

INTEGRATING MULTICULTURAL PERSPECTIVES WHEN TEACHING HUMAN IMPACT ON THE ENVIRONMENT IN GRADE 11 LIFE SCIENCES

Tsatsawani Trophie Maluleke, & Lydia Mavuru

Department of Science, Mathematics and Technology, University of Johannesburg (South Africa)

Abstract

This paper explores the integration of multicultural perspectives in the teaching and learning of the Grade 11 Life Sciences topic *Human Impact on the Environment* within South African schools. Grounded in Ladson-Billings' Culturally Responsive Pedagogy and Vygotsky's social constructivist theory, the study adopts a qualitative interpretive research design to examine how culturally responsive approaches influence learner engagement and understanding of environmental issues. Data were generated through semi-structured interviews with three Life Sciences teachers, lesson observations, and focus group discussions with learners from three multicultural high schools in Gauteng Province. Thematic analysis revealed that teachers integrated multicultural perspectives through indigenous environmental practices, locally relevant and global case studies, and culturally informed classroom debates. Learners reported increased engagement, a stronger sense of inclusion, and improved ability to relate scientific concepts to their lived experiences. However, challenges such as limited instructional time, inadequate resources, insufficient teacher training, and tensions between cultural beliefs and scientific explanations constrained effective implementation. The findings suggest that integrating multicultural perspectives enhances the relevance and inclusivity of Life Sciences education by connecting scientific knowledge to learners' cultural and environmental contexts. The study concludes that sustained professional development, culturally inclusive curriculum materials, and stronger policy support are essential to promote equitable and culturally responsive science teaching that advances environmental awareness and sustainability education.

Keywords: *Multicultural perspectives, life sciences education, human impact on the environment, culturally responsive pedagogy, indigenous knowledge systems.*

1. Introduction

The topic 'Human impact on the environment' in Grade 11 Life Sciences opens a space that allows the integration of multicultural perspectives and blends well with scientific knowledge. The incorporation of multicultural views brings a sense of belonging and fosters inclusivity in learners (Gay, 2018). It enhances the learners' engagement as every learner has a unique cultural background. This helps learners to share their relatable experiences and discussions in subtopics like environmental crises, such as pollution, climate change, and deforestation, as different communities are affected differently and have their unique ways of managing and sustaining the environment (Makokotlela & Gumbo, 2025).

The integration of multicultural views encourages critical thinking and creates awareness of global sustainability crises (Banks & Banks, 2010). The teaching strategies, which are culturally responsive, such as discussions and case studies, assist in closing the gaps in cultural knowledge (Ladson-Billings, 2021). Teachers may encounter challenges when integrating multicultural views in the lesson, such as time constraints, lack of resources, and inadequate training in multicultural education (Gorski, 2017). Despite all the challenges, the integration of multicultural perspectives caters to the affective domain, where learners appreciate and value the environment.

1.1. Problem statement

The South African Curriculum and Assessment Policy Statement (CAPS) for Grade 11 Life Sciences is designed to equip learners with scientific knowledge, critical thinking skills, and environmental awareness (Department of Education, 2011). The topic 'Human Impact on the Environment' focuses on how human activities influence ecosystems, biodiversity, sustainability, and conservation of the environment. This topic significantly allows an opportunity to explore social, ethical, and environmental issues that align with the cultural values and beliefs of the learners.

South Africa is a culturally diverse country, having multicultural schools with classrooms that have a fusion of diverse languages, traditions, cultures, values, and varying perceptions. The CAPS curriculum encourages inclusivity and promotes the integration of indigenous knowledge systems (IKS) in the process of teaching and learning, as advocated by Ladson-Billings (2024). However, in the classroom context, the teaching practice constantly focuses more on Western scientific knowledge and views and overlooks multicultural perspectives, especially when teaching about environmental issues (Banks & Banks, 2010). This is, however, against the United Nations Sustainable Development Goals that emphasise quality education and reduced inequalities. This inequality emanates from failure by some learners to relate to the content that they learn and being disconnected from their cultural identities, norms, and practices.

According to Ladson-Billings (2021), there is limited practical guidance on how to effectively integrate multicultural perspectives into teaching and learning, and in the context of the current study, this applies to 'Human Impact on the Environment'. This contributes to a gap in both research and classroom practices. Some teachers have tried to implement teaching strategies and resources that could promote culturally responsive classrooms (Ladson-Billings, 2021), such as providing local examples and contexts as per the CAPS document, but these methods remain inconsistent, underutilised, and under-documented, disregarding the existing knowledge, backgrounds, and lived experiences that diverse learners may bring into the learning of environmental issues.

1.2. Purpose of the study

The study sought to answer the following two research questions: 1. What teaching strategies can be used to effectively integrate multicultural perspectives in Grade 11 Life Sciences classrooms when teaching 'Human Impact on the Environment'? and 2. What are the benefits and challenges of integrating multicultural perspectives in the learning and teaching of 'Human Impact on the Environment' in Grade 11 Life Sciences?

2. Theoretical and conceptual frameworks

Ladson-Billings' (2021) theory of Culturally Responsive Pedagogy (CRP) provides a valuable framework for understanding how learners' cultural identities can be used as assets in the classroom. CRP encourages teachers to foster academic success, develop cultural competence, and promote critical consciousness among learners. Within the Life Sciences classroom, this means valuing learners' lived experiences, connecting curriculum content, such as environmental issues, to their cultural contexts, and encouraging them to question and challenge social injustices, including environmental inequalities.

As early as 1993, Banks emphasised the dimensions of multicultural education, which include the integration of content, equity of pedagogy, knowledge construction, prejudice reduction, and empowering school culture. Banks (1993) extends by stating that the content and cultural integration focuses on the extent to which teachers make use of examples from different cultural groups to demonstrate key concepts, principles, generalisations, and theories in their subject area or discipline. Ndwandwe (2022) highlights that in South Africa, the post-apartheid educational reforms have put more emphasis on the need for a curriculum that reflects the diversity of the nation and fosters social justice. This includes the integration of IKS, which fosters respect amongst learners. IKS provides meaningful insights for sustainable environmental practices and can offer scientific understanding when integrated into science teaching (Emeagwali, 2014). The coexistence of modern science and IKS in the curriculum fosters epistemological pluralism, allowing learners to appreciate and gain various ways of knowing.

3. Methodology

This study is grounded in an interpretive research paradigm (Bertram & Christiansen, 2014), which seeks to understand how learners and teachers make meaning of their experiences when integrating multicultural perspectives in the teaching and learning of *Human Impact on the Environment* in Grade 11 Life Sciences. A qualitative research design was employed to explore participants' views and experiences through an in-depth exploration. According to Spencer & Walsh (2014), qualitative research is grounded in phenomenological philosophy, emphasising the construction of social reality through individual or collective responses to specific phenomena.

3.1. Selection of participants

The study adopted purposive sampling, a non-probability sampling method (Andrade, 2021), to intentionally select participants who were experienced in teaching the topic. Each teacher's grade 11 Life Sciences class was automatically selected to participate in the study. The participants were drawn from

three multicultural high schools and classrooms that consisted of culturally diverse learners and teachers in the Gauteng Province.

3.2. Data collection

Data were collected through semi-structured interviews, lesson observations, and focus group discussions, allowing for rich, contextual insights. Three teachers were interviewed individually on how they integrated multicultural perspectives when they taught 'Human Impact on the Environment'. Each interview session took 30-35 minutes. The interviews were conducted in the school's private offices to minimise distractions. As noted by Brinkmann and Kvale (2015), semi-structured interviews are very useful in exploring meanings that people ascribe to their experiences and social worlds. After the interview, each teacher was observed delivering two lessons on the topic. The observations were done during normal school hours, with permission from the schools. According to Cohen, Manion, and Morrison (2018), lesson observations provide rich, holistic insights into classroom processes and teaching strategies that might be difficult to access through interviews alone.

Three focus groups were conducted with learners, and each group had 6 learners. Focus groups were valuable for uncovering shared meanings and generating discussion that may not have emerged in individual interviews (Krueger & Casey, 2015). The researcher discussed with the learners how they benefited and felt challenged when their multicultural perspectives were integrated into their learning. Each discussion took 40-45 minutes for each of the three focus groups.

The data were analysed using thematic analysis to identify recurring patterns and meanings. To ensure validity and reliability, strategies such as member checking, repeated coding, and triangulation of data sources were used. Ethical considerations were strictly followed, including obtaining institutional clearance, informed consent, maintaining confidentiality through pseudonyms, and adhering to the Protection of Personal Information Act, while ensuring respect for cultural diversity throughout the study.

4. Findings

Thematic analysis yielded three overall themes, which include teachers' approaches to integrating multicultural perspectives; learners' experiences and responses to integration, and challenges and opportunities encountered during the practice. To provide context, Table 1 shows the profiles of the teachers who were interviewed and observed teaching lessons under the topic of 'Human Impact on the Environment'.

4.1. Teacher profiles

To contextualise the results of the study, life sciences teachers' profiles are presented. Table 1 shows that teachers who were participants in the study are diverse in terms of culture and race. In addition, the teachers also vary in the number of years of their teaching experience and their individual ages. This implies that these findings are drawn and informed by multiple perspectives.

Table 1. Teachers' profiles.

Participants' pseudonyms	Musa	Roshney	Khanani
Age	42 years	31 years	26 years
Experience in teaching	14 years	10 years	2 years
Race/Ethnicity	African/Zulu	Indian	African/Tsonga
Gender	Male	Female	Female
Highest qualification	Bachelor of Education	Bachelor of Education Honours	Post-graduate Certificate in Education
School location	Soweto	Benoni	Tembisa

4.2. Teachers' approaches to integration

It was found in the interviews that teachers used different approaches to integrate multicultural perspectives in their Life Sciences classes. One of the teachers (Musa) used indigenous knowledge when describing environmental management, whereas the other teacher (Roshney) used global case studies to bring out the differences between human environment interaction across cultures. A third teacher (Khanani) engaged her learners in debating sessions where learners integrated their cultural values and scientific reasoning. These are presented in Table 2, which follows.

Table 2. Approaches teachers used.

Teacher	Integration strategies	Illustrative quote
Musa	Inclusion of indigenous knowledge practices in environmental management	"When teaching pollution, I ask learners how waste is managed in their villages. Some mentioned reusing and composting, which I bring into the discussion."
Roshney	Comparative use of global case studies	"Learners see that deforestation in the Amazon is linked to cultural and economic practices, which they can compare with local land use."
Khanani	Culturally informed classroom debates	"I allow learners to bring their family or cultural practices into class debates, for example, how water scarcity is dealt with at home."

4.3. Learners' experiences and responses

The discussions held during focus groups indicated that the learners appreciate the integration of multicultural views because they enhanced relevance, sense of belonging, and identity. Learners have said that they feel acknowledged when their cultural knowledge is used in the lessons, and they learn the scientific concepts better when they perceive them in their respective cultural knowledge. Nonetheless, confusion in conflicting cultures between scientific explanations and cultural beliefs was also pointed out by some learners. Table 3 below reports the learners' responses during the focus group discussions.

Table 3. Learner focus group responses.

Theme	Illustrative quote	Observation notes from the observed lessons.
Increased relevance	"It makes me feel proud when I share how my community saves water, and the teacher writes it on the board." (Focus Group 1)	Learners became visibly more engaged when discussing indigenous waste disposal methods.
Sense of inclusion	"Sometimes science feels like it's only about Western ideas, but when we bring our own knowledge, it feels like it belongs to us too." (Focus Group 2)	Learners nodded and clapped during peer contributions.
Tensions between cultural and scientific knowledge	"It's hard when my cultural beliefs clash with what the textbook says. For example, burning fields for ancestors vs. pollution." (Focus Group 3)	Some learners remained quiet during discussions on conflicting practices.

5. Discussion

The study found that teachers integrate multicultural perspectives in Life Sciences using indigenous knowledge, case studies, and debates, but this integration is inconsistent due to challenges such as limited resources, time constraints, and inadequate training. Learners responded positively and felt more included when their cultural knowledge was valued, supporting socio-constructivist ideas that learning is socially constructed. The findings support the socio-constructivist view of Vygotsky (1978) that learning is a socially mediated process. When classroom activities were based on the lived cultural experiences of learners, the meaning was co-created in this study. During discussions, tensions emerged between indigenous knowledge and scientific explanations, sometimes confusing but also encouraging critical thinking. Overall, while multicultural integration enhances engagement and a sense of belonging, it requires better teacher preparation, curriculum support, and resources to be effectively and consistently implemented.

6. Conclusion

The study concludes that integrating multicultural perspectives into the teaching of the topic ‘Human Impact on the Environment’ enhances learner engagement, inclusion, and cultural identity. Teachers use strategies such as indigenous knowledge, case studies, and debates, although these are not yet consistently or systematically applied due to structural challenges. Learners value the recognition of their cultural backgrounds, but differences between cultural and scientific perspectives sometimes lead to confusion. Overall, the findings highlight the importance of culturally responsive pedagogy in Life Sciences and recommend curriculum reform, improved teacher training, and better learning resources to strengthen integration.

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