

Research article

STUDENTS' PERCEPTION OF SCIENCE SUBJECTS AND THEIR ATTITUDE IN TANZANIAN SECONDARY SCHOOLS

Jimmy E. Kihwele

Kibaoni Secondary School, Ifakara

E-mail: kihwelejim@ovi.com

Abstract

The world is rapidly moving to the age where without investing in science and technology there will be no development. In Tanzania, less emphasis has been made in improving teaching of science in secondary schools. This has led to not only poor performance in final examinations, but also fewer students who are studying science. The study explored students' perceptions and attitudes on science subjects and reasons behind such situation. The study was conducted in two secondary schools in Kilombero district. The findings shows that, allowing students to opt subjects has developed a mentality that those subjects are difficult and for few intelligent students. The government needs to lift up the policy and make all subjects compulsory. **Copyright © WJER, all rights reserved.**

Key words: Students perception on science subjects, dropping science subjects

Introduction

The world is rapidly moving to the use of sophisticated technological tools. As science and technology is advancing, it creates a greater demand for people to study science (Anwer, Iqbal and Harrison, 2012). Our lives are directly or indirectly connected to science and technology innovations. The use of mechanical tools, chemical substances,

communication and medical services are all related to high level of technological innovations. Development of science and technology demands the skilled people and disciplined ones from lower level of learning (Mabula, 2012).

With this broad importance of scientific innovations, the Tanzanian government has a sacred duty to ensure it creates the required environment to enhance creativity and advanced scientific innovations. The best way to assist scientific and technological innovations is to improve educational policies, practices and support at a school level.

In sub-Saharan countries including Tanzania, there is poor response in improving science education (Mabula, 2012).

The Tanzanian government is trying to supply human and material resources to raise students' interest in studying science subjects. But there is high rate of teacher turnover and due to large number of enrolled students; teaching and learning materials are inadequate (Ingersoll, 2001; Flynt & Morton, 2009). New teachers are leaving the profession very early due to unsatisfactory working environments (Flynt & Morton, 2009). Regardless the government efforts, many students are not interested and have decided to drop physics and chemistry subjects.

Due to lack of interest, the rate of failure is rising every year, as in three subjects the performance in 2004, 2006 and 2008 were, mathematics 70%, 76% and 82%, physics 45%, 46% and 44% and chemistry 35%, 38% and 43% respectively (URT, 2008).

The issue has to be looked with future oriented eye and a critical mind. There is a need to find innovative and effective ways to combat teacher turnover and retain them (Flynt & Morton, 2009), for better performance in science subjects and to rise students interest in studying them. In 2011, Mamlock-Naaman conducted a study to investigate why students are not interested in science and came with ways to arouse students interest in studying science.

According to Mabula (2012), there is a high rate of students to drop science subjects which are not compulsory. In 2010, out of 350,904 candidates who sat for form four national examination 60.4% dropped Chemistry and 74% dropped physics. The drop out ratio in optional science subjects is extraordinary high (Nyamba & Mwajombe, 2012).

Several studies have been done in Tanzania concerning science education. In 2012, Nyamba and Mwajombe investigated factors influencing students' preferences on science subjects. Mabula (2012) also explored the

challenges and opportunities in promoting student choice of science subjects, and a study which researched about the attitude of students towards science subjects (Anwer, Iqbal & Harrison, 2012).

Research problem

There is very low interest in studying science subjects in secondary schools. However, if the situation will remain unresolved, soon there will be a serious scarcity of crucial and important experts. The lack of scientific experts will result to poor economic and social development in our country. To explain the problem, there is a need to understand students' perceptions towards science subjects. The study will help other efforts in identifying the root cause of high rate of dropping science subjects. This understanding will give teachers, educators and other stakeholders the clues of how to motivate and encourage students to choose science subjects than to drop them.

Objectives

1. To understand students' perception on science subjects in secondary schools
2. To identify reasons behind students' high rate in dropping science subjects in secondary schools
3. To explore best ways to help restore students interest in science subjects

Methodology

The study design was case study and it was conducted in two secondary schools at Ifakara in Kilombero district. Sample size of the study was 80 respondents who were teachers and students. Form four and form two students were picked randomly from the classes. Teachers and form four students were interviewed and form two students responded through questionnaires in order to give their perceptions on science subjects. Examination records were reviewed to supplement the data needed for the study. Teachers also were involved in the study sharing their knowledge. Then data was presented and analyzed in tabular form and percentage for better presentation and understanding.

Findings and Discussion

In Tanzania, most students from ward secondary schools drop science subjects. Some students believe they have low ability to manage science subjects. This lead to short supply of science personnel in important fields like medical

doctors, nurses, teachers and engineers. In one secondary school at Ifakara, drop ratio is enormously high and threatening as shown in the table below.

Table 1: Ratio of students who study science and those who have dropped at school A 2013

Class	Students who study science		Students who have dropped		Total students
	No.	%	No.	%	
III	44	68.8	20	31.2	64
IV	34	15.4	187	84.6	221

This finding shows the real picture of negative attitude towards science subjects in secondary schools. Most of the students are forced to study science by teachers or relatives because of their promising performance, but students themselves lack intrinsic motivation towards the subjects. According to the study, students are not interested in science because they believe science is difficult and requires high understanding ability. Also it involves a lot of calculations and uses difficult language whereby they are not doing well in English and mathematics subjects. They admit that, science subjects are difficult, but they cannot drop biology and mathematics because they are compulsory. Although they say arts subjects are not difficult, still students perform poor in all subjects.

Form two students who are prepared to enter form three next year also have conception that science is difficult and some of them are thinking of dropping them. Out of 9 subjects they study, 54.8% of students believe mathematics is most difficult subject, followed by physics 21.4% and chemistry 7.1%, while arts subjects had 2.4% for English and Kiswahili, and 4.8% for Geography and History. Subjects they enjoyed most were Kiswahili 35.7% and Biology 21.4%. One student said; “kwasababu wanafunzi wengi wanatishwa sana kabla hawajafika sekondari, kwahiyo wanaanza kuyaogopa na kushindwa kujiamini wanapokuwa wanasoma masomo hayo ya sayansi” [because many students are frightened before joining secondary schools, therefore they start fearing science subjects and lose confidence when they learn those subjects]. With the threats around, students consolidate their perception that they will never perform well science, they develop fear and at the end they drop the subjects.

Most threats are fabricated by the society around. Students take into consideration that science is very difficult and finally react by performing poor in science to prove their beliefs that science is difficult. The attitude make students put less efforts on science because they believe they will never perform better, and when they get lower marks they confirm that science is tough. Other students say that, there are teachers who tell students that science is for few who are intelligent, and whenever they try, they are told to go and study Kiswahili and civics which are considered to be simple. Students put much trust on teachers, and when they are told that science is for few talented ones, they withdraw their interest from studying them.

The policies and practices of educational management authorities acts like a catalyst in accelerating negative attitudes to students perceptions that science is difficult and is intended for few who are intelligent. One form four student when asked why students drop science subjects, he said; “haya masomo magumu sana, we unadhani yangekua kama historia au Kiswahili serikali ingekubali wanafunzi wayaache? “ [science subjects are difficult, imagine if they were history or Kiswahili language, do you think the government could allow students to drop them?]. Allowing students to drop subjects is considered as confirmation to their perception that science is difficult. Students continue to see obstacles towards science subjects. Out of 42 students interviewed, 38.1% say they will never study science, 30% are not sure while 32% are optimistic in studying science. Taking physics and chemistry as optional subjects’ shapes students’ mental model that, they are difficult subjects and are not much important. As number of schools increase, there is a serious shortage of science teachers. In 2013, out of 138 teachers employed and posted to Kilombero district council, there were only 10 science teachers. If science will continue to be optional at secondary school level, soon there will no science teachers and will require either to hire teachers from other countries or to be dependant to scientific experts from other countries which is more expensive than building laboratories and motivating more students to study science.

Society plays a central role in helping shape students perceptions. Most of the students who are studying science are influenced or advised by their parents, brothers or successful peers. A form four student was asked why she likes to study science, she said; “Kaka yangu aliniambia lazima nisome sayansi hata kama siwezi, nisiposoma hatanilipia ada, ndio maana nasoma. Ni magumu lakini siwezi kuyaacha”[my brother told me to study science subjects even if I will get low grades, they are difficult but I cannot drop them, because my brother will not pay my school fees if I

drop them]. If parents and guardian will play their role in helping students study science and motivating them, there will be much improvement not only in performance, but also in preparation for the better career in the future.

Failing in examination does not necessarily mean the student have no ability. There are students who are performing poorly in their science subjects but they are self motivated to study them more hoping they will improve. Others, who were performing better, are not interested and have dropped science subjects. One teacher in school B said, “Most students are lazy, they do not like to study, so when they are allowed to drop physics and chemistry they enjoy because they know they are getting relief by reducing the huge load of many subjects”. Even some science teachers are discouraged because they see their subjects are not important and less effort is made to recognize them. In most schools, physics and chemistry are regarded as subjects for form one and two students only. Form three and four are not considered much because subjects are option and not compulsory.

The following table shows the performance of form three students on their form two national examinations.

Table 2: Performance comparison of students who study science and who have dropped

Who study science			Who have dropped		
No.	Physics	Chemistry	No.	Physics	Chemistry
1	30	19	1	43	34
2	33	20	2	46	31
3	33	21	3	50	31
4	30	24	4	45	32
5	31	30	5	40	37

There is a lack of guidance and counseling services in secondary schools. Students are not supported and encouraged due to lack of enough science teachers. Students need closer assistance in facilitating learning, when teachers are few, students’ dreams fade. Few teachers available fail to take a close monitoring to all students due to high number of students. In school A, there are about 1000 students and have one chemistry teacher and one mathematics teacher with 17 streams to teach, students also cannot rely on parental supervision. According to the data collected from students, 54.8% of their fathers and 57.1% of their mothers’ education level is primary school

and they are working as peasants or engaged in small business. Due to the nature of their activities, parents have less or no time to spend with their children. Also at home, students receive less academic counseling on their future careers.

Way forward

Serious measures are needed to improve schools' environment in motivating students to study science. Common factors which are repeatedly spoken are lack of science teachers, lack of science laboratories, lack of learning and teaching tools, and low interest from students.

To help explain those factors above, there is a need to remove the persistent notion within our society that science subjects are difficult. Students are threatened that science is difficult even before they start to study. Parents, peers and students themselves have to encourage each other and put more efforts in studying. They have to be aggressive to ensure they excel and perform better.

Increasing number of teachers alone is not enough, but having teachers who are real motivated in performing their jobs and are able to use wide range of techniques to deliver the knowledge in a simple way that will motivate students. This includes creating friendly learning environment where students will be free to consult their teachers on emerging queries in learning. Teachers' creativity also plays a crucial part in igniting students' intrinsic motivation. Weak teaching methods and other verbal pattern of teachers may destruct students' readiness to study science.

The policy of allowing students to drop science subjects need to be lifted up. According to theory X by McGregor, people have a nature of disliking work, are lazy and have to be threatened or punished for them to achieve goals. Likewise, students dislike studying, hence need to be pushed and forced to study. If there will be option which allows to drop even five or six subjects out of nine, most students will drop and remain with as few as possible subjects.

All subjects should be compulsory for students. If poor performance will lead to drop of subjects, what will happen if students fail all subjects? Will they be allowed to drop all subjects? Rethinking another best way will help to deal with the problem in a best way. Instead of allowing students to drop subjects, the government should create conducive and learner-friendly environment in schools.

References

- [1] Anwer, M., Iqbal, H. M. & Harrison, C. (2012). Students Attitude towards Science: A Case Of Pakistan. Pakistan Journal of Social and Clinical Psychology, 9(2), 3-9.
- [2] Flynt, S. W. & Morton, R. C. (2009). The Teacher Shortage in America: Pressing Concerns. National Forum of Teacher Educational Journal, 19(3).
- [3] Ingersoll, R.M. (2001). A Different Approach to Solving the Teacher Shortage Problem. Teaching Quality Policy Briefs, Vol 3.
- [4] Mabula, N. (2012). Promoting Science Subjects Choices for Secondary School Students in Tanzana: Challenges and Opportunities. Academic Research International, 3(3).
- [5] Mamlock-Naaman, R.(2011). How can we motivate high school students to study science? Science education international, 22(1).
- [6] Nyamba, S. Y. & Mwajombe, K. K. (2012). Students Preferences on Science Subjects: Does This Affect Their Performance? A Case Of Udzungwa Secondary School, Kilolo Iringa, Tanzania. International Journal of Science and Technology, 2(8)
- [7] United Republic of Tanzania (2008). A Performance Audit Report On School Inspection Programme For Secondary Schools In Tanzania. A Report of the Controller and Auditor General of the United Republic Of Tanzania, National Audit Office