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Critical Emancipatory Research Approach to Enhance Performance Among Progressed Learners in Life Sciences

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Abstract

In this theoretical paper, we discuss critical emancipatory research (CER) as an approach to enhance performance among progressed learners in life sciences. Most of the progressed learners perform poorly in life science igniting the need to find alternatives to enhance the performance. We have earthed this paper in CER based on the values such emancipation, transformation and social justice which are pertinent to reinvent better performance in life science. To collect data, we used participatory action research ad used thematic approach to make meaning of the data. The finding of the paper is that progressed learners face various vulnerabilities, which impede their performance, necessitated a need to rethink approached used for teaching and learning. The main argument of the article is that CER has the impetus to change the progressed learners' attitude, enhances effective communication and collaboration between the progressed learners, parents, teachers and the DBE to improve the academic performance of progressed learners in life sciences.

Keywords: *Progressed learners, Critical emancipation theory, participatory action research, teacher's attitude, academic performance*

1. Introduction

Poor performance in life sciences is increasing from time to time among the progressed learners. Poor performances in life sciences is observed through the national examination results. According to data collected from the 2018 National Senior Certificate (NSC) examination results, few progressed learners perform well, despite the resources dedicated to supporting them. For instance, in 2018, there were 128 634 registered progressed learners nationally. Of these, only 33 412 were ready to write the requisite seven subjects, while 95 222 modularised. Of the total of 33 412, only 20 122 managed to pass with 30% average, and 13 290 failed. The minister explained that progressed learners also contribute to the poor quantity of results in South Africa; she pointed out that "we need to strengthen our support programme for progressed learners" (Motshekga, 2018:5). The study conducted in Uganda on the 2012 Uganda Certificate of Education (UCE) results exposed the continued poor performance of science subjects compared to other subjects and Basaza, Milman and Wright (2010:85) avers that science subjects remain burden of Uganda's education even as more endeavours are placed into advancement of the academic field.

This paper comes against various studies have been conducted on the poor performance of

progressed learners in life sciences. Dhurumraj (2013) argue that "the lack of resources, language of learning and teaching (LoLT), the socio-economic status of learners, parent involvement, large classes, the developmental level of learners, and the curriculum are among the factors for the poor performance in science." Another study conducted by Farooq, Chaundhry and Berhanu (2011) noted that teachers' attitudes also contribute to learners' academic performance. Lebata (2014:23) supports Farooq et al. (2011) by averring that, in "schools in Lesotho, the poor academic performance of learners is mostly caused by the poor attendance of teachers in classrooms, they even miss their lesson periods while present at school". In a related study by Leepo (2015), it was shown that learners cannot achieve their academic performance by only being provided with expensive school and good learning environment until their parents play a positive role towards them.

The paper fills the gap in various ways. It taps into CER as a starting point to tease the need to rethink progressed learners performance in life science. The study is done among the learners in Uthukela district where no similar study has happened and lastly it is unique in the sense that it focuses on the progressed learners with learning difficulties. In light of the foregoing, the aim of the study is to discuss CER as an approach to mitigate the challenges faced by progressed learners and and how the performance of the progressed learners can be enhanced

The paper is arranged as follows; theoretical framework, methodology, findings and conclusion.

2. Theoretical Framing: Critical Emancipatory Research

This article used critical emancipatory research (CER) is an offshoot of Critical theory associated with Frankfurt School in Germany in the late 1920s (Carrette and Keller, 1999:21–43). The Frankfurt school was established by Felix Weil's father, Herman, in 1923, with the aim of developing the Marxist tradition (McLaughlin, 1999:109–139). The theory was popularised by Jurgen Habermas who added the concept of emancipatory. Commenting on CER, Nkoane (2013:99) states that critical theory has its "philosophical roots in several traditions such as Marx's analysis of socio-economic conditions and class structure, Haberman's notion of emancipatory knowledge and Freire's transformative and emancipatory pedagogy". Jurgen Habermas is viewed as the father of CER, and he argues that power relations in society have an influence on how things are understood (Field, 2018). Habermas developed CER to enhance the participation of other sectors of society, who would otherwise not participate in decision-making, especially where educational issues are concerned (Wang, 2018). CER promotes equality and equity in all its forms, advocates for social justice, freedom, peace and team spirit, and changes people's hearts and minds (Foulger, 2010:135) essential to set conditions necessary to emancipate learners to confront the lived realties such as poor performance. We have chosen CER to couch this study informed by Mahlomaholo (2009:224–237) observation that CER allows the researcher to interpret other people's interpretations and make sense of and work towards fulfilling people through a democratic process, such as collective engagement. In addition, Lorini (2018) argues that CER promotes the collective engagement of all stakeholders, and promotes reaching consensus to retain underperforming learners, in order to create more time for them to master the concepts they had failed to master. In short, CER theory is relevant for this paper since it argues for conditions that negate exclusion, social injustice and lack of participation which are counted as challenges faced by progressed learners ultimately leading to poor performance. With CER, we seek to reinvent a new thinking towards progressed learners and integration of parents in the teaching and learning of life science.

The following section discussed the methodology of the study, which is participatory action research.

3. Methodology: Participatory Action Research

This paper is embedded by qualitative study and is positioned within the wider space of the transformative paradigm. PAR is a research approach that seeks transform the lives of marginalised people in societies. Furthermore, PAR is a blanket term that recognises the power of knowledge and

working together towards a shared goal (Glassman, Erdem and Bartholomew, 2013:272). We have chosen PAR as a research methodology "investigates the actual practices and not abstract practices and learning about the real, material, concrete, and particular practices of particular people in particular places" (Kemmis, S, & McTaggart, 2007, p. 277). In addition, PAR is relevant for the paper since it "identifies the rights of those concerned by the research, and empowering people to set their own schemas for research and development, thereby giving them tenure over the process" (Cornwall and Jewkes 1995, p. 1674). Due to the Covid-19 pandemic, visitors were not permitted entering the schools and data was collected through WhatsApp focus group discussions, in which 16 participants participated to discuss the research questions for over five days; during which we reflected on the two questions for three hours a day. The study participants were 10 progressed learners (from grade 10, 11 &12) aged between 16 and 18, and six life sciences teachers at rural schools in the Uthukela District in KwaZulu-Natal. Homogenous purposeful sampling was used for this study as life sciences progressed learners and teachers were recruited according to their status and experiences, as they possess deeper knowledge about teaching and learning of life sciences. Snowball sampling was used to allow participants to assist in identifying other participants possessing similar traits to participate in the study.

All participants concurred on the ground rules of the group, in order to achieve its purpose.To ensure ethical considerations, participants were asked for consent to participate in the study. During WhatsApp focus group discussions participants were aware that it was impossible to keep confidentiality and anonymity, and they were advised to hide or change their WhatsApp profile pictures to protect their privacy and to use pseudonyms (Moore, McKee and McLoughlin, 2015). The researcher assured them that they would not be connected to the information that they shared during the focus group discussion. Participants were also informed that, if they were uncomfortable about participating in the study, they had the right to withdraw from participating, or could contact the relevant people. The participation of the group members was guided by two research questions, namely, 1) What are the challenges faced by progressed learners in life sciences, and 2) how can life sciences performance of progressed learners be enhanced?

Data that was generated through PAR using WhatsApp group discussions between participants and was analysed through thematic approach

Data was collected and in-depth member checking was done to establish the validity of the findings. Data that had been categorised in themes and analysed was presented to participants so that they could affirm that the data reflected their lived experiences of poor performance, which affects both teachers and learners (Woodyatt, Finneran and Stephenson, 2016:741). Doing so enabled the researcher and the participants to analyse the data that had been collected concurrently, to check their contributions on the topic of the research.

4. Results and Discussion

The first section will address the results and findings based on the first question, which is, what are the challenges faced by progressed learners in life sciences?

5. Complicated life Sciences Terminology

The first challenge raised by the participants is the difficulty of life sciences concepts. They indicated that most of the progressed learners struggle to understand the language used in life sciences, especially its terminology. During the discussion, Ceboh, a teacher, said that

> *"the issue of language barrier is very serious. Learners experience problems in mastering Life Sciences concepts."*

Qhawe, a teacher, added

> *"life sciences concepts or terminologies is the main problem especially for progressed learners. They mostly lack understanding of them and recalling them".*

The findings make it clear that life sciences terminology is one of the main causes of poor performance, and progressed learners perceive some content in life sciences as being challenging to learn. This challenge was supported by the examination diagnostic report for the National Senior Certificate, which states that,

> *Poor performance is still being recorded in questions based on the process of protein synthesis, which include DNA transcription and DNA replication. Most of the progressed learners struggle in misconception of these terms: DNA transcription and DNA replication and apply wrong steps in a correct process (DBE, 2018).*

Dhurumraj (2013:37) states that, "[l]ife sciences concepts are too abstract and most are foreign terms" which affects the performance of the progressed learners. In a discussion, Andile, a learner, said: "*Genetics is the main problem for me; I'm struggling to understand the question when it requires me to solve genetic problems.*" Qhawe, a teacher, also indicated that,

> *Life sciences requires application. Especially in genetics. It requires learners to recall the rules and theories of which they are more similar but applied differently. So if the teacher's pace will be faster. Learners will find it difficult to see the differences and similarities between genetics theories.*

The issue of difficult terminology in life sciences was also referred to by researchers in Turkey, who argue that the nature of life sciences itself requires memorisation, and that the level of abstract concepts, topics and events is challenging for progressed learners (Zeidan, 2010; Cimer, 2011; Reinaldo, 2014). Findings by Ogunkola and Ravi (2011:17) reveal that "learners are experiencing difficulties in various topics in life sciences and therefore it affects their motivation and performance negatively". In support of the foregoing, Deshmukh (2013) notes that overloaded curricula and the interdisciplinary and challenging concepts of life sciences contribute to poor performance of learners in life sciences.

6. Lack of Motivation and Negative Attitude to Learning Life Sciences

During the WhatsApp discussion, it emerged that attitude and motivation play significant roles in learners' performance. Participants reported that most progressed learners lack motivation, and they have a negative attitude towards life sciences. Tholi, a teacher, reported that "I give my learners classwork exercises and homework but learners are reluctant to write the task given to them, they are too lazy". Lethu, a learner, said that,

> *We have a negative attitude towards life sciences because it has difficult words that are even hard to pronounce. And it demotivate us even more if the teacher is moving at a higher pace and we ended up losing interest completely.*

Gugu, a teacher added,

> *Being progressed kills self-esteem, some progressed learners they have been progressed most of their schooling that makes them feel incompetent. Teaching them life science is just too much for them and saps the negative attitude to the teacher.*

From the above points raised by participants, it is clear that the negative attitudes and lack of motivation of teachers' and learners' leads to poor academic performance of progressed learners in life sciences. It is argued by some scholars, such as Cimer and Cimer (2012:17), that "teachers' attitude and teaching style are one of the factors that affect learners in learning life sciences" and, therefore,

"if learners are not happy with the way life sciences is being taught, they may show disinterest towards life sciences and its teaching" (Sharpe and Abrahams, 2020:85). A negative attitude towards teaching progressed learners makes it impossible to assist progressed learners; a negative attitude contradicts CER, which emphasises the need for emancipation. Guido (2018) reports that "creating a positive environment only for the learners, while disregarding their interest and expectations in the subject could lead to learning problems and the decrease of performance in life sciences". Rabgay (2018: 265) believes that "a teacher is a key factor in the manifestation of a positive attitude towards life sciences."

For progressed learners to succeed, there is a need for motivated teachers and acquire right attitude towards teacher professionalism. This resonates with the argument by Sharpe and Abrahams (2020:85) that,

The duty of the teacher is to create an environment that is conducive to progressed learners to stimulate their attitude, the use of methods and approaches that will enhance their concentration and motivation in order to improve their academic performance in life sciences.

The next challenge experienced by progressed learners in life sciences that will be discussed, is a lack of adequate resources for teaching and learning life sciences.

7. Lack of Adequate Resources for Teaching and Learning Life Sciences

During the discussion, the participants reported that the lack of adequate resources for teaching and learning life sciences causes poor academic performance of progressed learners, as it limits them from extracting knowledge from their empirical data and physical surroundings. The LTSM policy stipulates that "every learner must have his or her own textbook and the usage of appropriate quality material must be ensured" (DBE, 2011a), and "teachers and learners have to be provided with a wide variety of curricular resources, exposing learners to diverse ideas, experiences and opinions" (Republic of South Africa, 1996a). While it is a duty of the DBE to provide learning material, some schools still struggle to obtain sufficient resources. This was revealed by Lihle, the teacher, who reported that:

> *The department of Education do not deliver the textbooks on time, and every time teachers used to make requisitions based on life Sciences textbooks, the Department supplies incorrect textbooks series not requested by the teacher, they just supply irrelevant textbooks which are not in line with the curriculum and examination guidelines.*

Sizwe, a learner, added that "life sciences is an interesting subject but I'm struggling a lot to memorise some investigation content because practicals and experiments are conducted theoretically because of the lack of resources to support practicals". The findings indicate that the absence of practical investigations in laboratories disadvantage progressed learners, as some of them learn better by being hands-on and moving around. Thuba, a learner, reported,

> *At our school we do have a life sciences laboratory but we have never used it because of the shortage of equipment, text books and study guides are not enough for all of us. We are sharing in pairs. This make it hard for me to use the study guide and my parents can't afford to buy them for me.*

The observation by the participants resonate well with various studies, such as that of Labov et al. (2010) and Dhurumraj (2013), found that inadequate resources for life sciences leads to poor performance. Informed by the CER "it is an injustice to institute systems and structures in education that exclude some on the basis of poverty, or because they live in underprivileged communities" (Dube, 2020:103). In light of this claim, it is clear that few schools in rural areas have adequate resources, which are needed to improve their performance. The study by Cimer (2011:61) found that "the major factor that ignites learners' performance and teachers' effectiveness to teach is the availability of instructional materials such as charts, textbooks and laboratories". Learners tend to

perform poorly in life sciences if resources needed for teaching and learning are lacking. Anif, Sutama, Prayitno and Idrus (2019:23) report that "the quality of learning materials such as text books, chats, laboratories are an ingredient of education". Matimbe (2014) found that learners without textbooks and laboratories perform worse than those who have textbooks and fully equipped laboratories.

In this regard, we are of the view that there is a strong correlation between the availability of resources and performance of progressed learners in life sciences. The findings of this study correlate with the findings by Mwaba (2011) and Mwenda et al. (2013:93), that "the lack of resources such as textbooks, physical infrastructure and laboratory equipment has led to the learner's poor academic performance" (Ohia, 2018:148). Firstly, this shortcoming makes it hard for teachers to be effective and innovative, as they cannot give learners work to be done at home. Secondly, it makes it difficult for progressed learners to study and research further what was done in the classroom. Lastly, it causes learners and teachers to lose interest in life sciences. Next, is the lack of trained teachers in life sciences.

8. Lack of Trained Teachers in Life Sciences

The responses by the participants indicate that most life sciences teachers lack training on the content knowledge of life sciences. According to SACE (2010), the lack of opportunities for teacher career advancement has caused many science teachers to leave their employment at the DBE. The findings also indicate that most life sciences teachers are older in age, and some are not up to date on what the new curriculum requires. This claim was supported by Vuyo, a learner, when he reported that:

> *Old teachers may at times not well conversant with imparting knowledge in life sciences, we prefer to be taught by newly qualified teachers because it seems that the old teachers do not understand what the new curriculum really want them to do.*

Thando, a teacher, said,

> *To add on that one. The teacher who is not well trained for life sciences could display a negative attitude towards the subject and that might affect the learners' attitude towards the subject especially the progressed learners.*

The above findings indicate that some teachers who teach life sciences have deviated from their subject specialisation and, therefore, possess limited knowledge on delivering the life sciences content; they fail to strengthen content clarification to learners, especially progressed learners who require more examples, attention and clarification if they are to understand the content better. Even though the findings indicate that some of the life sciences teachers are professionally qualified to teach life sciences, and others are qualified life sciences teachers, the training they received does not resonate with the new curriculum, hence, they find it difficult to teach the new curriculum.

The fact that some of the teachers were not qualified to teach life sciences contradicts the observation by Mwenda, Gitaari, Nyaga, Muthaa and Reche (2013:95) that "the central role of a teacher is to disperse the curriculum effectively". Qhawe, a teacher, commented on the lack of qualified teachers in life sciences:

> *I think the lack of trained educators in Life Sciences is a very big challenge for progressed learners. Teachers play a significant role in the performance of learners meaning they should be passionate about teaching Life Sciences, understand the terms as they are and that it is not an easy subject but needs to be practised daily in order to enjoy it. That will also help learners to fall in love with the subjects of their educator knows his or her story.*

Recent studies found that a lack of specialised teachers in the subject contributes to a higher failure rate in life sciences (Brownelland Tanner, 2012:339; Kiadese, 2011). With the lens of CER, we realise there is need to emancipate teachers and to train them to use different pedagogical styles to enhance the academic performance of progressed learners in life sciences. The lack of trained life sciences teachers is referenced by scholars such as Keller, Neumann and Fischer (2017:586) and Kleickmann, Richter, Kunter, Elsner, Besser, Krauss and Baumert, 2013:90), who indicate that incompetent life sciences teachers lack pedagogical content knowledge, which "they should use to create a positive environment, anticipate learners' difficulties and respond very quickly in making the subject matter accessible to learners that encounter problems in life sciences" (Caldwell, 2007:9). Tsanwani, Harding, Engelbrecht and Maree (2014:41) indicate that,

Teachers who are specialists in life science, understand science beyond the curriculum, and teach science in a variety of ways raise enthusiastic and confident learners about science, and spend time beyond their duty to ensure that the learners understand the concepts of science.

From the above findings, it is clear that competent life sciences teachers plays a significant role in understanding the current curriculum and the delivery of the subject content to enhance the academic performance of the progressed learners by using the relevant pedagogical approaches in teaching life sciences. Considering the shortage of trained teachers for life sciences, we argue that the DBE should prioritise the training of life sciences teachers. Our suggestion is supported by Lebata (2014), who proposes that teachers should receive in-service training organised by DBE subject advisors, with the ultimate aim of improving the academic performance of progressed learners in life sciences.

9. Enhancing the Academic Performance of Progressed Learners in Life Sciences

The WhatsApp group discussion not only highlighted problems – possible solutions were also discussed by the participants, who contributed to respond to Question 2 of the paper, which is, how can life sciences performance be enhanced? This section will present the solutions proposed by the participants for solving the problems that had been identified above. The first solution that was suggested by the participants is providing sufficient trained teachers, which is likely to enhance the academic performance of Grade 12 progressed learners in life sciences.

10. Providing Various Life Sciences Curricula

Another suggestion that the participants made as a solution to improve the academic performance of progressed learners in life sciences is providing various life sciences curricula. Having more than one syllabus for life sciences would meet the various needs of learners, by acknowledging variations in their potential abilities and intellectual and physical needs. In the discussion of possible solutions to alleviate the challenges experienced by Grade 12 progressed learners in life sciences, Gugu, Tholi and Lihle elucidated that,

> *Gugu: Learners are different, unique individuals and their level of thinking is not the same. I suggest that life sciences should have various syllabi to cater different learners. Back in the years, we used to have standard Grade and higher Grade systems in [life sciences].*
> *Tholi: I suggest that the DBE should adopt the inclusive approach that will specify the minimum requirements for each learner and acknowledges their potentials in order to receive the necessary support.*

The suggestions put forward by Gugu and Tholi are in line with the ideas of Balakrishnan (2020:131) that "different grading syllabi in life sciences reduce the unnecessary stress, pressure and unhealthy competition amongst the learners as they are provided with an opportunity to choose the subject grading according to their level of understanding". Sathy and Hogan (2019) add that a grading

system provides teachers with the means to identify special needs, appropriate learning programmes, assessment standards and instruments that can be used to help progressed learners to obtain good marks in life sciences.

Lihle, on the other hand, believes that the suggestion will add to teachers' burden, as it will mean extra work, and a great deal of extra time. This contradicts the argument of Priyadarshini and Thangarajathi (2017:28) that "inclusive syllabi work when there are enough resources available for teachers to provide individualised learning processes for each learner".

We appreciate the suggestion provided by the participants to avail various life sciences syllabi to cater for inclusivity. However, in reality, inclusive syllabi require enough resources, well trained teachers and enough time to deliver the content during teaching and learning. While the suggestions are appreciated, various syllabi in life sciences will have to be a long-term plan to be implemented effectively, as it would require a considerable capital outlay. In this regard, I conclude that it is advisable to focus on strategies that involve short-term plans and have few budgetary implications. The second solution that was given by participants to enhance the academic performance of progressed learners in life sciences, was providing sufficient resources to teach and learn life sciences.

11. Fostering Positive Attitudes in Teachers and Learners Towards Life Sciences

As part of the solution, fostering positive attitudes in teachers and learners was suggested during the discussion. Motivation and attitude are regarded as the key factors that boost the academic performance of progressed learners in life sciences (Mbajiorgu, Oguttu, Maake, Heeralal, Ngoepe, Msafu and Kaino, 2014:138). Participants reported that positive attitudes lead to interest in the subject, commitment, hard work and, in turn, the desired good academic performance. During the discussion, Qhawe, said:

> *Positive attitude contributes to positive results, attitude towards the Life Sciences affect the career choices of learners. Learners need to be motivated in order to change their negative attitude towards the subject as it will affect their performance.*

Participants emphasised that it is the duty of a life sciences teacher to display a positive attitude and commitment towards learners, in order to change their negative attitude towards the subject, in spite of the poor conditions they are learning under, and the lack of basic resources. Ceboh, a teacher said:

> *Progressed learners especially in life sciences want a teacher who is dedicated and optimistic because even the simplest task can become long and difficult for progressed leaners to master. It is at times like this that teachers must offer hope and encouragement by celebrating any and all victories no matter how big or small the accomplishment is. This will encourage learners to participate actively and build their confidence.*

According to Tsanwani, Harding, Engelbrecht and Maree (2014:42), Life sciences must be taught by an enthusiastic and confident teacher that is eager to spend time beyond their duty to ensure that the progressed learners understand the challenging concepts by giving them extra practise activities and reward them whenever they show some improvement. . Abudu and Gbadamosi (2014:35) believe that it is the duty of a learner to be disciplined, in order to perform well and to achieve good results in life sciences. Sipho, a learner, indicated that,

> *Being disciplined as a learner changes a bad attitude. When you are disciplined you will be able to work with other learners and you will be able to listen to instructions and you won't wait for the teacher to tell you to study you will be ahead already.*

In support of the foregoing, Vassallo (2014:105) argues that, "life sciences is a subject that

requires a lot of passion and dedication from the teachers as they should take their time in guiding learners through challenging concepts of life sciences which are seen as difficult, boring and irrelevant and they should make them interesting". However Abudu and Gbadamosi (2014:35), contrary to Vassallo (2014:105), says that "learners should take control of their learning and be responsible for their school work by working hard and seeking for help whenever they need it".

It seems that participants and the literature agree that it is the duty of both the teacher and the progressed learner to display positive attitudes towards life sciences, because having a negative attitude towards life sciences could lead to poor academic performance. The next solution suggested by participants relates to sufficient resources for teaching and learning, which they believed could enhance the academic performance of progressed learners in life sciences.

12. Sufficient Resources for Teaching and Learning in Life Sciences

In this article, the issue was that life sciences is a demanding subject and that it is taught best through a learner-centred approach – this was mentioned by participants during the discussion. This approach works effectively when there is sufficient resources. The availability of adequate resources, such as sufficient text books and fully equipped laboratories, enhances teaching and learning in life sciences, and also improves academic performance of progressed learners, because these learners would remain interested and pay attention. During the discussion, Lihle, a teacher, said,

> *Learners learn better if they can relate to the subject hence more practicals are key to their understanding. For example: by giving them a 3Dimension model for structures makes it easy for them to recall.*

Thando added,

> *Our laboratories should be fully equipped with the best teaching aids and progressed learners should be given practical worksheets to help them understand.*

Studies have shown that the availability of resources for life sciences appears to be one of the solutions for improving the academic performance of progressed learners in life sciences (Belay, Khatete and Mugo, 2020; Buah and Akuffo, 2017). The availability of learning and teacher support material would enhance the effectiveness of teaching and learning life sciences, as using basic resources, such as charts, videos and projectors for teaching, can bring about good academic performance by progressed learners.

During the discussion, Buhle, a learner, said, *"Watching a video on mitosis makes us understand the topic better and be able to differentiate it from meiosis"*. Lebata (2014:117) argues that sufficient learning material has a considerable effect on learners' academic performance, since it facilitates the learning of abstract concepts and ideas of encouraging rote learning. According to my experience as a teacher, I am aware that sufficient learning resources stimulate discipline and enhances the academic performance of progressed learners in life sciences. The national policy for Equitable Provision of an Enabling School Physical Teaching and Learning Environment "recognises the detrimental effects of inadequate resources on teachers and learners, especially in rural schools" (DBE, 2015). In this regard, we are of the view that the DBE should prioritise supplying sufficient resources for life sciences progressed learners, in order to improve their academic performance. The next solution offered by participants was providing sufficient trained life sciences teachers.

13. Providing Sufficient Trained Life Sciences Teachers

The participants suggested providing sufficient trained teachers for life sciences as one of the main solutions for enhancing the academic performance of progressed learners in life sciences. Teachers

who specialised in life sciences have scientific knowledge and will be able to deliver the life sciences curriculum effectively. In the discussion, Qhawe indicated that,

> *We, as life sciences educators, we need to be effectively and sufficiently grounded in the scientific knowledge and understanding of life Sciences and we should be able to apply the best and relevant methods that would help us to produce good results for progressed leaners in the classroom.*

Mbali added,

> *We need competent teachers whose specialisation is life sciences. Therefore, it will be easier for us to understand the subject content better.*

Regarding the claim that many teachers of life sciences are incompetent, researchers such as Mupa and Chinooneka (2019:98) argue that "teachers should possess some experience in teaching life sciences in order for effective teaching and learning to occur". Sathy and Hogan (2019:34) disagree with Mupa and Chinooneka (2019:98) by stating that teachers who are newly trained may have less experiences of teaching but be more effective than teachers with longer-term experiences in teaching. This suggestion is supported by South African Qualifications Authority (SAQA), which states that qualified teachers "are able to identify and solve educational problems by using critical and creative thinking to arrive at a responsible decision and evaluate knowledge in their area(s) of specialisation" (DBE, 2012b:9).

Sufficient trained teachers for life sciences would be the best solution for improving the academic performance of progressed learners, as trained teachers would find it easier to identify topics on which progressed learners struggle and need more attention. This suggestion resonates with Ogbonnaya (2011:121), who argues that the "quality of education cannot exceed the quality of the teacher". Better knowledge and pedagogical life sciences skills of teachers would enhance the academic performance of progressed learners in life sciences.

14. Conclusions

Based on the findings, the study recommends that teachers should create an environment that is conducive to progressed learners' performance, to improve their attitudes, by using methods and approaches that enhance their concentration and motivation and improve their academic performance in life sciences. Teacher must be ready to adapt to changes in life sciences curricula, as a new curriculum always prescribes certain specific teaching strategies. In this manner, attending training workshops, will enables them to work together as a team, collaboratively.

In addition, the study recommends that learners should display a positive attitude towards life sciences and take intervention programmes seriously, as they hold advantages for them in relation to improving their academic performance, to prepare them optimally for their final examination to enter tertiary institutions, and help them to achieve positive academic results in life sciences.

Finally, the study suggests that the Department of Basic Education should prioritise the availability of learning and teacher support materials, to enhance the effectiveness of teaching and learning life sciences. Invest in ICT at all schools, as it could encourage progressed learners to be creative and develop technical skills and knowledge. Teachers will also develop ICT-related pedagogical skills and knowledge.

In short, the study outlined the challenges face by progressed learners in life sciences. The study was couched in CER and responded to two objectives. PAR was used as a methodology for the study, in which 10 progressed learners aged between 16 and 18, and six life sciences teachers from Uthukela District, took part. The study found that there are many factors that contribute to poor academic performance of progressed learners in life sciences.

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