

Teacher Related Factors Influencing Students' Enrollment in Biology Subject in Public Secondary Schools in Meru Central Sub County in Kenya

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Abstract

This study examined teacher related factors influencing students' enrollment in Biology subject in public secondary schools in Meru Central Sub County in Kenya. The study utilized the descriptive survey research design on a target population of 9859 respondents consisting of 9748 Biology students, 62 trained Biology teachers and 49 Heads of Science Department (HoDs) in the 49 public secondary schools in Meru Central Sub County. Stratified random sampling and purposive sampling techniques were employed to select a sample size of 355 respondents comprising of 345 forms three and form four Biology students, five trained Biology teachers and five Heads of Science Departments. The tools for data collection were questionnaires and interview schedules. The research instruments were validated by the help of research experts in the Department of Education, Chuka University. Spearman Brown Prophecy Formula was used to estimate the reliability of the instruments and a reliability coefficient of 0.79 was obtained. The data were analyzed using descriptive statistics facilitated by the Statistical Package for Social Sciences (SPSS) version 20. Based on the findings of the study it was concluded that teacher absenteeism, motivation level, workload, experience, instructional approaches and preparedness were teacher related factors that influenced students to enroll in Biology.

Keywords: Biology, Enrollment, Secondary school, Teacher.

1. Introduction

Biology is a branch of science that deals with the study of living organisms. The subject lays a foundation for careers in health, education, agriculture, environment as well as a precursor of biotechnology which is a tool for industrial and technological development. Despite the importance of Biology in society, the percentage enrollment of students in the subject as compared to other science subjects has been declining in Kenya. The Biology teacher plays an important role in directly or indirectly determining students who may enroll in the subject. One attribute of the teacher that may determine students' enrollment in Biology subject is the teacher motivation. Ochieng (2001) in a study on motivation factors influencing the science teachers in public secondary schools in Migori district established that motivation is fundamental to the successful operation of any institution. For the school to realize maximum output in its concerns, the students and the professional staff must be appropriately motivated. Despite frequent attempts to motivate teachers in general by the Kenyan government, persistent lack of motivation among teachers has been prominent. This has negatively affected both the teaching and learning especially in public schools. Karagu (1980), in an investigation on job satisfaction among elementary school teachers and head teachers in Nairobi Kenya and a comparison of their perception of fourteen selected job factors from Herzberg two factor theory notes that people seen as the best teachers and head teachers have resigned from their jobs and moved out in search of what they regard better employment in the private sector. Accordingly, dissatisfaction among secondary school teachers has been manifested in acts like apathy, high staff turnover, lateness low job morale, poor performance of students in national examinations and absenteeism among teachers.

Waweru (1982) established that teachers' experience is important to students' learning. Teachers' attitudes, self concept, behavior and teaching practices are the most significant implications for schools and learners' level of achievement. Students can learn better, learn more and remember more if they find pleasure in the learning experience. A World Bank Report (1997) noted that the number of years of experience of a teacher was the most consistently positive and significant contributor to students' academic achievement. Studies on teacher experience and effectiveness in teaching consistently show that new teachers, those with fewer than three years of experience tend to be less effective than more experienced teachers (Murname & Phillips, 1981; Rottenberg & Berliner, 1990). In unsupported environment most beginning teachers experience a wide range of problems in teaching/learning process; problems with classroom management, motivating students, being aware of and dealing with individual learning needs and differences as well as developing diverse repertoire of instructional strategies (Rottenberge & Berliver, 1990). A teacher's lack of experience may translate into low enrollment of students in Biology subject.

The skill that teachers exhibit in teaching influences the student enrollment in biological science (Odubunmi, 2001). The method of approach is very vital in any teaching/learning situation. The way the teacher presents the subject matter to the learner may make a student like or dislike a subject. There is need to blend theoretical and practical work in teaching of subjects as to stimulate students' interest more especially in science subjects. The greatest single factor in teaching/learning process is the teacher. No technique, no method, no device and no gadget can guarantee success but only an effective qualified teacher can adequately execute this (Odubunmi, 2006). Thus the greatest motivating device yet discovered is the highly skilled teacher of students that are to be involved in teaching and learning process. Therefore, the lack of skilled teachers in Kenya exemplified by the dearth shortage of trained teachers in public secondary schools compelling parents to engage untrained form four leavers to teach especially in day secondary schools may be a factor contributing to low enrollment of students in Biology subject.

The extent and kind of teacher preparation are especially important in determining the effectiveness of teachers in "school-based" subjects; those subjects that students tend to learn primarily in school rather than through informal learning outside the school (Grossan, 1990). According to Bents and Bents (1990) teachers who enter classrooms without full preparation are less able to plan and redirect instructions to meet students' needs and are less aware of the necessity to do so, less skilled in implementing instruction, less able to anticipate students' knowledge and potential difficulties and less likely to see it as their job to do so often blaming students if their teaching is not successful. As such, when Biology teachers are ill prepared for lessons, then the students may not enroll in the subject due to the teacher's ineffectiveness in content delivery. Examining teacher related factors influencing enrollment of students in Biology subject may assist in designing measures that teachers and other education stakeholders may take to enhance enrollment of students in the subject in public secondary schools in Kenya.

2. Objective of the Study

The objective of this study was to determine the teacher related factors influencing students' enrollment in Biology subject in public secondary schools in Meru South Sub County in Kenya.

3. Methodology

This study adopted the descriptive survey research design. The target population of the study was 9,859 respondents from which a sample size of 355 participants was selected by use of stratified random sampling and purposive sampling techniques. The tools for data collection were questionnaires and interview guide. Validation of research tools was ascertained by research experts at Chuka University while reliability of the tools was estimated by use of Spearman Brown Prophecy Formula. The ethical considerations and research logistics were observed during the entire research process. Data obtained were analyzed using descriptive statistics and the results presented in Tables.

4. Results of the Study

This section is divided into demographic characteristics of the respondents and the teacher related factors influencing students' enrollment in biology subject.

4.1 Demographic Characteristics of Respondents

Each set of the research instruments generated the background information of respondents including attributes such as gender, age, experience and qualifications.

4.1.1 Students' Demographic Characteristics

Students were asked to state their gender. Information in Table 1 illustrates the gender composition of the student.

TABLE 1: GENDER OF THE STUDENTS

| Gender | Frequency | Percentage |
|--------|-----------|------------|
| Male | 221 | 64.1 |
| Female | 124 | 35.9 |
| Totals | 345 | 100 |

The findings in Table 1 indicated that there were more male (64.1%) than female (35.9%) students in this study.

An item in the questionnaire required students to state their age. Data analysis results were presented in Table 2.

Table 2: Age of the Students

| Age | Frequency | Percentage |
|----------------|-----------|------------|
| 13-15 Years | 66 | 19.1 |
| 16-18 Years | 266 | 77.1 |
| Above 18 years | 13 | 3.8 |
| Totals | 345 | 100 |

Information in Table 2 reveals that majority (77.1%) of the students were aged between 16 and 18 years. Further, the students were required to indicate their class. The findings were presented in Figure 1.

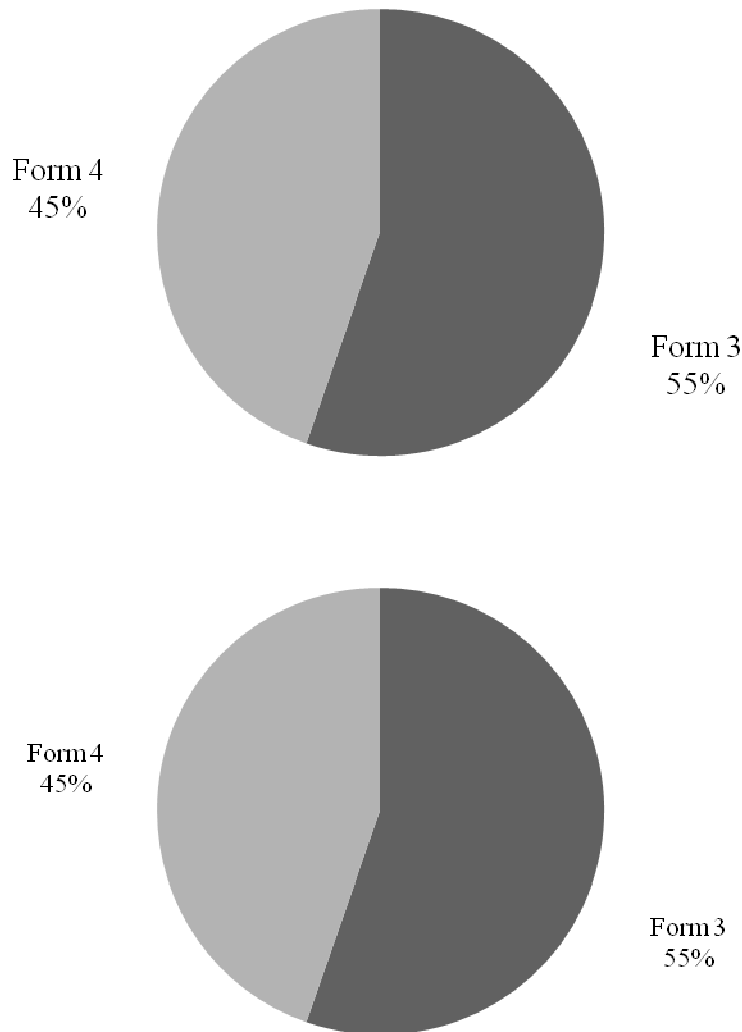


Figure 1. Year of Study

As indicated in Figure 1, there were more form 4 students (55%) than form 3 students (45%). The students were also requested to indicate the parents' highest level of education. The results were represented in Table 3.

Table 3: Parental Highest Level of Education

| Level of Education | Father | | Mother | |
|--------------------|-----------|------------|-----------|------------|
| | Frequency | Percentage | Frequency | Percentage |
| No Education | - | - | 14 | 4.1 |
| Standard 8 | 70 | 20.3 | 70 | 20.3 |
| Form 4 | 124 | 35.9 | 98 | 28.4 |
| College | 56 | 16.2 | 68 | 19.7 |
| University | 95 | 27.5 | 95 | 27.5 |
| Total | 345 | 100 | 345 | 100 |

The results indicate that the parents of most students have received basic education of at least standard eight. However, 4.1% of the respondents reported that their mothers had not had any education. Further, the students were required to state the occupation of their parents. The information in Table 4 represented the summary of data analysis results.

Table 4: Occupation of Students' Parents

| Parent | Occupation | Frequency | Percentage |
|--------|----------------------|-----------|------------|
| Father | Doctor | 27 | 7.8 |
| | Advocate | 14 | 4.1 |
| | Electrical engineer | 14 | 4.1 |
| | Teacher | 90 | 26.1 |
| | MCA | 4 | 1.2 |
| | Business man | 42 | 12.2 |
| | Military officer | 14 | 4.1 |
| | Driver | 28 | 8.1 |
| | Farmer | 112 | 32.5 |
| Mother | Doctor | 13 | 3.8 |
| | Nurse | 28 | 8.1 |
| | Metrological officer | 14 | 4.1 |
| | Teacher | 54 | 15.7 |
| | Banker | 27 | 7.8 |
| | Clerk | 14 | 4.1 |
| | Business woman | 56 | 16.2 |
| | Secretary | 14 | 4.1 |
| | Farmer | 125 | 36.2 |

Information in Table 4 shows that students' parents had varied occupations. The most common ones were farmers, teachers and business people. Some of the parental occupations such as being a doctor, a nurse and metrological officer required Biology as one of the cluster subjects.

An item in the questionnaire required students to indicate when the Biology syllabus was completed in relation to the commencement of the end of course examination. The information was represented in Table 5.

Table 5: Syllabus Completion

| Syllabus Completion | Frequency | Percentage |
|----------------------------------|-----------|------------|
| 3 months before the examination | 98 | 28.4 |
| A month before the examination | 168 | 48.7 |
| Just in time for the examination | 66 | 19.1 |
| Never completed | 13 | 3.8 |
| Totals | 345 | 100 |

The information in Table 5 indicates that most schools complete the syllabus before commencement of the end of secondary education course examinations. A small proportion of schools (3.8%) were never able to complete the syllabus by the time the end of secondary education course examinations began.

4.1.2 Biology Teachers' and HoDs Demographic Characteristics

The study sought information on the gender of the teachers and the HoDs who participated in this study. Information in Table 6 represents the data analysis results.

TABLE 6: GENDER OF BIOLOGY TEACHERS AND THE HODS

| Gender | Biology Teachers | | HoDs | |
|--------|------------------|------------|-----------|------------|
| | Frequency | Percentage | Frequency | Percentage |
| Male | 2 | 40 | 3 | 60 |
| Female | 3 | 60 | 2 | 40 |
| Totals | 5 | 100 | 5 | 100 |

The information in Table 6 indicated that there were more female (60%) than male (40%) teachers and more male (60%) than female (40%) HoDs.

The respondents were asked to indicate the teaching experience in terms of years. The findings in Table 7 reflect the relevant responses.

Table 7: Teaching Experience of Biology Teachers and HoDs

| Work Experience | Biology Teachers | | HoDs | |
|-----------------|------------------|------------|-----------|------------|
| | Frequency | Percentage | Frequency | Percentage |
| Below 5 Years | 1 | 20 | - | - |
| 5-10 Years | 1 | 20 | - | - |
| 10-15 Years | 2 | 40 | 1 | 20 |
| 15-20 Years | 1 | 20 | 4 | 80 |
| Totals | 5 | 100 | 5 | 100 |

Data analysis results in Table 7 indicated that all the HoDs had a teaching experience of at least 10 years. Further, majority (60 %) of the teachers had served as teachers for a period of more than 10 years. This is an indication that teachers and HoDs in the sampled schools had adequate experience to identify factors influencing students' enrollment in Biology in Meru Central Sub County.

The teachers and HoDs were required to indicate their academic qualifications. In regard to this question item, information in Table 8 represents the findings.

Table 8: Academic Qualification of Biology Teachers and HoDs

| Work Experience | Biology Teachers | | HoDs | |
|----------------------|------------------|------------|-----------|------------|
| | Frequency | Percentage | Frequency | Percentage |
| M.Ed | 1 | 20 | 5 | 100 |
| B.Ed | 3 | 60 | - | - |
| Diploma in Education | 1 | 20 | - | - |
| Totals | 5 | 100 | 5 | 100 |

All sampled HoDs were holders of Bachelors Degree in Education. In addition, all the sampled teachers had the relevant training in Education with 20% being holders of Masters of Education, 60% being holders of Bachelors Degree in Education and 20% being holders of a Diploma in Education. This is an indication that teacher and the HoDs in the Sub County had the relevant qualifications needed to instruct Biology subject.

The teachers and HoDs indicated the average number of lessons they teach per week. Information in Table 9 represents a summary of the findings.

Table 9: Teaching Work Load of the Biology Teachers and HoDs

| Teaching Work Load | Biology Teachers | | HoDs | |
|----------------------|------------------|------------|-----------|------------|
| | Frequency | Percentage | Frequency | Percentage |
| Less than 20 lessons | 1 | 20 | - | - |
| 20-24 lessons | 2 | 40 | - | - |
| 25-30 Lessons | 2 | 40 | 5 | 100 |
| Totals | 5 | 100 | 5 | 100 |

According to information in Table 9, all the HoDs taught between 25 and 30 lessons per week while majority of the teachers taught more than 20 lessons per week. This is an indicator that the teachers and HoDs interacted enough with the students to understand their perceptions towards Biology and enrollment in the subject.

4.2 Teacher Related Factors Influencing Students' Enrollment in Biology

Students were requested to indicate the extent to which they agreed with various teacher related factors that influenced students' enroll in Biology. Information in Table 10 provides a summary of the findings.

Table 10: Students' Perceptions about Teacher related Factors and Enrollment in Biology

| Statement | SA | | A | | U | | D | | SD | |
|--|-----|------|-----|------|----|------|----|-----|----|-----|
| | F | % | F | % | F | % | F | % | F | % |
| Motivated teachers influence students to enroll in Biology | 125 | 36.2 | 97 | 28.1 | 82 | 23.8 | 14 | 4.1 | 27 | 7.8 |
| Experienced teachers influence students to enroll in Biology | 140 | 40.6 | 96 | 27.8 | 82 | 23.8 | 27 | 7.8 | - | - |
| Teacher's with good instructional approaches influence students to enroll in Biology | 98 | 28.4 | 124 | 35.9 | 96 | 27.8 | 27 | 7.8 | - | - |
| Teacher who are well prepared influence students to enroll in Biology | 84 | 24.3 | 124 | 35.9 | 96 | 27.8 | 14 | 4.1 | 27 | 7.8 |

Key: F-Frequency, SA-Strongly Agree, A-Agree, U-Undecided, D-Disagree, SD-Strongly Disagree

As indicated in Table 10, 64.3% of the students agreed that motivated teachers influenced students to enroll in Biology. In addition, majority (68.4%) of the students agreed that teacher experience played an important role in influencing students to enroll in Biology. The results also indicated that 64.3% of students

agreed that teacher's instructional approaches had an influence on students' enrollment in Biology. Further, 60.2% of the students agreed that teachers who prepared well for lessons influenced students to enroll in Biology. Thus, teacher motivation, teacher experience, instructional approaches and teacher preparedness were important teacher related factors that influenced secondary school students to enroll in Biology in Meru Central Sub County.

The students were required to indicate how the teachers influenced them to enroll in Biology. Thematic analysis of this question item revealed that teachers explained to the students various career opportunities that one could pursue if they studied Biology in secondary school, the teachers also helped the students to have a positive attitude toward the subject, the teachers further exposed students to role models in the society who had made it in life by pursuing careers related to Biology and that the teachers were a good instructors. Based on this it is imperative that career opportunities available when one enrolled in Biology, positive attitude, role models and the ability of the teacher to instruct effectively may influence a student to enroll in Biology.

The study sought opinions of the teachers regarding various teacher related factors that influenced students' enrollment in Biology. Table 11 provides a summary of the findings.

TABLE 11: TEACHERS' PERCEPTIONS ABOUT TEACHER RELATED FACTORS AND ENROLLMENT IN BIOLOGY

| Statement | SA | | A | | SD | |
|--|----|----|---|----|----|----|
| | F | % | F | % | F | % |
| Motivated teachers influence students to enroll in Biology | 2 | 40 | 2 | 40 | 1 | 20 |
| Experienced teachers influence students to enroll in Biology | 2 | 40 | 2 | 40 | 1 | 20 |
| Teacher's with good instructional approaches influence students to enroll in Biology | 2 | 40 | 2 | 40 | 1 | 20 |
| Teacher who are well prepared influence students to enroll in Biology | 4 | 80 | - | - | 1 | 20 |

Key: F-Frequency, SA-Strongly Agree, A-Agree, SD-Strongly Disagree

Information in Table 11 reveals that 80% of the teachers who participated in this study agreed those motivated and experienced teachers; teachers with good instructional approaches; and who were well prepared influenced students to enroll in Biology. This suggests that schools ought to motivate teachers in order to increase enrollment in Biology. An open ended item in the questionnaire required the teachers to suggest other ways in which teachers could influence students to enroll in Biology. The responses indicated that creation of awareness about career opportunities related to Biology, taking students on field trips and acting as role models to students were likely to influence more students to enroll in Biology.

HoDs were requested to state some of the teacher related factors that influenced students to enroll in Biology. The HoDs indicated that teacher absenteeism discouraged students from enrolling in Biology. However, teachers who attended lessons in time; carried out more practical sessions; and assessed students' progress were more likely to encourage students to enroll in Biology. Further, the HoDs pointed out that overworked teachers often paid little attention to students' work and progress. Thus, teachers' workload may determine students' enrollment in Biology. The teachers' life style related to the manner of dressing and general presentation was pointed out as a teacher related factor that influenced students to enroll in Biology.

5. Discussion of the Results

Findings from this study showed that motivated teachers encouraged students to enroll in the subjects. Ochieng (2001) pointed out that motivation was fundamental to the successful operation of any institution. Thus, for a school to realize maximum output in its concerns, the students and professional staff must be appropriately motivated. The study findings also indicated that teacher preparation was important in determining students' enrollment in Biology. Teacher preparedness increases teacher effectiveness in content delivery and student motivation (Grossan, 1990). This means that students tend to like a subject when taught by teachers who are vast and well prepared for lessons. Bents and Bents (1990) suggests that teachers who enter classrooms without full preparation are less able to plan and redirect instructions to meet students' needs; less skilled in implementing instruction, less able to anticipate students' knowledge and potential difficulties and often blaming students the teaching is not successful.

Majority of the respondents indicated that experienced teachers influenced students to enroll in Biology. Teachers' experience in terms of teachers' attitudes, self concept, behavior and teaching practices are most important implications for schools and learners' level of achievement (Waweru, 1982). Therefore, students can learn better, learn more and remember more if they find pleasure in the learning experience which positively correlates with teaching experience of a teacher (World Bank Report, 1997). In contrast, Rottenberge and Berliver (1990) assert that most unsupported inexperienced or beginning teachers experience a wide range of problems in learning: problems with classroom management, motivating students, being aware of and dealing with individual learning needs and differences and developing diverse repertoire of instructional strategies.

The skill that teachers exhibited in teaching influenced student enrollment in Biology. This means that

the manner in which a teacher presents the subject matter to learners made students to either like or dislike a subject. According to Odubunmi (2006) there is need to blend theoretical and practical work in teaching of subjects as to stimulate students' interest more especially on science subjects. No technique, method, device or gadget can guarantee success as much as an effective qualified teacher. Thus the greatest motivating device yet discovered is the highly motivated teacher of students that are to be involved in teaching and learning process (Ochieng, 2001). Students under the instruction of a well prepared teacher may more probably enroll in the subject.

6. Recommendations

Based on the study findings, the following recommendations:

- i. The Ministry of Education needs to develop measures and avenues for teacher motivation in public secondary schools. This is because motivated Biology teachers are more likely to encourage students to enroll in the subject.
- ii. The Government of Kenya needs to equip schools with sufficient Biology teachers in order to encourage students to enroll in Biology. This will ensure that all schools have qualified and skilled teaching staff who can appropriately deliver the content to students.
- iii. School administrators need to provide the necessary resources including time, working desks, text books and laboratory equipment as well as technicians required by teachers for proper lesson preparation. This will encourage Biology teachers to prepare adequately for lessons and therefore enhancing students' enrollment in the subject.
- iv. There is need for diversification of teaching/learning techniques in Biology subject to include team teaching, group teaching, lesson study techniques, peer teaching and group discussions in order to make the subject interesting to the students.

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