane, 2023). However, its implementation varies, with some leaders demonstrating deep understanding through delegation and decentralization while others show limited familiarity (Sibanda, 2018; Sasere & Makhasane, 2023). Grant (2017) argues for a theoretically robust form of DL conceptualized as a sociocultural practice, framed as a product of interactions between school leaders, followers, and situational aspects. Despite initial unfamiliarity, once explained, most participants acknowledged the potential advantages of DL in addressing the challenges of environmental education. Shabalala and Gumbo (2024) assert that engaging many people in leadership activity is at the core of DL, which resonates with the participants' recognition of shared decision-making and collaboration as beneficial for environmental education initiatives.

4.2 Managerial leadership relationships

4.2.1 Hierarchical vs. collaborative approaches

The study observed significant differences in leadership structures across schools. In Cases One and Three, a top-down hierarchical approach was predominant, with principals directing instructions through the School Management Team (SMT) to teachers. This structure contrasts sharply with Case Two, where a more collaborative approach allowed staff to communicate directly with the principal. Woods and Roberts (2016) argue that DL focuses on engaging expertise wherever it exists in an organization rather than through formal positions, highlighting the limitations of hierarchical models observed in some cases. Woods and Roberts (2016) found contrasting hierarchical and holarchic patterns in their case study, noting the unequal distribution of proactive agency across the school. The varying degrees of DL across schools highlight the necessity for a more standardized approach to ensure consistent and effective implementation.

This aligns with Bush (2014), who emphasizes that clear guidelines and frameworks for DL can help schools transition from hierarchical to more collaborative leadership models.

4.2.2 Benefits of distributed leadership in fostering transformation

The study indicates that DL can significantly enhance stakeholder engagement and motivation by involving them in decision-making processes. This involvement fosters a sense of ownership and responsibility, leading to more sustained efforts in curriculum management. Distributed leadership (DL) in schools has been linked to sustainable school improvement and positive educational change. Research indicates that DL promotes collective responsibility and enhances the achievement of organizational goals (Shava & Tlou, 2018). A study of Nigerian secondary schools found significant relationships between DL and various aspects of school improvement, including goal achievement, teachers' professional development, and effective teaching and learning (Obadara, 2013). Similarly, a Swiss study revealed that more efficient DL strategies correlated with greater perceived change during implementing sustainable development education (Zala-Mezö et al., 2019). Furthermore, school leaders' collective efficacy, fostered by supportive district conditions, has positively influenced school conditions and student achievement (Leithwood & Jantzi, 2008). These findings suggest that DL can create a sense of shared ownership among stakeholders, leading to more effective and sustainable school improvement efforts when properly implemented and supported by district leadership.

4.2.3 Role distribution strategies

In this study, participants shared diverse strategies for distributing roles, ranging from leveraging individual strengths and expertise to creating structured monitoring systems. These strategies, such as Ms. Nkosi's cluster leader approach and Mrs. Sydney's tailored delegation based on individual capabilities, demonstrate the flexibility and adaptability of DL in addressing specific school needs. Literature suggests that research on distributed leadership (DL) in schools reveals diverse implementation strategies and varying degrees of effectiveness. In Nigerian secondary schools, DL is often practiced as delegation from superiors to subordinates, with teachers sometimes assigned leadership roles without formal portfolios (Sasere & Makhasane, 2023). A study of Ontario principals identified successful DL practices, emphasizing engagement, enablement, enactment, assessment, and emergent leadership (Irvine & Brock, 2020). Districts and teacher leaders can share tasks such as resource distribution, improvement monitoring, and staff development, with their effectiveness dependent on time, knowledge, and administrative support (Firestone & Martinez, 2007). The degree of DL in schools varies; some exhibit more advanced practices than others. Factors influencing these variations and their consequences were explored in a study of ten schools identified as exemplars of DL implementation (Ritchie & Woods, 2007). These findings highlight the complexity and context-dependent nature of DL in educational settings.

4.3 Impediments associated with the application of distributed leadership

4.3.1 Challenges of poor implementation

Distributed leadership (DL) in educational settings offers benefits like enhanced decision-making and shared responsibility (Baştea et al., 2023). However, implementing DL faces significant challenges. These include role ambiguity, conflicting priorities, and power struggles (Baştea et al., 2023). The current study also identified challenges in the implementation of DL. For instance, Mr. Mkhungo's criticism of the autocratic leadership style and lack of clear protocols highlights the

potential pitfalls of poor implementation. Spillane and Diamond (2007a) highlight the importance of clear protocols and support structures for the effective implementation of DL. In Indian organizations, employees' attitudes towards DL vary, with challenges in implementation identified (Jain & Jeppesen, 2014). Headteachers report that middle leaders often lack confidence in decision-making and rely on superiors' consent despite being empowered (Tahir et al., 2016). Additionally, teachers' ability, expertise, experience, and willingness to assume leadership roles pose challenges (Tahir et al., 2016). Teacher leaders struggle with conflict management, balancing responsibilities, and frustration over lack of influence (McKenzie & Locke, 2014). These challenges suggest that naively conceived DL theories may fall short in practice. To maximize DL effectiveness, organizations must consider contextual factors, provide ongoing support, and establish clear guidelines (Baştea et al., 2023).

4.3.2 Challenges in curriculum management

Distributed leadership (DL) in educational settings offers potential benefits such as enhanced decision-making and shared responsibility (Baştea et al., 2023). However, challenges persist in implementing DL effectively. Headteachers face issues with senior teachers lacking confidence in decision-making and teachers' varying abilities to assume leadership roles (Tahir et al., 2016). The findings of Tahir et al. (2016) are in line with the challenges highlighted by the participants in this study, such as lack of teacher preparedness, accountability issues, excessive paperwork, and the top-down hierarchical structures observed in Cases one and three that impede open communication and collaboration, essential of successful DL. In a study conducted by Shabalala et al. (2023), hierarchical power relations in schools have been identified to impede curriculum transformation and environmental education (EE) implementation by limiting stakeholder involvement in key decisions. To address these challenges, an Africanised approach to DL in EE curriculum management, based on the ubuntu philosophy, is proposed to better serve African communities and promote sustainability (Shabalala & Gumbo, 2024). Despite its potential, DL implementation requires careful consideration of contextual factors, organizational culture, readiness, ongoing support, and professional development to mitigate challenges such as role ambiguity and power struggles (Baştea et al., 2023).

4.3.3 Constraints and infrastructure issues

Resource constraints and infrastructure issues pose significant challenges for environmental education and school leadership. The lack of proper infrastructure and modern teaching tools limits the effectiveness of environmental education (Fazio & Karrow, 2013). As observed in Case One, the lack of proper infrastructure and modern teaching tools limits the effectiveness of environmental education. School organizational conditions, shaped by socioeconomic contexts, can either promote or constrain effective instructional leadership (Malinga et al., 2022). Resource-constrained leaders face difficulties empowering staff and enhancing employee engagement (Ronnie & Boyd, 2019). Allocating and managing financial, physical, and human resources is particularly challenging during times of diminished funding (Taylor et al., 2008). However, some schools have found ways to negotiate these challenges through personal commitment and initiatives like the Ecoschools certification program (Fazio & Karrow, 2013). Effective leadership and strategic management are essential for addressing these issues, requiring leaders to be well-versed in emerging realms of philanthropy and entrepreneurialism and to understand the external environment for making informed decisions about infrastructure investments (Taylor et al., 2008).

4.3.4 Curriculum integration

As mentioned in the results of the study, through the analysis of the CAPS document, the integration of environmental education (EE) and Indigenous Knowledge Systems (IKS) into the Natural Sciences curriculum in South Africa faces several challenges. While the Curriculum and Assessment Policy Statement (CAPS) prescribes this integration, it lacks clear guidelines for implementation (Damoah & E. Adu, 2020). Teachers struggle with integrating EE into their subjects due to insufficient resources and support (Damoah & Adu, 2020). Similarly, the integration of IKS faces obstacles such as a lack of government commitment, study materials, and the risk of IKS extinction (Madlela, 2023). However, incorporating IKS has potential benefits, including contextualizing education and promoting classroom diversity (Madlela, 2023). To address these challenges, recommendations include developing clear curriculum goals, appointing subject advisors, and involving IKS custodians in education (Damoah & Adu, 2020; Madlela, 2023). Additionally, teacher training at the higher education level is crucial for equipping educators with the necessary skills to integrate scientific and indigenous knowledge effectively (Ogunniyi, 2005).

4.2 Conclusion

The findings of this research provide valuable insights into the application of Distributed Leadership (DL) in secondary education, particularly within the context of managing the environmental education curriculum. The study highlights the varying levels of familiarity and understanding of DL among school stakeholders, reflecting a spectrum from deep comprehension to limited awareness. This variation aligns with the complex nature of leadership perceptions within educational settings, as noted in the existing literature. The research underscores the necessity of fostering a broader and deeper understanding of DL among educators and leaders. Professional development, workshops, and clear guidelines are crucial to bridge the knowledge gap and promote the consistent application of DL principles. By enhancing familiarity with DL, schools can leverage its benefits, such as shared decision-making and collaboration, to improve curriculum management and educational outcomes.

Significant differences in leadership structures were observed across schools, ranging from hierarchical to collaborative approaches. The study advocates for a more standardized implementation of DL to ensure consistency and effectiveness. Promoting collaborative leadership models and encouraging open communication can help schools transition from top-down hierarchical structures to more inclusive and participatory frameworks. The benefits of DL in fostering engagement and motivation among stakeholders are evident. Involving various stakeholders in decision-making processes creates a sense of ownership and responsibility, leading to sustained efforts in curriculum management. The literature supports the notion that DL can drive sustainable school improvement and positive educational change, particularly when supported by district leadership and tailored to local contexts.

However, the study also identifies several challenges associated with implementing DL. These include role ambiguity, conflicting priorities, power struggles, and resource constraints. Addressing these impediments requires clear protocols, structured support, and professional development to build confidence and competence among leaders. Additionally, equitable resource distribution and strategic management are essential to overcome infrastructure limitations and enhance the effectiveness of environmental education. Integrating environmental education (EE) and Indigenous Knowledge Systems (IKS) into the curriculum presents further challenges. The CAPS document prescribes this integration but lacks clear implementation guidelines. Providing clear curriculum goals, appointing subject advisors, and involving IKS

custodians in education are recommended to address these challenges. Teacher training is also crucial to effectively equip educators with the skills to integrate scientific and indigenous knowledge.

In conclusion, while the application of DL in secondary education shows promise, its effective implementation requires a comprehensive and context-sensitive approach. By addressing the identified challenges and leveraging the potential benefits of DL, schools can foster a collaborative and engaging learning environment that promotes environmental education and overall school improvement.

4.3 Future directions

Based on the empirical findings and literature review, the following recommendations are proposed:

1. Implement ongoing training and professional development programs to deepen the understanding of DL among educators and leaders. This aligns with existing research by expanding the practical knowledge base of DL.
2. Organize workshops and seminars led by experts to disseminate the latest research findings and practical applications of DL, thus bridging the gap between theory and practice.
3. Develop and implement clear guidelines and frameworks for collaborative leadership. This will ensure consistency in DL application, supporting the alignment of practice with current literature.
4. Establish clear protocols and support structures for DL, ensuring alignment with theoretical models and practical guidelines from literature.
5. Provide mentorship and leadership training to build confidence and competence among middle leaders, reflecting the findings from leadership studies.
6. Ensure fair distribution of resources across schools to support effective DL, aligning with research on the importance of resource equity. Ensure that all schools, regardless of socio-economic status, access the resources needed for effective DL and environmental education.
7. Develop clear guidelines for integrating environmental education (EE) and Indigenous Knowledge Systems (IKS) into the curriculum, aligning with recommendations from curriculum studies.
8. Promote a sense of ownership and responsibility among all stakeholders, enhancing social cohesion and community engagement.
9. Adapt leadership models to local contexts by adopting an approach to DL based on the ubuntu philosophy, promoting social cohesion and sustainability within African communities.

5 Statement of Researchers

In this section, you are expected to declare the information regarding the titles given below.

5.1 Researchers contribution rate statement

The author conceptualized the whole article alone.

5.2 Conflict statement

There is no conflict of interest present.

5.3 Support and thanks

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