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Examining learner feedback on Life Sciences teachers' practices in a resourceful secondary school: A South African case-study

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Abstract

The role of learner feedback has been widely acknowledged in higher education as a means of improving teaching practices, yet it has received limited attention in basic education. Drawing on the Pedagogical Content Knowledge (PCK) framework and the concept of learner voice, this study examined Life Sciences learners' feedback on their teachers' instructional practices in a resourceful secondary school. Data were collected through open-ended questionnaires administered to 20 learners in Grades 10 and 11, complemented by focus group interviews. Thematic analysis revealed that learners' feedback addressed the quality of content knowledge taught, the implementation of practical activities, the methods of instruction employed, the teacher's responsiveness to contextual factors, and the nature of assessment practices. These findings highlight the value of learner feedback in enhancing teacher practice within specific teaching contexts. It is recommended that science teachers systematically and informally engage learners to reflect on and refine their instructional approaches.

Keywords: Learner feedback, learner voice, pedagogical practices, science teaching

Introduction

Teaching science has been noted as a difficult task in the literature. Its difficulty is attributed to the complex nature of science (Lederman & Lederman, 2019), the abstract nature of concepts (Keskin & Cam, 2017), and the misconceptions that learners bring into classrooms (Halim et al., 2018). The difficulty gets worse in disadvantaged schools due to a lack of resources to perform practical work (Dison et al., 2019). In resourceful schools, the assumption is that teachers can leverage well-equipped laboratories to make science more practical and relatable, as well as make abstract concepts come to 'life'. However, the question is, how do we know if the resources are used effectively to teach Life Sciences? One way to answer this question is to use learners' experiences of how teachers teach. Understanding learner experiences is usually done by gathering and examining learner feedback on how classrooms are conducted (Clausen & Göbel, 2020). Learner feedback is regarded as not only "attention to the existence of others, but also giving others the right and the means to alter the course of a process in which they are involved" (Gattegno, 1976, p. 4). For science teachers to develop professionally, they need to receive information on how they teach and the impact of their teaching on learners. This "information provided by an agent… regarding aspects of one's performance" (Hattie & Timperley, 2007, p. 81) can lead to improvement in practice. Studies have established the role of learner feedback both in basic education (see, for example, Clausen & Göbel, 2020; Darling-Hammond, 2013) and higher education (see, for example, Ali & Khoza, 2023; Khoza, 2024). Learner feedback gives learners a 'voice' in the teaching and learning process, thus, a process of reflecting upon their learning. Although research also looks at teachers' feedback, where teachers observe each other's lessons and provide feedback, what they see may be different from how learners experience the teaching. We are taking the view that 'learner voice' through the provision of feedback matters in the sense that they are part of the complex classroom culture. We argue that such a voice can shed light on how teachers can improve their practices in a quest to better learner learning in a specific context. Hence, the focus of this study was to examine learner feedback on their Life Sciences teachers' practices in a resourceful school. We particularly sought to address the research question: *What do we learn from learner feedback about Life Sciences teaching in a resourceful school?*

Literature review

Science teaching and its significance

Science teaching plays a crucial role in fostering the development of scientific attitudes among learners (Ichsan et al., 2023). Achieving this goal requires science learning to align with the objectives outlined in the curriculum, ensuring that learners acquire not only knowledge but also the dispositions necessary for scientific inquiry (Zulkifli et al., 2022). Within this context, Life Sciences emerges as a central discipline in the broader field of science (Elsigini, 2021). It provides learners with a scientific perspective of the organic world, illuminates the historical development of life, and situates living systems within the broader dynamics of nature, an approach often described as a "controversial way of knowing nature" (Mardonov, 2019, p. 909). Importantly, Life Sciences bridges the gap between abstract scientific concepts taught in the classroom and the lived experiences of learners, thereby deepening their cognitive understanding of the natural world and enabling them to synthesise historical processes with observable events in their environment (Ali & Jager, 2020).

Asmara et al. (2016) argue that one major factor of ineffective teaching in science classrooms may be due to the pedagogical practices in the classroom. The pedagogical approach used in the classroom must appeal to the current learners at this age to ensure effective science learning (Ichsan et al., 2023). Innovation and creativity in the science classroom can serve as a motivating factor for learning science and improving the overall quality of science education (Rusli & Antonius, 2019). According to Mohzana et al. (2023), science educational facilities in the form of laboratories are essential in driving effective science learning. The use of science laboratories is meant to improve learners' conceptual understanding of science (Mohzana et al., 2023). A study conducted by Asano et al. (2021) among high school learners in Ghana reveals that resources are key to facilitating effective science learning. Promoting active learning through school activities such as task-based learning (Borja et al., 2024) and engagement in laboratory practical work (Mohzana et al., 2023) increases science learners' conceptual understanding. It is, therefore, important to understand learners' experiences of how they are taught science in resourceful schools.

The role of learner feedback in education

Improving the performance of both teachers and learners in the teaching and learning environment requires careful consideration of feedback on science teaching practices (Williams, 2024). Traditionally, feedback has been understood as verbal or written information provided to learners based on their work, to enhance their learning outcomes (Boud & Molloy, 2013). However, it is equally important that feedback flows in the opposite direction – from learners to teachers. Such feedback has a significant influence on the quality of teaching and learning, as it provides insights that can inform pedagogy (Albert, 2023). Pedagogy, a key component of pedagogical content knowledge (PCK), is central to shaping effective classroom practice (Shulman, 1986; Kennedy & Henderson, 2024). Earlier studies, such as that of Tacke and Hofer (1979), suggest that when teachers are rated by learners, they tend to adjust and improve their pedagogical approaches. Yet, despite this potential, learner feedback is often overlooked or undervalued by its intended recipients, whether teachers, school leaders, or curriculum developers (Albert, 2023). Ignoring such feedback risks perpetuating serious academic and learning challenges (Gibson et al., 2020). The present study investigates learner feedback on Life Sciences teachers' practices in a resourceful school.

Conceptual Framework: Learner Voice and Pedagogical Content Knowledge

This study draws from scholarly work on learner voice and the construct of Pedagogical

Content Knowledge (PCK) that explains science teachers' practices in the classroom (see Figure 1).

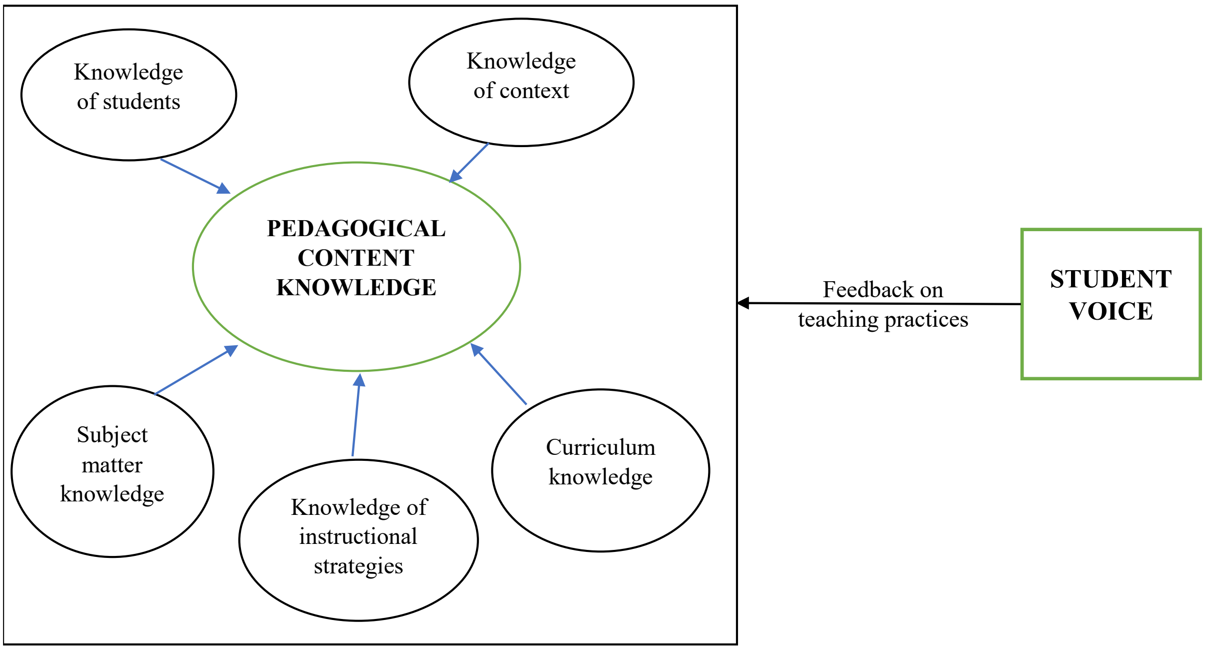

Figure 1: Conceptual Framework of this Study

PCK was first introduced by Shulman (1986), who described it as the intersection between content knowledge and pedagogical knowledge. Research in science education has established that PCK is underpinned by several knowledge domains (see for example, Rollnick et al., 2008; Mavhunga & Rollnick, 2011). The knowledge domains are illustrated in Figure 1 as subject matter knowledge, knowledge of instructional strategies, curriculum knowledge, knowledge of context, and knowledge of learners. Subject matter knowledge is about the concepts and principles of science taught to learners. Knowledge of instructional strategies includes how to teach that content. Curriculum knowledge includes what should be taught to learners and the knowledge of educational standards (Shing et al., 2015). Knowledge of context has to do with understanding factors like where the school is situated and the availability of resources. Knowledge of learners includes teachers' understanding of learners' misconceptions, their background, as well as their abilities and aspirations (Rollnick et al., 2008). Drawing from these knowledge domains, science teachers can construct their practice and enact this in the classroom. When learners' voices are heard regarding their science classroom experiences, the expectation is that they will talk about teachers' practices, which are framed or informed by the knowledge base that guides teachers. Thus, we assumed that learner feedback would be influenced by what they observe in terms of how teachers showcase their PCK.

We also drew from the concept of student voice to characterise their feedback. The concept of student voice was developed in the 1990s (Holdsworth, 1998; Holdsworth, 2000) as an attempt to argue that learners should actively participate in the decision-making of educational processes. The term voice, in its basic sense, is described as the utterances of the speaker. However, it also represents the feelings and perspectives conveyed by the speaker in relation to experiences of a phenomenon (Robinson & Taylor, 2007). According to Mitra (2018), student voice is a powerful way to understand ways in which learners influence or participate in decision-making regarding practices that affect their learning. The central premise of student voice is that learners know what is and is not working in their classrooms and schools, and therefore, it is incumbent on anyone who wants to improve learners' educational experiences to attend to their perspectives, solicit their ideas, and take their feedback seriously (Finefter-Rosenbluh et al., 2021). Therefore, voice represents the enactment of participatory rights to express an opinion. In this study, these opinions are about Life Sciences teachers' practices.

Methods

Approach

We adopted a qualitative case-study approach to understand the learners' experiences of their Life Sciences teachers' classroom practices. According to Yin (2014), a case-study approach provides the researcher with an opportunity to understand a phenomenon in depth. The phenomenon in this study was learner feedback. The type of study was exploratory in the sense that we went into the situation with no clear outcomes in mind.

Sampling and participants

Both purposive and convenience sampling were used in this study. Purposive sampling guided the choice of a Life Sciences school because its curriculum aligned with the study's aim of exploring science learning, and it had a teacher experienced in the subject (Ahmad & Wilkins, 2025). Convenience sampling supported the decision, as the school was geographically close and readily accessible, which facilitated sustained data collection (Andrade, 2021). From this school, 20 learners in Grades 10 and 11 were included because they had sufficient disciplinary background to engage meaningfully with the study tasks, while lower grades lacked the necessary exposure, and Grade 12 was excluded due to examination pressures.

Data collection

To understand the learners' experiences of the enacted curriculum, we used two data collection methods: open-ended questionnaires and focus-group interviews. Firstly, learners were given open-ended questionnaires to fill out (See Appendix A). The following questions/prompts were included in the questionnaire. The learners filled out the questions individually. In the end, we had 20 questionnaires (10 from each Grade). In addition to the questionnaires, focus group interviews were used. According to Wilson (2013), focus group interviews allow the researcher to get a first-hand understanding of participants' experiences and perceptions of a phenomenon. In this study, we assumed that the interviews would also allow the participants to engage in a conversation with each other about their experiences of their teachers' practices in Life Sciences classrooms. The interviews were conducted by the first author, who gave the learners a prompt to discuss: "Please share your experiences of how Life Sciences is usually taught in your classrooms." The learners were allowed to discuss, and follow-up questions were asked based on their discussions. For example, learners were asked how they would have liked to be taught the Life Sciences content. To maintain uniformity in terms of grade levels of learners, two interview focus groups composed of five learners were conducted per grade. At the end, there were six focus group interviews. All interviews were audio-recorded and transcribed verbatim for analysis. The trustworthiness of the study was ensured by maintaining reflexivity throughout the analysis process and utilising dual data sources.

Data analysis

To analyse both data sets, we utilised an inductive thematic approach. Firstly, familiarisation with data is fundamental to analysis. This process allowed us to identify trends that could emerge from the data without being influenced by the researcher's prior knowledge. Then, the questionnaires and the transcripts from focus group interviews were inductively coded. Inductive coding is where the data is coded without necessarily trying to fit it into an existing code (Brown & Clark, 2006). Inductive coding is chosen because it presents "themes [that] are strongly linked to the data instead of the researcher's theoretical interest in the topic" (Dawadi, 2021, p.63). The codes in the data set are categorized according to the patterns emerging from the data to create the themes. Hence, the codes are data-driven. Table 1 shows some of the codes that we used to analyse the data

Ethics

Ethical clearance was obtained from the University of Pretoria Ethics Committee and the

Provincial Department of Education. Permission was also obtained from the school principal, and consent was obtained from the learners and their parents. Data were only collected from learners whose consent was received.

Table 1: Examples of codes used during the analysis of data

Code	Description of code	Example from interview transcripts
Routine teaching	The approach to teaching is the same in every class	We have like a routine sort of. We come into class. We take out our notes, and then Ma'am starts teaching us.
Use of textbook	Teaching is taken directly from textbooks and teacher's note	Sometimes, she shows us different textbooks, like how things work. And she shows us different pictures because I really like pictures and learning from pictures. So that is basically what happens.
Love practical work	Seeing practical session as a means to understanding Life Sciences content	Well, the practical. I love doing practicals because then you see what you learn. And I also like learning how to do it and how to apply my knowledge to actually, the results of the practicals. So when we [structured] DNA I actually saw what I was learning, which was very interesting.
Without enjoyment, there's a lack of focus.	Disconnecting from the learning process	sometimes I don't really focus on the things that I don't like in Life Science like plants. I don't focus as much as I should because I don't enjoy the contents of plants.
Lack of interest in plant studies	Disconnecting from the learning process	I'm not interested in plants, how they're formed and the reproduction of plants. I'm not interested but I can become interested once I start learning and put my head down and actually understand each concept then I actually do become interested.
Disparity in various aspects of life science.	Finding no relevance of plant studies topics to personal life	Yes, because I'm a human. The plants, I'm not a plant lover. I like flowers, but I don't enjoy learning about the reproduction of them because I'm not a flower.

Results

The analysis of questionnaires and interviews revealed five themes regarding learner feedback on their experiences with their teachers' teaching practices. In Table 2, we present these findings per theme. We have grouped the findings per grade to allow further analysis of the similarities and differences per grade.

Theme 1: The nature of the knowledge that the teacher teaches versus learners' preferences

Across the two grades, there is a wide interest in learning human anatomy. This is evident in the data from learners E1.1A and E1.1B. To these learners, what appeals to them in the Life Sciences content is understanding how their body systems function (personalizing it) and how this functioning relates to their everyday life experiences. What is also generally noticeable from the extracts in Table 1 is that the learners do not prefer being taught about plants. Some of them provided reasons related to how the content of plants does not resonate with their career plans. For example, excerpt E1.3B "And I don't like doing plants, because it doesn't help me further on in life". What can be deduced from the learners' feedback is that the nature of the content they prefer to learn seems to be related to the perceived relevance of the content and the extent to which they enjoy being taught it.

Theme 2: Skills and practical work in the learners' Life Sciences classrooms

Across the grades, the skills learned are specific to the topic that is being taught. For example, drawing cells and plotting graphs in Grade 10, and drawing human anatomy in Grade 11. Some of these skills acquired can be useful in everyday life. For example, drawing and plotting graphs, which are not limited to the science field alone, could be used in multiple environments. However, in terms of practical work (see for example, E2.1A), the learner revealed her unmet expectations. She described how she would have loved to learn how to view cells under a microscope, which she was not privileged to do. Therefore, it could be said that some skills were acquired while others were not. The lack of practical opportunities also frustrated the learners (see for example, E2.3B). The learner's utterance (see E2.2B) shows that even though practicals are being done, they are not being facilitated well, as it was stated that the practical is only applicable for test and exam purposes.

Theme 3: The pedagogical approaches that teachers use to teach Life Sciences

Transmission of Information and the use of explanation as a teaching strategy

Most learners believed their teachers transmitted the information very well by direct instruction and explained the biological concepts (see for example, E3.1.2A and E3.1.1B). This indicates that the passing on of knowledge without the learners understanding how it relates to their lives may be frustrating. Furthermore, the learners admitted that their teacher uses a direct instructional method where the teacher does most of the talking (E3.1.1A, E3.1.2A and E3.1.1B). It was also revealed that the work is voluminous (E3.1.1B), and there is a time constraint in covering all the topics. Hence, the teacher rushes the teaching of the lessons (E3.1.2A) or summarises the lesson (E3.1.2A and E2.1.1B), which does not allow the learners to understand the lesson (E3.1.2A, E2.1.1B). Only one learner in Grade 10 mentioned that the teacher "doesn't just rush through the work. She takes time to go through everything" (E3.1.1A).

Questioning in the Classroom

The learners mentioned minimal active engagement in their Life Sciences classroom (see E3.1.1A, E3.1.2A, E3.1.1B and E3.1.2B), which is problematic, given the abstract nature of many concepts in Life Sciences. This experience cuts across the two grades. . To these learners, interacting and grappling with concepts engenders deep understanding (see E3.2.2B and E3.2.3B). Inactive, passive learning could also bring about boredom, as one of the learners affirms (see E3.2.2A). Another learner commented that they were not given opportunities to engage with the content (E3.2.3B). The kind of engagement the learners are looking for is the one where their questions are explored. While it may be right that teachers may be more knowledgeable in subject content, the attitude that only the teacher has the answer to a question is not good for cultivating a curious and innovative mind.

Linking topics and concepts to each other

Ensuring a connection between topics in a subject is vital as it facilitates memory retention (Arslan et al., 2020). Comparing the grades, learners from Grades 10 and 11 admit that there are no connections made by the teacher to connect topics to topics (see E3.3.1A and E3.3.1B). One of the contributing factors to learners' interest in science is how the topics are linked to each other. For example, a negative attitude is developed towards the learning of science, where there are no links between the topic and everyday events (see E3.3.1B). One learner said that the teacher "jumps around" (see E3.3.1B). This indicates that a true understanding of the concepts was lacking.

Theme 4: Teachers' consideration and negligence of context during life science teaching.

Context and learning are two inseparable phenomena necessary for effective learning. Apart from learning the content of Life Sciences, which results in knowledge acquisition, participants also felt that applying the content learnt in the classroom is necessary. The learners mentioned the application of the science content, which is of paramount importance to the learners (see E4.2B). A learner alluded to the need to be taught how things work in real-life situations and how they can use the knowledge they gain in their classrooms (see E4.2B). Since the learning context is not in place, learners, therefore, find the content detached from their everyday lives and experiences. For example, one of the learners said they were informed about stories about innovations in the world, but relating life science concepts to little things in their daily lives is lacking (see E4.2A).

Table 2: Findings per theme from each grade

Theme and sub-themes	Grade 10 learners' feedback (A)	Grade 11 learners' feedback (B)
1. The nature of the knowledge that the teacher teaches versus learners' preferences	E1.1A: I think the most important topic I learned is reproduction … I think it is most interesting because of the way that it will affect my life. I don't know cells dividing; [it] doesn't really affect me because they do it by themselves *(Interview)*	E1.1B: I will be most excited about Life Sciences when we start to learn about the human body. We're still doing plants. And I don't like plants because they don't make sense to me that much *(Interview)* E1.2B: I like learning about how things work, like the human body, especially because I like knowing what goes on in my body *(Questionnaire)* E1.3B Gr 11 learner said, "And I don't like doing plants because it doesn't really help me further on in life"
2. Skills and practical work in the learners' Life Sciences classrooms	E2.1A:Our teacher showed us pictures of plant and animal cells… explained to us the way they would look under the microscope….but we did not get to use the microscope E2.2A: ... I've learnt how to draw a graph and create tables. All the rules that you need to get the graphs and tables right	E2.1B: I think the most important things that we've learnt in Life Sciences is how to draw diagrams and the human body E2.2B: We only come to use it [knowledge from practicals] when we have to write a test or exam or something like that… (Gr 10 *interview*) E2.3B: I would like if we would do experiments and have projects every single day when it comes to Life Sciences ... when you do experiments, it gives you feedback [understanding].
3. The pedagogical approaches that teachers use to teach life sciences		
3.1 Transmission of information and the use of explanation as a teaching strategy	E3.1.1A: I like the teacher; she explains the work to us, and she doesn't just rush through the work. She takes time to go through everything. If you don't understand, she'll explain it again (*questionnaire*). E3.1.2A: I don't like the work when she [the teacher] summarises what is in her notes and the textbook, and she tries to compile everything…it is difficult to figure out what is most relevant. That is what I really don't like that E3.1.3A: The work is rushed, and you don't understand properly, you can't really go home and try to explain it to yourself, because then, you need someone who knows it to explain it again. and then you're just left then, you don't understand	E2.1.1B: … I don't like the work, when the work gets much, it is unclear. When she [teacher] teaches us, you know ... it is on the projector as well, and it is kind of like a summary of what is in our notes
3.2 Questioning in the classroom	E3.2.1A: So yes, that's what we do, and the teacher explains every section that we learn about. And we have a little test on each section, so we know what's going on and understand. E3.2.2A: Sometimes I get bored because we just ... sit and go through notes or listen to the teacher. We don't really get involved or do any interactive things in class".	E3.2.1B: If we ask questions, she is not answering. She is supposed to know what the answer is when, in actual fact, we sit there and are just confused. We don't know what is happening! E3.2.2B: I will prefer that the teacher take the work slowly and allow us to ask questions. I prefer that the teacher allow us to interact and ask any question; it is then that I can, kind of, learn more… (Gr 11 *questionnaire*) E3.2.3B: And sometimes, it is frustrating when you want to know more, and you are not able because you are not given a chance (Gr 11, *questionnaire*)

3.3 Linking topics and concepts to each other	E3.3.1A: My teacher does not link the topics, especially in different topics. Sometimes, it is difficult to understand, and there are sometimes big gaps. I would say that my teacher is not consistent with the topics E3.3.2A: Sometimes I just go with it, and sometimes my mind just wanders... and I don't know what it is	E3.3.1B: I would say that my teacher jumps around our topics. E3.3.2B: When I see how different topics fit together, it interests me…but I cannot see that.
4. Teachers' consideration and negligence of context during life science teaching	E4.1A: Not necessarily ... We only come to ... apply it [what we learn], when we have to write a test or exam or something like that E4.2A: I've learnt that there is innovation everywhere, which makes science exciting, and this must be related to what we see every day	E4.1B: I think it is not really learning about the work, but application of the work. A lot of times, we don't learn how to apply it in class E4.2B: We could do more application work than just reading the booklet. To help us with our exam and help us with everyday life, [to understand] how things work instead of just reading
5. Learners' perspectives on teachers' assessment practices	E5.1A: Like any other child, I don't like the homework ... you will need to write all the work in the way the teacher wanted it E5.2A: ... the essays, I always struggle with [them]. It is annoying because ... you don't get marks very well for the essay questions, even if you write everything that you know. So, I just want (Gr. 10 *questionnaire*	E5.1B: Sometimes, homework is difficult because you need to get the textbook to get the answers for the homework (*questionnaire*) E5.2B: I do study, but I think I should just improve on my study work; I don't get to practice enough. So, I just need actually to practice in class E5.3B: So, it is hard to get good marks, especially with essays. The essay questions that we write in our test make it really difficult to get high marks (Gr 11 *questionnaire)*.

Theme 5. Learners' perspectives on teachers' assessment practices

Regarding assessment, learners talked about the homework given to them and how it does not necessarily serve the purpose of learning. The assessments are in the form of exams, tests and homework as indicated by the learners (see E5.1A and E5.3B). Homework, which serves as an assessment, is believed by learners to not encourage them to research the topic but instead to demand that they reiterate what they learned in class or what they feel the teacher wants them to write (see E5.1A). This means they only consult their textbook and, probably, the teacher's notes for assignments or homework. This suggests that the teachers' assessment practice seldom goes beyond asking learners to research and explore other sources of information. The learners were expected to reproduce the content as it had been taught, not to construct their knowledge, nor to improve the conceptualisation of the biological concepts. The learners, therefore, end up reading textbooks while doing their homework, memorise the content and practise enough past papers (E5.1B), which is assumed to put them in the best position to pass their exams.

Discussion

Learner feedback reveals topic preferences, showing particular enthusiasm for human anatomy due to its relatability to personal experiences. This pattern aligns with Sheldrake et al.'s (2017) findings that teaching science for relevance serves as a crucial determinant of learner motivation and interest development. The Life Sciences curriculum ideology emphasises relevance to foster positive attitudes toward all topics (Mnguni, 2017), yet learners' responses suggest insufficient explicit connections between content and personal relevance. This finding supports relevance theory in education, which posits that learning is optimised when learners can establish meaningful connections between new information and their existing knowledge or experiences. The preference for human anatomy demonstrates how personal relevance serves as a cognitive bridge that can facilitate deeper engagement and understanding.

Learners consistently criticised transmission-mode teaching that fails to explore their questions or establish conceptual connections, leading to disengagement. This finding supports research by Khoza and Msimanga (2022), who demonstrated that instructors promoting active learner participation significantly improve academic achievement. Similarly, Roop et al. (2018) established a direct relationship between increased learner participation and enhanced learning levels. Modern pedagogical approaches prioritise learner engagement through critical thinking, problem-solving, and collaborative learning activities (Noreen et al., 2019). However, the traditional reductionist approach to biological knowledge, where discrete parts are learned separately, may hinder comprehensive understanding. Schmidt et al. (2011) argue for coherent science teaching that links topics and draws from prior knowledge, utilising models like Scott et al.'s (2011) pedagogical link-making framework.

Learners experienced difficulty connecting classroom learning to environmental phenomena, neglect of contextual connections in their learning experiences and linking different Life Sciences topics. Globally, learners find science learning difficult due to the abstract nature (Penn et al., 2020) and conventional teaching strategies (Alparuq, 2024). This fragmented approach fails to provide a holistic understanding of biological systems (Regenmortel, 2004). Flowers et al. (2023) found that biology learners lack essential mechanistic reasoning to explain connections between biological knowledge, attributing this to fragmented concept teaching. Bachtiar (2022) emphasises that mechanistic reasoning is critical for helping learners understand conceptual relationships in natural phenomena, bridging knowledge gaps from reductionist approaches. Linking classroom content with everyday experiences fosters meaningful concept understanding (Stephan et al., 2020) and empowers learners to solve real-world problems (Pertiwi et al., 2024), making learning more relevant and engaging.

Learners highlighted the underutilization of practical work in their learning experience. Research supports that knowledge transmission without practical application represents outdated pedagogy (Ubogu, 2020). Practical work enables deep conceptual understanding and stimulates subject interest (McNeil et al., 2019) while developing essential 21st-century skills. Teacher preparation during preservice training proves crucial, as pedagogical knowledge quality depends on trainer expertise (Aykac, 2016). Helliar et al. (2011) note that inadequately equipped teachers, unable to use practical work for knowledge conceptualisation, create negative learner perceptions. Early exposure to practical scientific work develops scientific attitudes and skills essential for innovative societies (Musengimana et al., 2021). Babalola et al. (2020) argue that practical work enhances scientific attitudes and knowledge retention, though they caution that experimental manuals without real-life connections provide limited value (Shana et al., 2020).

Learners criticised inappropriate assessment practices focused on content memorisation for examination purposes. Current assessment remains confined to lower levels of Bloom's taxonomy, representing assessment *of* learning rather than assessment *for* learning. This memorisation-focused approach spans all grade levels and fails to challenge critical thinking abilities. Wong et al. (2020) assert that memorising scientific concepts inadequately fosters conceptual understanding. Contemporary science education requires sense-making rather than fact recall. While biological concept accuracy remains important, effective learning demands application ability alongside memorization. Teachers can implement more interactive questioning strategies, create explicit connections between topics, integrate regular practical work, and develop assessment practices that promote critical thinking rather than memorization. The findings suggest that even in well-resourced schools, pedagogical transformation is necessary to optimize learner learning experiences.

Conclusion and implications

In this study, we examined Life Sciences learners' feedback on teaching practices in a resourceful school context, revealing critical insights into content delivery, pedagogical approaches, and assessment practices. The findings demonstrate that learner voice serves as a powerful evaluative tool for understanding and improving educational practices, challenging the traditional view of learners as mere knowledge consumers. From a pedagogical content knowledge perspective, the study reveals how teachers' subject matter expertise alone is insufficient without understanding learner perspectives and learning preferences. This highlights the need for more sophisticated theoretical models that integrate content knowledge, pedagogical knowledge, and learner feedback as interconnected components of effective teaching practice. Moving forward, educational stakeholders must recognise learners as legitimate partners in the educational process whose perspectives are essential for creating effective learning environments. Teachers should establish both formal and informal mechanisms for gathering learner feedback to continuously improve their practice. This shift recognises that all classroom activities ultimately serve learner learning, making their voices indispensable for educational excellence.

Limitations and future research

A key limitation of this study is its confinement to a single school within a particular context; accordingly, the findings should be interpreted cautiously. Future research should explore learner feedback patterns across diverse contexts, including rural schools, different socioeconomic settings, and various cultural contexts. Comparative studies examining how resource availability influences learners' learning preferences would provide valuable insights for educational equity discussions. Additionally, longitudinal studies tracking the impact of learner feedback-informed pedagogical changes on academic outcomes and learner attitudes would strengthen the evidence base for learner voice initiatives in science education

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