

Factors Affecting Students' Performance in Chemistry: Case Study in Zanzibar Secondary Schools

Ahmed A. Hassan, Hassan I. Ali, Abdallah A. Salum, Asia M. Kassim, Yussuf N. Elmoge, Ali A. Amour

Abstract—The purpose of this study was to investigate the performance of chemistry in Zanzibar Secondary Schools. It was conducted in all regions of Zanzibar in public and private secondary schools and Ministry of Education officials. The objective of the study included finding out causes of poor performance in chemistry. Views, opinions, and suggestions of teachers and students to improve performance of chemistry and a descriptive survey was adopted for the study. 45 teachers and 200 students were randomly sampled from 15 secondary schools in Zanzibar and ten Ministry of Education officials were purposively sampled for the study. Questionnaires and open-ended interview schedules were the main instruments used in obtaining relevant data from respondents. Data collected from the field was analyzed both qualitatively and quantitatively. Qualitative analysis involved content analysis of the responses obtained through interviews and quantitative analysis involved generation of tables, frequencies and percentages. The results revealed that there were shortages of trained teachers, lack of proficiency in the language of instruction (English) and major facilities like laboratories and books. These led to poor delivery of subject matter and consequently resulting in poor performance. Based on the findings, this study recommends that provision of trained, competent, and effective teachers as vital aspects to be considered. Government through Ministry of Education should put effort to stalk libraries and equip laboratories with modern books and instruments. In addition, the ministry should strengthen teachers' training and encourage use of instructional media in class and make conducive learning environment to both teachers and students.

Keywords—Zanzibar, secondary schools, chemistry, science, performance and factors.

I. INTRODUCTION

ZANZIBAR comprises of two main islands; Unguja and Pemba, and a number of smaller islets along the western rim of the Indian Ocean. The islands lie about 40 kilometers off the coast of main Tanzania. In 1964, Zanzibar joined with Tanganyika to form the united republic of Tanzania[1]. However, Zanzibar retains considerable autonomy of internal affairs like legislation, executive, and judiciary [2]. As per the constitution of the United Republic of Tanzania, both primary and secondary education is the responsibility of Zanzibar government while tertiary education is "union matter". One of the challenges facing the government, school administration,

parents and other stakeholders is the performance of science subjects especially chemistry. Hence, there is a need to focus on it.

Zanzibar is divided into 5 (five) regions, two in Pemba islands namely: South and North Pemba, the other three regions are in Unguja island namely: North Unguja, South Unguja and Urban-West Unguja [1]. Education wise, there is a remarkable concentration of secondary schools both private and public schools to cater for the ever-increasing population of students in all the regions. This research is aimed at establishing the performance of chemistry in Zanzibar secondary schools, a case study of all Zanzibar regions represented by 15 schools. The schools selected as a case study include five schools in Pemba namely: Konde Secondary School, Fidel Castro Secondary School, Shamiani Secondary School, Kinoe Secondary School and Uweleni Secondary School. Ten schools in Unguja: Lumumba Secondary School, Tumekuja Secondary School, Kinyasini Secondary School, Kikwajuni Secondary School, Dunga Secondary School, Makunduchi Secondary School, High View Secondary School, SOS Secondary School, Sunni Madrassa Secondary School and Bububu Secondary School

There has been a concern on students poor performance in science subjects particularly chemistry. Chemistry is one of the five branches of science, which are taught in Zanzibar secondary schools. In Zanzibar, Chemistry is taught at secondary level and at primary level, it is part of general science. Chemistry unlike other branches of science, like mathematics, is not compulsory in both "O" level and "A" level studies but it is taken depending on the specialization of the students in science combination, which can be PCB (Physics, Chemistry and Biology), PCM (Physics, Chemistry and Mathematics), PCG (Physics, Chemistry and Geography) and BCG (Biology Chemistry and Geography) [3].

Chemistry as a subject is universally accepted and realized not only by students but also people who are keen to know about chemicals. The subject provides broader knowledge about science in general which is compulsory to every individual that aim to study the environment or climate change related courses. Zanzibar government through the Ministry of Education and Vocational Training plays vital role in boosting the subject and creates awareness toward students hoping to take chemistry in different levels. This effort has been complimented by the introduction of laboratories, chemistry departments and as well as including chemistry in Tanzania National Ordinary and Advanced Certificates of Secondary

Ahmed Hassan is with King Fahd of Petroleum & Minerals Department of Earth Science, Dhahran 31261 Saudi Arabia (phone: +966541748557; e-mail ahmeyow104@yahoo.com).

Hassan Ali, Abdallah Salum, Asia Kassim, Yussuf Elmoge, and Ali Amour were with University College of Education Zanzibar, Zanzibar, 146 Zanzibar Department of Education.

Education Examinations; however, many more have to be done to improve the general performance. The variables which affect science teaching are not clear whether it is because of the negative attitudes of students towards science subject or the methodology used by teachers or because of absence of instructional materials in teaching science, absence of inspiration, and poor foundation particularly in the essential level when it was consolidated with other science disciplines or otherwise. The issue of language seems to be another area of discussion [3]. In secondary schools, English is the medium of instruction and it is taught as a subject of its own according to the curriculum.

Kiswahili is the national language of Tanzania including Zanzibar. This part of the curriculum on languages used in primary schools, which is Kiswahili, seems to be contributing much on the performance of students in chemistry. Many students seem to be facing the problem of capturing or getting the chemistry concept due to possible lack of familiarity with language and terminologies as used in chemistry. This appears to affect their performance. Therefore, the researchers' aim was to find out the factors influencing the performance of chemistry, the extent of the subject performance and to collect the views of the respondents (teachers, ministry of education officials and students) and suggest possible remedy that could be taken to overcome these problems.

As a result of this study, the researchers have obtained solutions to improve the subjects' performance. Performance in chemistry subjects has been a continuous problem in secondary schools in Zanzibar. So far, few researches have been conducted to ascertain the causes of the persistent issue in most of the science subject especially mathematics but not in chemistry [4]. Educationists (Zanzibar educationists) have remained quiet about the subject performance or just generalizing the study as a science subject, which does not give clear consideration to chemistry alone. This study aims to evaluate different factors affecting chemistry performance by collecting people's view especially those of the teachers and the students in Zanzibar.

This study was conducted among form 1, form 2, form 3 and form 4 students, both male and females, in secondary schools in Pemba and Unguja in Zanzibar. The research included chemistry teachers in this selected schools. The study concentrated on various factors influencing performance in chemistry, performance of chemistry in general and observation of respondents among the secondary schools in Zanzibar. Based on the objectives the following are some of guiding questions: How is the performance of chemistry in Zanzibar secondary schools? What are the factors affecting the chemistry performance in Zanzibar secondary schools? What are the people's views, observations, suggestions and opinions about the subject?

II. LITERATURE REVIEW

With regard to the causes that contribute to student's performance, several studies have been conducted with regard to school performance in general. Researches have shown that environmental, parental and family chores have adverse effect

on learners performance [5], [6]. They have also established that educational and occupational status of home and teacher's interest in teaching are some of the factors that affect achievements. Other factors include student's attitude towards science and teachers' home work load. The study also found that home location (i.e. urban or rural) has no effect on students' achievement. References [7], [8], emphasized that home background factors were more important than those in schools in determining students' performance.

Study done in Kampala Uganda ascertained different variables that affects learners outcome such as physical environments at home, parental attitude to school, and child care practices and in a study of disciplinary attitude of boarding and day school, which was observed that many day students' do not stay with parents which affects the learning outcome. The relatives expect some chores of housework to be done. These are excessively laborious. In most cases, such students are not shown love and care and as a result end up seeking revenge through harsh ways, which may be considered as indiscipline in the school environment. Such students tend to influence their peers this lowers their academic performance [9].

Studies have been conducted on causes and factors that influence students' academic performance in different subjects such as chemistry, [10]–[12]. Their findings show that there are several causes and factors, which hinder smooth learning and teaching of subjects. Reports on learning and learner characteristics [4], [13] showed positive correlation between cognitive preferences and student's performances in science [14] schools inspection is vital as a means of monitoring the delivery of education adherence to the stipulated curriculum and standards, and ensuring efficiency and quality of education. "school-inspection has not been as effective as expected due to shortage or lack of transport, office and office equipment, housing and the ability of inspectors to take appropriate and immediate corrective measures necessary" [15]. The services and working condition of teachers also could be one among other factors that could hinder or promote the school performance in the job satisfaction and the ability of teachers to perform well and professional are key factors in maintenance of quality education. In Tanzania, teachers have experienced low and irregular payments, lack of proper house, inadequate teaching facilities, low status accorded to them and limited opportunities for professional development [15]

On the side of schools' infrastructure and facilities; [15] describes establishment and registration of most of the secondary schools as a result of political pressure or competition among groups of parents, non-governmental organizations, and local leadership at the district level. It is further stated that "very often certificates for registration have been granted without first meeting the set minimum infrastructure requirements for secondary schools as provided in the guidelines". The policy had also put it clear that in most secondary schools, there is an acute shortage of textbooks in sciences and other areas, and laboratory equipment. Studies on resources and laboratory work examined the relationship between laboratory strategies and student achievement and

moreover, status study showed that laboratory activities in selected schools was still more or less an extension of the theoretical class rather than a place to carry out investigation, [4] process study and F.I.S. Inspection report (2005) found a set of behaviors (manipulated apparatus observing activity, etc.) correlated strongly with manipulative skills and conduct of the experiment, while students' attitude to laboratory work correlated strongly with manipulation of apparatus. [4] discovered that many biology, physic and chemistry students revealed poor power of observation, poor measurement, classification and experimental skills of inferring, predicting and formulating models they found that laboratory work contributed more to concept learning and experimentation than problem-solving and instrumentation, and that low ability students' benefit more from laboratory work than high and medium ability. The student also showed that boys benefited more than girls. The situation reaches to an extent that in terms of text reference books, 10 or more share single book. In addition, most of these schools do not have libraries at all or if available are not adequately stocked. In another words only the reading rooms are available. Also the curriculum at the secondary education level is mostly subject centered and does not respond easily to the changing socio-economic environment. Frequent addition of secondary education does not adequately meet the learning needs and their choices [15]. Other studies in curriculum development and evaluation focused on curriculum coverage and implementation and also found no relationship between curriculum coverage and students' scores and analysis of problems facing the implementation of senior secondary school science and technology curriculum categorized such problems as professional, practical, learner and resources administrative and communicative. Since teachers play a central role in improving the performance of the students in academic subjects, effective teaching is a major task to be emphasized [16] described the two ways in which lectures or teachers can do to improve their teaching; and help student improve on their learning [17]–[19] linked causes of misconceptions of concepts in chemistry learning to teacher ineffectiveness, inadequate textbooks and poor applications of science skills. Studies on variables of teaching compared different methods of teaching on ability grouping, cooperative learning and enhancement strategies and found poor performances of students as a result of poor classroom teaching and students' attitude to school [5], [19], [20] showed that project method improved achievements than lecture method while [21], [22] found that both inquiry-based and refined traditional approaches could be employed as viable alternatives in science teaching. References [19], [23] found that problem-solving was enhanced by verbal feedback and remedial instruction in chemistry. References [24], [25] showed that guided discovery approach was more effective than expository method on students' transfer on learning [6] found instruction television (ITV) in science useful when transmitted only in the evenings.

Again, language effects performance in science and other subjects. With regards Kiswahili as national language in

Tanzania and also as a language or medium of instruction in primary level in education, English language is only taught as a subject in primary level. While secondary schools, English language is used as medium instruction as well as subject and Kiswahili remains as a subject like any other subjects [9] in his paper talked about "teaching science in Kiswahili". He attempts to show the benefit of doing that. The paper starts by looking at the position and the status of the two languages, Kiswahili and English in the education system in Tanzania from the pre-independence period to the present. The paper also looked at some of the expected gains to Tanzania students if science subjects are taught in Kiswahili. Many researches have been carried out along this area and there are many causes that contributed to the poor performance of students in sciences. Among of these are: - Attitude of the students towards chemistry, [26], explains an attitude as; a manner assumed for specific purpose, a state of readiness of a living organization to respond in a characteristic way to be stimulated (e.g. an object, concept or situation). Reference [21] emphasized that the reason for this (attitude of student) emanate from different social attitudes and expectations. Studies on attitudes of students and their learning outcomes have shown that good teacher behaviors can play a positive role in the development of positive students, attitude to science [19] [27]. They further found that students have positive attitude towards science while [28] others found that students have negative attitude to science, and gender and class level of students do not significantly influence students' towards science. Intelligence is also counted as a contributing factor affecting the academic performance more especially in sciences. Intelligence has been described as the ability to do well in traditional school learning by Edger Stones reported the general concept about intelligence is that it is a result of hereditary and environmental factor. In a study of educational achievement of problem children, painter and indicated that although intelligence quotient is not a measure of educational achievement it does not indicate the capacity for achievement. Thus student's achievement at school largely depends on intelligence. Report on learning and learners' characteristics [5], [13] showed positive correlation between cognitive preferences and student's performance in science. Reference [14] found relationship between understanding chemistry concept and performance. However, those statements were disqualified by [7]. In their study, they supported the view that in their adolescence society particularly those who as seen as intellectuals and who come to think of themselves in this way are not really of the highest intelligence but are not only those who are hard working. However, for long time despite the discrepancies, it will still remain a fact that achievement and intelligence are closely related. In addition, some researchers associated the problem of poor performance with gender difference toward science subjects [26] is the gender teaching affiliation (masculine, feminine or neutral) associated to science performance? And they found ten items, which represent gender-unfair behaviors of teachers, which retarded students' interests and participation in STM (Science Teaching Modules). Concepts, these include among others consistent

usage of masculine pronouns in discussing STM concept, unequal access for male and female students to participate in discussion and demonstration, higher achievement levels set out for boys than for girls, and female students, being assisted most often in practical, projects and other assignment. They recommended that STM teachers should be sensitized on gender issue to develop gender-fair posture and exhibit a gender-inclusive environment in course of their classroom interactions. Most of these researchers explained that most female students hate science subject reasonably because they concerned much of physical works like experimental observations. They feel science is for masculine and rather majority of them diverts into linguistic subjects since they are well of in language. Some researchers on teachers factors in STM teaching examined teachers' academic and professional qualifications and there instructional needs and perception of their own teaching. References [20], [29], identified some 'O' level physic, chemistry and biology as among the topics which teachers perceived as difficult to teach and this difficulty correlated significantly with their professional qualifications and years of teachings experience, [30] revealed that teachers were not proficient in planning, selection of teaching methods and resources but were proficient in presentation, classroom management and students' involvement.

III. METHODOLOGY AREA OF STUDY

Study was conducted in all the 5 regions with 15 secondary schools in Zanzibar, divided as per 5 and 10 schools in Pemba and Unguja government and private secondary schools respectively. The research is qualitative due to the type of tools and techniques used for data collection. This is because; [31] commented that "after careful analysis, qualitative data provide useful and in-depth answers to the research question for decision makers and information users". Reference [32] emphasizes, "Qualitative data provide depth and details. Depth and details emerge through direct quotation and careful description..." To analyze data, tables and some graphs were used for the performance of students. From 88 secondary schools found in Unguja, 10 schools were selected and from 55 secondary schools found in Pemba, 5 schools were selected to represent others. The selection of schools was done randomly; these schools included the following; Lumumba, Tumekuja, Kinyasini, Kikwajuni, Dunga, Makunduchi, High view international, SOS, Sunni Madrassa and Bububu secondary schools in Unguja. Fidel Castro, Shamiani, Utaani, Uweleni and Dodeani secondary schools in Pemba.

The target population included educational officers, subject teachers and students. This study targeted on 200 respondents, divided as follows: 5 academic managers, 15 head teachers, 30 subject teachers and or head of science department, and 150 students. The academic managers included directors of education for secondary school; academic officers including head teachers and subject teachers from selected schools, and from, these we expected to get a wide range of opinions. Student's selection was random from form I to IV; ten (10) students from each school.

The instruments which were used for data collection were questionnaires, interviews and documentary review of the existing information. In view of large number of students, close-ended questionnaires were used. Statement relevant to the study was prepared which contained a set of questions. Interviews were conducted with a few selected officers, head teachers and subject teachers in order to elicit details and reliable information on the causes or factors affecting performances in chemistry subject among the students. The researcher collected information from the documents in respect of students' performance in final examination results from NECTA (National Examination Council of Tanzania) for O-level from school authorities to supplement on the data collected. To also enhance workability of the instruments researchers used permission to conduct research from relevant authorities, although researchers had general permit from the ministry of Education and Vocational Training in Zanzibar. The respondent's confidentiality of their responses was taken as the first priority. This was due to arrangement of time for interviews and discussions and the administration of questionnaires to the selected respondents. For collection of written responses immediately was done upon the appointment from head teachers to collect documents (i.e. examination results). This avoided inconveniences to other side. The researchers also spent reasonable amount of time to visit public libraries, the universities' main libraries, school libraries and internet to effect documentary research.

In the course of this study, the researchers have faced a number of limitations. This included the following: The main challenge of the study was financial support which was not adequately enough for more data to be sampled. Also in this publication, typing and photocopying of papers, questionnaires and others required financial stability. The effectiveness and the quickness of the work, was hindered by other academic work and also some respondents were unwilling to give detailed information as requested because of time limit, suspicion, job security, bureaucracy and so on. Then some attempts were made partly to overcome the limitations mentioned above. The researchers used reasonable means to enhance the fulfillment of the study to bring reliable and detailed results.

IV. RESULT AND DISCUSSIONS

The main aim of the study was to establish the factors affecting the performance of chemistry subject, the performance of the subject and collecting opinions and observation of the students and the subject teachers among secondary school students' in Zanzibar and possibly how this could be improved. The factors presented and analyzed in this chapter were arrived at, from the information obtained from the questionnaires administered to the chemistry students at ('O') ordinary level, their chemistry teachers and head of chemistry departments in the respective schools. Some of the information was obtained from the interviews and discussion held with some of the above mentioned respondents.

From students' questionnaires, the findings indicated that the students' attitude towards chemistry significantly affects

performance of the subject. It also established that, the attitude of students towards chemistry had a bearing with their academic levels. This was revealed through the analysis of the chemistry teachers and the attendance of the students (in chemistry periods).

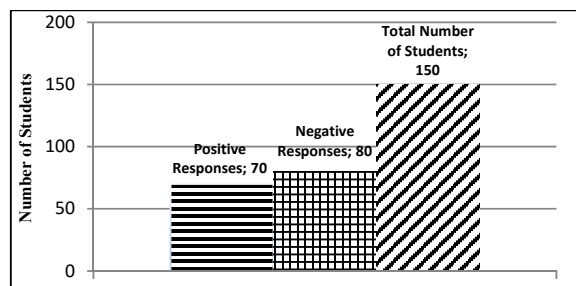


Fig. 1 Attitudes of chemistry students towards chemistry subjects

Students indicated that, they always held discussions with their classmates to solve simple problems in chemistry subject, but they were facing some difficulties in solving hard questions, since they are very few in the chemistry class as most even abscond the periods. The limiting factor mainly was the strictness of their parents. This was especially found in girls who were restricted by parents during their free time. They further indicated that, they had limited opportunities to attend educative seminars held in different places of Zanzibar. The students also added that they have fewer chemistry facilities such as textbooks, laboratory equipment's and instructional materials and others that would encourage their successful chemistry learning. Other students complained about the chemistry teachers. They indicated that, they had shortage of chemistry teachers. They further added that, they were facing difficulties in the methods used by teachers in teaching chemistry subject. During the interview, it was discovered that some of the teachers who were teaching in these schools were not professional teachers. Also students pointed out that, they performed poorly in chemistry because, chemistry as science subject was not as easy as other subjects taught to them, for example religious education, History, Kiswahili and others. This might be applicable due to poor laboratories, library and teaching methods. Majority of the students revealed that, they faced difficulties in expressing themselves in English during chemistry lessons; either in responding to the questions asked by the teacher or asking when they had not understood the essential concepts. This applied also to their daily revisions and capturing chemistry concepts. However, according to the students, there were several causes leading to poor academic performance in chemistry. These are summarized in Table I.

On the variable about the attitudes of students towards chemistry subject, 68.9% of the sampled teachers acknowledged that many of their students have negative attitudes towards studying chemistry. Others mentioned 'A' level students had more interest in chemistry. They added that majority of O-level students seems to dislike chemistry and

this could be one of the reasons why they performed poorly. These are summarized in Table II.

TABLE I
CAUSES OF POOR ACADEMIC PERFORMANCE IN CHEMISTRY SUBJECT
ACCORDING TO THE STUDENTS

Causes (factors) affecting performance	No. of students (out of 150)	%
Lack of motivation from teachers	108	72
Lack of well-equipped laboratories	80	53.3
Lack of chemistry text books	94	62.7
Language problem	92	61.1
Lack of chemistry teachers	58	38.6
Difficulties in methods used	82	54.6
Lack of interest	80	53.3
Too much subjects taken by the students	84	56
Not completing from syllabus	52	34.7
Class too large	102	68

TABLE II
CHEMISTRY TEACHERS' OPINIONS ON THE ATTITUDES OF STUDENTS
TOWARDS THE SUBJECT IN THE 15 SAMPLED SCHOOLS

Responses	Frequency	Percentage (%) frequency
Positive responses	14	31.1
Negative responses	31	68.9
Total	45	100

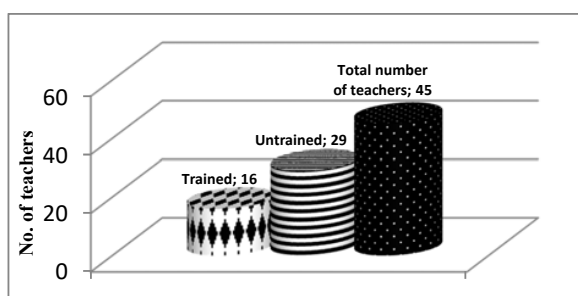


Fig. 2 Qualification of teachers

There are large numbers of unqualified teachers. Currently 41% of science are unqualified, 49% have diploma and only 9% have a degree or higher. According to the projection and the reports of the ministry of education that mathematics and science account for 1/3 of the curriculum, the requirements for teachers of mathematics and science would increase by 850 in 2014 with an average of 135 recent teachers in these subjects required each year [1]. On the other hand, the information obtained revealed that most of the teachers found in these selected schools had low qualifications. More than half of the teachers (64%) were unqualified. Moreover, other teachers in attempt to draw out their opinions about students' performance agreed that, they normally find a lot of grammatical errors when marking students' exercises in chemistry subject. However, in their comments about the conditions of their school laboratories, about 80% of the sampled teachers agreed that their laboratories are not well equipped. They attributed this to the poor performance of students in chemistry subject, accompanied with lack of textbooks and instructional materials. Lack of extra curriculum activities, which could probably also be an

additional cause leading to poor performance of chemistry subject. Other factors affecting performance according to the teachers can be summarized in Table IV.

TABLE III
SCIENCE TEACHERS' RESPONSES ON LABORATORY EQUIPMENT

Teachers opinions	Frequency	Percentage (%)
Well equipped	2	4.4
Fairly equipped	13	28.9
Poorly equipped	30	66.7
TOTAL	45	100

TABLE IV
OTHER FACTORS AFFECTING PERFORMANCE ACCORDING TO THE TEACHERS

Causes (factors) affecting performance	No. of students (out of 45)	Percentage (%)
Difficulties in the techniques employed	25	55.6
Poor syllabus coverage	27	60
Poor school administration	18	40
Poor or fail background of the students	25	55.6
Low wages	35	77.8
Lack of teaching experiences	20	44.4
Unequipped libraries	36	80
Classes too large	30	66.7
Indiscipline students	27	60

Most of the chemistry teachers agreed that there was poor performance in chemistry subject in Zanzibar not only in district level but also national level and their views are ascertained by the national examination results recently released by National Examination Council of Tanzania (NECTA). The result indicated that the worst performance was in chemistry.

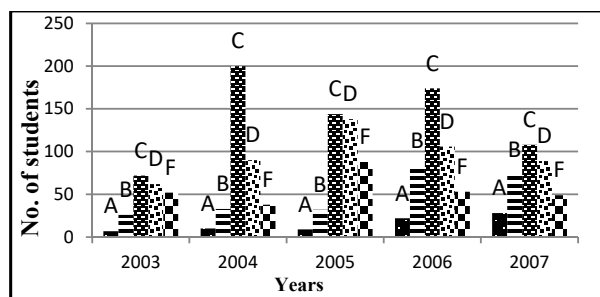


Fig. 3 Students' results from 2003 -2007

At secondary level, the school weeks were made up of 40 periods per 40 minutes each. Teachers could be asked to teach up to 12 periods per week. 2007 data exhibited average teacher workload of up to 60 periods per week.

The inspection service had an official complement of 30 inspectors. Inspectors were all promoted teachers; however, there were no proper selection and criteria in their appointment rather than political appointees. They were provided with short training course as they were available, but these often came as a result of some project. There was no specific induction training for inspectors. At secondary level there was only one inspector for each subject on each island. There were two types of inspection: Basic, which covered all

subjects and administrative matters and a short visit that examined administrative matters only. A prepared report of the inspection was sent to the head teachers, the principal secretary and the school management committee. The inspectorate produced an annual report for the ministry. They examined scheme of work, conditions of the buildings, cleanliness of latrines and financial records. There was home classroom observation and inspector checking of the topics taught how they were matching with the annual work plan. Currently there were 32 basic inspections and 103 short inspections planned for 2006-2007. Schools were selected for an inspection based on two criteria – a school where some concern had been expressed was prioritized and schools were selected based on the interval since the previous inspection. The main difficulties reported by inspectors include: Lack of preparations, Poor scheme of work and Teaching problems. The teaching problems reported include difficulties of both content and pedagogy. In particular there was shortage of trained teachers in chemistry and the content knowledge of even trained teachers is sometimes poor. There were concerns about the level of education of teacher and the numbers in classes, which could exceed 100 students per class.

Subject to presentations regarding research findings about the attitudes of students and their performance in chemistry, it was found that the students at fields toward chemistry subjects were closely related. Specifically poor performance in chemistry subjects tends to be associated with students who had a negative attitude towards chemistry subject. Indeed, the findings of [33], [34] and others have shown that positive attitudes towards any subject facilitated good performance of students and this clearly indicated that those students who had positive feelings and inductions towards sciences worked hard to achieve the best out of them. Despite the hardship in overcoming the scarcity of practical equipment, textbooks and other factors such students seem to utilize their teachers because of the interest they had for the subject, such students appreciated the need to settle and concentrate to attain better results. More work on this was done by [35] who pointed out that academic effort must develop among the people faced with a 'load' (problems), where they need to have the attitude and interest of working together, interact intensively in order to find solutions to such problems. Science teachers were also very vital in influencing their students to develop an attitude towards their subjects, they ought to share the blame too, this was because the results indicated that most teachers had low level of education and on the opinion of the students, majority said that they faced difficulties in sciences due to the methods employed by teachers in teaching lessons. Although it was difficult for the school administration to correct this problem immediately due to the scarcity of science teachers those who at the present should try to spare most of their time in schools to make science subjects enjoyable by availing themselves to their students for guidance and consultation in academic matters.

Almost all respondents testified that there were very few facilities such as laboratory equipment, textbooks and others all of which facilitate the teaching and learning of chemistry at

all levels. The students expressed the need and teachers appeal to their administrations to purchase textbooks and laboratory equipment to enhance experimental learning. They pointed out that if the facilities mentioned above were available, it would be one of the emergency needs for the stocking of the libraries and laboratories for better achievement in science subjects.

Language problem was another cause accompanied with students' performances in chemistry. Chemistry teachers released that they faced a lot of grammatical errors when marking students works. Also majority of students said that they were facing difficulties on expressing themselves in English language. The problem not only affected their understanding and presentation of various science concepts but also reflected to their daily revision in science subjects.

Although students had good background in chemistry subject since lower secondary level (form I and II), the curriculum of Tanzania especially in the section of language affected their performances. Psychologists have done a lot of researches on language skill development in human being. They commented that at the young age (i.e. nursery and primary school going age) a child has a wide opportunity to learn different languages and vocabularies [14]. The curriculum of Tanzania promotes Kiswahili language more than English language in primary level. In that, Kiswahili language was used as a medium of instruction in all subjects. English language was taught, as a subject only when you come to secondary level, although English language was known as a medium of instruction, majority of the teachers did not follow this curriculum section during the time of teaching. According to the opinion of the teachers, this could be due to the poor background of students in English language. Therefore, they suggest that various measures should be taken such as conducting the debates within the school and with other schools on different topics purposely for language improvement. Also, they suggested that all communications should be held in English within the school compound, punishment should be given to those who will converse in another language, sources which will lead to improve language should be used effectively; such as reading English novels and so on. These could help students in building the language skills hence understanding their student as well as improving their performances. Strictness of school rules and difficulties of some topics in chemistry subject, such as physical chemistry, organic chemistry and volumetric analysis, which were very important parts in chemistry, were other factors presented. According to the findings, hardness of these important topics in chemistry subjects accompanied with the strictness of the school especially in girls. Students revealed that, they faced a lot of challenges in solving different problems in chemistry subject, since they were few in number.

Conclusively, poor performance has been experienced in chemistry subject according to the national examination results for O-level students, 2003-2007. The poor performance might be due to one or another or the combinations of all the causes discussed. However, there had been an improvement in

average performance from 47.9% to 65.5% and 45% to 63.8% in 2003 to 2004 and 2005 to 2006 respectively.

The above, therefore, satisfies the significance of the study especially among the mentioned and discussed respondents so as to find possible solution to the poor performance in chemistry subject of students in the school within the study area.

V. CONCLUSIONS AND RECOMMENDATIONS

Having analyzed, interpreted and discussed the research finding in the respective schools studied, the researchers attempt to give a summary of the findings and generalizations with a focus on the possible recommendations from this study. In view of the findings of this study, it has been clearly expressed by many opinions that students attitude has a lot much to do with performance in the science subjects especially chemistry. The study indicated that students who have negative attitude towards chemistry perform poorly than those with positive attitude. Also research findings revealed that chemistry teachers contributed much in the development of negative attitude of students towards chemistry. It was found that majority of the teachers at that moment were relatively of lower grades (diploma holders and form six leavers). Such levels of teachers were dominating in implementing the chemistry curriculum. Really such levels could not satisfactorily meet the needs and educational requirements of students pertaining to a given course. This is supported by [36], which indicated, "The training of a teacher for a certain level makes him to have a documented knowledge base that can be comfortable to a particular area of specialization". They further emphasized, "The treatment of a specific content demands an individual's previous experimental knowledge or relevance peculiar to the subject and the significance of the content for instruction". Also according to the research findings, there seemed to be evident lack of academic facilities such as science literature, example textbooks for chemistry and laboratory equipment in almost all schools covered within the study. This meant that the only available literature was from teachers to students in the form of notes. Textbooks that ensure effective learning of chemistry lacked and the laboratories were so insufficiently equipped or absent. This also seemed to be the major cause of the students' poor performance in chemistry subject. The research findings proved that language problems influenced the performance of students in chemistry. Majority of students faced difficulties in expressing themselves in English language during the lessons and filling of research questionnaires where 61.1% of the students used Kiswahili to explain some answers on the questionnaires, and some answered in English language where we discovered a lot of grammatical problems. Additionally, other factors tested and proved by the research findings showed scarcities of chemistry teachers, methods employed in teaching chemistry. The study also noted that all the chemistry teachers in the study area are overloaded and have limited time to review and comment on all their students' work. Not only can this not be done within any reasonable workload limit, it is also an ineffective use of time. These seemed to

have effects on performance of students in the study area. In view of the research findings, the analysis and conclusions, the following recommendations can be put forward for improvement: At all school levels, various measures can be used to harmonize positive attitudes and interests of students taking science subjects. These include; stocking and or equipping laboratories with all the necessary materials that could foster learning and enquiry of knowledge. Additionally, there is urgent need for special guidance of students in different areas of specialization. The guidance could be based on the importance of taking sciences (including chemistry), its importance in their daily life and their future job opportunities, together with the details of their possible courses at higher learning institutions. Such efforts would encourage students to do chemistry (and other physical sciences). The Ministry of Education, through the curriculum designing section should revise again the language curriculum section especially in primary level; immediate change is needed in this area. The Ministry also should endeavor to organize seminars, workshops for chemistry teachers on strategies of teaching the subject to make them relevant to students and accommodate it in the stipulated teaching duration together with developing attitude and interests of their learners in the field. Ministry also should design different programs for upgrading (chemistry) teachers such as service program that can be used outside the teaching periods. This could be incorporated in evening programs, long distance learning programs and others. The field in which the research was carried out was too wide and the researchers could not explore every aspect due to time factor and financial constraints. Therefore, there is still room for other researchers interested in the same topic or topics related to this to carry out research.

ACKNOWLEDGMENT

The authors gratefully take this opportunity to acknowledge the support of University College of Education-Zanzibar affiliate College of International University of Africa-Sudan for funding the project.

REFERENCES

- [1] H. Bhagat and H. Othman, "Colonialism and Class Formation in Zanzibar," 1978.
- [2] M. Hettiger, "The Racialization of Politics in Revolutionary Zanzibar," vol. 1996, pp. 1–57, 2010.
- [3] A. J. Shamhuna, M. S. Abdalla, and A. M. Abdulla, "Education for All Assessment 2001 - 2013," no. July, 2014.
- [4] P. Obanya, J. Shabani, and P. Okebukola, "Guide to teaching and learning in higher education," 1996.
- [5] I. Kalu, "Secondary school students' perceptions of the environment of the science laboratory," 2004.
- [6] O. Adewale, "The challenges and future of secondary schools students in Nigeria," no. c, 1998.
- [7] S. C. Selden, J. E. Sowa, and J. Sandfort, "The Impact of Nonprofit Collaboration in Early Child Care and Education on Management and Program Outcomes," no. June, 2006.
- [8] M. C. Hayden and J. Thompson, "Perceptions of International Education: A Preliminary Study," vol. 41, no. 5, pp. 389–404, 1995.
- [9] A. G. M. Ishumi, *30 years of Learning: Education development in Eastern and Southern Africa from independence to 1990*. 1994.
- [10] S. Kratli, "Education Provision to Nomadic Pastoralists," vol. 7, 2001.
- [11] W. L. M. Komba, "Changing politics and political culture in Tanzania: The impact on political education and civics curricula," no. April, 1996.
- [12] M. E. Kisanga and N. Katunzi, "Discrimination in education the Tanzania Case," 1197.
- [13] K. M. Lewin, "Science Education in developing countries: issues and perspectives for planners," 1992.
- [14] S. M. Raimi and F. A. Adeoye, "Problem Based learning strategy and quantitative ability in college of education students' learning of integrated science," pp. 1–11, 2000.
- [15] P. M. Sarungi, "Education and Training Policy of Tanzania," 1995.
- [16] G. Brown and M. Atkins, "Effective Teaching In Higher Education," 1988.
- [17] N. Ihebuzor, R. E. O. Akpofure, and R. O. King, *The State of Education in Nigeria*, no. October. 2000.
- [18] K. Soyibo and M. Rainford, "An Evaluation of seventh Graders' performance on Jamaican Science Project," 1998.
- [19] T. O. Ogunmade, "The status and quality of secondary science teaching and learning in Lagos State, Nigeria," no. October, 2005.
- [20] P. Okebukola, "Principles and Policies Guiding Current Reforms in Nigerian Universities," vol. 4, no. 1, pp. 25–36, 2006.
- [21] E. Kaphesi, "The Influence of Language Policy in Education on Mathematics Classroom Discourse in Malawi: the teachers' perspective," vol. 7, no. 2, pp. 265–286, 2003.
- [22] M. M. Mulokozi, "The Common Oral Traditions of Southern Africa," no. April, 1999.
- [23] A. O. Sola and O. E. Ojo, "Effects of project, inquiry and lecture-demonstration teaching methods on senior secondary students' achievement in separation of mixtures practical test," vol. 2, no. June, pp. 124–132, 2007.
- [24] I. A. Hala, "Uncovering Gender Differences in Science Achievement and Attitudes towards Science for Jordanian Primary Pupils," vol. 21, no. 1, pp. 19–53, 2005.
- [25] F. E. M. K. Senkoro, "Language of instruction: The forgotten factor in education quality and standards in Africa," 2005.
- [26] W. F. Massy, "Teaching and Learning Quality-process Review: The Hong Kong Programme," pp. 1–21, 1996.
- [27] D. A. Alao and J. J. Gallagher, "Influences of Examination policies on Chemistry teaching practices in Nigerian high schools: An ethnographic study," no. 2, 1988.
- [28] C. Nwamaka, "Improving primary science teaching in Nigeria: A workshop Approach," 1996.
- [29] C. O. Onocha and P. N. Okpala, "Education of Women and Girls: The boy-child situation in education: a case study of Eastern Nigeria," 1999.
- [30] B. Gustafson, D. MacDonald, and Y. D'Entremont, "Elementary Science Literature Review," no. September, 2007.
- [31] Y. K. Singh, *Fundamental of Research Methodology and Statistics*. 2006.
- [32] L. Cohen, L. Manion, and K. Morrison, *Research Methods in Education*. 2007.
- [33] J. G. Greeno, "Gibson's Affordances," vol. 101, no. 2, pp. 336–342, 1994.
- [34] R. Miller, "What Are Schools For? Holistic Education in American Culture," 1997.
- [35] G. S. Becker, K. M. Murphy, T. Journal, and N. Aug, "Gary S. Becker and Kevin M. Murphy," vol. 96, no. 4, pp. 675–700, 2007.
- [36] P. A. Kirschner and R. E. Clark, "Work: An Analysis of the Failure of Constructivist, Discovery, Problem-Based, Experiential, and Inquiry-Based Teaching," vol. 41, no. 2, pp. 75–86, 2006.