IAA Journal of Education 10(2):13-26, 2024.
©IAAJOURNALS
https://doi.org/10.59298/IAAJE/2024/102.1326.11
www.iaajournals.org
ISSN: 2636-7270
IAAJE:102.1326.11

Factors influencing students' attitude towards science subjects in Secondary Schools: A case study of Secondary Schools in Kisseka Sub County, Masaka District.

Namayanja Madina
Institute of Open and Distance Learning College of Education Kampala International University, Uganda.

ABSTRACT

As a result of its earliest history, science has faced a minimal level of interest in secondary schools by students and few teachers qualified for teaching. The study, therefore, was about factors influencing students' attitudes towards science subjects in secondary schools. The study was carried out in Kisseka Sub County, Masaka District. The study was aimed at analyzing factors that influence students' attitudes towards the sciences, analyzing current teaching and learning practices in science and mathematics, and establishing strategies that have been adopted to improve students' attitudes towards the science subjects. Various data collection methods were used to elicit information from the respondents. These included a self-administered questionnaire, key informant interviews, and a documentary review. The data was analyzed both qualitatively and quantitatively using a computer package known as Microsoft Excel. Excel was used to generate tables, charts, and graphs. From the findings, it was found that students' attitudes towards science subjects were generally negative. The negative students' attitudes toward science subjects were attributed to a lack of necessary laboratory equipment, a lack of confidence and trust that the students may have towards the teachers handling the subject, low commitment by teachers, old students influence, and poor teaching methods. The teaching methods used by science teachers were said to include the use of notes and explanations, the use of practicals in the laboratory, setting constant tests for the science students, and the use of discussions. These teaching methods varied according to different secondary schools and according to their different capacities. With the above background, there is a need to encourage science and mathematics teachers to improve their classroom practices and create a conducive learning environment for students to motivate them to offer science subjects. Also, the school head teachers, in conjunction with the district education department, should recruit more trained and qualified science teachers to effectively handle science students' needs.

Keywords: Students, Science teachers, Secondary schools, Teaching methods

INTRODUCTION

In the landscape of secondary education, the cultivation of positive attitudes towards science subjects is of paramount importance. The attitudes students harbor towards these subjects significantly impact their engagement, academic achievement, and career aspirations [1]. Understanding the multifaceted factors that influence these attitudes is crucial for educators, policymakers, and researchers striving to enhance science education. After independence, the main guidelines for education development were provided by the Castle Commission (1963), which laid emphasis on the quality of opportunity in education for all people and the raising of standards in science, agriculture, and technical education [2]. The government agrees that the majority of the existing secondary schools already offer what can be defined as a secondary school curriculum with varieties in its subject combinations and, more especially, the vocational content in it. The curriculum includes subjects from the areas of physical and natural sciences, the arts, science practical subjects, and culture. It is also recognized that there is a need to reinforce intermediate technology, particularly for rural transformation, and to provide students with basic technical know-how, both of which necessitate in-depth science and vocational education. The ultimate aim of the comprehensive secondary school curriculum is therefore to meet some of the nation's manpower needs by providing students with skills for productive employment after high school. Such a curriculum is also hoped to lay the foundation for advanced science training. Attainment of the national development goals in the context of industrialization, self-reliance, and globalization requires quality science, mathematics, and technological education [3-6]. Despite the above, the classroom practices of science and mathematics teachers and students are still far from national expectations, which has always made performance in science and mathematics for a long time too poor. Ministry of Education and Sports 2006, in view of the central role of science education with regard to national development, the Government of Uganda, through the Ministry of Education and Sports, has made science subjects in all secondary schools at O' level (U.C.E.) compulsory for all students [7]. And has even gone ahead to emphasize their study at the A' level (U.A.C.E.) by encouraging or allocating government sponsorship to tertiary institutions and public universities, especially science courses (aneactodotal evidence). However, it is not known, despite such an emphasis, why students' attitudes towards such subjects have been affected either positively or negatively, which will be the main intent of this field study. Also, the government, in view of its central role, the Ministry of Education and Sports, has drafted teaching guidelines for science and mathematics teachers in secondary schools. Teachers' induction workshops have been held in different districts in the country, which included the SESEMAT project (Secondary Science and Mathematics Teachers' Project), which holds science at both the district and national level.

Statement of the problem

There is an urgent need to enhance the competitiveness of Ugandans in the ever-changing global economy and social structure affecting their living conditions. The scientific and technological era is closing, making it necessary for a few cultures to be developed and prompted through science, ICT, and education to meet the challenges. However, despite the many efforts by the government to offer an articulated mixture of academic subjects and courses, student reactions to science subjects have not sprouted. This has created an agent need for study to determine the influencing aspects towards the subjects that have rendered their performance always poor. That was the major intent of this study. The broad aim of the study was to establish an understanding of the key issues that influence students' attitudes towards the study of science subjects in secondary school in Kisseka sub-county Masaka district.

Specific objectives of the study

- To analyze factors that influence students' attitudes towards.
- To analyze current teaching and learning practices in science.
- To establish strategies that have been adopted to improve students' attitudes towards science.

Research questions

1. What are the factors that determine students' attitudes towards the sciences?
2. What are the current practices in the teaching of sciences that affect attitude formation?
3. What strategies have been adopted to help improve students' attitudes?

The significance of the study

1. The study serves as a basis for reforming and redesigning programs to improve students' attitudes towards science subjects.
2. The data generated provides insight on the various ways in which students and teachers' attitudes affect performance in science subjects.
3. The study findings serve to raise public consciousness and attract greater commitment from the government, teachers, and other stakeholders to the formation of attitudes towards science subjects.
4. The study findings would also unveil the underlying causes of such attitudes and design appropriate strategies that could be adopted to improve students' attitudes, which will lead to better performance in science subjects.
5. The findings from the study would add to the existing body of knowledge as far as factors affecting science attitudes among secondary school pupils are concerned. It would be able to approve or disapprove of some of the already available literature about factors affecting attitudes towards science subjects among pupils in secondary school. The findings might be useful to other researchers who are interested in the topic or related topics by borrowing related literature.

LITERATURE REVIEW

Factors that influence students' attitudes towards the sciences

In their argument, dominant scientists have noted that the scientific attitude of the mind involves a rejection of all other desires in the intent of the desire to know [8]. It involves the suppression of hopes and fears, loves and hate, and the subjective emotional life, never the less analysis of reality, among others, all of which are considered masculine qualities possessed by boys and men socially. Due to such an assumption, knowledge creation and development in the students who are considered to be objective, risk-taking, deficient in purely emotional elements, and their minds diverted to facts and obstruct theories not to the person's or human interest does sympathy and thus portrayal ads as masculine. Such a belief is hoped to influence the students' attitudes toward different subjects in the arts and sciences, including biology, chemistry, and physics. Though these subjects are not specifically recognized, there is a need for a study to highlight society's influence on the students' attitude to succeed, which is the major aim of this field study. McGrayne [9] emphasizes that knowledge creation and development in science and technology require a thorough activity of continuous research to reach the scientific arena. However, it is also realized that such an activity requires much time and dedication, which may not be readily available to people handling science subjects. It is imperative, therefore, that the study be undertaken to establish whether this can also influence students' attitudes toward a given subject in the science arena, which becomes the major aim of this study. He further notes that, for science to succeed, one must be ready to subject himself to rigorous experimental and mathematical inquiry, necessitating a scientist to be good at logic and reason and his mind to be directed to facts and obstruct theories. This requires that a person adopt intuition, not direction, and obstructs thinking, a capacity that may be missing in some personalities. This therefore brings someone to the extent of thinking, which could be a factor that may influence attitude formation for some subjects, bringing us to the need to carry out a study that will help reveal the misunderstanding of the major intent of such a society. Science is closely tied to war making. Margaret Jacobs [10] brings these connections into play by revealing that western science, at its foundations, as promoted by its brilliant as well as its ordinary exponents, never questioned the usefulness of scientific knowledge for war making. As studies of U.S. science policy since World War II show, owing to such an argument in a patriarchal society in which science originates and the belief that war making and state control are only meant for men, Knowledge creation and development in science and technology have been dominated by men, hence influencing the attitude of female children towards their studies. However, despite such a portrayal, it is not known what influences the attitude of male students towards the same. Thus, a study into such influence aspects is required, which is the main intent of this study. According to Macmob and Commune [11], lack of proper teachers' qualifications is a major cause of the inadequate presentation of mathematics content before the learners. They further say that" teachers tend to overlook gaps in the pupil's

knowledge and that such an approach is based on unwanted assumptions covering pupils' ability and progress".

Current teaching and learning practices used in science subjects

Brosseau [12] identified the following teaching procedures as guidelines for evaluation of effective teacher performance: planning, instructional presentation, motivation, questioning techniques, administration of assignments, and provision for individual differences.

Bukenya [13] said, "The continued poor performance in UCE examinations is due to teachers' inability to involve students in the learning process." However, it is not yet clear in Uganda whether graduate teachers administer assignments with corrective feedback since they are claimed to be effective [14]. Cockcroft [15] contends further that "low attainment in mathematics can occur in children whose general ability is not low and that factors such as inappropriate teaching, lack of confidence, lack of continuity, and poor reading skills can be contributory". Farrant [16] also contends that "motivation is a force that determines how much effort an individual puts into his learning." In Uganda, little attention is being paid to teachers' performance evaluations. This is evident due to the fact that the Ministry of Education and Sports has continued to employ both graduate and grade V teachers in secondary schools.

Strategies to improve the students' attitudes towards science subjects

Some scholars seem to suggest that graduate teachers can teach better than Grade V teachers because the former have wider subject matter coverage. This can be evidenced from Simmons [17]; he said, "In order to teach well, the teacher needs to know about the subject matter in both width and depth. In support of the same view, Cockcroft [15] said that 70% of mathematics teaching in 240 sixth-form colleges and grammar schools was done by teachers with suitable qualifications and added that these schools found themselves with a high proportion of graduate teachers. According to the Opolot-Okurut [18] report, he attributed students' underperformance to teachers' preparation programs. As a result, he suggested remedies, which included increasing the subject content of pre-service teachers and reducing instructional courses. More to that, UNCST [14] considered graduate teachers as better teachers because of their wide subject matter coverage. The explanation behind all this, therefore, may be that the primary factor related to teachers' effectiveness in the classroom is their subject content knowledge. Smith [19], while commenting on how best science and mathematics should be taught, observed that "the fundamental goals of school sciences and mathematics are to teach students to understand and reason with mathematical concepts, solve problems arising from new and diverse contexts, and develop a sense of their own mathematics power". He further noted that students should not be seen as recipients of knowledge transmitted directly from the teacher. Smith's [19] view agrees with that of Bukenya [13], which acts as evidence to show that students achieve better when teachers involve them in the learning process.

METHODOLOGY

The research design

The field study was in the form of a cross-sectional study intended to achieve a basic understanding of the factors that influence the students' attitudes towards science subjects in secondary schools in Kisseka sub-county Masaka district. The study largely used participatory research methods, generating descriptive and analytical case studies and general findings mainly from questionnaires, key informants, and relevant documents. Thus, an inductive, highly qualitative approach was used to obtain people's experiences of the subject.

Study population and sample selection

The study population was comprised of students, science teachers, school administrators, and parents. The school administrators and science teachers were selected purposefully, while parents and students were selected randomly. Using both sampling techniques, 30 students, 20 science teachers, 10 school administrators, and 30 parents were selected from the study area. All five secondary schools were selected from the subcounty for the study. The selection of the samples followed a cluster- and milt-stage procedure involving the selection of constitutes (schools) in the first stage, followed by students, teachers, and parents in the second stage. A total of 5 schools were selected from Kisseka sub-county in Masaka district.

Scope of the study

The study was limited to Kisseka sub-county as a geographical area because it is one of the regions where students' performance in science subjects is not impressive. It will also focus on subjects like biology, chemistry, physics, and mathematics because, in relation to any other subject in the comprehensive secondary school curriculum, they are poorly performed, and hence students have always had negative attitudes towards their studies.

The research process and tools

The study adopted both quantitative and qualitative methodologies. The specific study tools that were used included a semi-structured questionnaire, a key informant interview guide, and documentary studies. The study was conducted between August and September 2008. At entry into the communities' science schools, teachers and school authorities were contacted for their support and interest in making the exercise successful without criticism. During such contacts, the researcher introduced the research agenda and also gained insight into the issues that affect the students' attitudes toward science subjects through the guidance of the teachers and students in order to facilitate the interviews. This helped identify the students and teachers in all schools where science subjects are taught. This later helped in the identification of students with negative and positive attitudes, which enabled the researcher to compile some case studies.

Methods of data collection

Data was collected using a combination of interviews, a questionnaire, and a documentary review. Response schedule types of questions were the major method of collecting information for the field study. These involved the respondent and the researcher talking spontaneously about their experiences and attitudes toward science subjects. This was important for the study since the respondents were selected from the target groups whose opinions and ideas were of special interest to the study. During the interviews, the researcher visited the respondents in their respective homes, where she first created rapport and then asked questions. In the process of probing, the researcher recorded the responses simultaneously

as they were given out. The document that was reviewed includes the government white paper on the education policy review commission report as well as other information related to the field study. Quality control was maintained by the researcher first getting guidance about research procedures to help standardize and understand concepts and methods. Triangulation of methods of data collection was used as part of the validation process for information collected from different sampled areas.

Data processing and analysis

The analysis was largely done manually. This involved sorting data and editing it during fieldwork to check for errors and omissions. Respondents' comments and salient non-verbal expressions as recorded by the researcher were compiled together. Data analysis started with the definition of operational terms based on thematic areas of study. A descriptive analysis of the emerging situation was adapted. With the guidance of operational terms, the data was critically analyzed to derive an emerging pattern. Themes and categories were then developed from the study objects and the collected data. All data analysis was participatory since it began during the fieldwork activities and involved study participants interpreting events and issues that influence attitude formation. An assessment was done for the thematic areas of the study, and recommendations were made for future studies.

Ethical considerations

As the researcher got in touch with the respondents, she identified herself with them, the purpose of the study, and how they were selected from the entire universe. This helped the researcher create a rapport with them, which facilitated the acquisition of the necessary data from them without hesitation. They were assured of anonymity and confidential treatment of their responses through the use of symbols for their identity. This helped to make the respondents confident in giving their attitudes to issues related to science subjects, for they were well aware that nothing wrong was to befall them.

DATA PRESENTATION AND DISCUSSION

Respondents' biographic data

Respondents' biographic data comprised of sex, age, level of education and relatedly class of respondents (students). These were presented and analysed in relation to perceptions about students' attitudes towards science subjects.

Sex distribution

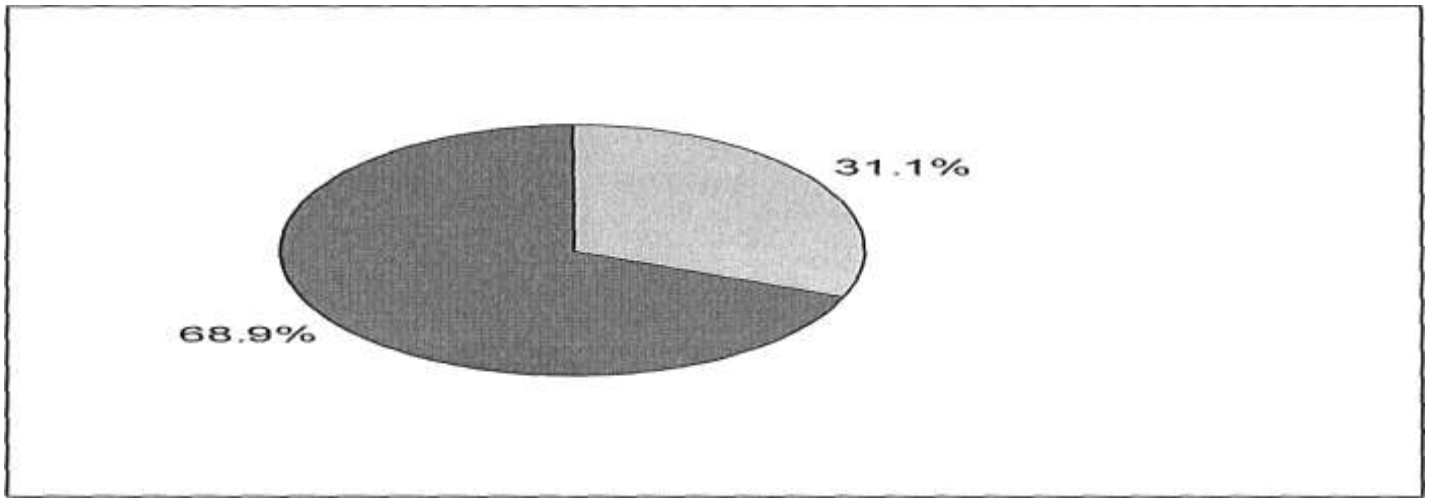

Figure 1: Showing sex distribution
Source: Field notes, 2008

The sex distribution of respondents' comprised of more males than females. According to the findings a big number of respondents constituting 62 (68.9%) were males while the other 28 (31.1%) respondents were females. This implied that males are more involved in education sector than females. This was witnessed among the science teachers and administrators. This again pointed to the fact that more male students go for science related subjects compared to female students. This in away was one of the factors that influence attitudes and later performance of students in science subjects.

Age distribution of respondents

The age distribution of respondents (School administrators and teachers) was in such a way that most of them were aged 30 and above as indicated in the table.

Table 1: Showing age of respondents

Age	Frequency	Percentage
21-30	2	6.7
31-40	5	16.7
41-50	15	50
15 & above	8	26.7
Total	30	100

Source: Field notes, 2008

As presented in table 1; number of respondents 15 (50%) were aged 41-50 years while the other 8 (26.7%) respondents were aged 51 years and above. Few of them 5 (16.7%) were aged 31-40 while the least 2 (6.7%) were aged between 21-30 years. The implication of the above findings was that most school administrators and teachers had had enough experience in management and teaching of students respectively. Hence this experience had enabled them to critically analyse factors behind students' negative attitudes towards science subjects. Hence from them relevant data about factors affecting students' attitudes towards science subjects was generated.

Education level of respondents

The education level of respondents was also presented. It was established that 16 (53.3%) respondents were educated to university level. More 11 respondents had attained tertiary level of education. The least 3 (10%) had gone beyond a degree and were postgraduates. The given education level of respondents (School Administrators and science students) showed high education levels that under normal circumstances would propel students to offer and perform well in science subjects. Hence the study was in position to assess how high education level of science teachers affect students' attitudes towards science subjects.

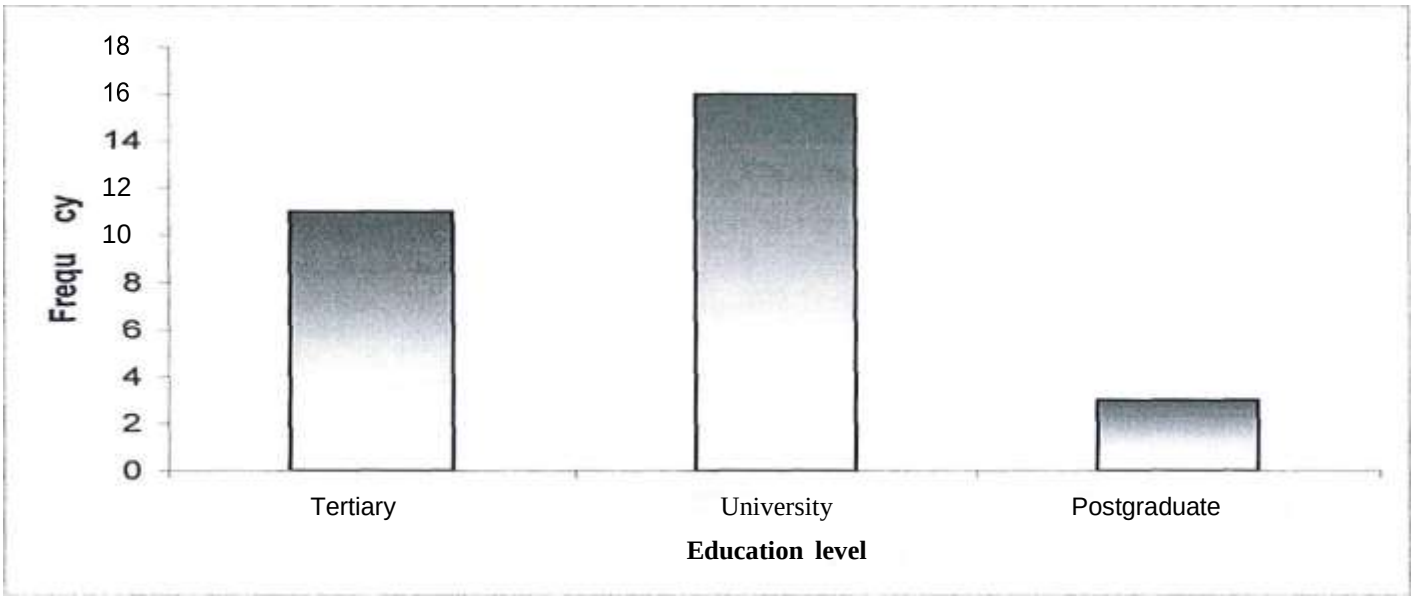

Figure: 2
Source: Field data, 2008

Class distribution of respondents

The class distribution was captured for respondents who included students both in O and A' level. The results showed that most of the respondents totaling to 19 (63.3%) were in classes between senior one and four. The remaining 11 (36.7%) respondents were in senior five and six. Those who were in 'A' level had had more experience with learning science subjects compared to those in O' level. However, each of the categories was able to share some of the factors influencing their ability to effectively learn science subjects.

Adequacy of science teachers in secondary schools

On whether there are adequate teachers of science subject respondents had mixed reactions. From the findings, 13 (43.3%) respondents revealed having adequate number of science teachers only the remaining 17(56.7%) respondents revealed that they had inadequate number of science teachers. This showed that most secondary schools in the area have inadequate number science teachers, a factor that hindered learning of science subjects by students. Even those with adequate science teachers yet performing poorly were likely to have other factors influencing their learning of science subjects. All in all, it was established that schools with adequate number of science teachers had better performance than those with far science teachers though other factors were to blame.

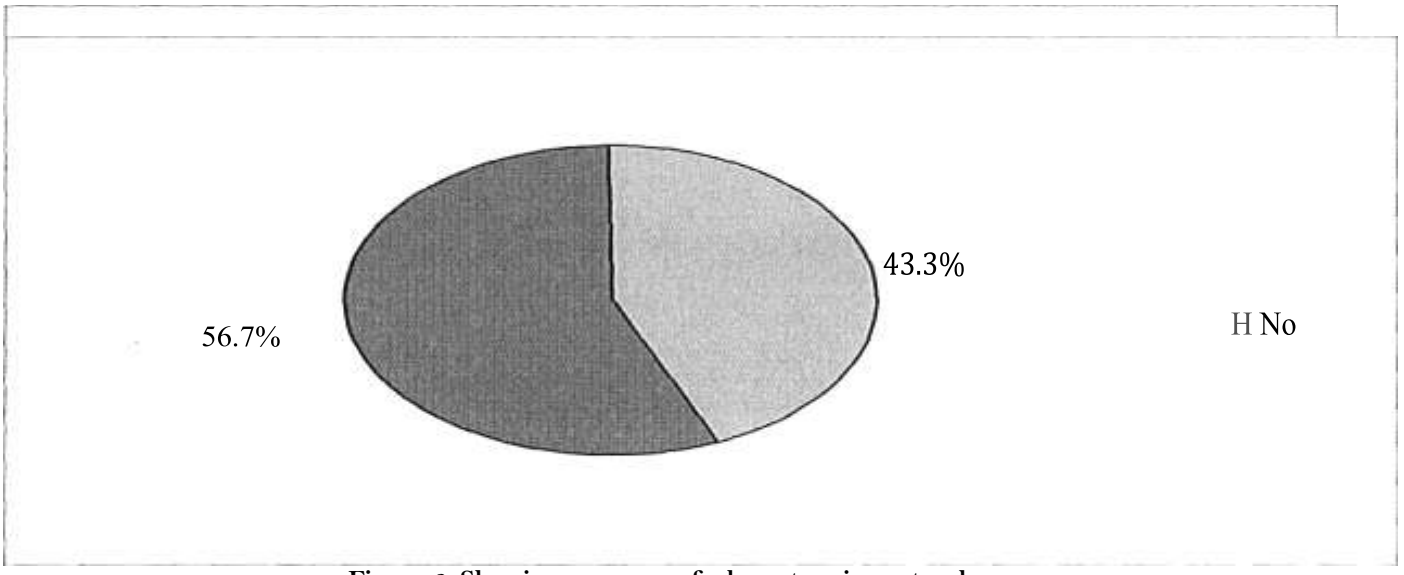

Figure 3: Showing presence of adequate science teachers

Students with science subjects in their combination

Respondents were further asked to show whether they had science subjects in their combination. It was learnt that the majority constituting 19(63.30Zo) revealed having no science subjects in their combinations only 11 (36.7%) respondents claimed to have science subjects in their combinations. Those who did not have science subjects in their combination lacked interest in the subjects and in lower classes all students had sciences compulsory. Those with science subjects were able to explain the challenges they were facing in their quest to perform better in science subjects. Yet in lower classes because of science subjects being compulsory majority of them had negative attitude towards them.

Nature of employment

The nature of employment for science teachers and school administrators was in form of those staying permanently at school and those part timing. From the study findings it was established from 17 (56.7%) respondents that teachers were not permanently staying at the selected secondary schools. In other words, they were only available for their lessons after which they went away. Only 13 (43.3%) respondents revealed that they were permanently staying at the school. The above showed that students in most secondary schools had no opportunity to consult science teachers in their free time since they were not available. This in away left them with problems in the science subjects.

Time spent in the teaching profession

Further analysis was about the period spent by teachers and school administrators in their respective secondary schools. 1 (53.3%) respondents had spent between 11- 15 years in the teaching profession. Other 8(26.7%) respondents had spent 16 years and above while 4 (13.3%) of the respondents had spent 6 — 10 years. The least 2 (6.7%) respondents had spent 1 — 5 years in teaching profession. The findings above meant that those who had spent more years had witnessed various factors that affect students' interests in offering science subjects. They were thus able to give detailed views compared to those who had spent 1 — 5 years. This factor notwithstanding, different information was given based on level of exposure by teachers to students' problems in science subjects. This was on the basis that different secondary schools had different problems affecting teaching and learning of science subjects.

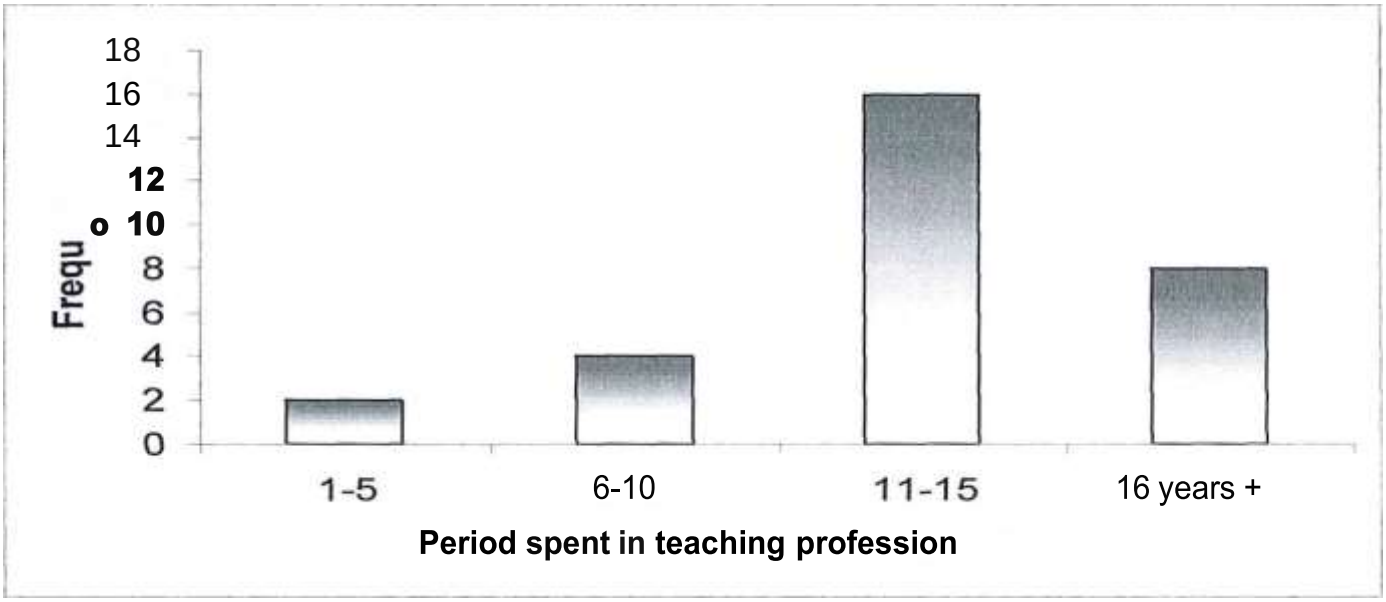

Figure 4: Showing period spent in the teaching profession

Source: Field data, 2008

Students' level of interest in science subjects

This was approached in form of students who liked science subjects and those who did not. On this issue respondents totaling to 17 (56.7%) revealed that they did not like science subject. The other 13 (43.3%) respondents showed preference to the science subjects.

The differing views from the findings implied that there obviously different factors that could be influencing students' attitudes towards science subjects.

Students' attitudes towards science subjects

The students' attitudes were also assessed and presented. Differing views were registered from the respondents. From the study findings, it was learnt that 35 (58.3%) respondents had negative attitude towards science subjects. The remaining 25 (41.7%) of the respondents cited positive attitude by students. The negative attitude was due to different contributory factors some of which were related to school environment, home background and other factors. Hence such issues had slowly impacted on students moral to offer science subjects and changed their attitudes in comparison to negatively ones. On the other hand, those with positive attitudes towards science subjects had conducive factors that motivated them to continuously offer and like science subjects such as adequate text books, experienced science teachers, constant discussions among others.

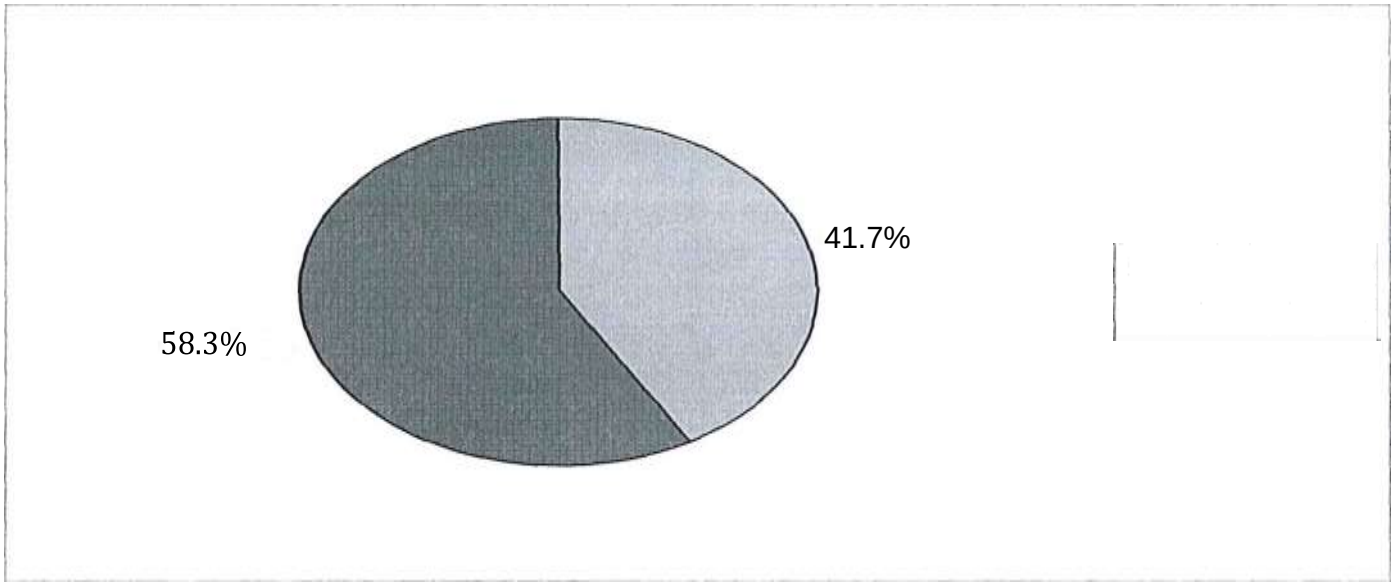

Figure 5: Showing students' attitudes towards science subjects
Source: Field data, 2008

Factors influencing attitudes towards science subjects

In relation to the student's attitudes towards science subjects, respondents were further asked to explain factors that could be influencing attitudes towards science subjects. Respondents came up with different views as shown in the table below.

Table 2: Showing factors influencing attitudes towards science subjects

Factors	Frequency	Percentage
Laboratory equipment	28	31.1
Teachers' commitment	19	21.1
Old students' influence	16	17.8
Teaching methods	7	7.8
Availability of science teachers	14	15.6
Home back ground	6	6.7
Total	90	100

Source: Field data, 2008

As shown in the table above, 28 (31.1%) respondents cited laboratory equipment as one of the factors influencing attitudes towards science subjects. It was learnt that inadequate laboratory equipment and science textbooks denies students to do science practical, which are part and parcel of science learning. This in turn affects their performance at UNEB level and discourages. Study findings revealed that, facilitation of secondary school science has been emphasized by the government under the Ministry of Education and Sports given the fact that science subjects are now considered compulsory to all '0' level students. However, despite the emphasis and continued effort, it is like such an effort is becoming a paper tiger. This is said to have a negative implication to the attitude, which students develop towards the subject since they expect only failures due to the inadequate availability of the teachers and equipment. Therefore, many students who opt for sciences have always fallen victims of failure, which in the end determines future attitude formation towards the subjects by other students in lower levels. Students of lower classes are discouraged from offering science subjects. On the other hand, when these resources are available, then science students and teachers are encouraged to offer the subject and perform better in turn. The other factor was mentioned by 19 (12.1%) of the respondents as teachers' commitment. It was revealed that once science teachers are committed to their work, then student can get necessary assistance in the science subject and be encouraged to offer the science subjects to higher levels. On the other hand, no schools, where teachers lack commitment, students were likely to be discourages from offering science subjects. Yet science subjects need a lot of commitment from both teachers and science students. The study further reveals that, learners' achievement is enhanced by academic environment of encouragement provided by all the stakeholders. Encouraging the learner in all aspects motivates them to "learn how to learn". This calls for science and mathematics to provide cognitive, affective, psychomotor, psychological, emotional and social support to the learners at all times. Old students influence was other factor cited by 16 (17.8%) respondents it was revealed that in some cases old students do influence students in lower classes from offering science subjects. This can happen in case old students' trend of performance has been declining or through such students discourage lower classes' students that science subjects are hard. This in turn reduces their morale to science subjects. In

addition to teachers' commitment, 14 (15.6%) of the respondents pointed out availability of science teachers as another factor. Where science teachers are made adequate, students are likely to get fewer lessons and fail to cover the syllabus. On the other hand, adequate science teachers imply more lessons and high chance of learning a lot as per syllabus. The teaching method was further cited by 7 (7.8%) respondents as another factor affecting attitude towards science subjects. It was learnt that when teaching methods are good, then students learn better and like the science subjects hence increasing their concentration to perform better. However, if the teaching methods are not conducive to the students, then there is a likelihood of not liking the science subjects. The least 6 (6.7%) of the respondents revealed home background as another factor affecting attitudes towards science subjects. Sometimes the parents themselves can discourage students from offering science subjects while in other instance brothers and sisters if such students take their advice and end up dropping the science subjects or reducing their interests in the same subjects. Relatedly, one of the students noted that because teachers lack confidence, most of them fear to carry out practical lessons their own. The normal procedure / practice is that a teacher guides students during the practical lesson. Such activities have been found out to influence students' attitudes towards the science subjects. A student said, he completed senior five without doing any practical lesson in chemistry because most of the time the teacher only gave notes. Another problem is that, "Our teachers teach in more than one School, this limits their concentration" said a student.

The study reveals further that, such has been a result of the fact that most schools lack apparatus and that those, which have, have damaged equipment that can give incorrect results, one student said. It was observed during the discussions and interviews that, to some extent attitude creation to the science subject are influenced by many outstanding issues ranging from intrinsic to extrinsic variables. It was observed that the nature of reward whether intrinsic makes a difference in the attitude formed for sciences between girls and boys and also between Rural students and Urban students. It is obvious that, teachers believe that sciences as subjects are for boys and thus pay attention to the boys. Relatedly, the performance of science subjects compared to other subjects was also assessed. It was found out from 13 (43.3%) respondents that performance of science was fair compared to other subjects. Other 9 (30%) respondents claimed that performance of science was poor. The remaining 8 (26.7%) respondents revealed that science subjects were generally well performed.

Table 3: Showing UCE Performance Statistics 2000-2004

Year 2000		1 — 2		3 — 6		7 — 8		9		No. Sitting
Subject name	Code	No.	%	No.	%	No.	%	No.	%	
Mathematics	456	3050	2.1	33830	22.9	52989	36.0	57575	39.0	147444
Physics	535	3056	5.1	24400	41.0	16930	28.4	15167	25.5	59553
Chemistry	545	1094	1.8	14321	23.7	18144	30.1	26778	44.4	60337
Biology	553	1461	1.0	33663	23.5	43457	30.4	64610	45.1	143191
Year 2001		1 —	2	3 —	6	7 —	8	9		No. Sitting
Subject name	Code	No.	%	No.	%	No.	%	No.	%	
Mathematics	456	1982	1.5	24359	17.9	48137	35.5	61262	45.1	135740
Physics	535	1219	2.3	16607	31.4	14191	26.9	20816	39.4	52833
Chemistry	545	1324	2.5	13661	25.3	16104	29.9	22835	42.3	53924
Biology	553	861	0.7	27362	20.8	37305	28.5	65494	50.0	131022
Year 2002		1 —	2	3 —	6	7 —	8	9		No. Sitting
Subject	Code	No.	%	No.	%	No.	%	No.	%	
Mathematics	456	1013	0.9	21056	17.7	36872	31.0	59935	50.4	118876
Physics	535	632	1.4	13915	31.6	12211	27.8	17238	39.2	43996
Chemistry	545	870	1.9	10001	22.1	10865	24.0	23510	52.0	45246
Biology	553	822	0.7	22217	19.4	32810	28.7	58678	51.2	114527

Year 2003		1 — 2		3 — 6		7 — 8		9	No. Sitting
Subject	Code	No.	%	No.	%	No.	%	%	
Mathematics	456	c2 i g	2.2	20966	20.5	26884	26.3	51.0	102278
Physics	535	1997	5.3	14859	39.7	9071	24.2	30.7	37430
Chemistry	545	1593	4.1	141 66	36.4	10875	28.0	31.5	38869
Biology	553	539	0.6	21366	21.8	25673	26.2	51.4	97991
Year 2004		1 —	2	3 —	6	7 —	8		No. Sitting
Subject	Code	No.	%	No.	%	No.	%	%	
Mathematics	456	1409	1.6	15745	18.5	24373	27.9	52.5	87509
Physics	535	791	2.8	11194	39.3	8201	28.9	29.1	28487
Chemistry	545	653	2.2	778	26.1	7586	25.4	26.3	29873
Biology	553	1093	1.3	24931	30.0	27463	33.1	35.6	83090

The above implied that in most secondary schools, the performance of science subjects was fair compared to other subjects. This fairness however meant that the performance was not yet up to standard level. In other wards a lot of improvement was still needed to improve the performance of science subjects and encourage students to offer science subjects. Moreover, other respondents testified that performance of science subjects was still poor compared to other subjects. The generally poor performance of science subjects indicates that most students still have negative attitude towards learning science subjects.

Teaching methods used in science subjects

Various teaching methods were being used in the selected secondary schools to improve science teaching

Table 4: Showing teaching methods used in science subjects

Teaching methods	Frequency	Percentage
Notes explanation	14	23.3
Used of practical	14	23.3
Constant tests	11	18.3
Discussions	21	35
Total	60	100

Source: field notes, 2008

One of the methods was revealed by 21 (35%) of respondents as involving students in discussion. This is whereby teachers encourage students to bring out area of concern in form of questions and encourage students to share their view/answers to such questions. From these discussions, science students were able to increase the information retention. More 14 (23.3%) of the respondents cited another teaching methods as giving notes with explanation. This was also intended to enable students memorize and revitalize their knowledge acquired in science subjects through consultation of notes. Respondents totaling to 14 (23.3) revealed another teaching method as use of practical in laboratory. This involved students being involved in practical by experimenting different chemicals so as to enable them vividly confirm what they learn in theory, this also enables them to remain focused on what they learnt. Respondents totaling to 11 (18.3%) cited setting up constant tests to science students. This was especially done for candidate classes to enable them strengthen their knowledge base in the science subjects. It was observed during the discussions that, an effective way of learning science and mathematics is by inquiry, investigation, problem solving, experimentation and interaction. These methods do not only introduce learners to nature of original research, but also promote learners' understanding of scientific, mathematical and technological concepts and skills as was noted by the Ministry of Education and Sports (2006).

Other learning practices in science subjects

The learning practices included lessons learnt per day, rate at which tests are given and the state of laboratory facilities. As far as the lessons learnt per day, it was revealed from 45 (75%) respondents that students have 1 to 2 lessons a week on average. Only 15 (25%) respondents revealed that science students have between 3 and 4 lessons per week. Hence those with 3 to 4 lessons per week were more likely to learn more things and complete, syllabus in time compared to those with 1 to 2 lessons per week. Furthermore, respondents had differing views about the rate at which tests are given to students. It was learnt from 17 (56%) of the respondents that tests are given once a month. Other 7 (23.3%) of the respondents revealed that tests are given to science students once week. The least 6 (20%) respondents claimed that tests are given to students twice a term. All in all, it was learnt that those students who were getting tests regularly had more knowledge and exposure about science subjects compared to those who were tested four times a term. Hence more tests given to students enlighten their knowledge in the science subjects.

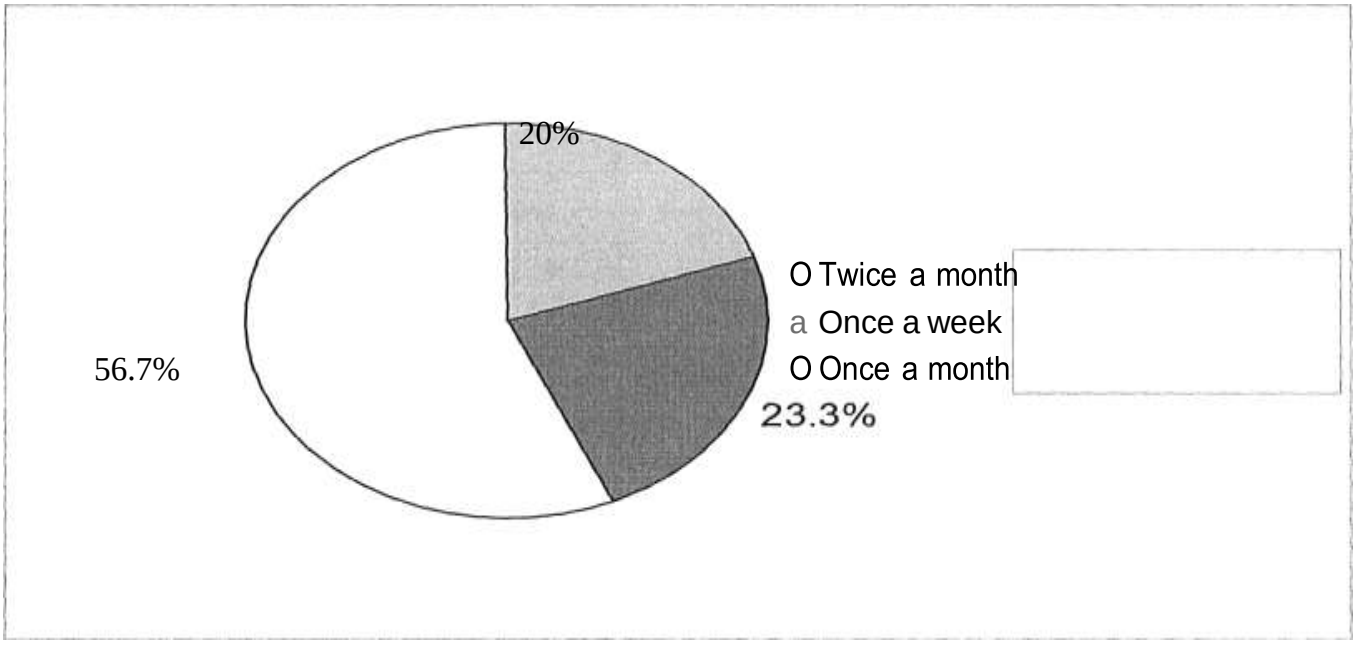

Figure 6: Showing rate at which tests are given
Source: Field notes, 2008

The state of laboratory facilities and science textbooks was also revealed. On this issue, most respondents constituting 55 (91.7%) revealed that laboratory facilities and science textbooks are inadequate. Only the remaining 5(8.3%) respondents revealed that laboratory facilities and science textbooks are adequate.

Rate at which students interact with teachers

The analysis further sought to establish the level of interaction between students and science teachers. From the study findings it was revealed by 14 (30%) respondents that students interact with teachers any time there is a problem. This could imply that teachers were always at school to enable students easily access them for their academic needs. More 13 (43.3%) respondents pointed out that interaction with teachers was done on a daily basis. This is where science students can immediately consult teachers after some lessons especially on the areas, which they have not understood well. The least 3 (10%) respondents revealed that students interact in enabling students to get consultation whenever they needed it. Those who were not always available at school after lessons deprived students a chance to consult. However, this also depended on how teachers create a free interactive environment for students.

Strategies used to change student's attitudes towards science subjects

The review of the syllabus was among the strategies used to change students' attitudes towards science subjects. Respondents totaling to 41 (68.3%) showed that the syllabus is reviewed when need arises. Other 16 (26.7%) respondents were of the view that the syllabus is reviewed once in a year while the least 3 (5%) respondents revealed once in four years. Those schools, which reviewed the syllabus regularly, were able to identify challenges and be able to deal with them for the good of students. Parents' visit at school was among the strategies used to change students' attitudes towards science subjects. It was learnt that parents do visit the school twice a term as revealed by 10 (33.3%) respondents. More 8 (26.7%) respondents revealed that there isn't any parent visiting the schools to interact with students every term. To other 7 (23.3%) respondents, visiting was done when need arose while the least 5 (16.7%) respondents revealed that they visit the school every month. The parents who visit the schools regularly were able to assess the learning environment at school from the teachers and head teachers which sometimes impact on students' attitudes towards science subjects. Through their visits, the parents are also able to identify the discipline of their children and talk to them in person to encourage them to read hard and like science subjects. On the other hand few visits by parents leave the students with their negative thinking, which causes indiscipline and low level of interest in science subjects.

Other strategies being used to change students' attitudes towards

Other strategies were being used to change students' attitudes towards science subjects. Among these strategies used were seminars for science students as revealed by 35 (38.9%) respondents? Through these seminars, students are able to exchange their knowledge in the subjects hence being able to learn more from their fellow students with guidance of science teachers. This encourages them to learn science subjects. More 29 (32.2%) of the respondents were of the view that they have more discussions in class to enable them understand more. This discussion is either among students themselves or between students and teachers. As a result, students are able to learn what they had not grasped clearly during lessons. Respondents totaling to 17 (18.9%) pointed out giving more tests and on a regular basis as one of other strategies used to improve performance in science subjects. This in turn is intended to change students' attitudes towards science subjects. The least 7 (7.8%) of the respondents cited procurement of more laboratory equipment and science textbooks increase students' access to practical lessons and relevant science textbooks. This has been intended to motivate students to offer science subjects and perform better in the long run.

CONCLUSION

One of the conclusions is that most of the science teachers are highly educated, and a large number of them are university graduates, a factor that has the potential to improve performance in science and mathematics while keeping other factors constant. The challenge is that most of these secondary schools have inadequate science teachers. It has also been evident that the teaching methods used are not generally appropriate, although not poor. It is these factors and others that determine the attitudes of students towards learning science subjects. Most of the students' attitudes towards science subjects are negative. This is attributed to various factors, which include inadequate laboratory equipment, the level of teachers' commitment towards teaching students, the influence of old students, and inappropriate teaching methods. It has also been learned that teachers experience in terms of time spent in the profession does not necessarily lead to changed students' attitudes towards science subjects. This is based on the fact that most of the science teachers had spent many years in the teaching profession, yet the students they were teaching generally had negative attitudes towards science subjects. It was also learned that science teachers endeavor to use various teaching methods when teaching students. The common teaching methods include the use of notes and explanations and trying hard to take students through practical for those with laboratory facilities. Other teachers use methods like giving constant tests and having discussions amongst students and with teachers. These are intended to motivate students to increase their interest in science subjects. The lessons given to students on a daily basis for most secondary schools are one to two on average, while the rate at which tests are given is once a month for most schools. However, the problem still remains in the adequacy of laboratory facilities and science textbooks. There are some strategies currently designed to improve students' attitudes towards science subjects. These have ranged from giving more tests to more discussions among students, seminars for science students with students from other secondary schools, and procuring more laboratory equipment and textbooks.

RECOMMENDATIONS

There is a need for head teachers to liaise with district education officers and lobby for more teaching resources from the government. They should also be supplied to students whenever they are available and needed during lessons. This can help reduce the student textbook ratio and improve students' performance in science subjects over time. More efforts should be made by the government to increase teachers' remuneration so as to motivate them to work hard to produce better results in mathematics and other science subjects. They should also give allowances and rewards to those science teachers whose performance leads to better results. This can encourage teachers to aim for better students' grades, as they will feel more committed to teaching. The school administration, in conjunction with other school bodies, should construct more classroom blocks to divide classes into streams so that the teacher-student ratio can be reduced to manageable numbers. This can enable the science teachers to easily identify and deal with students' individual problems. There is a need for regular career guidance for science students before and during their secondary education period. This can help make students appreciate the relevance of science and mathematics to their development. This can also encourage some students to double their efforts in studying the science subjects, which is an indicator of better performance and a changed attitude towards the subjects. The parents also need to come up and actively get involved in educating and sensitizing the students about the relevance of science subjects. Their efforts can achieve a lot in changing or shaping students' attitudes towards learning sciences in secondary schools. The school administration, in conjunction with science teachers, should compare regular tests to those of students, especially those in upper O' level classes. These tests should be based on past papers

from other schools to give students exposure to questions in the past papers. There is also a need to use well-qualified science teachers who can use appropriate teaching methods and give relevant knowledge to students. This can create confidence in the teacher by students; hence, they work according to his or her teaching methods to improve performance in science, thus, in a way, helping to change students' attitudes towards science subjects. There is also a need to use group discussions among students to enable them to effectively memorize the learned topics. These groups should be formed and monitored by science teachers to increase their effectiveness and interest in the subjects.

REFERENCES

1. Jones, M. G., Howes, A. and Rua, M. J. (2000). Gender differences in Students" Experiences, Interests and Attitudes Towards Science and Scientists",Science Education,84, pp.180-192.
2. Report of the Education Policy Review Commission. (April 1992).
3. Olaniyan, A. O. and Omosewo, E. O. (2013). Teachers' Assessment of the Implementation of the Senior School Physics Curriculum in Osun State, Nigeria. Journal of Education and Practice, Volume 4, Issue 18, Pages 135-140.
4. Asiimwe, S. and Niyikiza, Y. H. (2023). Head Teachers' Leadership Styles and Students' Discipline in the Selected Secondary Schools in Nyagatare District, Rwanda. IJARIIE, 9(1): 379-386.
5. Rahim, A., & Lakshmi, B. (2018). Job Satisfaction of secondary school teachers. *International Journal of Advance Research, Ideas and Innovations in Technology, 4 (6)*, 675-677
6. Rahim, A. (2023). Emotional Maturity of Secondary School Teachers In Relation To Their Academic Qualification and Social Status. IAA Journal of Communication 9 (1), 17-20
7. Ministry of Education and Sports. (2006).
8. Harding, S. (1991). The scientific attitude and its gendered assumptions. *Gender & Society*, 5(1), 4-15.
9. McGrayne, S. (1993). Continuous research and knowledge creation in science and technology. *Science and Technology Studies*, 7(2), 89-104.
10. Jacobs, M. (1985). Science and warmaking: Historical connections and contemporary implications. *Journal of War Studies*, 9(3), 249-265.
11. Macmob, D. S., & Commune, J. A. (1986). Teachers' qualifications and mathematics content presentation: A critical analysis. *Educational Research Quarterly*, 20(1), 41-56.
12. Brosseau, M. (1989). Guidelines for evaluation of effective teacher performance in science education. *Journal of Science Education*, 15(2), 78-92.
13. Bukenya, M. (1998). Enhancing student engagement in the learning process: Challenges and opportunities. *Educational Psychology Review*, 23(4), 301-315.
14. Uganda National Council for Science and Technology (UNCST). (1999). Evaluation of teachers' effectiveness in science education: A national report. Kampala, Uganda.
15. Cockcroft, W. H. (1982). Factors influencing mathematics attainment in secondary education. *Mathematics Education Research Journal*, 12(3), 63-78.
16. Farrant, S. (1976). Motivation and learning: Understanding the force behind effective education. *Educational Psychology*, 8(2), 110-125.
17. Simmons, R. (1993). Subject matter knowledge and effective teaching: Insights from graduate teachers. *Journal of Education*, 35(4), 87-102.
18. Opolot-Okurut, A. (1997). Report on teachers' preparation programs and students' performance. Ministry of Education and Sports, Uganda.
19. Smith, J. (1996). Improving science and mathematics education: A focus on student engagement and reasoning. *Educational Sciences Quarterly*, 25(3), 389-405.

CITE AS: Namayanja Madina (2024). Factors influencing students' attitude towards science subjects in Secondary Schools: A case study of Secondary Schools in Kisseka Sub County, Masaka District. IAA Journal of Education 10(2):13-26. https://doi.org/10.59298/IAAJE/2024/102.1326.11