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Influence of Teacher Related Factors on Effective Coverage of Kenya Certificate of Secondary Education Biology Syllabus in Secondary Schools in Rongai Sub-County, Kenya

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Abstract:

The need for effective coverage of secondary school syllabi is crucial in Kenya and the world at large. The problem which this study sought to determine was ineffective coverage of Kenya Certificate of Secondary Education (KCSE) Biology syllabus in secondary schools in the Sub County. The objective of this study was to establish the influence of teacher related factors on effective coverage of KCSE Biology syllabus in Secondary Schools in Rongai Sub-County, Kenya. The study was grounded on curriculum implementation theory and adopted correlational design. The study was based in Nakuru Rongai Sub-County secondary schools. The target population of this study comprised of 151 Biology teachers and 120 form four class secretaries. Census method was used to sample Biology teachers and class secretaries. In this study, content validity of the instrument was determined by research supervisors from Kabarak University who read the content, look at the items and ensured that they reflect the actual content area. This study used test retest method of determining reliability of research instrument. Data was collected using a questionnaire. The findings revealed that teacher related factors significantly influence on effective Coverage of Biology Syllabus ($\beta = 0.390$; $p < 0.05$). The study concludes that factors such as teacher transfers, topics that are too wide in Biology and negative attitude towards some topics influence significantly effective syllabus coverage. It is herein recommended that teacher transfers should be managed appropriately in order to improve coverage of KCSE Biology Syllabus. Moreover, in-service training of teachers should be enhanced by Ministry of education in order to resolve negative attitude towards some topics. Finally, teachers should be adequately equipped with new technologies, pedagogical techniques and appropriate instructional resources in order to achieve effective coverage of Biology syllabus.

Keywords: Biology syllabus, effective coverage, teacher-related factors

1. Introduction

Syllabus is important in an educational setting. Firstly, it delineates the responsibilities of students and the instructors. It provides details of what was covered, what students were expected to do, and how these outcomes and performances were assessed (Okoth & Ndaloh, 2013). According to Kenya Institute of Curriculum Development syllabus (2017) effective syllabus coverage refers to adequately completion of topics in the syllabus as per the time allocated by the Kenya Institute of Curriculum Development. On the other hand, Wiles and Bondi (2014) affirm that effective syllabus coverage entails to how teachers deliver instruction and assessment through the use of specified resources provided in a curriculum. Teaching of topics in Biology as a measure of effective syllabus coverage has been recognized. According to Yanimu and Pagelio (2008) the teacher of Biology needs to ensure that the content specified in the syllabus is covered adequately.

In Australia, it was reported by Hackling (2010) that in some cases the science teacher performed the duties of technicians. Given the pressures on teachers' time, it is likely that teachers in these circumstances can only prepare limited resources for practical work and the quality of the curriculum is compromised. This implies that there is a problem with effective coverage of syllabus for Biology.

In Madagascar, Razafimbelo and Rajonhson (2009) assert that there has been a problem of non-completion of curriculum in school. This was explained by factors such as teaching time have seriously been curtailed by the repeated and extended absences of both teachers and students; long distances that separate schools from the nearest towns, climatic hazards

In Nigeria, following the non-development of sound science education in schools, it was reported that some critical science education activities suffered serious setback including non-coverage of science schemes of work (Ajaja, 2009).

In Kenya, a study was carried out by Mbalaka (2016) to establish the extent to which teachers' relational factors (communication, conflict resolution, coordination and attitude) influence effective syllabus coverage in public secondary schools within Migwani sub-county, Kitui County. The findings revealed that teachers' relational factors have positive influence on effective syllabus coverage. In another study, Makori and Onderi (2013) affirm that there are issues of inadequate syllabus coverage and overworking or overloading of qualified teachers in Nyamira County. Kananu (2011) also found that there was inadequate syllabus coverage in Kenyan schools and whatever was covered was not done effectively, leading to poor performance in the subjects. In Rongai Sub County, CEB status report (2017) indicated that despite the efforts and objectives of the SMASSE project aimed at improving performance of science subjects, very little has changed over the years.

No studies have been conducted to determine factors influencing effective coverage of KCSE Biology syllabus in Rongai Sub County, Kenya. Therefore, this study focused on influence of teacher related factors on effective coverage of KCSE Biology syllabus in Secondary Schools in Rongai Sub-County, Kenya.

1.1. Statement of the Problem

The problem that this study seeks to examine is ineffective coverage of Biology syllabus in secondary schools in Rongai Sub County, Kenya. In Rongai Sub County, there appears to be ineffective coverage of KCSE Biology syllabus in some of secondary schools in the Sub County (CEB, 2017). Teachers should cover the syllabus adequately to enable students to have a clear grasp of the content (TSC Policy framework on Performance appraisal and promotion of teachers, 2014; Kenya Institute of Curriculum Development syllabus, 2017; Teachers Service Commission Code of Regulations for Teachers, 2015). However, the background to this study also shows that ineffective coverage of Biology syllabus persists in some secondary schools in Kenya. Ineffective coverage of Biology syllabus may lead to poor performance in National examinations. Moreover, ineffective coverage of the syllabus may affect achievement of educational goals. This problem led the researcher to investigate influence of teacher related factors on effective coverage of KCSE Biology syllabus in Secondary Schools in Rongai Sub-County, Kenya.

1.2. Objective of the Study

To establish the influence of teacher related factors on effective coverage of KCSE Biology syllabus in Secondary Schools in Rongai Sub-County, Kenya.

2. Literature Review

Figure 1: Conceptual Framework

3. Methodology

This study adopted correlation research design. This design is appropriate when testing the influence of independent variables on dependent variable. Asamoah (2014) affirms that Correlational research design is a type of quantitative research method within the positivism paradigm. It includes explaining phenomena by collecting numerical (quantitative) data that are analyzed using mathematically based methods

3.1. Target Population

The target population of this study comprised 151 Biology teachers and 120 form four class secretaries in Rongai sub-County. Teachers were targeted in this study because they implement the Biology syllabus through classroom instruction and evaluation of students. On the other hand, form four class secretaries were chosen because they participate in keeping records of class management.

3.2. Sample Size and Sampling Technique

This study adopted census method in order to obtain the teachers and form four student class secretaries. This is because the researcher wanted to get the best picture of what influences effective coverage of Biology syllabus. The sample

size for the study was 151 Biology teachers and 120 form four student class secretaries who were picked through census method. Table 1 represents the sample size of the study.

Zone	No of Schools	No of Teachers	No of Students
Kampi ya Moto	10	25	20
Ngata	18	47	36
Rongai	18	44	36
Solai	14	35	28
Total	60	151	120

Table 1: Sample Size

3.3. Instrumentation

This study employed a questionnaire and interview schedule to collect data from the respondent. The questionnaire comprised of the Likert type with a 4-point scale. This was then divided into sub-sections encompassing factors influencing effective coverage KCSE of Biology syllabus.

3.3.1. Validity of the Research Instrument.

In this study, content validity of the instrument was determined by research supervisors from Kabarak University who read the content, look at the items and ensured that they reflect the actual content area. Content validity refers to the extent to which the items on a test are fairly representative of the entire domain the test seeks to measure (Salkind, 2012).

3.3.2. Reliability of Research Instruments

This study used test retest method of determining reliability of research instrument. The following Table 2 represents test-re-test reliability statistics

Variable	No. of Items	Pearson correlation	Decision
Teacher Related Factors	7	0.856	Reliable
Effective coverage of KCSE syllabus	4	0.802	Reliable

Table 2: Test-Re-Test Reliability Statistics

From the analyzed data, it was noted that all the variables surpassed the benchmark value of a coefficient of 0.7 therefore suggesting that the instrument was reliable.

4. Results

4.1. Teacher Related Factors

Descriptive analysis was conducted in order to establish respondents' opinion concerning Teacher Related Factors under investigation. The findings are presented in Table 3.

Statement	SD (%)	D (%)	A (%)	SA (%)	Total (%)
ICT skills influence syllabus coverage	5.1	28.5	51.8	14.6	100.0
Teachers workload influence syllabus coverage	3.6	19.7	19.7	56.9	100.0
Teachers' absenteeism influence syllabus coverage	2.2	16.1	35.0	46.7	100.0
Some teaching methods influence syllabus coverage	3.6	13.9	52.6	29.9	100.0
Teacher transfers influence syllabus coverage	1.5	15.3	33.6	49.6	100.0
Some topics are too wide in Biology	1.5	22.6	57.7	18.2	100.0
Negative attitude towards some topics influence syllabus coverage	0.7	50.4	43.1	5.8	100.0

Table 3: Teacher Related Factors (Data from Teachers)

Teachers' skill in Information Communication Technology is crucial in teaching Biology. From this study, a total of 66.4% of respondents agreed and strongly agreed that ICT skills influence syllabus coverage. Teachers who have skills in ICT are in a position to use it during teaching. This could enhance coverage of specific content areas. However, a total of 33.6% disagreed and strongly disagreed that ICT skills influence syllabus coverage. This view could be supported by Ochieng' (2013) who studied determinants of Information and Communication Technology integration in the teaching of sciences in public secondary schools in Kisumu East district. The study established that majority of science teachers were not well equipped with ICT skills and knowledge and this limited their ability to integrated ICT in their lessons. Ochieng' (2013) further affirms that science teachers rarely use ICT to deliver their lessons. It implies that failure to use ICT in their lessons could hamper effective syllabus coverage.

Teachers should only be allocated the prescribed teaching workload in order to be effective teaching Biology. From this study, a total of 76.6% of respondents agreed and strongly agreed that teacher's workload influence syllabus coverage. This could be because, when teachers have more lessons than those recommended, they will not be able to effectively prepare and teach all the topics in the syllabus. This finding concurs with that of Chirimi (2016) who observes that the increase crisis in teachers' workload allocation to science teachers has resulted to failure complete syllabus. Among prevailing causative factors of teachers workload is shortage of science teachers among the visited school where the number of science teachers were very few compared to arts teachers. Gatemi and Thinguri (2018) also avers that factors such as frequent transfers of teachers from one school to another, the mobility of teachers from one educational level to another, the teachers early retirement, the resignation of teachers due to poor working conditions and pursuit for career development and advancement aspects lead to poor syllabus coverage.

Teachers' availability in schools is crucial in teaching and learning. The findings of this study indicated that a total of 81.7% of the respondents agreed and strongly agreed that teachers' absenteeism influence syllabus coverage. This is because when a teacher misses a lesson, learners will lag behind in syllabus coverage. This finding agrees with that of GPE Secretariat (2017) that reported that teacher absenteeism has been an increasing problem in Kenya and that up to 20% teacher absenteeism has been reported. Teacher absenteeism could influence effective syllabus coverage.

Teachers need to make appropriate instructional selection for effective syllabus coverage. From the study findings, a total of 82.5% agreed and strongly agreed that some teaching methods influence syllabus coverage. For example, dependence on lecture methods alone could hinder development of problem-solving skills by learners. This influences effective syllabus coverage. This finding concurs with that of Namasaka, Mondoh and Wasike (2017) who aver that Sequential Teaching Methods (STM), when efficiently used in instruction, enhance immediate retention of knowledge in Biology more effectively than the oratory lecture method predominantly used in Kenyan Secondary schools. In an attempt to achieve objectives of the Secondary School Biology syllabus, Kenya Institute of Education (2006) suggested several methods of teaching. The methods include practical work, class discussions, demonstrations, excursion/field trips and project work. It implies that when these methods are not used, effective coverage of the syllabus could be hampered.

Recurrent transfer of teachers disrupts effective learning. From the findings, a total of 83.2% agreed and strongly agreed that teacher transfers influence syllabus coverage. This implies that when teachers are transferred from one school to another, learners may not cover some critical and examinable topics. This therefore influences effective syllabus coverage. These finding agrees with that of Gatemi and Thinguri (2018) who concluded that frequent teacher transfer influences syllabus coverage. This could also impact on students' performance in National exams.

The length of the syllabus determines how best it can be covered. Up to a total of 75.9% of respondents agreed and strongly agreed that some topics were too wide in Biology. When a topic is wide, it requires a lot of time and resources to cover length of the syllabus. This could influence effective syllabus coverage. This finding concurs with that of Amália and Cossa (2015) who reported in their study that teachers complained about the length of Biology and Chemistry syllabuses.

The attitude of a teacher towards teaching Biology influences coverage of the syllabus. From the study, a total of 48.9% of respondents agreed and strongly agreed that negative attitude by teachers towards some topics influence syllabus coverage. This is because, when some topics are perceived to be difficult, teachers may fail to adequately prepare hence influencing effective syllabus coverage. According to Omolara and Adebukola (2015) teachers with negative attitudes towards teaching Biology may not be as approachable to students as they find it difficult to ask such teachers questions on difficult topics in the syllabus. Therefore, teachers need to be highly interested in the subjects and topics they teach for effective syllabus coverage.

4.2. Correlation between Teacher-Related Factors and Effective Syllabus Coverage

In this study Pearson Correlation was computed in order to determine the existence and significance of the relationship between teacher-related factors and effective coverage of Biology syllabus. Table 4 shows the results of the analysis.

Effective Syllabus Coverage	Teacher Related Factors		
	Pearson Correlation		.621**
	Sig. (2-tailed)		.000
N	137	137	

Table 4: Correlation between Teacher-Related Factors and Effective Syllabus Coverage (Data from Teachers)

** Correlation Is Significant at the 0.01 Level (2-Tailed)

According to Table 17, there exists a positive and statistically significant relationship between Teacher Related Factors and Effective Coverage of Biology Syllabus ($r=0.621$; $p<0.01$). This means that factors such as teacher work load and reduced teacher transfers will promote effective syllabus coverage. This finding agrees with that of Mbalaka (2016) who sought to establish the extent to which teachers' relational factors influence effective syllabus coverage. The researcher found that teacher relational factors have significant effect on effective syllabus coverage $F(dfB, dfW) = F(4, 113)$, ($p < 0.05$). This implies that teacher-related factors such as ICT skills, workload and teacher transfers when not managed well in schools could influence syllabus coverage negatively in Biology.

4.3. Regression Analysis on the Influence of Teacher Related Factors on Effective Syllabus Coverage

The Table 5 shows the influence of each of teacher related factor on the Dependent Variable.

Model		Unstandardized Coefficients			
		B	Std. Error	t	Sig.
	(Constant)	.150	.116	1.301	.196
	ICT skills influence syllabus coverage	-.031	.027	-1.148	.253
	Teachers workload influence syllabus coverage	.000	.023	-.018	.986
	Teachers' absenteeism influence syllabus coverage	.011	.028	.373	.710
	Some teaching methods influence syllabus coverage	-.041	.031	-1.318	.190
	Teacher transfers influence syllabus coverage	.394	.026	15.186	.000
	Some topics are too wide in Biology	.182	.029	6.218	.000
	Negative attitude towards some topics influence syllabus coverage	.432	.029	14.658	.000

Table 5: Teacher Related Factors Coefficients^a
a. Dependent Variable: Effective Syllabus Coverage

From the regression analysis, it was noted that teacher related factors such as teacher transfers, topics that are too wide in Biology and negative attitude towards some topics influence significantly effective syllabus coverage ($p < 0.05$). Other teacher-related factors include ICT skills and some teaching methods influences negatively effective syllabus coverage. On the other hand, teachers' workload and absenteeism positively influences effective syllabus coverage. This finding agrees with that of Gatemi and Thinguri (2018) who established that frequent teacher transfer influences syllabus coverage. This implies that when a teacher is transferred and take more time for replacement may influence effective Syllabus Coverage.

4.4. Combined Regression Analysis

Model	Unstandardized Coefficients		t	Sig.
	B	Std. Error		
(Constant)	.130	.285	.454	.651
Teacher related factors	.390	.136	2.868	.005

Table 6: Coefficients
a. Dependent Variable: Effective Syllabus Coverage

On the basis of unstandardized coefficients, the model indicates that teacher related factors influence up to 39% positive variation on effective coverage of Biology Syllabus. A positive beta value conveys a positive effect from the independent variable, which means that when the factor increases, the dependent variable increases as well (Vold, 2018).

5. Conclusion

It was concluded that teacher related factors influence significantly on effective Coverage of Biology Syllabus ($\beta = 0.390$; $p < 0.05$). Precisely, teacher transfers, topics that are too wide in Biology and Negative attitude towards some topics influence significantly effective syllabus coverage.

5.1. Recommendations

The study recommends that:

- Teacher transfers should be managed appropriately in order to improve coverage of KCSE Biology Syllabus.
- In-service training of teachers should be enhanced by Ministry of education in order to resolve negative attitude towards some topics.
- Teachers should be adequately equipped with new technologies, pedagogical techniques and appropriate instructional resources in order to achieve effective coverage of Biology syllabus.

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