Scholars Journal of Arts, Humanities and Social Sciences **ISSN 2347-5374 (Online)**
Sch. J. Arts Humanit. Soc. Sci. 2015; 3(9A):1391-1395 **ISSN 2347-9493 (Print)**

(An International Publisher for Academic and Scientific Resources) DOI: 10.36347/sjahss.2015.v03i09.001

An Examination of the Causes of High Failure Rate in Physical Science at Ordinary Level in Makoni District East Constituency

Dr Thembinkosi Tshabalala[1], Dr Regis Fanuel Gutuza[2]
[1]Senior Lecturer and National Programme Leader, Master of Education in Educational Management, Faculty of Arts and Education, Zimbabwe Open University, Zimbabwe
[2]Senior Lecturer in the Department of Educational Studies in the Faculty of Arts and Education, Zimbabwe Open University, Zimbabwe

***Corresponding Author:**
Dr Thembinkosi Tshabalala
Email: tshabalalathembinkosi@yahoo.com

Abstract: The aim of this present study was to examine factors contributing towards the low performance of Ordinary level candidates of Makoni East Constituency in physical science using the qualitative methodology. The population consisted of all Form 4 pupils doing physical science at the 8 high schools, 16 teachers and 8 heads of schools. The sample comprised of 10 pupils, 4 teachers and 2 heads of schools. The study collected information through the use of an open ended questionnaire, interview and through the use of document analysis. The study revealed that the major causes of poor performance by pupils at Ordinary level physical science included lack of proper facilities, unavailable learner support materials, lack of discipline English language as a medium of instruction among other factors. The study recommends that the Ministry of Primary and Secondary Education should ensure that schools are adequately supplied with teaching aids for physical science. There should also be learner support teams at schools to assist learners that may need extra lessons on physical science.
Keywords: Causes, high failure, physical science, Ordinary level, constituency.

INTRODUCTION

Pupils' performance in physical science at ordinary level has generally been unsatisfactory and this is evident when statistics of students who proceed to do science at advanced level are considered [1] As Madziyire [2] argues, the problem is acute especially in rural schools and most former Group B schools in high density suburbs in most Zimbabwean towns and cities. Nziramasanga [3] pointed to the poor performance in science by students in developing countries like Zimbabwe when compared to developed countries as one major reason for the development gap between the developing and the developed. Makoni [4] stated that the performance of urban students tends to be better than that of rural schools in physical science as there is a strong link between socio-economic backgrounds of the learners ands their performance in subjects like physical science. Moyo [1] postulates that arguments concerning lack of facilities and resources in rural based schools are always raised when the pupils underperform at public examinations because such schools often serve disadvantaged learners who are from families that are not educationally supportive. Physical science is a very crucial subject in the Zimbabwean context because as [5] observes all those students who wish to undertake studies at university for such high paying professions as doctors, engineers, pilots or astronauts should be in possession of this subject. It is against this background that his study set out to investigate the extent and nature of poor performance of pupils in physical science in Zimbabwean rural secondary schools.

REVIEW OF RELATED LITERATURE

Science education provides learners with a foundation of technical skills which are in short supply. High achievement in sciences is valued in society because it sets the precedence on academic success as the stepping stone for entrance into more prestigious occupations [6]. Physical sciences help us to understand the natural world through the use of one of the fundamental purposes of offering physical sciences is that it provides learners with scientific knowledge which is embedded in science education [7].

Talking about South Africa, Kriek and Grayson [8] state that the national pass rate in science learning (particularly mathematics and physical sciences) has decreased since 2003. Some of the variables that have contributed to the decline in the pass rate include the educators' poor understanding of the

syllabus, a negative attitude and arriving late to class. Teachers must be familiar with the subject content to be taught. Research conducted in many schools in Australia has shown that because of lack of resources, many teachers did not teach physical science[23]. Many teachers use outdated teaching practices and lack basic content knowledge and this has also contributed to the poor performance of learners [9].

The other factor that plays a role in underperformance of learner in schools has to do with strategies that science teachers use to teach physical sciences. As Castejon and Perez [10] posit, demonstration of lessons and chemical reactions should be an integral part of the teaching and learning process in a physical science classroom. Testing of ideas should not be confined to pen and paper, but rather active involvement of learners in investigative lessons. The advantages of active learning are that a larger quantity of information is assimilated by learners at one time, interaction amongst learners is improved, learners' academic performance improves, it allows for stimulation of higher order thought as well as developing respect for the views and opinions of others [11]. Active learning requires not only a hands-on approach but it also needs for learners to have an inquiring learning mind and engage in the process of inquiry learning, and inquiry learning is an approach in which the educator presents the learner with a rather puzzling situation and the learner then attempts to solve the problem by collecting data and then testing his / her conclusion.

In Portugal for example, learners' difficulty in physical science was due to failure to use laboratories properly [12]. Laboratory experiences are likely to make learners understand and enjy sciences and thus it is important to develop laboratory investigation skills in schools [13]. In South Africa as Muwanga-Zake [14] postulates, many schools do not have science laboratories and where they do exist, they are not used effectively. In Nigeria, there are insufficient laboratory facilities and consequently, secondary school learners are taught physics using guided discovery notes, demonstrations and expository teaching approaches [15]. Thus it is clear that most developing countries have a challenge in using laboratories to teach physical science [16]. Thus, it becomes difficult for learners to perform experiments in an investigation science classroom and as a result such schools report a low performance rate in physical science and learners lose interest in the subject [16].

Lack of skilled manpower is another aspect that brings about backwardness. As Derville [17 states, bad teaching skills contribute to the failure of pupils to master basic skills in science. Teaching does not take place unless the pupils are learning. The issue of teaching reveals that teachers who have themselves limited knowledge about physical science may fail to make it stimulating to pupils [18]. Their lack of knowledge causes them to teach incorrect facts. Some teachers use informal and mechanical methods of teaching that children are put off on learning and develop negative attitudes towards a subject.

The teaching of science can also be affected by the unavailability of resources in the school laboratories. As Farrant [19] argues, the design of the school and the limited resources allocated to many of them compel teachers to use teaching methods which are much less effective than those that could be used if resources and materials were available. Appleton [20] posits that in most cases science lessons fail due to the science language. There is a anger that any specialis group like scientists may develop their own kind of Maudlin English which acts as a barrier rather than a means of communication [20]. Most advanced books on science are too difficult to read because they contain complicated words and ideas expressed in what is known as specialized vocabulary and the science teachers are at times at fault, because they communicate at a level above the understanding of pupils [13].

Statement of the problem

The performance of pupils at ordinary level examinations in physical science has generally been very unsatisfactory and this problem cannot be allowed to go on without checking it as many pupils are left ill equipped with these very essential skills in physical science.

Purpose of the study

The study examined those factors that contributed to poor performance of pupils in physical science in order to come up with mitigatory measures to improve the situation.

Research questions

The study was guided by the following sub-questions.

1. Do schools have proper infrastructure to effectively teach physical science?
2. Are the teachers teaching physical science properly qualified?

Significance of the study

The findings of this study could provide deeper insights into the problems encountered by schools in the teaching of physical science and thus suggest solutions to reduce the impact of the problems. It is hoped that the study would also provide strategies to guide teachers and pupils when doing the subject for better results. Finally, the study hoped to add to the corpus of knowledge on the challenges experienced by schools in physical science in order to inform policymakers on how best to avoid these challenges.

Limitations of the study

In view of the small size of the sample used the findings of the study may have limited generalisability. The other limitation has to do with the qualitative methodology which was used in this study. As Leedy [21] postulates, the researcher's presence during data gathering which is often unavoidable in qualitative research can affect subjects' responses and issues of anonymity and confidentiality can present problems when presenting findings. The use of multi methods mitigated these limitations and participants' identifies were kept a secret.

Delimitation

The study delimited itself to an examination of high failure rate of ordinary level pupils in physical science in Makoni East Constituency secondary schools using the qualitative paradigm. Views from 10 pupils, 4 teachers and heads of schools were used.

METHODOLOGY

The study adopted a qualitative methodology and made use of a case study. The methodology and the design were selected because they afforded the participants to relive their experiences in their daily operations. The population consisted of all physical science ordinary level teachers and pupils in Makoni East Constituency. A constituency is a political administrative area under the jurisdiction of a Member of Parliament in the Zimbabwean context. Purposive sampling was used to select a sample of 10 pupils, 4 teachers and 2 heads of schools. Purposive sampling was chosen because as Anderson [22] observes, its advantage is that the researcher can use his/her research skill and prior knowledge to choose respondents. In the interests of this study, the participants were assumed to be information rich such that they would be ready to provide research sought data. The data were generated using an open- ended questionnaire, interview guide as well as use of document analysis.

RESULTS AND DISCUSSION

The study sought to examine the causes of high failure rate of ordinary level candidates in physical science. This section is presented in two parts; namely biological data and actual findings.

Table 1: Distribution of respondents by category (N=16)

Category	Frequency	Percentage
Pupils	10	63
Teachers	4	25
Heads	2	12
Totals	**16**	**100**

As table 1 above shows, the composition of participants was made up of 63% pupils, 25% teachers and 12% heads of schools.

Table 2: Composition of teachers and heads by professional qualifications

Professional qualifications	Heads		Teachers		Totals	
	Frequency	%	Frequency	%	Frequency	%
BSc Applied Physics	0	0	0	0	0	0
Bachelor of Education in other subject areas	2	100	3	75	5	83
Bachelor of Arts	0	0	1	25	1	17
Other	0	0	0	0	0	0
Totals	**2**	**100**	**4**	**100**	**6**	**100**

The information above reveals that the majority of both teachers and heads were in possession of the Bachelor of Education degree in other subject areas which are not physical science. None of the participants held any qualification in physical science. One of the teachers was in possession of a Bachelor of Arts degree and yet was teaching physical science.

DISCUSSION

The schools have classrooms that are in a poor state. They have cracking walls and pot holed floors, some windowpanes are broken and the floors, some windowpanes are broken and the classrooms have no ceiling which makes it very difficult for teachers and learners to hear each other due to noise on rainy days. During winter, the classrooms are very cold which might affect the concentration of the learners and they may also be attacked by flue. This tallies with findings by Gumbo [5] who argues that, some of the classroom conditions in most rural schools are in a dilapidated state of disrepair and very unsuitable for any learning purposes and yet we expect our children to perform wonders from such environments.

All the schools did not have standard science laboratories equipped with all the apparatus and materials befitting of a laboratory. Teachers were using one corner of the classroom for experiments while the remaining space was used for theory time. As Moyo [1] postulates, arguments concerning lack of facilities and resources in rural based schools are always raised when the pupils under perform in public examinations because most of the time such schools often serve disadvantaged learners who are from families who are

not educationally supportive. In other words, these children suffer from a double dilemma; their homes are anti-school or education and the schools they attend are equally not conducive for effective teaching and learning.

A document analysis revealed that attendance by learners was very poor. Almost every day there were more than ten (10) pupils who were absent from school for various reasons. The figures of absentees were higher on Fridays, Mondays and soon after school holidays. Progress records that were analysed revealed that pupils were scoring very high marks on coursework and yet dismally failed their public examinations. The work on the pupils' exercise books revealed that there were very few assignments given to pupils and in most cases the marking was not communicating anything to the pupils. The timetables also revealed that the official time allocated to physical science is very little. The teachers' supervision reports indicated that heads were conducting very few supervision sessions on this subject. This information summarises the major obstacles that learners in this subject are experiencing. As Appleton [20] posits, the rural pupil in developing countries is confronted by a number of significant obstacles to his / her guest to learning of science, some of which include absenteeism to engage in economic activities or to go to the diptank, superstition, like attending school on the opening day being taboo, lazy and incompetent teachers as well as poor supervision.

The study found that most disturbingly all heads and teachers did not possess a relevant professional qualification in physical science. The heads were in possession of administration degrees, and teachers who were assigned to teach the subject were specialists in other subject areas and yet were assigned to teach the subject. This dove tails with observations by Derville [17] who argues that lack of skilled manpower is another aspect that brings about backwardness, as bad teaching skills contribute to the failure of pupils to master basic skills in science. The issue of teaching reveals that teachers who have themselves limited knowledge about physical science may fail to make it stimulating and their lack of knowledge causes them to teach incorrect facts.

CONCLUSION

The study set out to examine the major factors that contributed towards high failure rate of pupils at ordinary level in physical science in secondary schools in rural areas of Zimbabwe. There are a multiplicity of causes which include lack of resources like proper laboratories and science equipment, lack of skilled manpower in the form of qualified teachers, inadequate supervision due to lack of knowledge in the subject by heads of schools as well as factors associated with the socio-economic and cultural background of the pupils themselves. There is rampant absenteeism by pupils and a general laissez-faire attitude towards school work. All these factors put together make success in this subject very difficult.

RECOMMENDATIONS

On the basis of the findings and conclusions of this study some recommendations are put forward:

- The Ministry of Primary and Secondary Education should prioritise the deployment of fully qualified physical science teachers in rural areas and incentive all those science teachers who volunteer to teach in the remote areas.
- Schools should engage the donor community in order to source funds for building proper science laboratories for the effective teaching of physical science.
- Heads and teachers should curb the scourge of absenteeism as it affects the learning of pupils.
- There should be thorough staff development of under qualified teachers currently teaching physical science as well as adequate supervision by heads of the work of these teachers.

REFERENCES

1. Moyo B; High failure rate in science and mathematics. Harare: College Press, 2014.
2. Madziyire NC; Supervision of educational personnel. Harare: Zimbabwe Open University, 2010.
3. Nziramasanga T; Teaching for success. Harare: University of Zimbabwe, 2008.
4. Makoni T; Performance of girls in science subjects in rural schools. Gweru: Mambo Press, 2004.
5. Gumbo R; Misconceptions of physical science. Harare: Longman, 2013.
6. Okoye I; Promoting science, technology and mathematics (STM) as indices of development in Africa in Akale. Learning and Instruction, 2006; 13(6); 125-139.
7. Herskovitz D; Science education. IOWA: University of IOWA, 2012.
8. Krick T; Grayson L; Effective science teaching. Houston: University of Houston, 2009.
9. Makgato M, Mli A; Factors associated with high school learners' poor performance: A spotlight on mathematics and physical science. South Africa Journal of Education, 2006; 26(2); 253-266.
10. Castejon JL, Perez AM; Complex learning: The role of knowledge, intelligence, motivation and learning strategies. Alicate: University of Alicate, 2008.
11. Gough NW; Historical studies in the physical sciences. International Handbook of Research History, 2009; 8(3); 1-33.

12. Afonso AS, Leite L; Prospective physical science teachers' use of laboratory activities: An analysis of its evolution due to a science teaching methods course. Braga: University of Minho, 2000.
13. Cordak Q, Peina B, James S; Science students' misconceptions of the water cycle. Journal of Applied Sciences, 2009; 9(4); 865-873.
14. Muwanga-Zake N; Science and gender issues. Kampala: Makerere University, 2008.
15. Ottander C, Grelson G; Laboratory work: The teachers' perspective. Journal of Biological Education, 2006; 40(3); 113-118.
16. Kibirige I, Hodi T; Learner's performance in physical sciences using laboratory investigations. International Journal of Educational Science, 2013; 5(4); 425-432.
17. Derville T; The use of psychology in teaching. Kualar Lumpur: Longman Publishers, 2009.
18. Siddiqui U, Khatoon T; Teaching physical science: Should we implement teacher centred CAI or student-centred CAI in secondary level in India. European Scientific Journal, 2013; 9(10): 136-150.
19. Farrant JS; Principle and practices of education. Sinderpose: Longman, 1991.
20. Appleton K; Do we dare teach physics? Research in Science Education, 2003; 33 (4): 1; 1-25.
21. Leedy PD; Practical research. London: Longman, 2009.
22. Anderson L; Research in education. London: SAGE, 2011.
23. Appleton K; How do beginning primary school teachers cope with science? Towards an understanding of science teaching practice. Research in Science Education, 2003; 33: 1-25