International Journal of Sciences: Basic and Applied Research (IJSBAR)

ISSN 2307-4531
(Print & Online)

https://gssrr.org/index.php/JournalOfBasicAndApplied/index

Influence of Classroom Management Practices on Academic Performance in Public Secondary Schools in Siaya County, Kenya

Joseph Oduor Opiyo[a*], Dr. Edna Asesa[b], Prof. Maureen Olel[c]

[a,b,c]*Department of Educational Management and Foundations, Maseno University, Maseno, Kenya*

[a]*Email: qopiyojoseph@gmil.com,* [b]*Email: ekohlerasesa4@gmail.com*

[c]*Email: maureen.olel@gmail.com*

Abstract

Poor academic performance is a serious concern for education sector in Kenya and in many countries around the world. According to UNESCO Institute for Statistics (2017), 617 million children and adolescents are not achieving minimum proficiency levels in reading and mathematics globally. Siaya County, like most counties in Kenya, has persistent below average academic performance as indicated by county KCSE mean scores 4.123, 4.575 and 4.915 out of 12 points for the years 2020 to 2022. This situation brings to question effectiveness of classroom management given that classroom is the primary context for implementing educational programs. Research has identified evidence-based specific practices that define basic components of classroom management. However, few studies have examined influence of each of the basic components of classroom management as a package of evidence-based practices on academic performance. The purpose of this study was to examine influence of classroom management practices on academic performance in public secondary schools in Siaya County. Specific objectives were to examine: influence of maximizing structure on academic performance, influence of establishing expectations for behavior on academic performance, influence of actively engaging students on academic performance, and influence of using a continuum of strategies for responding to behavior on academic performance in public secondary schools in Siaya County.

Received: *10/15/2024*

Accepted: *12/2/2024*

Published: *12/16/2024*

---

* Corresponding author.

Conceptual framework based on the concept of Simonsen and his colleagues (2008) that classroom management founded on evidence-based practices is a critical input for successful teaching and learning was adopted. Descriptive survey and correlational designs were used. Study population comprised 465 English teachers, 635 mathematics teachers, 580 chemistry teachers and 247 deputy principals in 243 public secondary schools in Siaya County. Sample size of 112 schools was decided using published table of sample size by Glenn Israel (1962). By stratified random sampling based on school categories, a sample of 112 schools consisting of 1 national school, 5 extra-county schools, 11 county schools and 95 sub-county schools was obtained. By purposive and simple random sampling techniques one teacher each of the three subjects; English, mathematics and chemistry was selected in each school, giving 112 teachers for each subject and a total of 336 classroom teachers. 112 deputy principals in the selected schools were included in the sample by purposive sampling, giving total sample of 448 as respondents. Data was collected using questionnaires and document analysis. Content validity of questionnaires was tested by the researcher's expert supervisors using Lawshe's content validity ratio. CVR of +1 ascertained validity. Pilot study was conducted in 11 schools outside the sample to determine reliability of the instrument. Cronbach's alpha coefficient of 0.74 was obtained. Data was analyzed using frequency distribution tables, percentages, means, Pearson's "r" coefficient of correlation and regression analysis. The study found that evidence-based specific classroom management practices under maximizing structure, establishing expectations for behavior, actively engaging students; and using a continuum of strategies for acknowledging appropriate behavior and responding to inappropriate behavior were implemented in public secondary schools in Siaya County. Implementation was moderate and varied among the public secondary schools and across the five basic components of classroom management. The study revealed weak, negative and insignificant influence of maximizing structure on academic performance [r (93) = - 0.004, p = 0.969]; weak, negative and insignificant influence of responding to students' inappropriate behaviour on academic performance [r (93) = - .025, p = 0. 816]; weak, positive and insignificant influence of establishing expectations for behavior on academic performance [r (93) = 0.146, p = 0.163]; and weak, positive and insignificant influence of acknowledging students' appropriate behaviours on academic performance [r (93) = 0.178, p = 0. 087]. Actively engaging students had moderate, positive and significant influence on academic performance [r (93) = .314, p = 0.002) and accounted for 8.9% of variation in academic performance (Adjusted R square =. 089). It was a significant predictor of academic performance F (1, 91) = 9.949, p < .05). For every one unit increase in implementation of practices for actively engaging students there was a 1.259 increase in academic performance. The findings are significant to policy makers and school administrators in planning physical learning environment and to classroom teachers in deciding appropriate application of classroom management practices in enhancement of academic performance in Siaya County.

Keywords: Classroom management; classroom management practices, academic performance, secondary schools.

1. Introduction

Poor academic performance is a serious concern in education sector in Kenya and many countries around the world. According to [1], 617 million children and adolescents are not achieving minimum proficiency levels in reading and mathematics globally. The total includes 387 million children of primary school age and 230

million adolescents of lower secondary school age. Of these cases, 68 per cent and about 60 per cent respectively are in school but will not achieve minimum proficiency levels when they complete their school levels [1]. Three regions including Sub-Saharan Africa, Central and Southern Asia, and Western Asia and Northern Africa have been identified as having the highest rates of children and adolescents in school but not learning successfully [1]. In Kenya, about 70 per cent of the candidates that sit for Kenya Certificate of Secondary Education (KCSE) exams score below average mean grades of C- and below each year since 2016 [2].

Education serves a vital role in creating a stable and cohesive nation and meeting the human capital needs for socio-economic development of the nation [3]. Due to the vital contribution of education to countries' stability and development, education quality is always a concern of the society and has become the principal goal of any educational system.

Quality education is largely recognized through student academic performance. Academic performance refers to a measure of student learning as outcome of educational experiences. It is a measure of attainment of learning objectives and acquisition of desired skills and competencies [4]. Research has shown that quality education is determined by several variables. Such variables include: the curriculum, instructional materials, physical infrastructure, teacher training and competences, and school management [5]. Other factors contributing to academic performance are student factors such as student's previous educational outcome, socio-economic status of parents, parents' educational background, and student self-effort and self-motivation [6, 7].

Measures have been implemented in various countries to improve quality of education. For example, [8] highlights progress in education quality parameters such as pupil-teacher ratio, the proportion of trained teachers, number of female teachers, availability of learning materials, and school infrastructure. In Kenya, the government provides trained teachers, course books, tuition funds, and maintenance and infrastructure fund. While all these are valid endeavour towards quality education, the over 370 million children and adolescents in school but not learning successfully [1] attest to the fact that the interventions have yielded little success in improving academic performance in many countries. A gap therefore exists that requires more to be done, especially at the classroom level where actual implementation of educational programmes occurs. Studies have associated various classroom management practices with reduced inappropriate and disruptive classroom behaviour, increased student engagement and improved academic performance [9, 10, 11, 7].

Classroom management refers to the planning, organization and control of learners, the learning process and classroom environment to create and maintain effective learning experience [12]. It is a collection of techniques that teachers use to encourage effective learning by minimizing behaviors that impede learning while maximizing the behaviors that facilitate or enhance learning [13]. Classroom management includes all non-instructional and instructional actions teachers take to create and maintain an environment that facilitates both academic and social-emotional learning of students [14].

Considerable research exists on classroom management highlighting numerous evidence-based specific classroom management practices for adoption in the classroom. Much of the findings have been consolidated

into basic components of effective classroom management by different authors, yielding a number of theoretical models of classroom management.

Reference [14] define classroom management as the actions teachers take to create an environment that supports and facilitates both academic and social-emotional learning. The authors distinguish five types of teacher actions that constitute high-quality classroom management: develop caring, supportive relationships with and among students; organize and implement instruction in ways that optimize students' access to learning; encourage students' engagement in academic tasks; promote the development of students' social skills and self- regulation; and use appropriate interventions to assist students with behavior problems. Reference [15] defining classroom management as classroom organization and students' behaviour management, distinguish six essential components of classroom management. The components are structured environment, actively supervising student engagement, school-wide behaviour expectations, implementing classroom rules and routines, encouragement of appropriate behaviour, and use of behaviour reduction strategies.

Reference [16] in a meta-analysis of studies on classroom management published between 1969 and 2007 identified 20 evidence-based general classroom management practices. The researchers analyzed the evidence-based practices into five empirically supported critical features of classroom management; namely: maximizing structure; posting, teaching, reviewing, monitoring and reinforcing behaviour expectations; actively engaging students; using a continuum of strategies for acknowledging appropriate behaviour and using a continuum of strategies for responding to inappropriate behaviour.

It is, however, noticeable from literature on classroom management that the theoretical conceptualizations of classroom management by the different authors bring out classroom management as a comprehensive approach built on several evidence-based practices. The authors largely agree on essential components of classroom management. For example, it can be observed that all the basic components identified by [14] and by [15] are covered under the five critical features of effective classroom management by [16]. This investigation of influence of implementation of classroom management practices on academic performance was based on [16] model of classroom management. The model originated from the authors' commitment to indentifying and implementing evidence-based classroom management practices, as is the standard in the current trend in educational fields.

Structure refers to the amount of teacher or adult directed activity, the extent to which routines are explicitly defined and the design or physical arrangement of the classroom. Physical arrangement of the classroom includes the permanent structure that defines the classroom space; the placement of furniture that defines seating arrangement, movement in the classroom, students and teacher's areas; and visual displays on the walls [16]. Maximizing structure as a basic component of classroom management concerns preparation of the classroom as an organized and conducive learning environment that prompts responsible student behaviors and prevents off-task disruptive behaviors [10, 16].

According to [17,18] clean and tidy classroom with adequate spacing, appropriate lighting and good ventilation makes the classroom appear comfortable and helps to establish a positive expectation towards the lesson. Apart

from protecting learners from weather elements, classroom enhances teaching and learning through its facilities like writing board, furniture and instructional materials [7].

A study by [19] on factors contributing to teaching and learning ineffectiveness in primary schools in Zimbabwe found among other findings that students were learning in harsh environmental conditions, instructional materials were limited and there was low morale among teachers. Similar findings were made by [20] in a study to explore strategies applied to cope with challenges inhibiting effective implementation of basic education curriculum in Kenya. Using a sample of 205 primary and secondary school teachers, the researchers found that key challenges were insufficient physical facilities and instructional resources, inadequate teachers resulting in high teaching load, and lack of motivation of the teaching force. [21] in a study of contribution of school administrators to teaching-learning resources in enhancement of students' academic performance in secondary schools found a strong, positive and significant relationship between administrators' contribution to teaching-learning resources and academic performance. These studies highlight the relationship between physical environment of the classroom and academic performance.

Another study by [9] showed that classroom management that involves creating an organized classroom environment, forging positive teacher-student relationships, improving instruction, and cooperatively improving discipline provides significant positive effects on student achievement in mathematics and reading in middle schools. A meta-analysis by [16] highlighted the evidence base for classroom structure indicating that in general classrooms with more structure promote more appropriate academic and social behavior. The analyzed studies showed that students in high structure classrooms exhibited greater task involvement and more attentive behavior. However, the researchers also highlighted evidence that structure was unrelated to independent task persistence and suggested a balance between teacher-directed structure and student independence. A study by [10] also highlighted low independent task persistence by students outside the structured classroom. Their study on whether effective classroom behavior management can increase student achievement in middle school found that there was a significant effect on student class work completed but not homework completed.

Establishing expectations for behavior is a preventive strategy that involves posting rules and discussing correct ways to act in the classroom. Through behavioral instruction, the teacher aims to establish a positive classroom climate, enable students to function with minimum uncertainty and to minimize lost instructional time [22]. Several studies have been conducted related to establishing expectations for behaviour, as a method of addressing students' disruptive behaviours and instructional effectiveness.

A study by [11] on classroom management procedures implemented by teachers for teaching pro-social behaviors found that students were less disruptive and showed less inappropriate and aggressive behaviors in treatment classrooms compared with control classrooms. According to [23], establishing expectations for behavior helps develop a positive school climate which has a positive influence on academic performance. [10] when investigating whether a behaviour management program could increase student achievement found that the program had significant improvement on academic achievement in middle school. Reference [24] in a study of the relationship of classroom management strategies with academic performance of students at college level found that there is a weak but significant positive relationship between learners' English scores and the degree

to which their instructors apply classroom administration methodologies in the classrooms. Reference [25] found a statistically significant moderate positive relationship between antecedent which involves setting rules of behavior and academic performance of junior high school students.

Reference [26] conducted meta-analysis of 213 social and emotional learning programs for students in kindergarten through to high school. The programs interventions were categorized into three groups: classroom-based interventions administered by regular classroom teachers, school-based interventions administered by non-school personnel like university researchers and multi-component programs combining teacher-administered classroom interventions with parent component or school-wide initiatives. It was found that students' academic achievement improved significantly only when teachers implemented the interventions or when multi-component programs involving regular teachers were used. Implementation by non-school personnel did not yield significant results regarding students' academic achievement. This finding revealed the significance of classroom teachers' involvement in behavioural instruction.

Engagement refers to how students participate during classroom instruction and involves passive and active behaviors [16]. Globally, the classroom practice experiences a shift in instructional approach from the traditional teacher-centered approach where the learner is a passive recipient of knowledge to learner-centered approach that fosters development of 21st century skills. The most crucial of these skills are critical thinking and problem solving, creativity and innovation, communication skills and collaboration [27].

Reference [28] in a study of classroom management practices commonly used by secondary school teachers found that instructional practices was one of the most commonly used set of practices to prevent unproductive behavior. The teachers reported engaging students through curriculum and instruction in which they applied varied, relevant and interesting lessons, making learning goals clear and being organized. Reference [23] teaching and learning international survey found that teachers who more often summarize the previous lesson, state learning goals and check student understanding also report a better learning atmosphere, less noise and fewer distractions and lead to better learning outcomes. Reference [29] argue that because successful classroom managers maximize the time their students spend engaged in academic tasks, they also maximize their students' opportunities to learn academic content and this shows up in superior performance in achievement tests.

Reference [16] from a meta-analysis study provide evidence base for several specific classroom management practices that define active engagement of students. The practices include increasing opportunities to respond through different instructional strategies, direct instruction, peer tutoring, guided notes and computer-assisted instruction. According to these researchers, engagement is the best mediating variable between instruction and academic performance.

A correlational study by [30] to investigate relationship between classroom management and academic achievement found a significant moderate positive relationship between perceived classroom management and students' academic achievement. The study explored effects of different strategies used by secondary school teachers including lesson planning, teaching methodology and professional skills, communications skills, physical resources, students behavior and time management on students' academic achievement. A case study

by [31] on classroom management and students' academic performance using five schools in a district in Rwanda found a significant positive relationship between instructional management and academic performance.

Research has shown that successful classroom management involves not just responding effectively when problems occur but preventing problems from occurring frequently in the first place [29, 32]. The last two basic components of classroom management involve using a range of evidence-based practices for acknowledging appropriate classroom behavior and responding to inappropriate behavior. By applying these practices classroom teachers aim to promote development of students' social skills and self-regulation and to assist students with behavior challenges [32, 16].

Meta-analysis studies by [32] and [16] highlight a range of empirically supported strategies for recognizing appropriate behavior and those for decreasing the likelihood of inappropriate behavior in the future. Practices for increasing appropriate behavior indentified by the researchers include: specific contingent praise, group reinforcement contingencies, behavior contracts and token economies. Those for decreasing inappropriate student behavior include: specific error correction or explicit reprimand, performance feedback, differential reinforcement, planned ignoring, response cost and time out from reinforcement.

A number of studies have highlighted the impact of teachers' response to student behavior on academic performance. A study by [11] found that teachers' classroom management tasks and practices have positive effects on reducing students' aggressive, negative, lethargic and inattentive way of learning in classrooms. They concluded that teachers who utilize effective classroom management strategies can expect to have greater academic achievement. This observation agrees with the findings of the study by [26] who found that academic achievement improved significantly when teachers implemented social and emotional learning programs. A case study by [31] on classroom management and students' academic performance found a significant positive relationship between behavioral management and academic performance. Reference [33] in a study of teachers' classroom strategies for enhancing students' performance in public secondary schools in Nandi County Kenya found that improvement of students' performance depends on handling students discipline, feedback from students' assessment and teaching strategies that the teachers use.

The importance of classroom management in preparation of the classroom as a productive learning environment, preventing disruptive behavior, maximizing student engagement in learning tasks and promoting development of students' social skills and self-regulation is well illustrated in the empirical literature. Therefore, teachers' knowledge and implementation of evidence-based classroom management practices is an essential strategy to ensure successful classroom instruction. However, implementation may be quite different for different settings, leading to different impacts on learning outcomes.

While empirical research has identified evidence-based specific practices that define basic components of classroom management, few studies have examined influence of each of the basic components of classroom management as a package of evidence-based practices on academic performance. Reference [11] observe that research on classroom management has over the years focused on identification of individual practices that have some level of evidence to support their adoption in the classroom. The practices are combined on the

assumption that if individual practices are effective, combining these practices into a package will be equally if not more effective. The purpose of this study was to examine influence of the basic components of classroom management on academic performance in public secondary schools in Siaya County.

2. Methods

This section explains the methods employed in this study. The section has the following subheadings: research design, area of study, study population, sample and sampling techniques, instruments of data collection and, data analysis procedures.

2.1. Research Design

The study employed descriptive survey and correlational designs. Descriptive survey provides quantitative description of trends in attitudes, opinions or behavior of a population by studying a sample of that population [34]. Descriptive survey was appropriate for examining and describing trends in teachers' classroom management behavior regarding frequency of use in daily classroom teaching of classroom management practices under the basic components of classroom management practices covered by the study objectives. Correlational research involves collecting quantitative data in order to determine whether and to what degree a relationship exists between two or more variables [35]. The design was appropriate for examining relationship between independent and dependent variables in this study.

2.2. Area of Study

The study was conducted in Siaya County which is one of the six counties of Nyanza region. The county has a land surface area of approximately 2,530 km^2 and water surface area of approximately 1,005 km^2. Siaya County is bordered by Busia County to the North West, Vihiga and Kakamega counties to the North East, Kisumu County to the South East, and Homa Bay across Winam Gulf to the South. It approximately lies between latitude 0º 26´ South to 0º 18´ North and longitude 33º 58´ and 34º 33´ East.

Siaya County has one of the highest student-teacher ratios in public secondary schools in Kenya. Available data of student-teacher ratios 40:1, 38:1 and 36:1 for the years 2016, 2019 and 2020 indicate, student-teacher ratio in the county's public secondary schools is the highest in its Nyanza Region and is above the UNESCO recommended ratio of 25:1. Siaya County, like most counties in Kenya, has persistently had below average academic performance [36]. A study by [37] demonstrated that class size has significant influence on senior secondary schools classroom discipline, engagement and communication. It was therefore necessary to establish relationship between classroom management practices and academic performance with the view to understand academic performance vis a vis the circumstances in Siaya County.

2.3. Study Population

The study population comprised all of the 465 English teachers, 635 mathematics teachers, 580 chemistry teachers and 247 deputy principals in the 243 public secondary schools in Siaya County,

2.4. Sample and Sampling Techniques

This study was to examine influence of implementation of classroom management practices on academic performance in public secondary schools in Siaya County. The study therefore used the school as the primary sampling unit given that KCSE mean scores used as measure of academic performance were for the schools.

Using a published table of sample size by Glenn Israel (±7% precision, 95% confidence level and p = .5), a sample size of 112 schools from the population of 243 public secondary schools was decided. According to [38] one of the ways to determine sample size is to rely on published tables that provide the sample size for a given set of criteria.

Stratified random sampling was then conducted based on categories of public secondary schools to obtain a sample of 112 schools that was representative of the population of public secondary schools in Siaya County. The researcher divided the population of each category of public secondary schools by the total population of public secondary schools (243) in the county and multiplied it by 112, which was the total sample size needed for the study. This gave a sample consisting of 1 national school, 5 extra-county schools, 11 county schools and 95 sub-county schools, out of the category populations of 2, 10, 23 and 208 respectively. Stratified sampling involves identifying sub-groups in the study population and their proportions and randomly selecting subjects from each sub-group to form the sample. According to [39], stratified random sampling ensures equitable representation of the population in the sample and accounts for the difference in sub-group characteristics. In this study stratified random sampling ensured the different school situations in which classroom management takes place with regard to category were taken into account in the sample.

By purposive and simple random sampling techniques one teacher each of the three subjects; English, mathematics and chemistry was selected in each school, giving 112 teachers for each subject and a total of 336 classroom teachers as respondents. Three subjects were purposively chosen to make the study more manageable and because the three subjects contribute more to overall KCSE results of a school as they are taken by most students. A purposive sample is chosen for specific purpose [34], Purposive sampling was appropriate in this study for choosing subjects on which to base selection of respondents in a manner that could meet the purpose of the study. Simple random sampling was applicable in this study in ensuring each teacher of each of the three chosen subjects in a school had an independent chance of being selected into the sample [39]. Applying purposive sampling, 112 deputy principals in all the selected schools were included in the sample, giving the final sample size of 448 for respondents.

2.5. Instruments of Data Collection

Teachers' Questionnaire and Deputy Principals' Questionnaire were used to measure implementation of classroom management practices. The questionnaires were adapted from classroom management checklist originally designed by [16]. Reliability of questionnaires was ascertained with Cronbach's alpha coefficient of 0.74 for teachers' questionnaire from a pilot study conducted in 11 (10%) schools outside the sample. Deputy Principals' Questionnaire had same content as Teachers' Questionnaire since the deputy principals were to rate

classroom teachers' implementation of the practices from observer's point of view. Same reliability as that of teaches questionnaire applied. Content validity of the instruments was ascertained with CVR of +1 by the researcher's expert supervisors using Lawshe's content validity ratio.

Return rates of 78.3% and 82.1% for teachers and deputy principals respectively were realized, giving a total 263 classroom teachers and 92 deputy principals out of the sample expectations of 336 classroom teachers and 112 deputy principals. The total for classroom teachers included 83 English teachers, 88 mathematics teachers and 92 chemistry teachers.

2.6. Data Analysis Procedure

The filled in questionnaires were collected and audited by the researcher for completeness and consistency with the instruction. The quantitative data on implementation of classroom management practices in each of the participating schools was summarized on the Excel spreadsheet for statistical analysis. The statistical methods used to analyze the data collected were means, frequency distribution and percentages.

Summary of data involved first determining school ratings for frequency of use in daily classroom teaching of evidence-based specific classroom management practices under basic components of classroom management. School ratings were obtained by averaging ratings by respondent three classroom teachers and deputy principal in each of the sampled schools which was then recorded for each school as whole number based on the used instruments' scale of 0 to 3. From this summary of responses, other critical information for analysis were then determined, including: mean ratings for implementation of specific classroom management practices in the sampled schools, school mean ratings for implementation of specific classroom management practices under each basic component of effective classroom management, and school mean ratings for general implementation of classroom management practices. KCSE 2022 exam mean scores for the sampled schools obtained by document analysis were analyzed in a summary table as a measure of the schools' academic performance.

To examine influence of the independent variables on academic performance as per objectives of the study, Pearson product moment correlation coefficient and regression analysis were applied. Correlation coefficients were computed using school mean ratings for implementation of classroom management practices under each basic component of classroom management and school KCSE 2022 exam mean scores. Given that same teachers' appointment and students' admission policies apply in all counties in Kenya, teacher factors and student factors had been controlled and applied equally in public secondary schools in Siaya County. Stratified random sampling based on school categories used in this study controlled influence of school characteristics on academic performance making the researcher able to reach valid conclusions on influence of classroom management practices on academic performance.

3. Results

The primary purpose of this study was to examine influence of implementation of classroom management practices on academic performance in public secondary schools in Siaya County. Specifically, in the context of public secondary schools in Siaya County, this study was to examine influence of the following basic

components of classroom management on academic performance: maximizing structure, establishing expectations for behavior, actively engaging students; and using a continuum of strategies for responding to student behavior. To achieve this purpose, the researcher first examined implementation of evidence-based classroom management practices under the basic components of classroom management, after which relationships between the basic components and academic performance were determined. This section presents results on implementation of classroom management practices, influence of classroom management practices on academic performance, and discussion on results.

3.1. Implementation of Classroom Management Practices

In examining implementation of classroom management practices the following were determined based on responses of participants: school ratings for frequency of use in daily classroom teaching of the specific classroom management practices in the sampled schools, mean ratings for implementation of each of the specific classroom management practices in the sampled schools, school mean ratings for implementation of specific classroom management practices under each basic component of classroom management in the sampled schools and school mean ratings for general implementation of the specific classroom management practices in the sampled schools. Figure 1 presents frequency of use of specific classroom management practices in daily classroom teaching in the sampled public secondary schools.

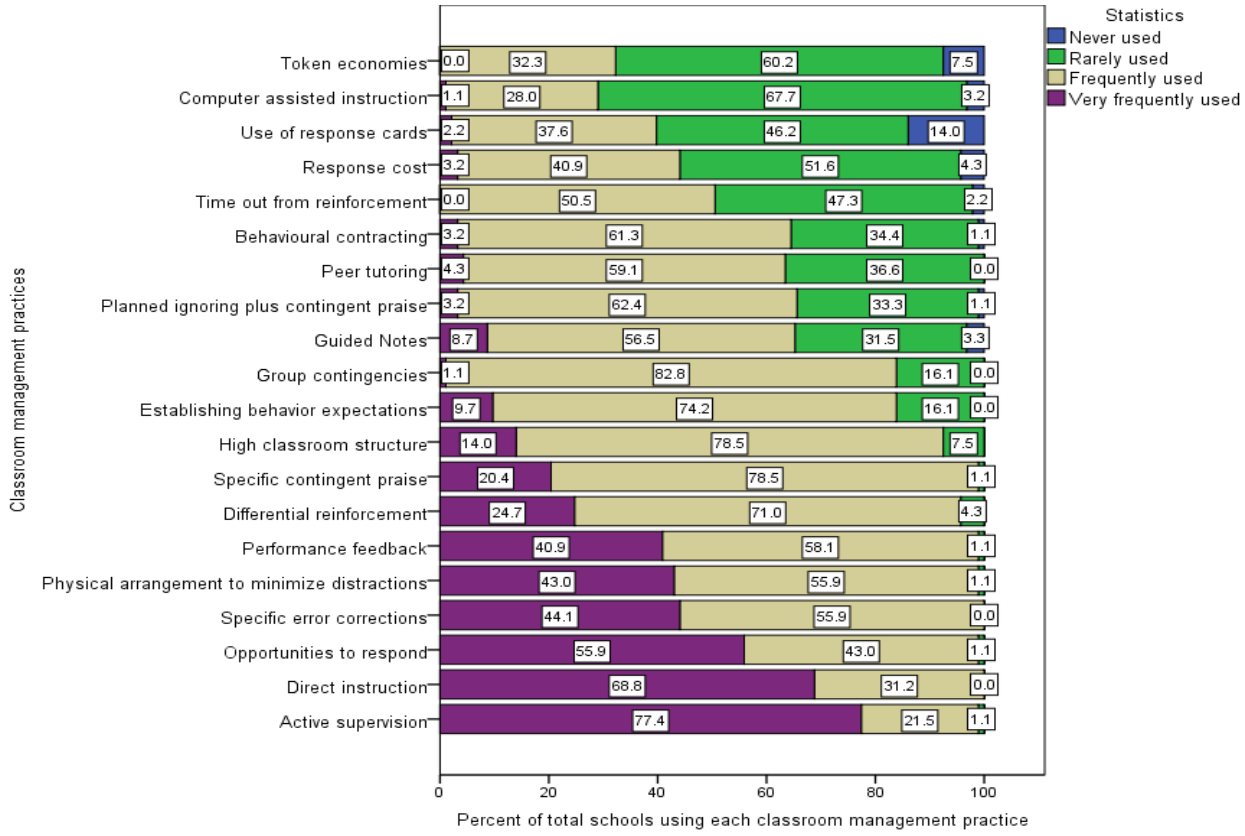

Figure 1: Use of specific classroom management practices in daily classroom teaching in the sampled public secondary schools (n=93).

Results in Figure 1 indicate that all the twenty specific classroom management practices were used in daily classroom teaching in the sampled public secondary schools. Frequency of use of the specific classroom management practices in daily classroom teaching in the sampled schools varied. Direct instruction and specific error correction were either frequently or very frequently used in daily classroom teaching in all of the 93 sampled public secondary schools. Active supervision, opportunities to respond, physical arrangement, performance feedback, and specific contingent praise were frequently or very frequently used in daily classroom teaching in almost all (98.9 %) of the public secondary schools. Other classroom management practices with higher frequencies of use (Frequently used or Very Frequently used) in most of the schools were: differential reinforcement and high classroom structure.

On the other hand, four (4) classroom management practices were never used or rarely used in majority (more than 50%) of the sampled public secondary schools. The practices include; response cost, response cards, computer assisted instruction, and token economies. The remaining practices had majority of schools reporting higher frequencies of use (Frequently used or Very Frequently used) with a significant portion reporting lower frequencies of use (Never used and Rarely used) in daily classroom teaching.

Further analysis involving calculating mean ratings for implementation of the specific classroom management practices across the sampled schools revealed that implementation of the practices varied from high to low implementation. Six of the practices had high implementation with mean ratings of 2.40 to 2.76 on a scale of 0 to 3; five had moderate implementation with mean ratings 1.85 to 2.20 while nine had low implementation (mean ratings 1.25 to 1.71. The conclusion on levels of implementation of the practices correspond with the general guide provided by Simonsen and his colleagues (2008) for assessment of implementation of the evidence-based specific classroom management practices. The guide uses 80-100%. 60-80% and fewer than 60% as the basis for considering classroom management "effective", "somewhat effective" and "need improvement", respectively. The comparison was applied by considering a mean rating over three as a percentage, to adapt it to the scale of measurement used in this research. Classroom management practices that had high implementation include active supervision (2.76), direct instruction (2.69), opportunities to respond (2.55), specific error correction (2.44), physical arrangement to minimize crowding and distraction (2.42) and performance feedback (2.40). Those with moderate implementation were differential reinforcement (2.20), specific contingent praise (2.19), high classroom structure (2.06), establishing expectations for behavior (1.94) and group contingencies (1.85). Classroom management practices with low implementation were guided notes (1.71), planned ignoring plus contingent praise (1.68), peer tutoring (1.68), behavioural contracting (1.67), time out from reinforcement (1.48), response cost (1.43), use of response cards (1.28), computer assisted instruction (1.27) and token economies (1.25). Mean ratings for general implementation of the specific classroom management practices per school revealed variation in implementation of the practices among public secondary schools. Mean ratings of implementation per school ranged from 1.40 to 2.50. Generally, implementation of the classroom management practices in public secondary schools in Siaya County was moderate, as evidenced by overall mean rating of 1.95. Analysis by mean ratings for implementation of specific classroom management practices under each basic component of classroom management across the sampled schools showed that implementation of classroom management practices varied across the five basic components of classroom management. Classroom management practices under establishing expectations for behavior were the most

implemented as evidenced by its highest (2.35) mean rating of implementation in the sampled schools. This was followed by maximizing structure (2.24), responding to inappropriate behavior (1.94), actively engaging students (1.86) and acknowledging appropriate behavior (1.73) respectively.

3.2. Influence of Classroom Management Practices on Academic Performance

To examine influence of the independent variables on academic performance as per objectives of the study, school mean ratings for implementation of specific classroom management practices under each basic component of classroom management (appendix) and KCSE 2022 exam mean scores were used. Table 1 presents KCSE 2022 mean scores for the sampled public secondary schools.

Table 1: Academic performance in the sampled public secondary schools in Siaya County (Grading scale 1 -12**)**

School S/N	Mean Score	School S/N	Mean Score	School S/N	Mean Score	School S/N	Mean Score
1	7.5	29	5.07	57	5.52	85	3.95
2	5.8	30	3.23	58	3.75	86	3.3
3	2.62	31	4.85	59	3.35	87	2.65
4	3.51	32	4.77	60	4.12	88	3.36
5	3.44	33	5.34	61	3.06	89	2.97
6	3.37	34	3.22	62	3.27	90	2.61
7	3.72	35	4.2	63	4.14	91	3.22
8	3.27	36	4.11	64	3.56	92	2.85
9	3.94	37	5.08	65	6.22	93	3.45
10	2.83	38	3.31	66	3.24		
11	3.23	39	5.81	67	7.51		
12	3.44	40	2.11	68	2.83		
13	3.81	41	2.24	69	5.78		
14	3.15	42	4.76	70	5.73		
15	3.89	43	6.03	71	3.7		
16	3.89	44	3.22	72	3.71		
17	3.13	45	4.67	73	4.67		
18	4.17	46	3.46	74	5.08		
19	2.91	47	3.09	75	7.76		
20	5.05	48	5.01	76	6.35		
21	3.83	49	3.33	77	4.54		
22	4.55	50	3.4	78	4.24		
23	3.1	51	4.16	79	3.9		
24	4.04	52	3.89	80	3.48		
25	2.82	53	4.82	81	2.21		
26	2	54	4.41	82	3.58		
27	8.22	55	3.73	83	3.77		
28	5.53	56	2.69	84	3.4		

Source: Field data

From Table 1 it is observed that academic performance varied among the sampled public secondary schools, as shown by KCSE mean scores ranging from 2.00 to 8.22.

3.2.1. H_{01}: There is no Relationship between Maximizing Structure and Academic Performance

Maximizing structure as a basic component of classroom management had two specific classroom management practices examined. The practices include physical arrangement to minimize crowding and distraction, and high classroom structure. Table 2 shows mean ratings for implementation of these specific classroom management practices across the sampled schools.

Table 2: Mean ratings for implementation of maximizing structure

Classroom management practice	Mean rating (0-3)
Physical arrangement to minimize crowding and distraction	2.42
High classroom structure	2.06
Mean rating for maximizing structure	2.24

Refer to the appendix for the school mean ratings for implementation of specific classroom management practices under maximizing structure.

To examine relationship between maximizing structure and academic performance, school mean ratings for implementation of specific classroom management practices under maximizing structure (appendix) and KCSE mean scores were used. The relationship was determined by applying Pearson's 'r' coefficient of correlation. Table 3 presents the results as computed with the aid of SPSS version 23.

Table 3: Relationship between maximizing structure and academic performance

		Maximizing structure	Academic performance
Maximizing structure	Pearson Correlation	1	-.004
	Sig. (2-tailed)		.969
	n	93	93
Academic performance	Pearson Correlation	-.004	1
	Sig. (2-tailed)	.969	
	n	93	93

Results in Table 3 show that there was weak negative relationship between maximizing structure and academic performance. The relationship was insignificant as the calculated p – value was 0.969, which was greater than the set critical value of 0.05. Based on the results there was no sufficient evidence to reject the null hypothesis. Nevertheless, the obtained Pearson's r-value of – 0.004 indicates that maximizing structure had very weak negative influence on academic performance. To determine the actual influence of maximizing structure on

academic performance, regression analysis was done. Table 4 shows the results.

Table 4: Regression analysis of the influence of maximizing structure on academic performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.004[a]	.000	-.011	1.25674

a. Predictors: (Constant), Maximizing structure

From Table 4, it can be observed that maximizing structure accounted for none (Adjusted R square = - .011) of the variance in academic performance in public secondary schools in Siaya County. Other factors a part from maximizing structure accounted for academic performance in public secondary schools in Siaya County. Further information on the association of the two variables was obtained by computing analysis of variance. Table 5 shows the results.

Table 5: Analysis of variance on influence of maximizing structure on academic performance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.002	1	.002	.001	.969[b]
	Residual	143.726	91	1.579		
	Total	143.728	92			

a. Dependent Variable: Academic performance

b. Predictors: (Constant), Maximizing structure

The results in Table 5 indicate that maximizing structure was not a significant predictor of academic performance in public secondary school in Siaya County $F(1,91) = .001$, $p > .05$). Therefore there was no need to compute simple linear regression analysis.

3.2.2. H_{02}: There is no Relationship between Establishing Expectations for Behaviour and Academic Performance

Establishing expectations for behaviour had two specific classroom management practices; namely: Post, teach, review, and provide feedback for expectations, and active supervision. Table 6 shows mean ratings for implementation of the specific classroom management practices under establishing expectations for behaviour across the sampled public secondary schools in Siaya County.

Table 6: Mean ratings for implementation of establishing expectations for behavior

Classroom management practice	Mean rating (0-3)
Post, teach, review, and provide feedback for expectations	1.94
Active supervision	2.76
Mean rating for establishing expectations for behaviour	2.35

Refer to appendix for school mean ratings for implementation of specific classroom management practices under establishing expectations for behaviour.

Pearson's 'r' correlation coefficient was computed to determine the relationship between the two variables using school mean ratings for implementation of specific classroom management practices under establishing expectations for behaviour and KCSE mean scores. Table 7 presents the results.

Table 7: Relationship between establishing expectations for behaviour and academic performance

		Establishing expectations for behaviour	Academic performance
Establishing expectations for behaviour	Pearson Correlation	1	.146
	Sig. (2-tailed)		.163
	n	93	93
Academic performance	Pearson Correlation	.146	1
	Sig. (2-tailed)	.163	
	n	93	93

From Table 7 it can be observed that there was a weak positive relationship between establishing expectations for behavior and academic performance. The relationship was insignificant as the calculated p – value was 0.163 which was greater than the set critical value of 0.05. Based on the results there was no sufficient evidence to reject the null hypothesis. Since Pearson's r- value was 0.146, it means that establishing expectations for behavior positively influenced academic performance in the sampled public secondary schools in Siaya County. As classroom teachers increasingly posted rules and discussed correct ways to act in the classroom with students, academic performance improved.

To determine the actual influence of establishing expectations for behaviour on academic performance, regression analysis was done. Table 8 shows the results.

Table 8: Regression analysis of the influence of establishing expectations for behaviour on academic performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.146[a]	.021	.011	1.24329

a. Predictors: (Constant), Establishing expectations for behavior

From Table 8 it can be observed that establishing expectations for behaviour accounted for 1.1% (Adjusted R square =. 011) of the schools' academic performance. To determine whether establishing expectations for behaviour was a significant predictor of academic performance in schools or not, analysis of variance was computed and results were as shown in Table 9.

Table 9: Analysis of variance on influence of establishing expectations for behaviour on academic performance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.063	1	3.063	1.981	.163[b]
	Residual	140.666	91	1.546		
	Total	143.728	92			

a. Dependent Variable: Academic performance

b. Predictors: (Constant), Establishing expectations for behaviour

From Table 9, it can be observed establishing expectations for behaviour was not a significant predictor of academic performance in public secondary schools in Siaya County $F(1, 91) = 1.981$, $p > .05$).

3.2.3. H_{03}: There is no Relationship between Actively Engaging Students and Academic Performance

Actively engaging students comprised six specific classroom management practices which were examined in this study. The practices include: direct instruction, opportunities to respond, guided notes, peer tutoring, use of response cards, and computer assisted instruction. Table 10 shows mean ratings for implementation of specific classroom management practices under this basic component of classroom management across the sampled public secondary schools in Siaya County.

Table 10: Mean ratings for implementation of actively Engaging Students

Classroom management practice	**Mean rating (0-3)**
Direct instruction	2.69
Opportunities to respond	2.55
Guided notes	1.71
Peer tutoring	1.68
Use of response cards	1.28
Computer assisted instruction	1.27
Mean rating for actively engaging students	**1.86**

Refer to appendix for school mean ratings for implementation of specific classroom management practices under actively engaging students

To test the null hypothesis, Pearson's 'r' correlation coefficient was computed to determine the relationship between school mean ratings for implementation of specific classroom management practices under actively engaging students and KCSE mean scores. Results were as presented in table 11.

Table 11: Relationship between actively engaging students and academic performance

		Actively engaging students	Academic performance
Actively engaging students	Pearson Correlation	1	.314**
	Sig. (2-tailed)		.002
	n	93	93
Academic performance	Pearson Correlation	.314**	1
	Sig. (2-tailed)	.002	
	n	93	93

**. Correlation is significant at the 0.01 level (2-tailed).

Results in Table 11 indicate that there was moderate, positive relationship between actively engaging students and academic performance. The relationship was statistically significant as the calculated *p* – value was 0.002 which was less than the set critical value of 0.05. Based on the results there was sufficient evidence to reject the null hypothesis, and was therefore rejected. The Pearson's *r*-value of 0.314 indicates that actively engaging students had positive influence on academic performance. To determine the actual influence of actively engaging students on academic performance, regression analysis was done. Table 12 shows the results.

Table 12: Regression analysis of the influence of actively engaging students on academic performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.314[a]	.099	.089	1.19322

a. Predictors: (Constant), Actively engaging students

From Table 12, actively engaging students accounted for 8.9% (Adjusted R square =. 089) of public secondary schools' academic performance in Siaya County. Further analysis of variance to determine whether this variable was a significant predictor of academic performance in public secondary schools produced results on Table 13.

Table 13: Analysis of variance on influence of actively engaging students on academic performance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.166	1	14.166	9.949	.002[b]
	Residual	129.563	91	1.424		
	Total	143.728	92			

a. Dependent Variable: Academic performance
b. Predictors: (Constant), Actively engaging students

From the table it can be observed that actively engaging students was a significant predictor of academic performance in public secondary school in Siaya County F (1, 91) = 9.949, p < .05). Since actively engaging students was found to be a significant predictor of academic performance, there was need to compute linear regression analysis to establish the influence. Table 14 shows the results.

Table 14: Linear analysis of influence of actively engaging students on academic performance

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.695	.753		2.251	.027
	Actively engaging students	1.259	.399	.314	3.154	.002

a. Dependent Variable: Academic performance

Table 14 indicates that for every one unit increase in implementation of classroom management practices for actively engaging students there was a 1.259 increase in academic performance.

3.2.4. H_{04}: There is no Relationship between Using a Continuum of Strategies for Responding to Student Behaviour and Academic Performance

Responding to behaviour in the fourth null hypothesis of this study referred to the fourth and fifth basic components of effective classroom management as stated by Simonsen and his colleagues (2008). The two components include using a continuum of strategies for acknowledging appropriate behaviour and using a continuum of strategies for responding to inappropriate behaviour. These two components of classroom management involve responding to students' behavior and were considered together in the fourth objective of this study. Specific classroom management practices under the two components of classroom management were included in the questionnaire items and were responded to by the participants. Under using a continuum of strategies for responding to inappropriate behavior there were six specific classroom management practices and four under acknowledging appropriate behavior. Table 15 shows mean ratings for implementation of specific classroom management practices under the two components of classroom management across the sampled public secondary schools in Siaya County.

Table 15: Mean ratings for implementation of using a Continuum of Strategies for Responding to Student Behaviour

Using a continuum of strategies for responding to inappropriate behaviour	Mean rating (0-3)	Using a continuum of strategies for acknowledging appropriate behaviour	Mean rating (0-3)
Specific error correction	2.44	Specific contingent praise	2.19
Performance feedback	2.40	Group contingencies	1.85
Differential reinforcement	2.20	Behavioural contracting	1.67
Planned ignoring plus contingent praise	1.68	Token economies	1.25
Time out from reinforcement	1.48	-	-
Response cost	1.43	-	-
Mean rating for using a continuum of strategies for responding to inappropriate behaviour	1.94	Mean rating for using a continuum of strategies for acknowledging appropriate behaviour	1.73

Refer to appendix for school mean ratings for implementation of specific classroom management practices under using a continuum of strategies for acknowledging appropriate behaviour and responding to inappropriate behaviour

In this study, analysis of data to test the fourth null hypothesis was done at two levels. First, school means ratings for implementation of specific classroom management practices under acknowledging appropriate behavior and responding to inappropriate behavior were separately correlated with KCSE means scores. This was to give understanding of the kind of influence each of the components would contribute to the examined relationship. Tables 16 and 19 present the correlation results.

Table 16: Relationship between acknowledging appropriate behaviour and academic performance and academic performance

		Acknowledging appropriate behavior	Academic performance
Acknowledging appropriate behavior	Pearson Correlation	1	.178
	Sig. (2-tailed)		.087
	n	93	93
Academic performance	Pearson Correlation	.178	1
	Sig. (2-tailed)	.087	
	n	93	93

From the result it can be observed that there was weak positive relationship between acknowledging appropriate behaviour and academic performance. The relationship was insignificant as the calculated p – value was 0.087 which was greater than the set critical value of 0.05. The Pearson's r- value of 0.178 means that acknowledging students' appropriate academic and social behaviors by classroom teachers during lessons had positive influence on academic performance. To determine the actual influence of acknowledging appropriate behaviour on academic performance, regression analysis was done. Results were as shown in Table 17

Table 17: Regression analysis of the influence of acknowledging appropriate behaviour on academic performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.178[a]	.032	.021	1.23658

a. Predictors: (Constant), Acknowledging appropriate behavior

Results in Table 17 indicate that acknowledging appropriate behaviour accounted for 2.1% (Adjusted R square =. 021) of academic performance in the sampled public secondary schools. To determine whether this component of classroom management was a significant predictor of academic performance in public secondary schools in Siaya County, analysis of variance was computed and results were as shown in Table 18.

Table 18: Analysis of variance on influence of acknowledging appropriate behaviour on academic performance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.578	1	4.578	2.994	.087[b]
	Residual	139.150	91	1.529		
	Total	143.728	92			

a. Dependent Variable: Academic performance

b. Predictors: (Constant), Acknowledging appropriate behavior

From Table 18, it can be observed that acknowledging appropriate behaviour was not a significant predictor of academic performance in public secondary school in Siaya County $F(1, 91) = 2.994$, $p > .05$). It was therefore not necessary to compute simple linear regression analysis,

Table 19 shows results on correlational analysis of relationship between responding to inappropriate behaviour and academic performance.

Table 19: Relationship between responding to inappropriate behaviour and academic performance

		Responding to inappropriate behviour	Academic performance
Responding to inappropriate behvior	Pearson Correlation	1	-.025
	Sig. (2-tailed)		.816
	n	93	93
Academic performance	Pearson Correlation	-.025	1
	Sig. (2-tailed)	.816	
	n	93	93

The results in Table 19 show that using a continuum of strategies for responding to students' inappropriate behavior had a weak negative relationship with academic performance. The relationship was insignificant as the calculated *p* – value was 0.816 which was greater than the set critical value of 0.05. The Spearman's *r*- value of - 0.025 indicates that responding to students inappropriate behaviours during lessons had negative influence academic performance. Regression analysis to determine the actual influence of responding to inappropriate behaviour on academic performance produced results in Table 20.

Table 20: Regression analysis of the influence of responding to inappropriate behaviour on academic performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.025[a]	.001	-.010	1.25638

a. Predictors: (Constant), Responding to inappropriate behavior

From Table 20 it can be observed that responding to inappropriate students classroom behaviours had negligible influence (Adjusted R square = -.10) on academic performance. Table 21 shows analysis of variance computed to verify the influence of this component of classroom management on academic performance in public secondary schools in Siaya County.

Table 21: Analysis of variance on influence of responding to inappropriate behaviour on academic performance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.086	1	.086	.055	.816[b]
	Residual	143.642	91	1.578		
	Total	143.728	92			

a. Dependent Variable: Academic performance

b. Predictors: (Constant), Responding to inappropriate behavior

From results in Table 21, responding to students inappropriate behaviours during the lesson was not a significant predictor of academic performance in public secondary school in Siaya County $F(1, 91) = .816$, $p > .05$).

In the second level of analysis school mean ratings for implementation of specific classroom management practices under acknowledging appropriate behavior and responding to inappropriate behavior were together correlated with KCSE means scores. This gave the results for relationship between using a continuum of strategies for responding to behavior and academic performance, as presented in table 22.

Table 22: Relationship between responding to behaviour and academic performance

		Responding to behavior	Academic performance
Responding to behavior	Pearson Correlation	1	.057
	Sig. (2-tailed)		.589
	n	93	93
Academic performance	Pearson Correlation	.057	1
	Sig. (2-tailed)	.589	
	n	93	93

The results in Table 22 show that responding to students' behavior had a weak positive relationship with academic performance. The relationship was insignificant as the calculated *p* – value was 0.589 which was greater than the set critical value of 0.05. Based on the results there was no sufficient evidence to reject the null hypothesis. However, the Pearson's *r*- value of 0.057 indicates that responding to students' academic and social behaviors by classroom teachers during lessons had positive influence on academic performance. To determine the actual influence of responding to behaviour on academic performance, regression analysis was done. Table 23 shows the results.

Table 23: Regression analysis of the influence of responding to behaviour on academic performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.057[a]	.003	-.008	1.25473

a. Predictors: (Constant), Responding to behavior

Results in Table 23 indicate that responding to students classroom behaviours had negligible influence (Adjusted R square = -.008) on academic performance in public secondary schools in Siaya County. Analysis of variance to determine whether this variable was a significant predictor of academic performance produced results in Table 24.

Table 24: Analysis of variance on influence of responding to behaviour on academic performance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.464	1	.464	.295	.589[b]
	Residual	143.265	91	1.574		
	Total	143.728	92			

a. Dependent Variable: Academic performance

b. Predictors: (Constant), Responding to behavior

From Table 24, it can be observed that responding to behaviour was not a significant predictor of academic performance in public secondary school in Siaya County $F(1, 91) = .295$, $p > .05$).

3.3. Discussion

Several important points can be observed from the study of influence of classroom management practices on academic performance, in the context of public secondary schools in Siaya County. From the schools surveyed, results indicated that specific classroom management practices under maximizing structure, establishing expectations for behavior, actively engaging students, and using a continuum of strategies for acknowledging appropriate behavior and responding to inappropriate behavior were implemented in public secondary schools in Siaya County. However, implementation of classroom management practices was in overall moderate (mean rating 1.95 on a scale of 0-3) and varied among basic components of classroom management (mean ratings ranging from 1.73 to 2.35) and public secondary schools (mean ratings ranging from 1.40 to 2.50). Classroom management practices under establishing expectations for behavior were the most implemented as evidenced by its highest (2.35) mean rating of implementation in the sampled schools. This was followed by maximizing structure (2.24), responding to inappropriate behavior (1.94), actively engaging students (1.86) and acknowledging appropriate behavior (1.73) respectively.

The finding of implementation of classroom management practices under maximizing structure, establishing expectations for behavior, actively engaging students, and using a continuum of strategies for acknowledging

appropriate behavior and responding to inappropriate behavior in all the sampled schools agrees with the results of a meta-analysis by [16]. Analysis by the researchers identified maximizing structure, establishing expectations for behavior, actively engaging students; using a continuum of strategies for acknowledging appropriate behavior and using a continuum of strategies for responding to inappropriate behavior as empirically supported critical features of classroom management. While the finding that classroom management practices covering all the five critical components of classroom management were applied in public secondary schools in Siaya County is encouraging, the observed overall moderate implementation may not be adequate. For products of educational research to bear meaningful results in improving quality of education, full implementation is necessary.

The observed variation in implementation of classroom management practices agrees with finding by [25] in a study of classroom management strategies mostly used by public junior high school teachers in Ashanti Akim North District in Ghana. The researchers found that good relationship was a classroom management strategy mostly used by teachers, reinforcement was the second mostly used, antecedent strategy was the third mostly used and punishment was the least used. Similarly a study by [40] found that interactionist style was the most frequently used style by a sample of primary school teachers in Serbia followed by interventionist. Non-interventionist was the least frequently used. [29] explains that differences in classroom management may occur based on grade levels, individual and group differences among students. However, the differences are more in degree of emphasis given to the various classroom management tasks but not in the underlying basic principles.

Correlational analysis of relationships between the basic components of classroom management and academic performance revealed weak positive relationships between establishing expectations for behavior and academic performance, actively engaging students and academic performance and acknowledging appropriate behaviour and academic performance. There was weak negative relationship between maximizing structure and academic performance as well as between responding to inappropriate behaviour and academic performance. Only actively engaging students had statistically significant influence on academic performance in public secondary schools in Siaya County.

From the correlation table of the relationship between establishing expectations for behavior and academic performance, Pearson's correlation coefficient of 0.146 was observed. This means that there was a weak positive relationship between establishing expectations for behavior and academic performance. The positive sign of the correlation coefficient indicates that as classroom teachers in the sampled public secondary schools increasingly implemented classroom management practices for establishing expectations for behaviour, academic performance of the schools improved. However, based on the obtained p – value of 0.163 which was greater than the set critical value of 0.05, this relationship did not reach the statistical significance at the chosen .05 significance level. We cannot be confident that the relationship observed in the sample is representative of relationship in the population of public secondary schools in Siaya County. Nevertheless, the observed Adjusted R square =. 011 means that 1.1% of the variation in the schools' academic performance can be explained by establishing expectations for behaviour.

The finding of weak positive relationship between establishing expectations for behavior and academic

performance agrees with that by [24]. The researchers, working with college students, found that there was a weak but significant positive relationship (r = 0. 121) between learners' English scores and the degree to which their instructors applied classroom administration methodologies in the classrooms. However, it does not agree with the findings by [10] and [25]. [10] found that CHAMPS, a package for training teachers on effective classroom management, had significant improvement on academic achievement. But we note that the researchers also reported that the package had significant positive effects on English and problem solving but the effects on math and reading comprehension were insignificant. [25] found a statistically significant moderate positive relationship between antecedent which involves setting rules of behavior and academic performance of junior high school students. Majority (76.8%) of students involved in the study by [25] were from urban schools.

While the finding of this present study largely agrees with the finding by [24] which was based on a different setting, college level; it conflicts with findings of [10] and [25] from similar settings of public secondary schools. However, the study by [10] was aimed to examine effects of a specific classroom management package on academic performance. Implementation of the package was preceded by teacher preparation on the material and had defined period for implementation of the interventions. The present study examined implementation of evidence-based classroom management practices as they are used in daily classroom teaching, hence the different settings of implementation may contribute to difference in results. Though the study by [25] had a setting of public secondary school similar to that of the current study, there were some differences in that the study by [25] was delimited to public junior secondary schools. This present study covered public secondary schools inclusive of students in junior secondary school age bracket and above.

Using linear correlation and regression analysis, it was evident that a relationship exists in public secondary schools in Siaya County between actively engaging students and academic performance. Actively engaging students had moderate, positive and significant influence on academic performance as indicated by the calculated correlation coefficient [r (93) = .314, p = 0.002) and accounted for 8.9% variation in academic performance (Adjusted R square =. 089). On average for every one unit increase in school mean rating for implementation of specific classroom management practices for actively engaging students there was a 1.259 points increase in KCSE means score in Siaya County.

The results of this analysis identify actively engaging students as a classroom management practice that has a statistically significant influence on academic performance in public secondary schools in Siaya County. However, this study also found that actively engaging students was the second lowest implemented component of classroom management in the county. Additionally, out of the six specific classroom management practices examined under this category, only direct instruction and increasing opportunities to respond had high implementation. Guided notes, peer tutoring, computer assisted instruction and use of response cards as practices for actively engaging students had low implementation. The low implementation of classroom management practices for actively engaging students and the minimal integration of technology in classroom instruction may not bring out the best impact of this component of classroom management on academic performance.

The finding of this study that there was a significant positive influence of actively engaging students on academic performance agrees with findings of several studies that have investigated this approach to classroom management. Reference [31] in a case study of classroom management and students' academic performance using five schools in a district in Rwanda found a significant positive relationship between instructional management and academic performance. Reference [23] teaching and learning international survey found that teachers who more often summarize the previous lesson, state learning goals and check student understanding report a better learning atmosphere, less noise and fewer distractions which lead to better learning outcomes. The named instructional activities are elements of direct instruction. Reference [16] observe that engagement is the best mediating variable between instruction and academic performance. These researchers from a meta-analysis provide evidence base for several specific classroom management practices for actively engaging students. The practices include increasing opportunities to respond through different instructional strategies, direct instruction, peer tutoring, guided notes and computer assisted instruction.

Result of analysis of relationship between maximizing structure and academic performance in public secondary schools in Siaya County showed very low correlation between maximizing structure as a component of classroom management and academic performance ($r = – 0.004$). With correlation coefficient significant at 0.969, this association does not reach statistical significance at the chosen .05 significance level. The obtained Adjusted R square value - .011 showed that maximizing structure accounted for none of the variance in academic performance in public secondary schools in Siaya County. Other factors a part from maximizing structure accounted for academic performance in public secondary schools in the county.

The finding of the current study was not in agreement with that of the study by [16] which indicated that in general classrooms with more structure promote more appropriate academic and social behavior. The analysis by [16] showed that students in high structure classrooms exhibited greater task involvement and more attentive behavior. However, the researchers in the same study also highlighted evidence that structure was unrelated to independent task persistence, and suggested a balance between teacher-directed structure and student independence. Another study by [10] on whether effective classroom behavior management can increase student achievement in middle school found that there was a significant effect on student classwork completed but not homework completed. This indicates low independent task persistence by students outside the structured classroom.

One of the findings this current study on implementation of classroom management practices was that high classroom structure characterized by high amount of teacher-directed activity and clearly defined procedures is used in daily classroom teaching in most (over 90%) of the sampled public secondary schools in Siaya County. Given that most (85%) of public secondary schools in Siaya County are day schools, academic performance may be impacted by low independent task persistence associated with high classroom structure.

Another factor that may have contributed to the difference in results is limited physical infrastructure and instructional resources. One of the findings of this current study was that physical arrangement of the classroom to minimize crowding and distractions was used in daily classroom teaching in almost all (98.9%) of the sampled public secondary schools in Siaya County, indicating inadequate physical facilities and instructional

resources. This practice may be time consuming hence contributing to negatively to influence of maximizing structure on academic performance. A study by [21] has shown a strong, positive and significant relationship between administrators' contribution to teaching-learning resources and academic performance.

In this study, analysis of data to explore relationship between responding to behaviour and academic performance was done at two levels. First, school means ratings for implementation of specific classroom management practices under acknowledging appropriate behavior and responding to inappropriate behavior were separately correlated with KCSE means scores. This was to give understanding of the kind of influence each of the components would contribute to the examined relationship. In the second level of analysis school mean ratings for implementation of specific classroom management practices under acknowledging appropriate behavior and responding to inappropriate behavior were together correlated with KCSE means scores.

Analysis involving correlating separate data on using a continuum of strategies for responding to inappropriate behavior and acknowledging appropriate behaviour with schools' academic performance produced mixed results. The results indicated that acknowledging students' appropriate behaviours had weak, positive and insignificant influence on academic performance [r (93) = 0.178, p = 0. 087]. The positive sign of the correlation coefficient indicates that as classroom teachers increasingly acknowledged students appropriate academic and social behaviors during lessons, academic performance improved. From the calculated Adjusted R square coefficient 021, acknowledging appropriate behaviour accounted for 2.1% of variation in academic performance. However, because the significance value obtained is greater than the 0.05 significance level we cannot be reasonably certain that the relationship observed in the sampled schools is representative of the relationship in public secondary schools population in the entire county.

On the other hand, responding to students' inappropriate behaviour during lessons had weak, negative and insignificant influence on academic performance [r (93) = - .025, p = 0. 816]. The negative sign of correlation coefficient means as classroom teachers responded more to students inappropriate behavior academic performance declined. The obtained Adjusted R square coefficient of -.10, however, indicated that responding to inappropriate behavior as a basic component of classroom management had no predictive value on academic performance.

When the two aspects of responding to student behaviour were considered together, this study found weak, positive and insignificant relationship between using a continuum of strategies for responding to behaviour and academic performance [r (93) = .057 p = 0.589]. In overall responding to students' classroom behaviours, both appropriate and inappropriate, had negligible influence on academic performance in public secondary schools in Siaya County, as indicated by Adjusted R square coefficient of -.008.

This study's finding that responding to students behaviours in the classroom had no significant influence on academic performance is not in agreement with the findings of [16]. These researchers highlighted empirical evidence bases that support a range of specific classroom management practices for recognizing appropriate behavior and for decreasing the likelihood of inappropriate behavior. [16] clarified and gave evidence bases of four strategies for increasing appropriate behavior, including specific contingent praise, group reinforcement

contingencies, behavior contracts and token economies. They also highlighted evidence based practices for decreasing inappropriate student behavior; namely specific error correction or explicit reprimand, performance feedback, differential reinforcement, planned ignoring, response cost and time out from reinforcement. However, it is noteworthy that though findings highlighted by [16] associate the specific practices with improved academic performance, the practices were not considered as a package in their analysis of relationship with academic performance. This present study analyzed relationship between responding to behavior as a package of specific evidence-based practices and academic performance. This approach may contribute to difference in results.

The finding also does not concur with the findings by [26,10] who found significant positive relationship between behaviour management and academic performance. However, the two studies focused on evaluating specific classroom management programs while the present study examined influence of behaviour management practices as implemented in daily classroom teaching.

While this present study found that responding to students' behaviour during lessons had overall negligible influence on academic performance, analysis based on data on each of the two aspects of responding to behavior revealed a distinction. Acknowledging appropriate behaviour had positive relationship with academic performance while responding to inappropriate behaviour had negative relationship with academic performance.

Effective classroom management focuses on preventive rather than reactive procedures. It aims to establish a positive classroom environment where the teacher focuses more time, attention, and energy on acknowledging responsible behavior than on correcting misbehavior [41, 32]. This study's finding on implementation of classroom management practices indicated that classroom management in public secondary schools is Siaya County applies behavior management that focuses more on correcting misbehaviour than acknowledging appropriate behaviour. This was evidenced by the finding that acknowledging appropriate behaviour had the least mean rating of implementation (1.73) while responding to inappropriate behaviour had a mean rating of (1.94). Such approach to classroom behaviour management may be counterproductive in the effort to improve academic performance.

This study had one potential limitation. Some participants completing self-reported survey may have been unwilling to portray themselves accurately when rating their frequency of use of classroom management practices in daily classroom teaching. However, the researcher made effort to minimize the effect on the results of this study by working out average rating of implementation of each classroom management practice per school. School ratings for frequency of use in daily classroom teaching of each specific classroom management practice were determined by averaging ratings by the respondent three classroom teachers and deputy principal who rated the classroom teachers' implementation of the practices from observer's point of view in each of the sampled schools. The [42] has institutionalized appraisal of teachers and requires school administrators to conduct lesson observation of each teacher at least once a term. The termly lesson observation provides a good opportunity for collecting data on classroom management by observation method using deputy principals as participant observers rather than a one-off lesson observation by a visiting researcher that may be less reliable [43]. According to [16], classroom management checklist, which was adapted for this study, can be completed

by teacher self-assessment or assessment by an observer. The limitation notwithstanding, the findings of this study are significant to policy makers and school administrators in planning physical learning environment and to classroom teachers in deciding appropriate application of classroom management practices in enhancement of academic performance in Siaya County.

4. Conclusion

Specific classroom management practices under maximizing structure, establishing expectations for behavior, actively engaging students; and using a continuum of strategies for acknowledging appropriate behavior and responding to inappropriate behavior were implemented in public secondary schools in Siaya County. Implementation was overall moderate and varied among the public secondary schools and across the five basic components of classroom management. Correlational analysis revealed weak, negative and insignificant influence of maximizing structure on academic performance; weak, negative and insignificant influence of responding to students' inappropriate behaviour on academic performance; weak, positive and insignificant influence of establishing expectations for behavior on academic performance and weak, positive and insignificant influence of acknowledging students' appropriate behaviours on academic performance. Actively engaging students had moderate, positive and significant influence on academic performance and accounted for 8.9% variation in academic performance (Adjusted R square =. 089). It was a significant predictor of academic performance $F(1, 91) = 9.949$, $p < .05$). For every one unit increase in implementation of classroom management practices for actively engaging students there was a 1.259 increase in academic performance.

Acknowledgements

I first give thanks to God for good health, strength and grace enabling me to complete this work. I express my sincere gratitude to my doctoral supervisors Dr. Edna Asesa and Prof. Maureen Olel for their expert guidance, encouragement and support. They have worked patiently with me to ensure my academic growth and successful completion of this research study. I acknowledge all the committee members at various levels before whom I made presentations. Their insightful questions, comments and guidance ensured my research study produced sound results. I cannot forget to thank the Siaya County Director of Education's office, principals, deputy principals, heads of departments and classroom teachers in Siaya County for readily assisting me whenever I visited them about this research. May I also express hearty appreciation of my wife Maureen, my sons Harris and Jacob, my daughter Suzzane, my mother Margaret, and my nieces Naomi and Natasha. They not only endured the financial burden of this project but encouraged and supported me a great deal. Mr. Aloo, my neighbor in the village, I'm grateful for your generosity. You contributed to making this work a success by availing the charging power. Finally I acknowledge IJSBAR editorial board for evaluating and accepting this paper for publication in your esteemed journal.

References

[1] UNESCO Institute for Statistics. *More Than One-Half of Children and Adolescents Are Not Learning Worldwide*. Montreal: UIS, 2017.

[2] Ministry of Education. *Basic education statistical booklet 2019*, Nairobi: Ministry of Education, 2019.

[3] J. O. Jwan. Changing the curriculum: A New error for education in Kenya. *The Principal Secondary Heads Professional Magazine,* (June. 2018 Conference)

[4] T. T.York, C. Gibson & S. Rankin. Defining and measuring academic success. *Practical Assessment, Research and Evaluation*, 20, Number 5, 2015.

[5] R. N. Osakwe. "Classroom management: A tool for achieving quality secondary school education in Nigeria." *International Journal of Education.*vol. *6*, 2014

[6] P. M. Mwangi. Administrative factors influencing students' performance in Kenya certificate of secondary education in public secondary schools in Thika West District, Kenya. M.Ed. thesis, University of Nairobi, 2015.

[7] M. Sunday-Piaro. "Classroom management and students' academic performance in public secondary schools in Rivers State." *International Journal of Scientific Research in Education,* vol.11, pp. 940-963, 2018.

[8] UNESCO. *EFA Global Monitoring Report 2013/2014: Teaching and Learning, Achieving Quality for All*. Paris: UNESCO, 2014.

[9] H. J. Freiberg, C. A. Huzinec & K. Borders. "The effects of classroom management on student achievement: A study of three inner city middle schools and their comparison schools." Presented at the 2008 American Education Research Association (AERA) Annual Meeting, New York, 2008.

[10] K. C. Herman, W. M. Reinke, N. Dong & C. P. Brandshaw. *Can effective classroom behavior management increase student achievement in middle school? Findings from a group randomized trial.* https://dx.doi.org/10.1037/edu0000641, 2020.

[11] R.M. Oliver, J.H. Wehby & D. J. Reschly. "Teacher classroom management practices: Effects on disruptive or aggressive Student behaviour." *Campbell Systematic Review,* vol. 7, pp. 1-55, 2011.

[12] W. Doyle. *Classroom Organization and Management. In M. Wittrock (Ed.). Handbook of Research on Teaching (3rd Ed.).* New York: McMillian, 1986.

[13] S. Kaur & J. Pahuja,. "Best classroom management practices." *International Journal for Research Trends and Innovation*, vol. 4, pp. 2456-3315, 2019.

[14] C. M. Evertson & C. S. Weinstein (Eds). *Handbook of Classroom Management: Research, Practices and Contemporary Issues.* Mahwah, NJ: Routledge, 2006.

[15] R. M. Oliver & D. J. Reschly. *Classroom Management: Teacher Preparation and Professional*

Development. Washington DC: National Comprehensive Center for Teacher Quality, 2007.

[16] B. Simonsen, S. Fairbanks, A. Briesch, D. Myers, & G. Sugai. "Evidence-based practices in classroom management: Consideration from research to practice." *Education and Treatment of Children*, vol. 31, pp. 351-380, 2008.

[17] C.Kyriacou. *Essential teaching skills* (3rd ed.) Deltaplace United Kingdom: Nelson Thomas Ltd., 2007.

[18] A. Iqbal,, M. Reuf,. Z. Alan, R. Shafiqur, K. Wajid, R. Aqila, & A. Farman. "Teachers perception of classroom management, problems and solutions: Case of government secondary schools in Chitral, Khyber Pakhtunkhwa." Pakistan. *International Journal of Business and Social Sciences,* vol.3, 2012.

[19] P.Mupa & J. I. Chinooneka. "Factors contributing to ineffective teaching and learning in primary schools: Why are schools in decadence?" *Journal of Education and Practice,* vol. 6, pp.115-132, 201.

[20] J. A. Orodho, P. N. Waweru, M. Ndichu & R. Nthinguri. "Basic education in Kenya: Focus on strategies applied to cope with school-based challenges inhibiting effective implementation of curriculum." *International Journal of Education and Research,* vol.1, pp. 1-19, 2013.

[21] E. G. A, Wanyama, E. M. W. Simatwa & T.O. Okwach. "Contribution of school administrators to teaching and learning resources in enhancement of students' academic performance in secondary schools in Kenya: An empirical study across secondary schools of Emuhaya and Vihiga Sub-Counties." *International Journal of Current Research,* vol.*3*, pp. 67302-67314, 2018.

[22] H. London. *Three Phases of Management That Allow Teachers to Succeed* https://connect.ilprincipals.org/blogs/principalconnection/2015/01/29/three-phases-ofmanagement-that-allow-teachers-to-succeed, 2015.

[23] OECD. *Creating Effective Teaching and Learning Environment: First results from TALIS.* Paris: OECD Publishing, 2009.

[24] S. Ahmad, A. Hussain, M. Zaheer & A. Batool. "Relationship of classroom management strategies and academic performance at college level." *Bulletin of Education and Research,* vol.39, pp. 239-249, 2017.

[25] M. K. Owusu, B. Y. Dramanu & M. O. Amponsah."Classroom management strategies and academic performance of junior high school students." *I.J. Education and Management Engineering, 2021*, pp. 29-38, 2021.

[26] J. A. Durlak, R. P. Weissberg, A. B. Dymnicki, R. D. Taylor & K. B. Schellinger. "The impact of

enhancing students' social and emotional learning: a meta-analysis of school-based universal interventions." *Child Development,* vol.*82*, pp. 405-432, 2011.

[27] O. K. Nabwire, G. Obondo & K. T. Sella. "Teacher preparation practices in Kenya and the 21st century learning: A moral obligation." *Journal of Education and Practice,* vol. *6,* 1-8, 2015.

[28] L. Hepburn, W. Beamish & C. Alston-Knox. "Classroom management practices commonly used by secondary school teachers: Results from Queensland survey." *The Australian Educational Researcher*, (2021) 48:485–505 https://doi.org/10.1007/s13384-020-00402-y

[29] J. Brophy. *Classroom management and organization.* Michigan: The Institute for Research on Teaching Michigan State University, 1982.

[30] M. Nisar, I. A. Khan & F. Khan. "Relationship between classroom management and student academic achievement." *Pakistan Journal of Distance and Online Learning*.Volume 1. 2019.

[31] E. Hakizimana. Classroom management and students' academic performance in secondary schools in Nyamagabe District, Rwanda. M.Ed. thesis, Mount Kenya University, 2016.

[32] R. J. Marzano, J. S. Marzano, & D. J. Pickering. *Classroom Management that Works, Research-based for Every Teacher*. Alexandria, VA: Association of Supervision and Curriculum Development (ASCD), 2003.

[33] A. Jepketer, K. Kombo & N. D. Kyalo. "Teachers' classroom strategies for enhancing students' performance in public secondary schools in Nandi County, Kenya." *IOSR Journal of Humanities and Social Science (IOSR- JHSS),* vol. 20, pp. 61-73, 2015.

[34] L. Cohen, L. Manion & K. Morrison. *Research Methods in Education*. London: Roulledge 2 Park Square Publishers, 2007.

[35] O. N. Mugenda, & A. G. Mugenda. (2009). *Research Methods: A quantitative and qualitative approach.* Nairobi: ACTS Press, 2009.

[36] Ministry of Education. *Basic education statistical booklet 2020*, Nairobi: Ministry of Education, 2020.

[37] O. V. Ajayi, C. T. Audu & E. E. Ajayi. "Influence of class size on students' classroom discipline, engagement and communication: A case study of senior secondary schools in Ekiti State, Nigeria." *Sky Journal of Educational Research*, vol.5, 034-041, 2017.

[38] G. D. Israel. *Sampling the Evidence of Extension Program Impact, Program Evaluation and Organizational Development*. IFAS, University of Florida, 1992

[39] W. Y. Oso, & D. Onen. (2005). *A general guide to writing research proposal and report: A hand*

book for beginning researchers. Naorbi: Jomo Kenyatta Foundations, 2005.

[40] G. Djigic & S. Stojiljkovic. "Classroom management styles, classroom climate and school achievement." Procedia - Social and Behavioral Sciences, vol.29, pp. 819 – 828, 2011.

[41] H. Korpershoek, T. Harms, H. de Boer, M. van Kuijk & S. Doolaard. "A meta-analysis of the effects of classroom management strategies and classroom management programs on students' academic, behavioral, emotional, and motivational outcomes." *Review of Educational Research*, vol. 86, pp 643-680, 2016.

[42] Teachers Service Commission (2015). Code of regulation for teachers. Nairobi: Author, 2015.

[43] J. Bell & S.Waters. Doing your research project (6th ed.). England: McGaw-Hill Education, 2014.

APPENDIX

SCHOOL MEAN RATINGS FOR IMPLEMENTATION OF CLASSROOM MANAGEMENT PRACTICES

Table 25

School S/No	Maximizing structure	Establishing expectations for behaviour	Actively engaging students	Acknowledging appropriate behaviour	Responding to inappropriate behaviour	Responding to behaviour
1	2	2	2	1.5	2	1.8
2	1.5	2.5	2.17	2	2	2
3	3	2.5	1.83	2.5	2.33	2.4
4	1.5	2	1.33	1.25	1.33	1.3
5	2.5	2.5	1.67	1.25	1.67	1.9
6	2	2	1.83	1.25	1.83	1.6
7	2.5	2.5	2.17	2	2.5	2.3
8	2	2.5	2	1.5	1.67	1.6
9	2.5	2.5	1.5	1.5	1.67	1.6
10	2	2	2	2	1.67	1.8
11	2.5	2.5	1.5	2.25	2.5	2.4
12	2	2	1.8	1.5	1.67	1.6
13	2	1.5	1.67	1	1.67	1.4
14	2	2.5	**2.17**	1.25	1.67	1.5
15	2	2	1.5	1.25	1.83	1.6
16	2	2.5	2.33	1.75	2	1.9
17	2	2.5	1.83	2.25	2	2.1
18	2.5	2.5	1.67	1.5	1.33	1.4
19	2	2	1.67	2.25	2.17	2.2
20	2.5	2	2.17	2.25	1.83	2

21	2.5	2.5	1.83	2	2.17	2.1
22	2	2	1.83	1.5	1.67	1.5
23	2.5	2.5	1.83	2	2	2
24	2	2.5	1.83	1.75	2.33	2.1
25	3	2	1.83	1.75	2.5	2.2
26	3	2.5	1.67	1.75	2.33	2.1
27	2.5	2.5	2.17	2.25	2.17	**2.2**
28	2	2.5	2.17	1.75	1.83	1.8
29	2.5	2.5	2.33	2	2.5	2.3
30	1.5	2.5	1.67	1.5	1.5	1.5
31	2	2.5	1.5	1.5	1.83	1.7
32	2	2.5	2.33	1.75	2.33	2.1
33	2	2.5	1.833	2	1.83	1.9
34	2	2	1.67	1.75	2.17	2
35	2.5	3	2.5	2	2.17	2.1
36	2	2.5	2	1.75	1.5	1.6
37	3	2.5	2.17	1.75	2	1.9
38	2.5	2	2.17	2	1.83	1.9
39	2	2.5	1.83	1.75	1.83	1.8
40	2	2.5	1.67	1.25	2.33	1.9
41	2	2.5	2	1.5	2.17	1.9
42	2	2	1.5	1.5	1.5	1.5
43	2	2.5	2.33	2	2	2
44	2	2.5	1.5	1.5	2	1.8
45	2	2.5	1.5	2	1.67	1.8
46	3	2.5	2.33	2	2.33	2.2
47	2.5	2.5	1.833	1.5	1.83	1.7
48	2.5	2.5	2	1.5	1.83	1.7
49	2	1.5	1.33	1.5	1.17	1.3
50	3	2	1.33	2.25	2.33	2.3
51	2.5	2.5	2	2.25	2	2.1
52	2.5	2.5	1.83	1.5	2	1.8
53	2	1.5	1.67	1.5	1.67	1.6
54	2	2	1.67	1.5	1.67	1.6
55	2	2.5	1.33	1.5	1.83	1.7
56	2.5	1.5	1	1.25	1.67	1.5
57	2.5	2	1.83	2	2	2
58	2	2.5	2.17	1.5	2.33	2
59	2	2	1.83	1.75	2.17	2
60	2	2.5	1.67	1.75	1.67	1.7
61	2.5	3	2.17	1.75	2.17	2
62	2	2.5	2.33	2	2.33	2.2
63	2	2.5	1.83	1.75	2	1.9
64	2	2.5	2	1.75	1.5	1.6
65	2.5	2.5	1.833	1.75	1.83	1.8
66	2.5	2.5	1.33	1.5	2	1.8

67	2.5	2.5	1.83	1.75	1.83	1.8
68	2.5	2.5	2	1.75	1.83	1.8
69	2.5	2	2.5	1.75	2	1.9
70	2	2.5	1.83	1.75	1.83	1.8
71	3	2.5	1.83	1.25	1.83	1.6
72	2.5	2.5	1.67	1.75	2.17	2
73	2	2.5	1.83	1.75	2	1.9
74	2	2.5	2	1.75	2	1.9
75	2.5	3	2.5	2.25	2.5	2.4
76	2.5	2.5	2.17	1.75	2.17	2
77	2.5	3	1.67	1.75	1.67	1.7
78	2	2.5	2	2	1.5	1.7
79	2	2	1.83	1.75	1.83	1.8
80	2	3	2.17	1.75	2	1.9
81	1.5	2	1.5	1.75	2	1.9
82	2	2	1.33	1.25	1.67	1.5
83	2.5	2	1.83	1.75	1.67	1.7
84	2.5	3	2.33	2.25	2.33	2.3
85	2.5	2.5	1.5	1.75	1.5	1.56
86	2	2	1.17	1.25	2	1.7
87	2	1.5	1.83	1.75	1.83	1.8
88	2	2.5	2	1.5	2	1.8
89	2.5	3	2	1.75	2	1.9
90	2.5	2.5	1.83	1.75	2.17	2
91	2.5	2.5	2.17	2.25	2.67	2.5
92	2.5	1.5	2.17	1.75	1.67	1.7
93	1.5	2.5	1.83	1.75	2	1.9
Overall mean	**2.24**	**2.35**	**1.86**	**1.73**	**1.94**	**1.86**

Source: Field data