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Relationship between Learning Strategies and Academic Achievement Among Primary School Pupils in Nakuru County, Kenya

Kaburu Joel Bundi
PhD Student, Kenyatta University
Dr. Doyne Mugambi, *PhD, Educational Psychology Department, Kenyatta University*
Dr. Peter. A.M. Mwaura, *PhD, Educational Psychology Department, Kenyatta University*

Abstract
Over the years, academic achievement of pupils from public primary schools in Nakuru County in national examinations has been consistently below average. Despite the efforts of educational stakeholders including teachers, psychologists, educational researchers, guidance and counseling professionals to address the issue, the problem continues to persist. This study provides possible insights on how this problem may be resolved by examining the relationship between learning strategies and academic achievement. The study was based on achievement goal theory. The researcher adopted convergent parallel mixed method research design, where all the 50750 standard eight pupils enrolled in 747 public primary schools in the county formed the study population. At the time of this study, the accessible population was 1364 class eight pupils from 16 public primary schools. The sample consisted of 400 standard eight pupils selected from 16 public primary schools. Probability sampling procedures, namely stratified and simple random and purposive sampling, which is a non-probability sampling procedure were used in the selection of the schools and the respondents. The data were collected using questionnaires and interview guides. A pilot study was conducted among 30 class eight pupils from one school not involved in the actual study to establish the validity and reliability of the research instruments. The collected data were analyzed using both descriptive and relevant inferential statistical procedures. The results showed that there was a moderate positive and significant correlation between deep approach learning strategy and academic achievement, $r (282) = .40$, $p < .05$. The study established that there was no statistically significant relationship between surface approach learning strategy and academic achievement, $r (283) = .11$, $p > .05$. Qualitative data also revealed that pupils who used deep approach learning strategy performed better in academics compared to the pupils who employed surface approach learning strategy. The study recommends that teacher trainers and guidance counselling department should come up with training programs for teachers and mentorship for pupils to enhance effective learning strategies in order to improve academic achievement of the pupils.

Key Words: *Academic Achievement, Learning Strategies, Deep Approach Learning Strategy and Surface Approach Learning Strategy*

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I. Background to the Study

In Kenya, primary school pupils mark the end of primary education by sitting for Kenya Certificate of Primary Education (KCPE) examinations at class eight. In his study, Mutweleli (2014) indicated that in the event a learner fails to perform well in the national examinations, such a learner will not manage to secure opportunities of learning in higher level of education which limit their chances of getting rewarding employment opportunities in future. On the other hand, the society will be denied the skilled human capital required for economic growth of any country that would facilitate sustainable wealth creation.

According to the 2015-2021 KCPE results statistics, 50% of the candidates who sat for the national examinations during this period, a majority failed to attain 250 marks. The largest proportion of these candidates came from the public primary schools. Further analysis of KCPE results for the period 2015-2021 indicated that Nakuru County is among the counties in Kenya that registered a significant number of candidates who obtained 250 marks and below. The primary school pupils in the county who obtained 250 marks and below were represented by 48.9% of those who sat for the examination. This shows that almost half of the pupils failed to

attain the average marks of 250. The huge population of the pupils failing to attain the average pass mark denied them the opportunities to explore their educational potential further (KCPE 2015-2021).

Previous studies done to unmask the reasons behind the low academic achievement in the county by teachers, psychologists, educational researchers, guidance and counseling professionals in Nakuru County, have mainly focused on institutional and contextual factors such as learning resources, type of school, parental and family support given to pupils, and the teachers' roles (Awour, 2019; Matunga et al., 2019). Despite the fact that psychological domains may have an immense contribution towards addressing the persistent low KCPE marks, little attention has been paid to it on the extent to which it can contribute towards improvement of the marks.

At the national level, studies conducted on the influence of psychological constructs have focused largely on self-efficacy, academic identity status, self-handicapping and defensive mechanisms, self-regulated learning, academic buoyancy, academic motivation, academic resilience, causal attributions, academic self-concept and examination anxiety (Collie & Martin, 2019; Ireri, 2015; Mukolwe, 2015; Mutweleli, 2014; Wawire, 2010). In Nakuru County, the extent to which psychological factors such as learning strategies contributes towards academic outcomes has not been extensively examined. The current study aimed fill this gap by studying the impact of learning strategies on academic outcomes.

Nadir and Yavus (2019) explained learning strategies as cognitive skills or behaviors that learners use for storage and retrieval of information**.** Chen (2019); Gillian and Xiaowen (2020) classified learning strategies into two distinct categories, namely surface and and deep learning strategies. Surface learning strategies entail rehearsal strategies (reciting, naming items to be learnt, repetition, identifying important segments, loud reading, underlining, putting special marks, listing concepts, taking personal notes, highlighting and mnemonics memorizing and reading) while deep learning strategies comprise of elaboration strategies (paraphrasing, summarizing), organization strategies (outlining the materials, soliciting main ideas, taking notes), critical thinking (applying previous knowledge to new situations, reflection, looking for evidence, evaluating alternatives, interpretation) and metacognitive strategies (planning, monitoring, self-regulations).

Muwonge and Ssenyoga (2019) studied the relationship between self-regulated learning strategy and academic achievement among 680 pupils in Awassa, Ethiopia. The study found that self-regulated strategy, which is only a single component of the deep learning strategies, has significant influence on academic achievement. Ayesha and Habiba (2020) examined academic motivation and self-regulated learning among students. Both variables had significant relationship with academic achievement, where the latter had higher predictive value. The reviewed studies examined only a single component of deep learning strategies. Yet, findings in the reviewed literature indicate that all components of surface and deep learning strategies influence academic achievement. This expanded study examined surface and deep learning strategies and their influence on academic achievement.

Most of the available research findings on the variables studied are largely from developed countries and it was necessary to expand the research and examine the relationship between learning strategies and learners' academic achievement in a developing country. Further, there are scanty studies in Kenya that have examined the relationship between pupils' learning strategies and academic outcomes. Therefore, this study aimed to fill the gap.

II. Statement of the Problem

In Kenya, thousands of standard eight pupils sit for KCPE every year to mark the end of primary school education. The pupils' performance varies from county to county but majority of the pupils obtain low marks. In the last decade, the pupils from public primary schools in Nakuru County have been consistently achieving low KCPE scores. It is important to note that the county has been obtaining slightly above the national average mark but the high number of pupils (about 87%) from public schools have been recording low marks between 100 to 200 and others below 100 marks (KCPE 2015-2021). Studies conducted in the county to determine the causes of such low marks have cited school-related environmental factors, including parents' socioeconomic status, staffing levels, parental roles, type of school, leadership styles, attitude towards the school and the subjects and ineffective guidance and counseling as the main causes of the low marks obtained. Few studies have paid attention on the psychological domains of learners in the county and how they contribute to poor KCPE results. If this challenge of poor academic achievement is not addressed, more pupils will continue missing out on opportunities of learning at higher levels, which will have an impact on their employment opportunities in future. Nakuru county and the country at large will also suffer from the deficit of skilled manpower to steer economic growth. There are so many psychological factors that have an impact on academic achievement. The present study, therefore sought to examine the relationship between learning strategies (surface, deep) and academic achievement of primary pupils in Nakuru County.

Significance of the Study

In the research field, the findings may add and expand the existing body of knowledge on the importance of learning strategies in pupils' academic achievement and may even stimulate further research in the area under the current study. The findings may also inform and address reported inconsistencies on relationship among surface and deep approach learning strategies and academic achievement.

The findings of the current study may offer guidance to curriculum developers as the study findings reveal some implications for instructional interventions for teachers. For example, teaching learners to be aware of their learning strategies and skills for development, internalization of adaptive constructs and academic tasks and how to regulate them for more effective learning and academic achievement**.** For the teacher trainers, the findings may offer guidance towards equipping teacher trainees with the necessary knowledge on learning strategies and their importance in enhancing academic achievement of the pupils.

III. Literature Review

Surface approach learning strategies are lesser effective compared to deep learning strategies, since learners may just rehearse what they read without deeply processing the learning material which is detrimental to academic outcomes (Matos et al. 2007; Simsek & Balaban, 2010; Lindblom-Ylänne et al. 2018). However, rehearsal learning strategies are not unnecessary during learning process, especially if used in combination with the deep learning strategies (El Amandi, 2001). Yet, the few studies conducted in Africa and Kenya, for example, Mutweleli (2014) assessed self-regulated learning, one of the components of deep learning strategies. The reviewed literature reveal that both surface approach and other components of deep learning strategies could be potential mediators of academic achievement. Scanty research was found to have examined separately the relationship between surface and deep learning strategies and academic achievement of primary school levels or any other level in Africa or Kenya. Thus, it was necessary to compare the results with primary school pupils considering that the reviewed studies are largely from developed countries, focused on high school and university students and mostly employed cross-sectional and longitudinal research designs.

A research by Fen et al. (2021) found that motivational strategies based on Vroom's Expectancy theory encourage students to engage actively towards goal achievement and academic content learning. By allowing students engage in the hybrid learning program, researchers used motivational strategies to satisfy valence, instrumentality, and expectancy. The program lasted for 10 weeks, and a total of 82 university students from Pakistan's Metropolis City took part in the research. SPSS version 20 was used to conduct the independent sample t-test, ANOVA and Pearson's Correlation for hypothesis testing. The hybrid learning approach significantly impacted on academic achievement of the students. However, the study was based on university students and did not specifically examine how each of the types of learning approaches influence academic achievement, a gap the current research addressed.

In Malysia, Tan et al. (2021) conducted a study to compare academic achievement of undergraduate students with different learning strategies. A total of 400 undergraduates from an open distance learning (ODL) university participated in this quantitative study. This study employed a correlational research design. Archival data and a questionnaire were used to collect information. SPSS was used to run independent t-tests as well as Pearson's correlation analysis. The results showed that regular students performed marginally better than Accredited Prior Experiential Learning (APEL) students. The learning strategies employed by APEL and regular participants were not significantly different. The study also found that there was no link between cognitive abilities and academic achievement. Regular entrants' academic performance was not significantly related to APEL entrants' meta-cognitive self-regulation and help-seeking, which were found to affect the students' academic success. This research was limited to a sample of university students. As a result, the generalizability of the findings may not done to a sample of primary school pupils.

Studies by Matos et al. (2007), Simsek and Balaban (2010) and Subasinghe and Wanniachchi (2003) on the relationship between deep level learning and academic achievement among 1505 Peruvian secondary school students, Anandolu university students in Turkey and 202 Colombo university students respectively indicated there exists positive and significant association between the variables. The studies also established that deep level learning strategies are more effective in academic achievement compared with surface learning strategies. These studies used cross-sectional research design and findings were largely based on university and secondary school students while the current study used convergent parallel mixed research design and focus on primary school pupils. No regional or local research data, if any, relating to all components of deep learning strategies and academic achievement were found and it was therefore be of research interest to examine the influence of deep learning strategy on academic achievement.

In Kenya, Stephen et al. (2018) argued that education plays a critical role in the achievement of Sustainable Development Goals and therefore low academic achievement will derail the achievement of these goals. The purpose of the research was to establish the association between study skills and student performance in physics. Specifically, it aimed at determining the relationship between self-regulated strategies and physics

achievement in Nakuru East Sub-County. The study was based on Steffe and Gale's (1995) structuralism theory of learning and Bandura's social cognitive theory. The study used a correlational research design and the sample comprised of principals, physics teachers, and physics students. Krejcie and Morgan (1970) formula was used to calculate the sample size with 95% confidence level. To select the principals and physics teachers, purposive sampling was used. The research tools included questionnaires, interview schedule and content analysis. Cronbach alpha reliability coefficient was calculated to establish the instruments' internal consistency. The study found a positive relationship between self-regulation strategies and academic success.

Relatedly, Mutua and Oyoo (2020) examined whether academic performance is linked to cognitive strategies among secondary school students. The study also aimed to determine if there were sex differences in cognitive strategies and educational success among the students. The researchers employed sequential explanatory mixed methods design. Purposive, stratified and simple random sampling procedures were employed to select 488 participants who were drawn from ten public secondary schools. Data were collected through the use of questionnaires and interview guides. The study found significant sex differences in rehearsal and elaboration learning strategies. However, there was no significant gender difference in organizational learning strategy. Finally, the sex differences in the various learning strategies were linked to differences in academic achievement. To enhance knowledge in this area, the current research focused on primary school pupils from a different county.

IV. Methodology

a. Research Design

The relationship between learning strategies and pupils' academic achievement was determined using convergent parallel mixed research design. The quantitative and qualitative data collected were merged and used to test the research hypothesis as explained in the design proposed by Creswell and Creswell (2018). The design was appropriate because it provides for in depth analysis of the research problem.

b. Sampling Techniques and Sample size

Three sampling techniques were adopted for this study. The techniques used include; purposive sampling, stratified sampling and simple random sampling. The adoption of these sampling techniques was meant to ensure that the selected participants adequately represented the study population. The formula proposed by Nassiuma (2000) was used to obtain 16 schools from the 767 public primary schools in Nakuru County. Specifically, purposive sampling was used to select the 16 schools. The schools were classified as either boarding or day school where schools accommodating both class 7 and 8 pupils within the school were categorized under boarding schools. The final selection resulted in three boarding schools and thirteen day schools, resulting to a total of 16 schools selected using simple random sampling technique. From each school, 25 pupils were selected using simple random sampling, resulting in a sample of 400 participants from the 16 schools involved in this study.

According to Israel (2012)**,** a sample of 400 participants in a population of 50725 pupils was considered appropriate at 5% precision levels, confidence level at 95% and P = 0.05. Table 1 presents sample size of schools and participants.

Table 1: Sampling Frame

Type of School	Population			Sample Size		
	Schools	Pupils		Schools	Pupils	
		Boys	Girls		Boys	Girls
Day	749	25147	25005	13	180	145
Boarding	18	315	283	3	37	38
Sub Total	767	25462	25288	16	217	183
Total	767	50750		16	400	

Source: County Director of Education Office, Nakuru (2021)

c. Research Instruments

Learning Strategies Scale

To measure students' learning strategies, The Revised Two Factor Study Process Questionnaire (R-SPQ-2F), (Biggs et al., 2001) was used. The R-SPQ-2F is a self-report instrument with a Likert-type scale that ranges from 1 (Not at all true) to 5 (Very true). Two different types of learning strategies were assessed namely surface approach strategies and deep approach strategies according to the scoring system provided by Biggs et al. (2001**).** Each student was given separate scores on deep approach strategy, surface approach strategy and thus deep and surface approach. The score of each approach was calculated using the sum and students were identified as deep or surface learners based on the score each obtained. Students with equal scores for both

approaches were not categorized into either category, but were separately categorized as equal. Modification was done in consultation with the supervisors to ensure the scale was suitable for the study.

Interview Schedule

An in-depth interview was used in the study in order to complement the participants' quantitative data collected in the R-SPQ-2F sub scales which allowed deep analysis of the research problem.

Pupils' Academic Achievement Proforma

The academic achievement for the pupils in term one 2021 were obtained with the assistance of the class teachers from the selected schools. Document analysis was done to determine the aggregate scores obtained by the pupils for the five subjects examined. The aggregate scores were recorded in the proforma table designed for this purpose. To facilitate comparison of the aggregate scores obtained from the 16 selected schools, the scores were first transformed to Z-scores then to T-scores, which were then categorized into three levels including low (0-40), average (41-60) and high (60 and above).

d. Data Collection

The researcher obtained the research permit to carry out the study from the National Commission for Science, Technology and Innovation (NACOSTI). This was followed by seeking the permission from head teachers of the selected schools to carry out the study. The questionnaires were distributed to the selected respondents during the normal lesson time, after which they were given instructions on how to fill the questionnaires. The participants took approximately 40 minutes to complete the questionnaire. The researcher interviewed selected pupils to collect qualitative data. Academic achievement for the standard eight pupils was obtained from the class teachers of the respective schools. This was used to obtain a summary of the pupils' performance in the five subjects for term one 2021.

e. Data Analysis

The quantitative data collected was analyzed using Statistical Package for the Social Sciences (SPSS) Version 25. The results from the analysis were presented using tables. The descriptive statistics were used to obtain the frequencies, percentages, minimum score, maximum score, range, mean, and standard deviations among others while inferential statistics were used to determine the correlation between variables. The qualitative data collected were analyzed using thematic analysis.

V. Findings

5.1 Demographic Information of the Respondents

The researcher managed to collect 368 questionnaires out of the 400 that were issued out, which translates to a return rate of 92%. The return rate for the boys was 90% while that for the girls was 95% of the total questionnaires issued to either gender.

Age and Gender of the Pupils

The researcher further examined the age of the pupils by sex of the pupils as illustrated in Table 2.

Table 2: Descriptive Statistics of Age by Gender

Sex	N	Range	Min	Max	*M*	*SD*
Boy	195	4.00	12.00	16.00	13.99	0.76
Girl	173	5.00	12.00	17.00	13.73	0.81
Total	368	5.00	12.00	17.00	13.86	0.79

As illustrated in Table 2 above, the range for the boys was 4.00 with a minimum of 12.00 years and a maximum age of 16.00 years. The mean was 13.99 and the standard deviation was 0.76. The girls had a range of 5.00 years with a minimum age of 12.00 and a maximum age of 17.00 years. The mean age was 13.73 years with a standard deviation of 0.81. The results showed that the boys were slightly older than the girls.

5.2 Relationship Between Learning Strategies and Academic Achievement

The objective of this study was to investigate the relationship between learning strategies and academic achievement. This section presents the descriptive statistics of learning strategies, hypothesis testing and discussion of the results.

a) Descriptive Statistics of Pupils Learning Strategies

The study looked at the distribution of learning strategies among pupils. The results are presented in Table 3.

Table 3: Distribution of Learning Strategies Among the pupils

Learning Strategy	*f*	*%*
Equal	12	3.3
Deep Approach Learning Strategy	283	76.9
Surface Approach Learning Strategy	73	19.8
Total	368	100.0

As per the results in Table 3, pupils who were not categorized into either deep or surface learning orientation were 12 (3.3%). Majority of the pupils representing 76.9% used deep approach to learning while 19.8% of the pupils used surface approach learning strategy.
Further analysis was conducted to examine the descriptives of the surface and deep learning strategies and the results are given in Table 4.

Table 4: Descriptive Statistics of Learning Strategies

	N	Range	Minimum	Maximum	*M*	*SD*	*Sk*	*Kur*
DA	283	19.00	19.00	38.00	28.92	4.36	-0.06	0.56
SA	73	20.00	16.00	36.00	25.88	3.95	0.08	- 0.12

Note. DLS- Deep learning Strategy; SLS – Surface Learning Strategy
The range of the scores of pupils with deep approach orientation was 19. The minimum score was 19 while the maximum score was 38. The mean score was 28.92 (*SD* = 4.36). Their counterparts with surface approach orientation had a range of 20.00 with a mean of 25.88 (*SD* = 3.95). The minimum score of students with surface learning orientation was 16 while the maximum score was 36.

b. Descriptive Statistics of Academic Achievement Scores
Academic achievement of the students was measured using the marks they scored at the end of term one examination in 2021. The descriptive statistics of the scores of academic achievement were as shown in Table 5.

Table 5: **Academic Achievement Standardized Scores**

	N	Range	Minimum	Maximum	*M*	*SD*	*Sk*	*Kur*
Standardized scores of academic achievement	368	42.52	27.52	70.04	49.95	10.03	0.28	-0.93

The range of the standardized scores was 42.52 (minimum =27.52 and maximum=70.04). The mean score was 49.95 with standard deviation of 10.03. The skewness coefficient was 0.28 while the kurtosis coefficient was -0.93. This suggested that the scores were near normal distribution.
Academic achievement scores were categorized into levels and the results are presented in Table 6.

Table 6: Levels of Academic Achievement

	Frequency	Percent
Low	65	17.7
Moderate	233	63.3
High	70	19.0
Total	368	100.0

As seen in Table 6, less than a quarter (17.7%) of the respondents had low level of academic achievement. A majority representing 63.3% of the respondents had moderate level of academic achievement while 19% of the pupils had high level of academic achievement. Generally, most of the participants had moderate level of academic achievement.

c. Hypothesis Testing
The objective of this study was to investigate the relationship between learning strategies (deep, surface) and academic achievement. The following hypothesis was advanced;
There exists no significant relationship between learning strategies (deep, surface) and academic achievement.

The hypothesis was tested using Pearson correlation and the results are presented in Table 7.

Table 7: Correlation Between Learning Strategies and Academic Achievement

		Academic Achievement
Deep Learning Strategy	Pearson Correlation	.40**
	Sig. (2-tailed)	.00
	N	283
Surface Learning Strategy	Pearson Correlation	.11
	Sig. (2-tailed)	.38
	N	73

As shown in Table 7, there was a moderate positive and significant correlation between deep approach to learning and academic achievement, r (282) = .40, $p < .05$. Therefore, the null hypothesis that there is no significant relationship between deep approach strategy and academic achievement was rejected. The results imply that increase in the use of deep approach strategy leads to increase in academic achievement and vice versa. However, the study established that there was no statistically significant relationship between surface approach strategy and academic achievement, r (72) = .38, $p > .05$.

The study further examined if there were mean differences in academic achievement of pupils who used deep learning strategies and surface learning strategies.

d. Qualitative Data Analysis and Results

The researcher complemented the quantitative data collected by conducting interviews among the 40 selected pupils seeking their opinions on various statements that were structured in line with the research objectives. Analysis was done by comparing responses for each question from each of the 40 respondents. The questions used in the interview guide were open ended.

The qualitative data collected from the respondents were analyzed manually and using NVivo software. The analysis was done in a series of stages and in a systematic manner to provide information that effectively responds to the objective of this study.

To collect qualitative data, the respondents were asked to give their opinions on various statements. When asked whether they got the feeling of deep personal satisfaction when doing their studies, majority of the respondents agreed to this statement while a few stated otherwise. On whether they focused on a topic so that they form their own conclusions before being satisfied, most of the respondents agreed with this statement. When asked whether they were satisfied if they passed the examination while having done as little work as possible, majority of the respondents indicated that they were satisfied while a few indicated that they were not satisfied.

Regarding whether they normally studied what teachers gave out in class, majority of the respondents said that they did while a few indicated that they did not study seriously what the teacher gave out in class. On whether any topic can be highly interesting once they get into it, most of the respondents agreed to this statement. When asked whether they enjoyed most new topics and often spent extra time trying to obtain more information on them, majority of the respondents agreed to this statement while a few were of a contrary opinion.

The researcher further asked the respondents whether they relied on memorizing key sections rather than trying to understand them and majority of the respondents agreed that they relied on memorizing key sections rather than trying to understand them. On whether their studies were generally restricted to what is specifically set by the teacher as they thought it unnecessary to do extra work, almost half of the respondents agreed to this statement and indicated that they go an extra mile of reading outside what has been taught by the teacher. The respondents were further asked whether passing examination was more important than studying in-depth, majority of the respondents indicated that passing examination was a priority to them though they did not see the point of struggling to study in-depth.

When further asked to give their opinions on whether the teachers should not expect learners to spend significant amount studying materials that won't be examined, majority of the respondents concurred with this statement while other respondents were of contrary opinion that the teachers should expect learners to spend significant amount of time and resources studying things that will not be examined. In conclusion, most of the pupils adopted deep approach strategy and a few were more inclined to surface learning strategies. The pupils' dispositional optimism and learning approach adopted were directly associated with the pupil's academic achievement. The pupils who adopted deep learning strategy performed better than those who employed surface learning strategy.

In this study, the researcher identified three types of learning strategies adopted by the pupils, which include equal, deep learning and surface learning strategies. Table 8 indicates the results of the interviewed respondents.

Table 8: Distribution of Learning Strategies Among the Pupils

Learning Strategy	*f*	*%*
Equal	0	0
Deep Approach	24	60
Surface Approach	16	40
Total	40	100.0

From the Table 8 above, the majority (60%) of the pupils used deep approach as their learning strategy while the minority (40%) used surface approach as their learning strategy. This implies that majority of the pupils preferred deep approach learning strategy.

Table 9 presents quantitative results on learning strategies and academic achievement mean scores.

Table 9: Learning Strategies and Academic Achievement Mean Scores

Learning Strategy	*N*	Academic Achievement Mean Score	Std. Deviation
Deep Approach	283	51.80	9.67
Surface Approach	73	44.06	8.97
Equal	12	42.16	6.75

From the results shown in Table 9, pupils who used deep approach strategy scored a mean of 51.80 in academic achievement while those who used surface approach strategy scored a mean of 44.06. The ones who used the strategies equally scored a mean of 42.16. The pupils who used deep approach had the highest mean score while those who had equal scores in the two sub scales had the lowest mean score in academic achievement.
To establish if the mean differences were statistically significant, ANOVA was conducted and the results were as shown in Table 10.

Table 10: ANOVA for Learning Strategies and Mean Differences in Academic Achievement

	Sum of Squares	*df*	Mean Square	*F*	Sig.
Between Groups	4228.04	2	2114.02	23.61	.00
Within Groups	32675.59	365	89.52		
Total	36903.63	367			

The results showed that the mean differences in academic achievement based on learning strategy were statistically significant, F (2, 365) = 23.61, $p < .05$. The results suggest that pupils who used deep approach strategy performed better than those who used surface approach.
Further analysis was conducted using Tukey HSD to establish if the mean difference in academic achievement between any two learning strategies was statistically significant and the results are presented in Table 11.

Table 11: Tukey HSD for Learning Strategies and Academic Achievement

(I) LS categories	(J) LS categories	Mean Difference (I-J)	Std. Error	Sig.
Equal	DA	-9.64*	2.78	.00
	SA	-1.90	2.94	.79
DA	Equal	9.64*	2.78	.00
	SA	7.73*	1.24	.00
SA	Equal	1.90	2.94	.79
	DA	-7.73*	1.24	.00

Mean difference in academic achievement among pupils with equal and SA was not statistically significant. The rest were statistically significant (equal and DA; DA and SA).

e. Discussion of the Results

The current study found that there was a significant relationship between deep approach strategy and academic achievement. However, surface approach to learning was not significantly related to academic achievement. The pupils who used deep approach had the highest mean score while those who had equal scores in the two sub scales had the lowest mean score in academic achievement. The results showed that the mean differences in academic achievement based on learning strategy were statistically significant, F (2, 365) = 23.61, $p < .05$. The results were in line with a number of studies carried out in the past.

A study by Ylänne et al. (2018) that investigated surface approach in academic settings, as well as the reasons that underlie variances in its application found similar results. The 61 students involved in the research were enrolled in different faculties. From each program, one mandatory course was chosen. There were five different surface approach profiles, ranging from a full surface approach to a deep approach with rote memorization. Despite having equal high scores on the surface approach scale, the students used surface-level processes in different ways. However, the different surface approach processes did not have a significant impact on academic achievement.

Tan et al. (2021) posted similar results while investigating the relationship between learning strategies and academic performance: a comparison between accreditation of prior experiential learning (APEL) and regular entry undergraduates. The correlation analysis conducted indicated that meta-cognitive self-regulation, time and study environment management, effort regulation and help seeking are positively correlated with

academic performance. The sample size for this study was 700 students. The students who used learning strategies aimed to enhance content mastery performed better than students who used strategies that focused on getting favorable judgement.

Similar results were also found by Stephen et al. (2018) while investigating the relationship between learning strategies and physics performance in public secondary schools in Nakuru County. Their findings revealed that self-directed learning strategies had positive impact on academic achievement. The researcher concluded that the students who adopted self-directed strategies performed better than those who occasionally used them. The sample study for this research was 210 students. The results demonstrated the importance of learning strategies in achievement. This shows that regardless of the measure of achievement in school, deep approach to learning play a key role in academic achievement.

In Kenya, not much attention has been given to deep and surface learning approaches and academic achievement. Mutua and Oyoo (2020), posted similar results in their study in Nairobi City. Even though the study did not specifically focus on surface and deep approaches, the results demonstrated that learning strategies were significantly related to academic achievement. The researchers also reported no significant gender differences between boys and girls on the learning strategies adopted and academic achievement. The researchers attributed these results to the work done by UNESCO in promoting gender equity in Kenya, which was gaining momentum and yielding positive results. The current study established that a significant number of pupils employed deep approach strategy in learning but based on academic achievement of the pupils, this approach was not effectively used. Therefore, the below average academic achievement experienced in the area of study may be associated with this factor.

VI. Conclusions

The research sought to determine the correlation between learning strategies and academic achievement. The researcher hypothesized that there exists no significant correlation between learning strategies (deep, surface) and academic achievement. The results showed that the correlation between deep approach strategy and academic achievement was statistically significant. The correlation between surface approach strategy and academic achievement was not statistically significant. The results suggest that pupils who employed deep approach strategy performed better in academics than pupils who used surface approach strategy. Therefore, to enhance academic achievement of the pupils there is need to guide and support them to enhance the use of deep approach strategy in learning.

VII. Recommendations

a. Practice Recommendations

The study aimed to establish the association between learning strategies and academic achievement. The results of this study showed a statistically significant relationship between learning strategies and academic achievement. It is therefore recommended that teacher trainers and guidance counselling department come up with training programs for teachers and pupils respectively to enhance effective learning strategies in order to improve academic achievement of the pupils.

b. Recommendations for Further Research

i. This study was only conducted in Nakuru County. The results cannot therefore be used to generalize the rest of the 46 counties of Kenya because learning strategies are influenced by contextual factors. Therefore, further research is necessary in other counties to establish the influence of learning strategies on pupil's academic achievement for more conclusive findings.

ii. This study was conducted in primary schools and only class eight pupils were involved. These results from only one level of education may not be generalized to other levels of education like the secondary and tertiary institutions because of the differences in academic demands. Therefore, further studies are recommended in secondary schools and tertiary institutions to enhance knowledge in this area.

iii. Since this study found that deep learning strategy is significantly related to academic achievement, further studies are recommended to establish the variables that can be used to enhance deep learning strategy in order to enhance academic achievement of learners.

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