Enrolment Progression Trends of Grade 1 2017 CBC Cohort into Senior Secondary Schools in 2026 in Kenya.

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ABSTRACT

Enrolment projections are critical for the government and planners to allocate education-related resources and ensure necessary school infrastructure and teachers are provided. In view of the new education system of 2-6-3-3-3 that was launched in 2017 in Kenya and named Competency Based Curriculum (CBC), there was need to come up with a projection of enrolment trends of Grade 1 2017 CBC cohort into Senior Secondary Schools in 2026. The objectives of the study were to project the enrolment progression trends of Grade 1 2017 CBC cohort into Senior Secondary Schools in 2026. This study was guided by the rational comprehensive (Synoptic) planning theory propounded by Faludi and Needham (1993), which allows for the evaluation that consists of procedures such as cost benefit analysis, systems analysis, and forecasting (projection) research. The study adopted a descriptive survey research design. All the primary and secondary schools in Kenya were the target population for the study. Collection of data was done by means of questionnaires, document analysis and direct observation. The study followed Thonstad's Grade Transition Model for projecting the CBC enrolment trends of the 2017 Grade one cohort to Junior and eventually Senior School. The study considered 2017 to 2021 enrolment data. The findings of this study indicated an increase in CBC enrolment over the years to 2026. The study also established that an increase in enrolment leads to an increase of teacher requirement, physical infrastructure, and average school size. The study concluded that there will be a shortage of teachers and selected projected infrastructure due to the projected increase in enrolment at Senior secondary levels by 2026. The study therefore recommended the need to expand the physical infrastructure, the need for TSC to roll out a plan to employ more teachers by 2028. With the findings of this study, the MOE, and TSC may be guided to consider adequate and effective teacher training programmes for the teachers to be CBC compliant and the need for adequate textbooks supply in time for use during instruction. With the enrolment projections at Senior Secondary Schools in 2026, budgetary allocations will be much easier by the stake holders. Findings of this study would also inform policy makers including TSC and Ministry of Education to come up with practical policy reforms that would enhance provision of quality education in Vihiga County. This study can also guide Tertiary and University institutions for proper preparation when the learners graduate from Senior School.

INTRODUCTION

Formal education was introduced in Kenya during the British colonial era. Between 1964 and 1985, an education structure 7-4-2-3 (seven years of primary school, four years of secondary school, and three years of university education) was modelled and adopted (Kinuthia, 2009). In January 1985, the 8-4-4 system of education was introduced. This was because of concerns that the basic education provided previously lacked the necessary content to promote widespread sustainable self-employment. An evaluation of the curriculum in 1995 revealed that the curriculum had a heavy workload across the various subjects in both primary and

secondary education. Based on the Report on "Total Integration of Quality Education and Training" of 1999, a needs assessment was undertaken. The findings of the study indicated that the subjects at primary level were too many, the content in each subject for primary and secondary was too much, and there was also repetition of content in various subjects. The national curriculum for primary and secondary education was then reviewed in 2002 to remove the overloads and unnecessary overlaps within and across subjects, and to mainstream emerging issues. According to KIE (2002) in primary, Music, Art and Craft were integrated into one study area called creative arts. Home science, Agriculture and Science were integrated into one study area called Science- which also includes aspects of technology. Geography, History and Civics (GHC) – a combined course was renamed Social Studies and included environmental education, civic education and aspects of Business Studies. The emerging issues mainstreamed included HIV/AIDs, child labour, environmental conservation, and gender issues, among others (KIE, 2002).

Growing demands for the acquisition of 21st century skills and the introduction of technology to the everyday life as well as globalization of the labour market have affected the nature and meaning of learning and teaching process and bought the need to guarantee to everybody the achievement of new key competencies for their personal and social development (Pamier, 2017). According to the Kenya Institute of Curriculum Development (KICD) Report on Needs Assessment for School Curriculum in Kenya (2016), summative evaluation of primary and secondary education in 2009 indicated that the current curriculum content relegates practical skills necessary for economic development to non-examinable subjects, thus, most of the learners exiting the education system at secondary level did not have adequate skills and competencies to join the job market. Among the skills gaps identified by the report included agricultural skills, entrepreneurial skills, vocational and technical skills, innovation and creativity and ICT skills as learners opted not to take these subjects.

The new education system of 2-6-3-3-3 was launched in 2017 in a major departure from the 8-4-4 system. The Competency Based Curriculum (CBC) is designed to take two years in pre-primary, six in primary education, three in junior secondary, three in senior secondary education and three at the university. It is against this background that there is need for a projection model for Grade 1 2017 CBC cohort progression to Senior School come the year 2026. This will help in proper planning.

STATEMENT TO THE PROBLEM

The government of Kenya introduced 8-4-4 system of education in order to produce graduates who are self-reliant. However, the 8-4-4 system of education became too much examination oriented therefore paving the way for the newly launched Competency-Based Curriculum currently being implemented in Pre-Primary, lower primary and Junior Secondary school. The proposed education system of 2-6-3-3-3 was launched in 2017. It was designed to take two years in pre-primary, six years in primary education, three years in Junior Secondary education, three years in Senior Secondary education and three at the university. For schools to fully implement a curriculum they need to have teachers who have acquired knowledge, skills and competency to handle the curriculum. The teacher is expected to act as a facilitator in the teaching learning process. The availability and adequacy of instructional material for Competency Based Curriculum is also a vital requirement for the implementation of the curriculum. In 2016, USAID through the Ministry of Education increased its support for the system of education change to CBC by providing some level of funding to assist in the curriculum development process and production of instructional materials. Various workshops were conducted through this grant to actualize the curriculum, some materials (books) produced and teachers trained for seven days during the 2017 August holiday (IBE- UNESCO, 2017). Afterwards the curriculum was rolled out for piloting from pre-primary one to grade two. A year later, external reports emerged revealing that there were gaps that needed to be addressed. The Kenya Publishers Association Chairperson, (2018) had cast doubts about the implementation of the new curriculum saying materials had not been published. Waweru (2018) in his research on the influence of teacher preparedness on

implementation of CBC in public primary schools in Nyandarua North Sub-County, Kenya, had not seen any evidence of instructional materials in schools except for mathematics and language activities. A letter by Kenya National Union of Teachers (KNUT) addressed to the cabinet secretary of education in December 2017 feared that the new system was hurriedly done without appropriate designs, pupils' books and teachers were ill prepared.

This study sought to establish the enrolment progression trends of Grade 1 2017 CBC cohort into Senior Secondary Schools in 2026 in Kenya.

Significance of the study

The findings of this study will be important to the stakeholders of education to ascertain the status of preparedness for the implementation of CBC in Senior Secondary Schools in Kenya in the year 2026. The findings on enrolment projections will be of great benefit to Ministry of Education (MOE), KICD and TSC to consider adequate and effective teacher training programmes, the need for adequate textbooks supply in time for use during instruction and the need for construction of adequate infrastructure for use at the Senior Secondary level. The findings of this study will allow the planners to make appropriate decisions related to school locations, the number of school places needed and to provide the necessary school infrastructure and resources (Campbell, 1997). Schools may face unexpected enrolment pressures and teaching may be disrupted due to inadequate number of teaching staff, facilities, or equipment. With the enrolment projections at Senior Secondary Schools in 2026, budgetary allocations will be much easier by the stake holders. This will be due to the changing sizes and composition of the school population, and generally limited expenditure available for schools.

Curriculum reform is an improvement or change for the better. The proposed CBC system of 2-6-3-3-3 was launched in 2017, piloted for two years and rolled out in 2019. In the year 2023, the roll-out was at Junior Schools and in the year 2026 the roll-out will be at Senior Secondary Schools, early preparations are therefore in order. This study seeks to model projections for student enrolment, classrooms requirements, textbooks requirements, teacher requirements and FSE capitation for the implementation of CBC in Senior Secondary Schools in the year 2026.

Justification of the study

Curriculum reform is an improvement or change for the better. The proposed CBC system of 2-6-3-3-3 was launched in 2017, piloted for two years and rolled out in 2019. In the year 2023, the roll-out was at Junior Schools and in the year 2026 the roll-out will be at Senior Secondary Schools, early preparations are therefore in order. This study seeks to model projections for student enrolment, classrooms requirements, textbooks requirements, teacher requirements and FSE capitation for the implementation of CBC in Senior Secondary Schools in the year 2026.

Scope and Limitation of the Study

The study was restricted to secondary schools and projections of enrolment, for the implementation of CBC. Data on schools to offer STEM pathway was not covered because it was not known which schools will fall in this category. However, the study would have been more comprehensive if the pathway for each school was known.

The study was limited since there are no studies for comparison as it is a new area and that the projections would be based on existing enrolment and yet enrolment is a continuous process thus some students may enroll along the way.

Theoretical Framework

The framework for this research was formed on the rational comprehensive (Synoptic) planning theory propounded by Faludi and Needham (1973). The rational comprehensive theory is the most widely used approach because of its fundamental classical elements: (1) goal setting, (2) identification of policy alternatives, (3) evaluation of means against ends, and (4) implementation of policy that is a point of departure for most other planning approaches. It is the kind of planning process that permits multiple iterations, feedback loops and elaboration of sub-processes. The use of the theory allows for the evaluation that consists of procedures such as cost benefit analysis, operations research, systems analysis, and forecasting (projection) research. Forecasting in rational planning can further be broken down into deterministic models or can consist of purely descriptive analysis (trend extrapolation, econometric modelling, curve-fitting through multiple regression analysis); or probability envelopes and contingency models to accommodate foreseeable variations in patterns. Furthermore, the comprehensive planning theory typically looks at problems from a systems viewpoint, using conceptual or mathematical models relating ends (objectives) to means (resources and constraints) with heavy reliance on numbers and quantitative analysis. It is also an algorithm which is a set procedure for solving a known class of problems. It generally involves quantitative methods, and by definition it is capable of arriving at an optimal solution. The algorithm is often employed in linear programming and input-output analysis, operations research, and trend projections. This paper therefore adopted rational comprehensive planning theory that seeks to provide a framework of objective decision rules and analysis. The theory is more dynamic than others in the scope of problems it addresses and the diversity of operating conditions it can tolerate. Similarly, the theory has an internally consistent, self-reinforcing network of methods and data requirements. The theory advocates a total view of planning at once without limiting the scope of planning. That is, it allows for planning for the entire educational system of a country for five or more years through the use of trend extrapolation and quantitative analysis and this is applicable in this research, as the projection plan is for the CBC implementation at Senior Secondary Schools in the year 2026.

This theory was suitable for this research as it focuses on the projections of enrolment, teachers, textbooks, classrooms that may help to successfully implement a new curriculum in Senior Secondary Schools in 2026.

LITERATURE REVIEW

Professor Douglas Odhiambo task force in 2012 came up with the Competency Based Curriculum which emphasises more on practical subjects that had earlier been rejected (Republic of Kenya, 2012). This is because, Kenya, like many other African countries has a high number of unemployed youths. To curb this problem, it is prudent that education and training in Kenya must be aligned to meet the needs and aspirations of the Kenyan populace and vocational education and training should be emphasised to help reduce the high youth unemployment problem in line with Sessional paper No.1 of 2005 on Policy Framework on Education, Training and Research (Republic of Kenya, 2005).

A research report on the needs assessment for curriculum reform by KICD affirmed the necessity for a primary school curriculum that integrates and equips individuals with competencies and skills applicable in real life situations locally and globally. It added that curriculum needed to prioritize vocational education and practical subjects. Consequently, it recommended that for effective curriculum delivery and provision of quality education, teacher capacity building, provision of learning resources and teacher training in all areas either through pre-service and in-service is fundamental. This therefore shows that enrolment data is key in planning for the implementation of a new curriculum.

According to Agboola and Adeyemi (2013), student enrolment at any level of education is very crucial to the achievement of the nation's overall goals through education. There is a need to know the actual number

of learners that are enrolled in the educational system because other school characteristics such as teachers, classrooms, textbooks, and funds depend on it.

Enrolment statistics forms the basis for many investment decisions in education. Enrolment projections are the building blocks of effective school planning. Only with detailed and accurate projections are countries or counties able to site schools in the best possible location, future-proof school attendance area boundaries, serve students effectively with special programs, prepare for bonds and levies, and carry out numerous other important planning activities that school managers must juggle throughout the year.

Enrolment level between majorities of local people still hold to the belief priority in matters of development (UNESCO, 2010). Last statistics from the Ministry of Education also show declining Gross Enrolment Rate (GER) from 94% in 2016 to 86% in 2017 (Republic of Kenya 2012). This means that despite Free Primary Education (FPE), the education sector still faces many challenges relating to access. However, the factors influencing GER have not been provided, therefore this calls for a study to be conducted to find out determinants of enrolment rates in Kenya. An increase in primary enrolment has always been a priority for every successive government (UNESCO, 2011)

In Kenya, the government has implemented several policies on UPE since independence which has led to increase in enrolment up to the present day. Therefore, the colonial education system which discriminated Africans from further education were abolished (Bogonko, 1992). There was also elimination of school levies in semi-arid and arid areas which was set as the first policy of FPE for the first four years of the policy implementation. Eventually, FPE package for seven years was announced in 1978 which led to an increase in enrolment by 23.3% and at least 93% of school age children had been enrolled by 1983. Conversely, Bogonko (1992) notes that charging of fees for standard five and seven led to a decline in the enrolment contrary to the early admission in lower primary where education cost was catered for.

In 1988 the IMF imposed structural adjust programmes where cost sharing was introduced in the education sector. The parents had to purchase books, equipment and paid for development in the schools. This step-imposed difficulties to parents and community members to sufficiently support education and thus education appeared to be beyond the reach of the household (Abagi, 1997; World Bank, 1995). The NARC government, in January 2003, introduced free primary education to accelerate the speed of achieving EFA's goals whose target was to increase the enrolment by 85% (Angelucci, & National Bureau of Economic Research, 2000).

In East African countries, the demand for education has been increasing due to the increase in enrolment of pupils in primary schools. This high demand led to the expansion of secondary schools up to local level to meet the demand. Nandi South Sub-County is a typical representative of a Kenyan rural sample opportunity in this region, several challenges have been noted. There is a low enrolment of girls, low transition rate, high dropout rate and understaffing in schools (Hannum & Buchmann, 2011). The public resources are limited, and governments have traditionally relied on private educational sector particularly at the post basic levels to meet the excess demand. Consequently, it has resulted to constraints on the provision of quality of both primary and secondary education in the region (Wedgwood, 2006). Kenya not being an exceptional, this study sought to project enrolment rates at Senior Secondary Schools in 2026 in Kenya.

When the implementation of FPE was put in place in 2003, there was a 22% increase in the Net Enrolment Rate. The national enrolment rates for Kenya in 2007 stood at 5.0% for the male and 3.0% for the female (MOE, 2009). The national enrolment rate for the year 2016 stood at 7.46% for boys and 5.48% for girls giving an overall dropout rate of 6.47%. Even though enrolment rates have been on the rise over the years, the rate of rise has been unstable (MoE, 2009). This picture indicates that enrolment is still a problem in Kenya. This study will project enrolment in Senior Secondary Schools in Kenya in the year 2026.

In 2019, the education Cabinet Secretary reported that there were over 1.3 million grade 3 CBC learners in Kenya who were studying using the new 2-6-3-3-3 system of education (The Star, 13th September, 2019). The enrolment statistics indicates the need for a framework of projecting teacher demand to avoid crisis as the output of Grade 9 enter Senior Secondary while FSE attract more enrolments at this level.

According to MoE (2018) more children are enrolling in pre-primary centers although enrolment rates at this level show that a substantial proportion of children at pre-primary school going age are not enrolled. It further notes that in absolute numbers, enrolments in pre-primary schools increased from 2.8 million in 2013 to 3.4 million in 2018. The national pre-primary NER was 77.2 percent in 2018, meaning that accounting for age-school appropriateness, close to 25 percent of children who are supposed to be enrolled in pre-primary centers are not enrolled. A large proportion of them are out of school, while a few are directly enrolled in primary schools. From this it was evident that access at preprimary levels remains relatively low in arid and semi-arid areas with the NER being as low as 18 percent in Mandera County (MoE 2018). At the national level, enrolments rates at pre-primary level do not indicate a significant attendance bias by gender, with the GPI of 0.96 in 2018. This, however, masks the low enrolments of girls, especially in ASAL areas (MoE).

Mbeche (2003) carried out a study to project enrolment in Kenya's Universities Bachelor of Education programme to meet the demand for this cadre of teachers. The study population comprised of all teachers for Integrated English in public secondary schools in Kenya and all student teachers for Integrated English in Universities. This data was collected from the Teachers Service Commission (TSC) headquarters and Kenyan Universities. Ex post facto research design was employed. The researcher gathered data on the entire study population. Data analysis mainly involved carrying out the desired projections. The model of compounded relationship was employed for this purpose. This involved the computation of weighted average survival rate and weighed average graduation rate. The researcher used this typical flow pattern to project enrolment in universities to meet the projected demand by 2015. Descriptive statistics such as mean, percentages and frequency tables were used to analyse some of the data. The findings of the study were that there was a mismatch between the demand and supply of teachers for Integrated English in public secondary schools in Kenya. That the total number of public secondary schools countrywide was 2895. These schools were inequitably distributed throughout the country. The compounded relationship between graduates and corresponding enrolment at the entry point was computed to be 0.885. This study is relevant to the current study which will model projections for the requirements of the implementation of CBC in Senior Secondary Schools in 2026.

METHODOLOGY

Research Design

The study used a descriptive survey research design of past time series of important indicators like population size and structure, demographic trends, enrolment, and government policies on education (Ahmed, 2000). To project future school enrolment, at least four general types of basic information are needed. The first relates to the population of school age, the second to pupil enrolment, the third to various rates and ratios derived from the first two types of data, and the fourth to questions of administrative policy affecting education in general and school enrolment in particular (Mehta,1994). Projection of the future size of school age population enrolled at any level of education constitutes the starting point of educational planning. This is so because it provides the basis of estimating future number of schools, classrooms, teachers, textbooks, funds, and other facilities. The objective of the projection would be to develop a basic frame of reference for the future. Demographic factors and the development of education are interrelated in many ways. There are important causal links in both directions. Population dynamics have a direct bearing on the development of education while educational development affects population growth and distribution

(Ahmed, 2000). Hence the need for these projections in this research to model projections of enrolment and thereafter projections of teachers, textbooks, classrooms and subsidized day secondary education funds for the implementation of CBC at Senior Secondary schools in 2026 in Kenya.

Location of the study

The study was carried out in Kenya. Vihiga County was selected as the accessible study population. Vihiga County is one of the 47 counties that were created when a new national constitution was promulgated in Kenya on 27th August, 2010. In the 2019 Census Report, the county had a total population of 554,622 with a population density of 1,045 people per square kilometre. Nairobi County is leading with a population of 6,247 people per square kilometre followed closely by Mombasa County with 5,495 people per square kilometre and Vihiga comes third. According to the Vihiga County Integrated Development Plan 2018-2022, the high population density has negatively impacted on the available resources including land, forests and wetlands. This therefore means that the educational resources are also overstretched, and thus careful planning is needed in the implementation of CBC. According to the KPHC 2019 report, the poverty level of the County is at 39 percent against the national's at 45 percent. This means less contribution of stakeholders to provision of teaching /learning resources in the implementation of CBC. Despite there being FPE and Subsidized Secondary Education, high poverty may also negatively affect enrolment if planning is not well done.

The County borders Kakamega County to the North, Nandi County to the East, Kisumu County to the South and Siaya County to the West. Vihiga County has an annual average rainfall of between 1800mm and 2000mm with an average temperature of 24^0c (Republic of Kenya, 2019). The County has 150 secondary schools with an enrolment of 39,413 students and the primary schools are 457 in total (County Government of Vihiga, 2018).

Target population

This study targeted all primary schools in Vihiga County, which was the study accessible population, because they will produce pupils for Junior Secondary Schools who will thereafter transit to Senior Secondary Schools. Secondary schools were also targeted in this study as they will receive students for Junior and Senior Secondary education under CBC. The population of the study was, MoE County Director of Education from the sampled county, 457 head teachers and 161 principals of the sampled schools.This study targeted all primary schools in Vihiga Countywhich will release pupils to Junior Secondary and eventually Senior Secondary Schools education under the new curriculum.

Sampling Technique and Sample size

Sampling involves making of conclusions about an entire population using a subset of the population (Orodho 2004). The research used 161 principals and 457 head teachers. The schools were categorized into various categories basing on their characteristics. That is boarding girls, boys or mixed, day girls, boys or mixed, both day and boarding boys, girls or mixed.

Data collection instruments

Questionnaires, document analysis and direct observation were the main research instruments determined and tied to the study methodology. These methods were used to get data from key respondents to model projections of the enrolment and requirements for Senior Secondary Schools for the implementation of CBC in Kenya.

There were two questionnaires for the head teachers of primary schools and the principals of secondary

schools. Questionnaire for Primary School heads sought information on total enrolment from 2017 to 2021 in primary schools. Questionnaire for Secondary school principals sought information on total enrolment 2017-2021 in secondary schools.

Data from this enrolment patterns was then be used to come up with projections for the enrolment at Senior Secondary School in 2026. This was further used in the projection of the targeted requirements for the implementation of CBC at the Senior Secondary School in the year 2026.

Document analysis is a form of qualitative research in which documents are interpreted by the researcher to give voice and meaning around an assessment topic (Bowen, 2009).

The NEMIS output software was analyzed to get information on enrolment.

An observation schedule was used to get the available number of selected infrastructures such as classrooms, toilets and laboratories in schools.

Validity and Reliability of Research Instruments

The content validity of the instruments was obtained by the researcher discussing by the items in the instruments with university supervisors, other lecturers in the department and colleagues. The advice given by these people helped the researcher improve the validity of the research instruments.

Reliability of the instruments was checked by Test-retest method. Orodho (2005), points out that reliability of instruments is their consistency in producing the same results. An instrument is reliable when it can measure a variable accurately and consistently and obtain the same result under the same condition over a period of time. The reliability of a standardized test is usually expressed as a correlation coefficient, which measure the strength of association between 0.00 and 1.00 with the former (0.00) showing there is no reliability and the later (1.00) showing that there is perfect reliability which is an ideal situation. To enhance reliability of the instruments, a pre-test study was conducted in five schools in one of the sub-counties. Reliability of a research instrument involves administering the same instrument twice to the same group of subjects (Mugenda & Mugenda 2003). The second administering was done after a time lapse of one week. The score from both tests were correlated to determine their reliability using Pearson's Product moment correlation.

Pilot study

The research instruments were piloted to standardize them before the actual study. The pilot study was in five schools in one of the Sub- County of Vihiga County. The sampled school for piloting were left out in the main study. This helped to identify problems the respondents would have encountered and if the items in the research instrument yielded the required data for the study. The feedback obtained from the pilot study assisted the researcher in revising the questionnaire to ensure that it covered the objectives of the study.

Data collection

Before embarking on the data collection exercise, the researcher obtained a research permit from the National Council of Science and Technology and sought clearance from County Commissioner and the County Education office in the sampled Counties. The researcher visited the sampled schools and obtained permission from the school authorities to collect data.

Data Analysis

Data analysis followed the works of Gould (1993) and Thonstad (1980) in projecting the enrolment of the

CBC cohorts to 2028.

Gould (1993) presents three possible pathways for projecting enrolment:

1. Average the retention in the historical data and apply this to give the next year's projection.
2. Only the last two- or three-years' retention rates could be averaged to emphasise more recent trends.
3. Weighted average used for smoothing techniques applied to seasonally varying data.

The researcher preferred Gould's second method for an emphasis on recent trends in the data and largely because there is an increase in the retention from one grade to the next for all the cohorts denoting in-transfers from out of the county.

To implement this, the researcher followed Thonstad's Grade Transition Model for Primary Education which is the most used model for enrolment projections. Thonstad uses transition rates observed between the schoolyears 1975 and 1976 to demonstrate the projection of enrolment in the latter year. The researcher then generated a flow table for the study's CBC cohorts.

RESULTS AND DISCUSSION

Description of data

The study collected five years (2017-2021) of historical data on enrolments, repetitions, dropouts in-transfers, out-transfers, and deaths among the CBC cohorts. The data were absolute showing increasing enrolments for each cohort running to 2021. This rendered data on repetitions, dropouts in-transfers, out-transfers, and deaths redundant as applyingthose on the absolute data would have yielded substantially different enrolment numbers other than those given by the Vihiga County statistics office.

Distribution of schools in Vihiga County

Vihiga County has five sub-counties. These are Sabatia, Vihiga, Hamisi, Emuhaya and Luanda. Hamisi Sub-County has the highest number of Secondary schools while Emuhaya has the least as shown in table 1.

Table 1. Distribution of schools per sub-county in Vihiga County

Sub-county	Freq.	Percent	Cum.
Sabatia	36	22.36	22.36
Vihiga	30	18.63	40.99
Hamisi	52	32.30	73.29
Emuhaya	21	13.04	86.34
Luanda	22	13.66	100
Total	**161**	**100**	

Of the 161 secondary schools in Vihiga County, mixed boys' and girls' category is at 120, while girls only schools are 23 and the least being boys' schools at 18. This shows that each gender has access to basic education as shown in Table 2.

Table 2. School types in Vihiga County

School Type	Freq.	Percent	Cum.
Boys only	18	11.18	11.18

Girls only	23	14.29	25.47
Mixed boys and girls	120	74.53	100
Total	**161**	**100**	

Projected enrolment progression trends of grade 1 2017 CBC cohort into Senior Secondary Schools in 2026 in Kenya.

The objective of the study was to project the enrolment progression trend of Grade 1 2017 CBC cohort into Senior Secondary School in 2026 in Kenya. This projected enrolment subsequently enabled the researcher to project teacher requirement, selected infrastructure (classrooms, laboratories, and toilets), textbooks, and the funds for the subsidised secondary education.

In working out the projections, in the study, the first step was to get the proportion of the enrolment in a given yeardivided by the enrolment in the previous year, for example the enrolmentin 2021 for the grade 1 cohort of 2017, then 2021 grade 5, was 20313. We divide this by the enrolment of the same cohort in the previous year 2020 which was 19588 and we get 1.03701 which is the transition rate from 2020 to 2021.

Since these are the last two years of the five-year historical data, we apply thattransition to succeeding years in projecting enrolment in those years to 21065, 21844, 22653, 23491, 24361, 25263 and 26198 for 2022-2028 respectively. We repeat the same for the other grade 1 cohorts of 2018, 2019 and 2020.

Our second step is to project the 2021 grade 1 transition to grade 2 in 2022.To do this, we use Microsoft's Excel forecast capabilities.

The forecast uses historical time-based data to create a new worksheet that contains both a table of the historical and predicted values and a chart that expresses this data. (see,https://support.microsoft.com/en-au/office)

We use grade 2's vertical enrolment data in 2018, 2019, 2020, 2021 to project 18703 as the grade 2 enrolment in 2022. With the grade 1 enrolment of 17345, we get the transition rate as 1.078293456 from 18703/17345. We then use this transition rate to project the grade 1 cohort of 2021 all the way to 2028. We repeat the same procedure to project the enrolment in grade 1 in 2022 and follow suit to 2028 to generate the six cohorts that will be in secondary school in 2028.

In Table 3. the absolute enrolment being the data collected from the field and their projections to 2028 is presented. The greyed sections of the table show the projected enrolment.

The enrolment of CBC grade one cohort of 2017 in Vihiga County is projected to increase by 35.41% from 17990 in 2017 to 24361 in 2026. This increase is attributed to the in-transfers of learners from other Counties. Table 3. shows the projected grade 1 2017 CBC cohort into Senior Secondary School in 2026.

Table 3. Vihiga County's Grade Transition Model for Projecting Enrolment, 2017-2026

Year	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Grade 9	Grade 10
Enrolment 2017	17,990									
Enrolment 2018	18,190	18,340								
Enrolment 2019	18,452	18,718	18,749							
Enrolment 2020	18,146	18,689	19,534	19,588						
Enrolment 2021	17,345	18,593	19,429	19,882	20,313					
Projected Enr 2022		18,703	19,051	20,198	20,236	21,065				

Projected Enr 2023			20,167	19,520	20,998	20,597	21,844		
Projected Enr 2024				21,746	20,001	21,829	20,964	22,653	
Projected Enr 2025					23,449	20,494	22,694	21,337	23,491
Projected Enr 2026						25,285	20,999	23,592	21,717	24,361
115954(the grade 1 cohort of 2017 in 2026 =24361)									

Proportion   1.078293456   1.024633528   1.039595484   1.017815092   1.037012457

Step 1 Get proportions for the enrolment in 2021 divided by the enrolment in 2020.

Step 2 Apply the proportions to project the enrolment in t+1, i…n.

Step 3 G2 2022 projected using excel forecast 18340, 18718, 18686, 18593 to get 18703

CONCLUSION

The research findings led to the following conclusions and generalizations based on the established objectives and the summary of findings on the projection models of the selected requirements for implementing CBC in Senior Secondary Schools in Vihiga County in 2026.

The enrolment of the Vihiga County CBC Grade 1 cohort will increase from 17,990 learners in 2017 to 24,361 learners in 2026 when they transition to the Senior School. It is anticipated that the number of junior school students will increase from 21,844 in 2023 to 23,491 in 2025.

The recommended PTR for the Junior and Senior Secondary Schools in the Vihiga area is 45:1. This implies that by 2028, 3,385 teachers will be required to oversee the numerous pathways of the 2-6-6-3 educational system and enhance the quality of education in the region. The current number of teachers in Vihiga County would result in a deficit of 872 teachers in Junior and Senior Secondary Schools by 2030.

In order to achieve a pupil-to-teacher ratio of 45:1, senior schools in Vihiga County will necessitate 5,098 classrooms. The MOE guideline of 25 females per toilet necessitates a projection of 6093 toilets in order to ensure that the implementation of CBC at Senior Schools in Vihiga County in 2026 is adequately provided. The current number of toilets is 3545. In order to effectively implement CBC at Junior and Senior Schools in Vihiga County, it is necessary to project 966 laboratories. The sampling of only 114 laboratories out of 161 schools has led to a current shortage of 852 laboratories. In the majority of the schools, there were insufficient scientific, computer, and geography laboratories, as well as no language labs, as required by the current curriculum. The study's results indicate that laboratories are essential for the effective implementation of competence-based curricula. The competence-based curriculum will be unable to achieve the intended results in secondary schools unless the requisite laboratory facilities are constructed. As a result of inadequate laboratory facilities and congestion in practical sessions, students may study more theoretically than practically. This may result in subpar performance on examinations.

According to projections, the current boarding facilities in Vihiga County will require an improvement of up to 43.98% to accommodate the entire CBC enrolment in boarding institutions at Senior institutions. A forecast of current technical subject facilities suggests that they will need to be more than doubled by 2028 to accommodate the whole CBC enrolment at the senior high school level. A projection of 3,419,000,000 Kenya Shillings is necessary to subsidize secondary education in Senior Secondary Schools in Vihiga County in 2026.

RECOMMENDATION

From the research findings, the following recommendations were made:

The analysis clearly indicated that secondary schools in Vihiga County will require additional instructors, classrooms, boarding facilities, technological facilities, and restrooms in order to accommodate the projected increase in student enrollment by 2026. In order to accommodate the expected rise in enrollment at the Senior School in 2026, it is recommended that additional Constituency Development Funds be granted to the existing day secondary schools in Vihiga County to enhance their instructional facilities.

This report also suggests that Boards of Management should seek funding to construct more physical infrastructure and expand the existing 161 secondary schools. This will enable schools to provide the high-quality education outlined in Kenya Vision 2030. There will be a rivalry among Junior Secondary students, Senior Secondary students, and 8-4-4 students due to the limited availability of laboratory facilities and equipment. Moreover, the absence of Geography and Language laboratories impeded the efficient progress and attainment of necessary skills in those disciplines. This study suggests that the MOE, Science and Technology should develop a policy to ensure that schools have adequate laboratory facilities and teaching-learning resources for effective curriculum implementation. The policy should focus on establishing, procuring, and utilizing these resources efficiently. The government should engage in collaboration with stakeholders, including the community, to provide the necessary facilities such as science, geography, language, and computer laboratories.

The Teachers Service Commission should implement a systematic strategy to hire an additional 872 educators for teaching in Junior and Senior Secondary Schools in Vihiga County by 2028. The analysis clearly demonstrates that Vihiga County has numerous sub-county secondary schools that are fiscally unfeasible and incapable of accommodating Senior school classes. This report suggests that the MOE should evaluate these schools in order to elevate them to the status of Junior Secondary Schools.The MOE should conduct an assessment of sub-county and secondary schools to identify those with sufficient facilities that can be upgraded to senior secondary schools. This report suggests the establishment of day school wings in every senior secondary school as a means to increase student enrollment without overburdening boarding facilities.

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