

Teachers' views on challenges affecting learners' performance in natural science

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ABSTRACT

In Namibia, natural science (NS) is one of the priority subjects in upper primary phases (Grades 4 to 7). However, in the Omusati Region of Namibia, there are increasing public concerns that many learners are not performing well in NS. This study surveyed the views of NS teachers on the challenges affecting upper primary learners' performance in NS at three selected combined schools in the Omusati Region. Qualitative research design using face-to-face interview was used to gather the views of upper primary NS teachers in the schools. Seven teachers who are currently teaching NS at the selected schools were selected using the purposive sampling method to participate in the study. The results obtained revealed that the following challenges affect upper primary learners' performance in NS in the selected schools: medium of instruction, lack of adequate teaching and learning resources, lack of laboratories, sensitive topics, overcrowded classroom, indiscipline among learners, absenteeism, unfavorable teaching environment, hunger, and lack of proper guidance from subject advisory teachers. The study recommended that the government should provide schools with feeding programs, build laboratories, renovate classes and provide teaching materials. The schools should evolve disciplinary measures to check the learners' indiscipline.

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1. INTRODUCTION

The human society in the present day lives in the age of science [1], and as knowledge regarding human development and learning are growing at a rapid pace, the opportunity to shape more effective educational practices has increased [2]. In Namibia, the Ministry of Education Arts and Culture (MoEAC) states that learning experiences in the natural science (NS) should be focused on promoting teaching and learning for understanding [3]. Namibia, like most African countries, is rich in natural resources and the optimum exploration and utilization of these resources requires scientific knowledge and relevant skills. Moreover, scientific knowledge and technical skills are prerequisite for advancing the national economy and improving the standards of lives of people as envisaged in the Namibia's long-term Vision 2030. As noted by Prakash [1], the distinctive characteristic of scientific knowledge is that it provides material explanations for the behavior of the material world. Poincare [4] also added that while scientific knowledge is always open to revision, its core elements are stable and beyond reasonable doubt. As noted by Cantor, *et al.* [5], the key insights from the science of learning and development are that the brain and the development of intelligences

and capacities are malleable, and the development of the brain is an experience-dependent process. Thus, it is important for learners to acquire scientific knowledge and skills which will foster their understanding of the interaction of the human being and the environment in order to satisfy human needs.

Although NS is an imperative subject, it has been identified that learners often have significant misconception about the subject [4]. Learners' views about NS have been picked up from what they learn via popular media like television, internet, magazines, newspapers, and from classroom experience [4]. Mostly, science is distorted in the media, and classroom teaching can reemphasise what we know rather than how we know it. While acknowledging that science education in today's global education system is much more than fact-based knowledge, Jessani [6] noted that science education becomes meaningless and incomprehensible for learners if they are not able to relate it to their lives. The aims of science education include helping learners to gain an understanding of as much of the established body of scientific knowledge as is appropriate to their needs, interests and capacities [7]. It has been reported that a knowledge and love of science is the ultimate equalizer and the pathway to human rights and better quality of life [8]. Moreover, NS provides special training in observation and reasoning which explains why science learners reason from definitely ascertained facts and form clear concepts which make one to be systematic and enable one to form an objective judgment [1]. As the world is becoming a knowledge society, it is important to include the nature of science in planning and teaching, so that our learners gain useful understanding to enable them perceive how science is related to their real life.

In his communique on the role of practical work in the teaching and learning of science, Millar [7] noted that school science curriculum in most countries has two distinct purposes. First, it aims to provide every young person with sufficient understanding of science to participate confidently and effectively in the modern world—a 'scientific literacy' aim. Second, advanced societies require a steady supply of new recruits to jobs requiring more detailed scientific knowledge and expertise; school science provides the foundations for more advanced study leading to such jobs [7]. Despite these laudable aims, it is worrisome that the teaching and learning of science subjects in some schools, especially in the study area are not producing the desired result and upper primary learners continued to perform poorly in NS. In a study on the challenges encountered in the teaching and learning of the NS in rural schools in South Africa, the authors identified lack of required infrastructure and resources for science teaching, learners' background, language of instruction, and lack of parental support among the factors affecting science learning [9].

Science and technology are at the heart of the 2030 agenda, included as one of the means of implementation under Goal 17. Realizing the full potential of science and technology depends on a host of actors, including scientists and engineers in the public and private sectors, entrepreneurs, financiers, policymakers and educators, among others [10]. In a different report, it was argued that science teachers are important in the teaching and learning of science and there is no development of science education in any country without considering teachers' contribution [9]. While teaching NS effectively can help learners apply their knowledge and skills in understanding the nature of science which can deliberately increase learners' interest in the subject, the continued learners' poor performances in NS in the study area put questions to several perceived challenges. A report by the Ministry of Education showed that the government of Namibia has improved its education system by changing the curriculum, enrolling more qualified teachers and providing subject advisory teachers with a purpose of improving learners' performance in NS. Despite all these laudable measures, there is an increasing public outcry that learners are not performing well, especially in the NS, and no documented study has been carried to establish the views of the teachers which could provide important insight towards devising specific remediation measures. Therefore, it becomes pertinent to carry out the study and understand the views of NS teachers on the challenges affecting primary learners' performance in NS in the Omusati Region and advice remediation measures. The study provides valuable baseline literature information which could be explored by the Ministry of Education about the challenges affecting the performance of learners in NS in the study area and devise appropriate measures and policies to tackle the challenges.

2. RESEARCH METHOD

2.1. Research design

Research design refers to the set of methods and procedures used for the collection and analysis of the measures of variables stated in the research problem [11]. This study used qualitative research design using descriptive approach. The qualitative design was used because it enabled the researchers to gain insight and understanding of the challenges causing poor performance of the upper primary learners in NS from the participants' perspective. This is important for the purpose of identifying and recommending helpful mitigation measures that could address the challenge of the study area and other places with similar characteristics.

2.2. Sample and sampling procedures

Sampling is a technique or a process of choosing a sub-group from a population to participate in the study [12]. The study used purposive sampling procedure to select the participants for the study. Purposive sampling is a procedure where the researcher chooses the sample based on who is thought to be appropriate for the study. Members of the sample are those that can adequately answer the research questions. Thus, the researcher selected seven upper primary NS teachers from three combined school in Onawa cluster to participate in the study.

2.3. Research instrument and data collection

Research instruments are tools (for example questionnaires, interviews, and observation) intended to obtain data on a topic of interest [13]. This study used an interview as a research instrument to obtain data on the views of NS teachers about the challenges affecting upper primary learners' performance in NS in the selected schools. Reddy [14] defined an interview as a gentle conversation between two or more people where questions are asked to a person to get the required answers. This study used the face-to-face interview during the data collection. This interview allows the researcher the flexibility to pursue an idea in the response in more detail. Interviews are useful to get comprehensive information about personal feelings, perceptions and opinions and they also allow more detailed questions to be asked. The researcher asked the NS teachers to respond to open-ended interview questions about the challenges affecting upper primary learners' performance in NS and the possible suggestions on how to improve on the challenges. Questions were asked face-to-face and the responses were recorded using a voice recorder.

2.4. Data analysis

The thematic analysis method was used to analyse the data collected in the study. This analysis method involves the process of systematically applying logical techniques to describe, condense, recap and present the data according to the emerging themes. It involves the identification of common patterns within the responses and critically analysing them according to the research questions [15].

The recorded data were transcribed from audiotape to written information so that they can be read through over and over to provide a clear understanding, and to ensure that all information that answered the research questions were taken down. Then, the data were summarised into themes and subthemes, and interpreted to give meanings to the research findings.

2.5. Research ethics

The researchers first sought and obtained the approval of University of Namibia (UNAM), Katima Mulilo Campus Research Ethic Committee to carry out the study. Further permission was sought and obtained from the principals of the selected combined schools. Before data collection, the researchers clearly explained the purpose of the study to the participants. Participants were guaranteed of confidentiality by informing them that their names and names of schools will not appear on the research document. Thus, names of participants and the selected schools have been kept anonymous in this study; the researchers used Teacher 1, 2, 3, 4, 5, 6, 7 instead of the real names. Participants were also informed that their participation in the study is strictly voluntary and assured of their right to withdraw from the study anytime they wished to without any harm.

3. RESULTS AND DISCUSSION

In this section, the researchers used letter Q to refer to the question asked and letter T to represent teachers involved in the study respectively.

3.1. Q1: Which grade/s do you teach NS?

In order to ascertain the actual grades, the participants teach NS, they were asked to indicate the grades they teach the subject and the results obtained were presented in Table 1. These results obtained revealed that the participants taught NS in grades 4 to 7. It was found that Teachers 1 and 3 taught Grade 6 only in their respective schools, Teacher 2 taught Grade 5 only, Teacher 4 taught Grade 4 only, Teacher 5 taught Grades 5, 6 and 7, Teacher 6 taught Grades 5 and 6, while Teacher 7 taught Grades 4 and 7. These results also showed that Grade 6 NS teachers constituted the majority of the study participants while Grade 4 and 7 NS teachers constituted the minority. However, all the participants taught in upper primary phase (Grades 4 to 7) and hence could provide relevant opinions on the challenges affecting the upper primary learners' performance in NS in their schools.

Table 1. Some demographic characteristics of the study participants

Teacher	Grade taught	Period (Years)	Number of classes	Number of NS lesson/day
T ₁	6	16	2	1
T ₂	5	4	2	1
T ₃	6	1	1	1
T ₄	4	3	2	1
T ₅	5, 6, 7	20	6	1
T ₆	5, 6	3	2	1
T ₇	4, 7	2	5	1

T=teacher

3.2. Q2: How long have you been teaching NS?

This question aimed to find out the number of years of experience the participants had in teaching NS. The findings obtained were as presented in Table 1. This finding showed that Teachers 1 and 5 are most experienced in teaching NS with 16 and 20 years of teaching experiences respectively. The other participants had teaching experiences ranging from 1 to 4 years. This wide range in the participants' years of teaching experiences might help to provide a wide range of information related to the challenges affecting upper primary learners' performance in NS in the selected schools.

3.3. Q3: How many classes do you currently teach NS in?

This question aimed to find out the number of classes in which each participant is currently teaching in NS and the findings obtained were given in Table 1. The results showed that T₅ and T₇ taught more classes; 6 and 5 respectively while T₃ taught one class only and the rest taught 2 classes each. It is surprising that T₇ having just two years of teaching experience is currently teaching NS in five different classes. This might not be unconnected with the shortage of NS teachers in the school.

3.4. Q4: How many NS lesson do teach in a class per day?

This question was aimed to find out how many lessons the NS teachers teach in each class per day of the week. The findings obtained revealed that all the participants taught one lesson in each class every day from Monday to Friday (five lessons per week). This might be due to the time table plan.

3.5. Teachers' challenges which affect learners' performance in NS in the selected schools

The results in Figure 1 outlined the different teachers' challenges as indicated by the participants to be contributing to the learners' poor performances in NS in the selected schools. As shown in Figure 1, the results revealed that the majority (86%) of the participants indicated lack of teaching and learning resources as a major challenge affecting learners' performance in NS in the study area. The lack of resources is followed by medium of instruction which was indicated by 56% of the participants while 43% of the participants indicated lack of guidance from advisory teachers as a challenge affecting the learners' performance in NS. The figure further showed that 29% of the participants indicated learners' absenteeism and unfavorable teaching environment respectively as challenges affecting learners' performance in NS. Other challenges like lack of laboratories, sensitive topics, too much curriculum contents, overcrowded classes, indiscipline learners and hunger were respectively indicated by 14% of the participants. The follow up face to face interview on how the challenges identified by the participants affect the learners' performances in NS revealed the following.

3.6. Medium of instruction

It was found during the interview that some learners do not understand English language which is the medium of instruction as from upper primary phase in the study area and Namibia as a whole. One of the respondents revealed that:

“Some learners have difficulties in expressing themselves in English language. Most learners do not know how to read English texts and how to spell English words. Several learners do not understand me when teaching using English language and some tend to write their work in Oshiwambo.”

Yan [16] asserted that teaching some subject contents in English language may affect learners' performance negatively especially in science subjects where difficult linguistic features are used. Research findings consistently show that learners benefit from using their home language in education in early grade years (ahead of a late primary transition stage); yet, many developing countries continue to use other languages for teaching in their schools [17]. In addition, Shipanga [18] highlighted that learners in Namibia

are having their vernacular language as a medium of instruction at lower primary phase and they end up struggling with English language when they get to upper primary. The change in the language of instructions as learners progress from lower primary phase to the upper primary phase in Namibia made it difficult for several learners to connect their skills and experiences from the former to the latter phase and this tends to create real challenge for the teachers to bridge the gap in order to achieve continuity in the teaching and learning stages. The interactive learner-centered approach—recommended by all educationalists—thrives in an environment where learners are sufficiently proficient in the language of instruction [17].

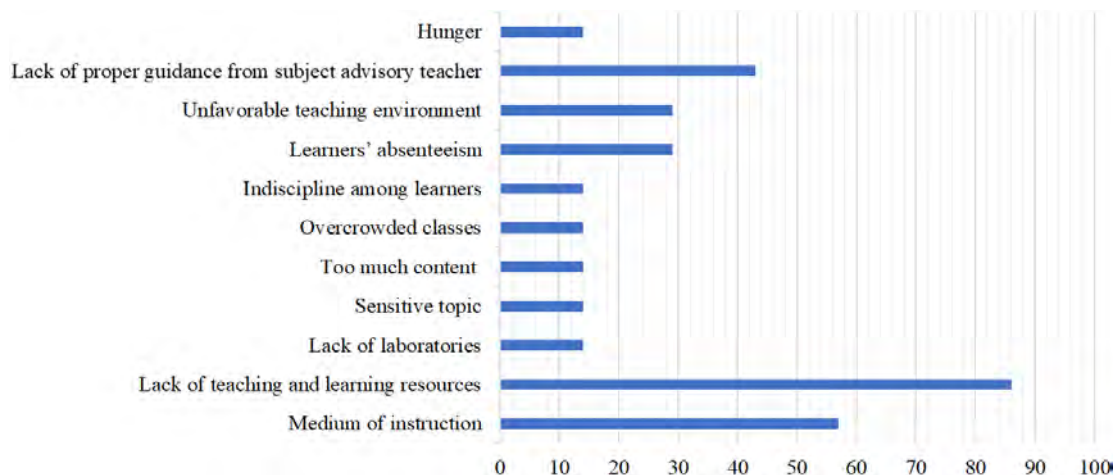


Figure 1. Percentage respondents on challenges affecting learners' performance in NS in the study area (Note: a participant can mention more than one challenge)

3.7. Lack of resources

It was found that the lack of teaching and learning resources such as textbooks is the most prevalent challenge affecting learners' performance in NS as revealed by 86% of the respondents. During the follow up interview, the respondents stated that there are not enough textbooks in their schools and some learners are sharing textbooks. According to one of the respondents:

"This challenge is affecting the performance of learners negatively because learners do not get enough time to use the textbook. For example, when given homework, if one learner goes home with the textbook, others will not have opportunity to use it and this will affect their performance in the given task."

The respondents further added that there are some grades where there is only one textbook which is reserved for the teachers' use only, and the learners do not have access to any textbook which they can use to read for further understanding, or to do their homework or prepare for tests and exams. They also stated that there is no apparatus to do experiments in the schools; a situation which made the learners to continue to perform poorly in practical questions. These findings corroborate other research report which revealed that resources such as textbooks, teaching aids and stationeries affect the academic performance of learners [19]. It was further asserted that learning is strengthened when there are enough reference materials especially the textbooks [19]. However, Ogbaji [20] argues that one of the biggest setbacks in the use of instructional materials is inadequate supply of the materials. Indeed, this is among the major challenges observed to be affecting the learners' performance in NS in the study area.

3.8. Lack of laboratories

There are 14% of the respondents identified lack of laboratories at schools as one of the challenges affecting learners' performance in NS in the study area. One respondent revealed that:

"There are no laboratories at schools where science teachers can go and do practical/experiments. So, we tend to leave those practical unattended to, and this has continue to affect the learners' performance because they end up failing those parts in exams."

Dhurumraj [21] opines that learners should be encouraged to do laboratory activities during practical lessons because scientific concepts are clarified and reinforced through such activities. Learners begin to engage with scientific concepts and experiments via the manipulation of materials during laboratory experiences. It was further indicated that some learners learn through kinesthetic learning where they carry out physical activities rather than listening to a teacher or watching demonstration [21]. Thus, if experiments are not done by NS teachers, it will greatly affect the learners' performance in NS in the study area.

3.9. Sensitive topics

The upper primary NS is an integrated science subject that covers topics such as the ecosystem, human body, organisms and electricity among others. Findings from the interview revealed that 14% of the respondents indicated that teaching sensitive topic is one of the challenges affecting learners' performance in NS in the study area. The respondent explained that:

“Our learners are more on traditional myths and values, and when I teach topics that include sensitive concepts, e.g., reproductive system; some learners immediately develop shyness and become uncomfortable, and this makes them to lose concentration in class.”

This finding is in consonance with earlier research finding where it was reported that attitudes about sensitive topics are often bound up in issues of shame, guilt, or freedom [22].

3.10. Too much content

There are 14% of the participants indicated that NS have too much contents and the time given per term is short to cover them. Thus, the teachers find themselves overloaded and end up not teaching some contents or rushing through the topics, and at the end, the learners do not perform well in those topics. In a different report, it was held that some curriculum is packed with so much contents that leaves little time for learners to acquire a deep understanding of the subject or to develop a life-skills such as critical thinking, communication and problem-solving skills [23].

3.11. Overcrowded classes

Overcrowded classes were identified as one of the challenges affecting the learners' performance as indicated by 14% of the respondents. In response to the interviews, one respondent explained that:

“There are some classes where we about 45–50 learners and this cause some slow learners to be neglected. Personally, I do not have enough time to give attention to those learners because the class is full.”

Overcrowded classes prevent learners from concentrating on the lessons. Learners who are seated too close to one another in a classroom have difficulty concentrating on the lessons, and this lead to less learning and lower test/exam scores [24].

3.12. Indiscipline among learners

The study also found that 14% of the respondents revealed that indiscipline among learners is one of the challenges in the study area. According to the respondents:

“Some learners do not respect teachers and they do not listen to the teacher but misbehave in the classroom. They also do not obey the school/classroom rules. By the end of the day, these learners do not make it to pass test and exams; so, their performance is affected negatively.”

It has been asserted that indiscipline has an effect on academic performance of learners which include, learners' inability to concentrate in class, loss of materials taught due to absenteeism and inability to learn. Thus, the learners' indiscipline could negatively affect the performance of the upper primary learners in NS in the study area [25].

3.13. Learners' absenteeism

Absenteeism was one of the challenges affecting learners' performance in NS in the study area as indicated by 29% of the respondents. The respondents revealed that some learners can go up to 2 weeks without coming to school and these learners are usually left out because they miss a lot. In addition, some learners may come to school but they choose to absent themselves from NS lesson because they do not want

to write a test, task or quiz and they end up having low continuous assessment mark. In a different study, it has been shown that learners' class participation becomes affected due to absenteeism. Learners who are always absent from class often miss the chance to become a part of the lesson. Such learners cannot raise questions about the confusion they have regarding the topics and they also miss the chance to participate in group work within the class [26]. Education research has long suggested that broader indicator of student behavior, student engagement, school climate and student well-being are associated with academic performance, educational attainment and risk of dropping out [27]. In a different research report, the author noted that student absenteeism impacts not only students' educational progress but also affects their social development [28]. Thus, there is need to introduce effective measure as well as build strong synergy between the schools and parents/guardians to curb learners' absenteeism in the study area.

3.14. Unfavourable teaching environment

The results further showed that 29% of the respondents indicated that the classroom environment in which they teach NS is not conducive for teaching and learning. They indicated that the classrooms are old and dilapidated such that the teachers do not stay there comfortably. Some classrooms' board where teachers can paste poster are worn out, learners are sitting on broken chairs and tables which are not comfortable for them to concentrate and learn in the class. In a different report, it was held that classroom needs supportive learning environment that contribute to learners' achievement. Classroom environment may influence learners' wellbeing and their capacity to pick up to certain degree [29]. It was further argued that learners who feel contented and secured are probably going to obtain more information when contrasted with the individuals who are unhappy and uncomfortable. Also, negative classroom condition can debilitate the learners causing them to be less ready to learn [29].

3.15. Lack of proper guidance from subject advisory teacher

From the interview, 43% of the respondents indicated the lack of proper guidance from subject advisory teacher as one of the challenges affecting learners' performance in NS. It was revealed that the subject advisory teacher does not visit schools to see how the teaching and learning are going and comment on them. Moreover, the subject advisory teacher does not give teachers information on how to assess practical investigation in NS, and does not organize workshops where NS teachers can go and discuss to learn the subject issues. The respondents explained that some issues that cannot be solved by teachers without the help of the subject advisory teachers are affecting the learners' performance. In a different study, it was asserted that without an adequate knowledge base, teachers might lack the skills necessary to provide support to learners. The author added that the lack of expertise in teaching strategies is a bigger impediment to effective teaching and learning than lack of content expertise [30].

3.16. Hunger

The result also revealed that 14% of the respondents indicated hunger as one of the challenges affecting learners' performance in NS in the study area. One respondent revealed that:

“Some learners come to school with empty stomach (coming to school without eating anything) and these learners could not concentrate during lessons, they are usually sleeping because they apparently do not have energy to participate in class.”

At an earlier study, it was submitted that hunger and poor diet can make it hard for an individual to concentrate. Feeling hunger is uncomfortable, and is the body's way of saying that it needs nutrients and energy [31]. The author further added that this sensation (hunger) takes over almost all of the children's cognitive resources, making it difficult for them to concentrate and it affects how the brain works [31].

3.17. Participants suggestions on the challenges affecting learners' performance

The teachers who participated in the study were asked to suggest possible ways that could be used to minimize the challenges affecting learners' performance in NS in the study area and they gave variable opinions. The participants opined that the schools should organize fundraising events in order to raise funds that could be used to purchase instruments and materials needed to carry out practical works. They also added that the schools should designate science subjects as priority items in their budget at least, to purchase the critical science materials. In another suggestion, it was indicated that both the schools and the community should organize parent-teacher meeting to discuss matters such as discipline among learners, poor classroom infrastructure, lack of adequate teaching and learning materials at schools and possible intervention measures, as well as organising remedial lessons to assist slow learners meet up with their learning demands.

These they felt will make the parents/guardians to be more involved and committed to the welfare of their children (the learners).

Furthermore, the participants suggested that the Ministry of Education should produce practical manual that NS teachers will use to conduct practical works, and also train teachers in their first year of teaching on how to teach and asses various tasks. It was also added that the Ministry of Education should provide adequate funds to the schools to enable them respond to needs that can aid teaching and learning in NS. Also stressed was the need for the subject advisory teacher to visit schools at least, once in a term to check how NS teaching and learning are going on. It was added that the subject advisory teacher should organize workshops for the NS teachers to develop their pedagogical skills.

In order to address the plight of hungry learners and motivate them to put more efforts in their studies, the participants suggested that government should implement school feeding programme. This will motivate the less privilege learners to become more interested in attending school, which is critical for good academic performance. Finally, it was suggested that the parents should provide home education to their children on some sensitive issues related to growth changes and social awareness. This is hope to minimize some learners' shyness during classroom instructions of some topics such as adolescence and reproduction.

4. CONCLUSION

The findings of the study revealed the poor performance of learners in NS in the study area was attributed to various challenges such as lack of teaching and learning resources in the subject, medium of instruction, learners' absenteeism, unfavorable classrooms environment and lack of proper guidance from the subject advisory teacher. There were also challenges of hunger, indiscipline among learners, overcrowded classes and lack of laboratories that were identified to affect the performance of learners in the study area. In order to address these burning challenges and improve the performance of learners in NS in the study, the participants suggested among others the need to organize fundraising event and including NS as a priority in the school budget, organizing parent-teacher meeting to discuss issues that could assist the schools, building classrooms, laboratories and provision of adequate teaching and learning resources by the MoE as well as implementing school feeding programme to mitigate the related challenges. Thus, considering the importance of effective science education at the foundation stage to the future science careers of the learners, it is necessary for the educational stakeholders to work together and address the identified challenges. In addition, there is need to address the challenge of medium of instruction as this is critical to successful classroom instructions. Learners should be taught in English right from the lower primary phase (Grade 0–3) so that they become proper literate in English in order for the learning experiences gained at that phase to augment further learnings at the upper primary phase.

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