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Original Article

Influence of Learning Strategies on Academic Achievement of Final Year Aviation College Students in Mombasa County, Kenya

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Learning strategies are used by learners to achieve their academic goals. This study sought to establish the influence of learning strategies on the academic performance of final year aviation college students in Mombasa County. The specific objectives of the study were to establish the influence of the deep learning strategy on academic achievement and to determine the influence of the surface learning strategy on academic achievement. The study was based on the Experiential Learning Theory. This theory was relevant to the study because it places the subject to be learned at the centre to be experienced by both the learner and the instructor, which tends to be the case in aviation-related courses. The study adopted a positivist research philosophy because it involved quantitative data collection and analysis. The researcher was also independent. A cross-sectional research design was adopted by the study, and the target population was the aviation colleges licensed by TVETA to operate in Mombasa County, and there were three (3) in number. The sample size was 130 students, and those who responded were 109. This translated to an 84% response rate, which was excellent. Data analysis was done using simple linear regression analysis. The results of the simple linear regression analysis indicated that the deep learning strategy positively and significantly affected academic achievement ($F = 22.384, p = 0.000, t = 4.731, p = 0.000$). Surface learning strategy was found to have a positive but insignificant influence on academic achievement ($F = 1.475, p = 0.227, t = 1.1214, p = 0.227$). This led the study to reject H01, which stated that the deep learning strategy has no significant influence on academic achievement. However, the study failed to reject H02, which stated that the surface learning strategy has no significant influence on academic achievement. The findings of this study will add to the existing body of knowledge on learning strategies and academic achievement and can also be used in policy formulation by stakeholders of the Competency-Based Education and Training in Kenya. The researcher recommended that first year college and university students be taken through workshops on learning strategies so that they are well informed about the influence that their choice of learning strategies will have on their ability to achieve their academic goals. The researcher also suggested that future studies should consider investigating the moderating or mediating influence of academic

engagement and learning environment on the relationship between learning strategies and academic achievement.

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INTRODUCTION

Learning strategies are an essential element for learner success in educational institutions since academic achievement is a significant predictor of students' success or failure (Chandra, 2019). This influences students to utilise various learning strategies to achieve their academic goals. Learning strategies are defined by Muelas and Navarro (2020) as a set of approaches used by learners to acquire information and knowledge, such as taking notes, organising information, summarising, and coding. They can also be the cognitive behaviours or skills that learners utilise to store and retrieve information (Nadir & Yavus, 2019). The factors which affect the choice of learning strategies include individual learner differences, learner motivation, learner attitude, goal orientation and teaching methods used (Nisar et al., 2019). Students have different learning strategies, which they use to achieve their academic goals, because the various learning strategies help students to analyse, internalise, and remember the knowledge that they have acquired. The effectiveness and practicality of learning strategies vary (Nabizadeh et al., 2019), even though they may have common characteristics such as learning with understanding and meaningful learning. Academic achievement is a

multi-dimensional construct that is composed of skills, attitudes and behaviours of a student or learners which contribute to the individual's success in the learning environment (Hijazi & Naqvi, 2019). The measurement of students' academic achievement in learning institutions has elicited a lot of debate among policy makers (Elliot, 2007), and measures such as grade point averages, report card grades, teacher ratings and cognitive test scores have been used by researchers to measure academic achievement of learners. In general, academic achievement is represented by a numerical grade or point average in an examination, assignment or continuous assessment test. This implies that academic achievement is a quantitative outcome of a learning process where the learners' performance is expressed in terms of test scores or marks.

Studies have been done around the world on the relationship between learning strategies and the academic achievement of students. A study by Nabizadeh et al. (2019) on the prediction of academic achievement based on learning strategies among medical students in Iran. The findings indicated that self-regulating learning strategies could predict the students' academic achievement. This finding is similar to that of Mazetti et al. (2020), who investigated the impact

of learning strategies on the academic performance of undergraduate students in Italy. The study findings showed that learning strategies positively influenced the academic performance of students, but only through student self-efficacy. There are several studies that have reported contradicting findings on the relationship between learning strategies and the academic performance of students. For instance, a study in Italy by Vetorri et al. (2020) on 170 upper-secondary school students found that the relationship between learning strategies and academic achievement was negative. Another study by Tariq et al. (2018) in Pakistan found that there was no relationship between learning strategies and academic performance and this finding is not in tandem with that of Vetorri et al. (2020). Adeyeni (2019) investigated students' learning strategies and academic performance of secondary school students in Ondo state, Nigeria. The findings suggested the existence of a positive and significant effect of learning strategies on the academic performance of students. A study by Papageorgiou (2022) on self-regulated learning strategies and academic performance of accounting students at a South African university produced results that indicated that learning strategies were associated with higher exam grades.

In the East Africa region, a study by Sibomana et al. (2021) studied the effect of cooperative learning on the academic achievement of chemistry students in Rwandese day – upper secondary schools using a quasi-experimental research design and a sample of 257 students. Data was analysed using ANCOVA. The findings of the study indicated that the cooperative learning strategy significantly affected the academic performance of the chemistry students. This finding is similar to that of Faustino and Muneja (2020), who used a cross-sectional study to investigate the effect of cooperative learning on the academic achievement of English literature students in Dodoma, Tanzania, using a sample size of 160 students. Data from the study was analysed using descriptive statistics and correlation analysis, and the findings indicated

that there is a significant positive relationship between cooperative learning strategy and academic achievement of the students.

In the Kenyan context, a study by Bundi et al. (2022) examined the relationship between learning strategies and academic performance among primary school pupils in Nakuru County. The results of their study indicated that there was no statistically significant relationship between the learning strategies and the academic performance of the pupils. This finding contradicts that of Adeyeni (2019), and this shows that study results are not conclusive. Aboki and Kitawi (2020) investigated the impact of e-learning strategies on the academic performance of students at Strathmore University. The findings showed a positive effect on academic performance. However, the learning environment was virtual and not the physical learning environments that most researchers have done their studies in.

An empirical review of past studies done on the relationship between learning strategies and academic achievement of students reveals significant inconsistencies in the study findings. These inconsistencies could be a result of differences in the conceptualisation of the learning strategies by the researchers. For instance, the target population of the studies done by Mazetti et al. (2020), Nabizadeh et al. (2019), and Papageorgiou (2022) was university students, while the target population of the studies by Sibomana et al. (2021), Vetorri et al. (2020), Faustino and Muneja (2020) and Adeyeni (2019) were secondary school students. There are significant differences between university and secondary school students. Similarly, there were differences in the use of data analysis methods, with some authors using descriptive analysis and correlation analysis only, while others used regression analysis and Structural Equation Modelling (SEM), which are more robust than correlation analysis. Inconsistencies in study findings is an indicator that more studies need to be done to get more conclusive results, hence the need for the proposed study.

Research Problem

Achievement of excellent academic performance is an important objective for students because it determines whether the individual student will be able to proceed to the next level or whether he or she will successfully complete the course of study. From the literature review, most of the studies done on the relationship between learning strategies and academic performance have been conducted in primary and secondary schools as well as at the university level. The studies by Kaptum et al. (2018) and Mavole et al. (2017) were done in secondary schools in Nakuru and Nairobi counties respectively. Few studies have been done on learning strategies and academic performance of students in middle-level colleges, especially in Mombasa County, and this represents a geographical gap that this study will seek to address. The study by Viet (2022) on learning strategies and academic performance produced findings that indicated that there is no correlation between learning strategies and the academic achievement of students. This contradicts the finding in a study by Almoslamani (2021), who found that learning strategies are a significant predictor of academic achievement. The studies by Viet (2022) and Almoslamani (2021) targeted university students, and there is a need to study the learning strategies of students at the college level.

Inconsistency in the research findings by researchers is an indication that existing findings on the relationship between learning strategies and academic performance are not conclusive, and there is a need for more studies to be done. Middle-level colleges have largely been ignored by researchers investigating the link between learning strategies and the academic performance of students. A study by Achieng et al. (2022) recommended that new studies should investigate the link between learning strategies and academic achievement of learners in colleges so that results can be compared across the various levels of education, and this also influenced this study. This study sought to answer the question of what the influence of learning strategies is on the academic

achievement of aviation college students in Mombasa County.

LITERATURE REVIEW

Theoretical Foundation

Experiential Learning Theory

This study was based on the Experiential Learning Theory. It is a learning theory that was developed by Kolb (1984), and it confirms all the main aspects of active learning by providing theoretical arguments of independent learning, learning by doing, work-based learning and problem-based learning. The Experiential Learning Theory describes the learning process as a cycle made of four phases, which are concrete experience – doing, reflexive observation – observing, abstract conceptualising – thinking and active experimenting – planning. According to Sharnalova (2004), the first phase of concrete experience involves the learner trying or doing something. In the second phase of reflexive observing, the learner returns to the starting point of the task to review what was done. This is done through listening skills, paying attention, identifying differences and sharing them with other learners. The third phase of abstract conceptualisation involves the interpretation of the results and understanding the connections between them. During the critical reflection, questions are asked from the perspective of the previous experience. The fourth and last phase is that of active experimenting (planning), and this gives a learner the opportunity to master a new understanding or what other actions should be taken to improve the way the task is done.

This theory was relevant to this study because experiential learning theory places the subject to be learned at the centre to be experienced by both the instructor and the learner (Kolb & Kolb, 2017). This implies that the cycle of learning is very applicable for learners in undertaking an aviation course since they receive information through concrete experience of the subject in the lecture halls and during practical sessions, which

they then transform through reflection and conceptualisation. They then transform it again by acting to change the world of aviation. The learners in the experiential learning theory are both receivers of information and creators of information, which makes learning for those pursuing aviation-related courses very hands-on.

Learning Strategies

Learning strategies are defined by Muelas and Navarro (2015) as a set of approaches used by learners to acquire information and knowledge, such as taking notes, organising information, summarising, and coding. The term approach is used to signify both the learner's intention and the strategy he or she uses to process information (Husin et al., 2019). This implies that learning strategies involve not only receiving information and knowledge, but also performing mental activities to process and utilise the information effectively. Learners are free to choose their learning strategies, direct their learning process and control their tendencies to achieve their learning objectives (Diaz et al., 2019). Learners approach their learning in different ways in response to various motivations and environmental factors that may be internal or external to them. The most common learning strategies found in the literature are surface and deep learning strategies, which originated from the research work done by Marton and Saljo (1976). Since then, many researchers around the world have adopted these two learning strategies to measure student learning approaches in various contexts.

Deep Learning Strategy

The deep learning strategy is characterised by the learner having an interest and searching for the meanings of the content in the study material. This implies that a learner using this strategy wants to clearly understand the content, and McCune (2019) suggested that learners using the deep learning strategy are intrinsically motivated and have content mastery goals. Deep learning strategy is meaningful, and it involves the learner

reading widely and interacting with previous knowledge (Biggs et al., 2018). Learners are more likely to adopt a deep learning strategy in courses offering more authentic assessments, such as projects or course units that require students to make sense of the study material. Desierto et al. (2021) suggested that a deep learning approach may be adopted by learners when they find themselves in an active, learner-centred environment. It is also possible that having clear learning goals and standards, "good teaching", suitable learner assessments, encouragement towards autonomous learning and quality instructor feedback can make it conducive for students to adopt a deep learning strategy (Wang, 2020). Elaboration of the study content by the learner is a deep strategy that involves assigning meaning to new information by associating it with prior information. In order for a learner to comprehend new learning material easily, he or she may outline the main ideas in the content, sketch an information scheme, draw concept maps and tabulate information (Güven, 2018). Deep learners also try to overcome emotional obstacles that emerge during learning by reducing anxiety, motivating one-self and eliminating distractions from their learning environments for maximum focus on learning material.

Surface Learning Strategy

The surface learning strategy involves the learners focusing more on the details of the learning materials, which they deem to be the most important. This implies that when using a surface learning strategy, the learner focuses on the memorisation of details that are sufficient to enable the learner to pass the examination (Wilkins, 2019). The goal of studying for learners who use the surface learning strategy is to avoid failure in the examination, and therefore, they are more concerned with reproducing the content as it is rather than understanding it. The motivation for learners who use a surface learning strategy is more extrinsic, such as the fear of failure. According to Lyke and Young (2020), surface learning strategies are helpful for managing information that is needed for recall on a short-

term basis, and they may be useful for certain types of assessments. Some researchers have argued that surface learning strategy is necessary to enable learners to move on to acquiring deeper knowledge for certain fields of study and in specific contexts (Ryan & Louie, 2018; Hattie & Donoghue, 2019). According to Yin and Desierto (2019), surface learning strategy learner behaviour, such as rote learning, is necessary for students studying law who are required to recall genuine elements of legal cases and court rulings to create convincing legal arguments for use in answering examination questions. Similarly, Chan (2018) suggested that surface learning strategies can be used to develop and deepen understanding and lead to more in-depth learning in sciences, mathematics and languages.

Academic Achievement

Academic achievement is a multi-dimensional construct that is composed of skills, attitudes and behaviours of a student or learners which contribute to the individual's success in the learning environment (Hijazi & Naqvi, 2019). It can also be thought of as a satisfactory level of performance of the learners that enables them to progress and complete their school, college or university (Tope, 2021). The measurement of students' academic achievement in learning institutions has elicited a lot of debate among policy makers (Elliot, 2007), and measures such as grade point averages, report card grades, teacher ratings and cognitive test scores have been used by researchers to measure academic achievement. In general, academic achievement is represented by a numerical grade or point average in an examination, assignment or continuous assessment test. This implies that academic achievement is a quantitative outcome of a learning process where the learners' performance is expressed in terms of test scores or marks.

Deep Learning Strategy and Academic Achievement

The deep learning strategy is associated with students focusing on learning to understand

subject content by making reference to other materials and previously learned concepts (Sam, 2020). It also allows the students to consciously get involved in the process of learning by relating their previous life encounters to what they are learning, expressing intrinsic interest and putting effort into understanding what they learn (Enwistle & Ramsden, 2003). Several studies have been done on deep learning strategies and their influence on the academic performance of students. A study by Chotitham et al. (2013) on deep learning and its influence on the academic achievement of university students in Thailand produced results that indicated that the deep learning strategy had a positive and significant effect on the academic achievement of students. Marambe et al. (2019) examined the influence of deep learning strategies on the academic performance of medical students in Sri Lanka. The findings of the study showed that there was no relationship between the academic performance of the students and the deep learning strategy. This finding contradicts that of Chotitham et al. (2013), and this shows the need for more studies to be done.

A study by Ladan et al. (2014) investigated learning approaches as predictors of academic performance of undergraduate students in a Nigerian University. The results of their study indicated that the deep learning strategy predicted high academic achievement among the students. This also contradicts the finding by Marambe et al. (2019). None of the studies reviewed was conducted in a college set-up or in Mombasa County in Kenya, and this represents contextual and geographical gaps that need to be addressed. This study sought to examine the influence of deep learning strategy on the academic achievement of aviation college students in Mombasa County.

Surface Learning Strategy and Academic Achievement

Surface learning strategy is characterised by students choosing the quickest way to accomplish the academic tasks, and they study the learning

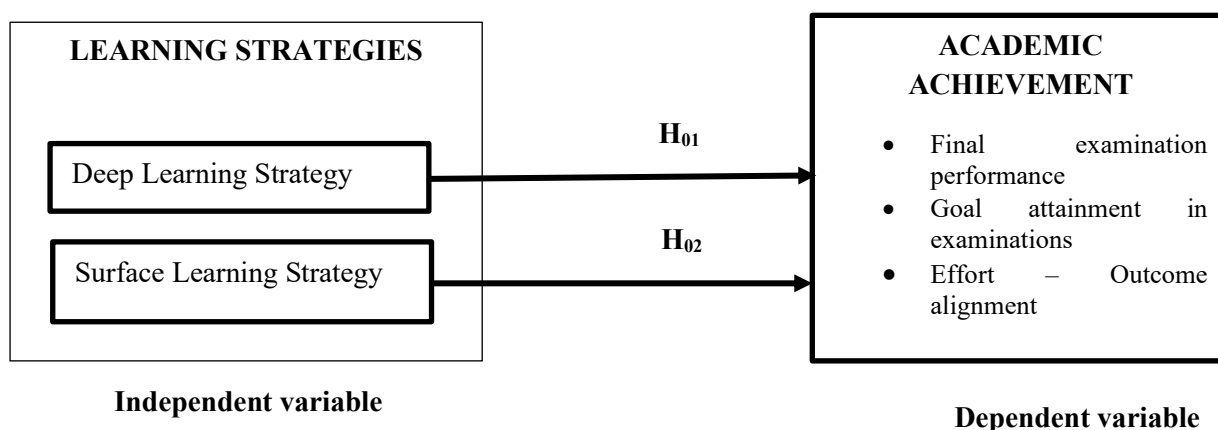
materials in a linear manner, do not show proper interest in the subject, and they rely on memory and not comprehension (Delgado et al., 2018). The implication of the use of surface learning strategies is that students who use such strategies tend to achieve the minimum grades required to avoid failing. Surface learning is also considered by Hussin et al. (2017) to be rote learning because students focus on memorising subject content. A study by Sam (2020) investigated the relationship between learning approaches and academic achievement of accounting education students at the University of Cape Coast in South Africa. The findings of the study indicated that the surface learning strategy had a negative relationship with the academic achievement of students at the university. However, another study by Amiri

(2018) on the relationship between critical thinking, epistemological beliefs and learning strategies with students' academic performance found that the surface learning strategy had no significant relationship with academic performance. This contradicts the finding by Sam (2020), and there is a need for more studies to be done to have more conclusive results. This study sought to establish the influence of surface learning strategy on the academic achievement of aviation college students in Mombasa County.

Conceptual Framework

The conceptual framework of this study was developed from the review of literature and is illustrated in Figure 1.

Figure 1: Conceptual Framework



Source: *Researcher (2026)*

The conceptual framework in Figure 1 indicates that learning strategies is the independent variable and academic performance is the dependent variable. There is a direct relationship between the two variables. Learning strategies were measured based on deep learning strategies and surface learning strategies. The academic achievement of students was measured based on the final exam grades of the students. From the conceptual framework, the learning strategies influence the academic achievement of the students. The two null hypotheses formulated from the relationships depicted in Figure 1 were;

H_{01} : Deep learning strategy has no significant influence on the academic achievement of Aviation College students in Mombasa County

H_{02} : Surface learning strategy has no significant influence on the academic achievement of Aviation College students in Mombasa County

METHODOLOGY

This study adopted a descriptive cross-sectional research design because data on the study

variables was collected at a single point in time. The study population consisted of all final year students at aviation colleges licensed by the Technical and Vocational Training Authority (TVETA) to operate in Mombasa County. TVETA keeps records on the number of students enrolled to pursue academic programs at TVETA-licensed institutions. Final year college students were targeted in this study because they are at a critical stage of their academic journey where learning strategies and academic achievement are most clearly demonstrated. Having spent several years in college, final year students have been exposed to a wide range of instructional methods, assessments, and academic demands, enabling them to develop relatively stable and well-established learning strategies. This makes them better positioned to provide reliable and informed responses regarding their use of deep and surface learning strategies. In addition, their academic achievement, particularly examination scores and overall performance, reflects the cumulative effect of these learning strategies over time rather than short-term or transitional experiences. For aviation college students, the final year is especially important because it involves advanced coursework, professional examinations, and preparation for industry certification and employment, where a deep understanding and application of knowledge are essential. Therefore, targeting final year students provided more meaningful, valid, and comprehensive insights into the relationship between learning strategies and academic achievement.

Data from the TVETA office in Mombasa indicated that there are 130 final year students at the three aviation colleges in Mombasa County. Since 130 students is a relatively small number, a census study was conducted. A group-administered questionnaire was used to collect data from final year aviation college students. Group administration is an efficient and effective survey distribution method in educational settings because it achieves higher response rates and allows researchers to clarify items in real-time, reducing response error and enhancing data quality. Additionally, evidence from survey

research shows that face-to-face, supervised administration yields significantly increased participation and completion rates compared to other modes of delivery, which reinforces the suitability of this method for studies requiring comprehensive quantitative data. (Sebo et al., 2025). Learning strategies as a variable was measured using the R-SPQ-2F scale items adapted from Biggs et al. (2001), while academic achievement was measured using the SAAS scale items adapted from Stadler et al. (2021). The R-SPQ-2F is the *Revised Two-Factor Study Process Questionnaire* that measures students' approaches to learning. It focuses on deep learning and surface learning strategies. The SAAS scale refers to the *Subjective Academic Achievement Scale*, which was developed to capture students' *subjective sense of achievement* at university, complementing objective measures like GPA. Both scales were selected for their established validity and reliability in educational research, and the adaptations ensured contextual relevance to the current study.

All the items were measured on a 5-point rating scale with 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree nor Disagree, 4 = Agree and 5 = Strongly Agree. Data analysis was done using linear regression analysis, and therefore, the data collected was subjected to the tests of the assumptions of regression analysis. The assumptions underlying the statistical analyses were tested and met. Linearity was confirmed as there was no significant deviation from linearity. Normality of the data distribution was verified using both the Shapiro–Wilk and Kolmogorov–Smirnov tests, which indicated that the data did not significantly deviate from a normal distribution. Independence of residuals was established through the Durbin–Watson test, with values falling within the acceptable range, thereby confirming the absence of autocorrelation. These results demonstrate that the data collected met the requirements for subsequent analyses. Cronbach's alpha reliability analysis was conducted for each variable. Learning strategies yielded a coefficient of 0.82, while academic achievement produced a coefficient of 0.76. Since both values are above

the recommended threshold of 0.70, the instruments were considered reliable for this study.

FINDINGS

The response rate for the study was 84% since 109 of the 130 final year students responded by filling in the questionnaires. The 84% response rate is considered excellent in quantitative educational research and supports the representativeness of the sample. Recent meta-analytic evidence indicates that typical absolute response rates in

survey research average approximately 67 % across educational studies, suggesting that an 84 % rate exceeds common benchmarks and enhances the validity of the findings (Wilson et al., 2023). Additionally, response rates of 50 %–60 % are frequently regarded as reasonable for general research purposes, indicating that the current study's response rate is highly satisfactory and reduces concerns about non-response bias. Table 1 presents details of the gender, educational level and work experience of the respondents of the study.

Table 1: Respondent Characteristics

Description	Frequency	Percentage
Gender of the respondents	Male = 58	Male = 53.2%
	Female = 51	Female = 46.8%
	Total = 109	Total = 100%

Source: *Research Data (2026)*

Data from Table 1 shows that male students comprised 53.2 % of the sample, compared to 46.8 % female students. This distribution was expected given documented patterns in technical and vocational education in Kenya, where enrolment in technical and engineering-oriented programmes is frequently higher for male students than female students. National statistics from TVETA indicate that male students represented approximately 54.6 % of total student enrolments

at Technical and Vocational Training Institutions in Kenya, with females at around 45.4 % (TVETA, 2023). Persistent social and cultural norms that frame technical and specialised fields as more suitable for males also contribute to this gender disparity in enrolment in technical programmes. (Kenya Institute for Public Policy, Research and Analysis, 2025; TVETA, 2023). Table 2 provides details on the descriptive statistics for the Deep Learning Strategy.

Table 2: Descriptive Statistics for Deep Learning Strategy

Statements	Mean	Std. Deviation	N
1. I find that at times studying gives me a feeling of deep personal satisfaction	3.19	1.236	109
2. I feel that virtually any topic can be highly interesting once I get into it	3.55	1.182	109
3. I find that studying academic topics can, at times, be as exciting as a good novel or movie	3.28	1.203	109
4. I work hard at my studies because I find the material interesting	3.70	1.076	109
5. I come to most classes with questions in mind that I want to ask the lecturer	3.95	1.004	109
6. I find that I have a lot of work on a topic so that I can form my own conclusions before I am satisfied	3.32	1.170	109
7. I find most new topics interesting and often spend extra time trying to obtain more information about them	3.40	1.107	109

Statements	Mean	Std. Deviation	N
8. I test myself on important topics until I understand them completely	2.99	1.005	109
9. I spend a lot of my free time finding out more about interesting topics which have been discussed in different classes	3.23	1.281	109
10. I make a point of looking at most of the suggested readings that are provided in the course outline	3.42	1.196	109
Average score	3.40	1.146	

Source: Research data (2026)

The descriptive statistics in Table 2 indicate that, overall, the respondents demonstrated a moderately high level of intrinsic motivation and deep learning orientation in their study practices, with an overall mean score of 3.40 (SD = 1.146) on a five-point Likert scale. This suggests that most students generally agreed with statements reflecting interest-driven learning, curiosity, and self-directed engagement, although responses varied across individuals. The highest mean score was recorded for the statement “*I come to most classes with questions in mind that I want to ask the lecturer*” (M = 3.95, SD = 1.004), indicating that a large proportion of students actively engage in class and approach learning with inquiry and preparedness. Similarly, relatively high mean scores for “*I work hard at my studies because I find the material interesting*” (M = 3.70, SD = 1.076) and “*I feel that virtually any topic can be highly interesting once I get into it*” (M = 3.55, SD = 1.182) suggest that interest in course content is a strong motivator for academic effort among the students. Moderate mean scores were observed for statements related to seeking deeper understanding, such as forming personal

conclusions (M = 3.32, SD = 1.170), spending extra time on new topics (M = 3.40, SD = 1.107), and consulting suggested readings (M = 3.42, SD = 1.196), implying that while many students engage in deep learning strategies, this behavior is not uniformly practiced by all respondents.

The lowest mean score was reported for “*I test myself on important topics until I understand them completely*” (M = 2.99, SD = 1.005), indicating comparatively weaker use of self-testing and metacognitive monitoring strategies. Overall, the standard deviation values, which range from 1.004 to 1.281, reflect moderate variability in students’ responses, suggesting individual differences in learning approaches. Collectively, these findings imply that the students generally display positive attitudes toward learning and intrinsic motivation, which are likely to support academic achievement, although there remains room for strengthening more systematic and reflective learning strategies, such as self-assessment and independent consolidation of knowledge. Table 3 provides descriptive statistics on Surface Learning Strategy.

Table 3: Descriptive Statistics for Surface Learning Strategy

Statements	Mean	Std. Deviation	N
1. My aim is to pass the course units while doing as little work as possible	2.94	1.409	109
2. I do not find my course very interesting, so I keep my work to the minimum	3.06	1.173	109
3. I find that I can get by in most assessments by memorising key sections rather than trying to understand them	2.79	1.306	109
4. I find that it is not helpful to study topics in depth since it confuses me and wastes time, yet all I need is to pass	2.93	1.345	109

Statements	Mean	Std. Deviation	N
5. I see no point in learning content in materials which is not likely to be in the examination	3.25	1.292	109
6. I only study seriously what is given out in class or in the course outlines	3.28	1.195	109
7. I learn some things by going over them severally until I know them by heart even if I do not understand them	3.27	1.168	109
8. I generally restrict my study to what is specifically set, as I think it is unnecessary to do anything extra	2.93	1.120	109
9. I believe that lecturers should not expect students to spend a lot of time studying material that will not be examined	3.27	1.152	109
10. I find that the best way to pass my examinations is to try to remember answers to likely questions.	3.50	1.102	109
Average score	3.12	1.23	

Source: Research data (2026)

Table 3 presents the descriptive statistics for the Surface Learning Strategy among 109 respondents, showing generally moderate to relatively high endorsement of surface learning behaviours. The overall average mean score of 3.12 (SD = 1.23) indicates that, on average, students tend to agree with statements reflecting a surface approach to learning, such as focusing on passing examinations, memorisation, and limiting study to examinable content. The highest mean score was recorded for the statement *"I find that the best way to pass my examinations is to try and remember answers to likely questions"* (M = 3.50, SD = 1.102), suggesting that many students rely heavily on rote memorisation as a strategy for academic success. Similarly, high mean values were observed for statements related to restricting study to examinable materials and course outlines, including *"I only study seriously what is given out in class or in the course outlines"* (M = 3.28, SD = 1.195) and *"I see no point in learning content in*

materials which is not likely to be in the examination" (M = 3.25, SD = 1.292), indicating a strong exam-oriented learning culture. Moderate mean scores were also evident for items reflecting minimal effort and lack of intrinsic interest, such as *"My aim is to pass the course units while doing as little work as possible"* (M = 2.94, SD = 1.409) and *"I do not find my course very interesting, so I keep my work to the minimum"* (M = 3.06, SD = 1.173). The relatively consistent standard deviations, ranging from 1.102 to 1.409, suggest a reasonable level of variability in students' responses but no extreme dispersion, implying that these surface learning tendencies are fairly common across the sample. Overall, the results indicate that a substantial proportion of students adopt surface learning strategies, prioritising examination performance and memorisation over deep understanding of course content. Table 4 provides the descriptive statistics for Academic achievement.

Table 4: Descriptive Statistics for Academic Achievement

Statements	Mean	Std. Deviation	N
1. I am satisfied with my final exam scores/grades	3.54	1.190	109
2. I am successful in achieving my target examination scores/grades	3.74	1.158	109
3. My final exam scores are appropriate for my effort	3.74	1.101	109
Average scores	3.67	1.149	

Source: Research data (2026)

Table 4 presents the descriptive statistics for Academic Achievement among the 109 respondents, indicating a generally positive perception of students' academic performance. The overall average mean score of 3.67 (SD = 1.149) suggests that most students tend to agree that they are performing well academically and are satisfied with their examination outcomes. The highest mean scores were recorded for the statements "*I am successful in achieving my target examination scores/grades*" (M = 3.74, SD = 1.158) and "*My final exam scores are appropriate for my effort*" (M = 3.74, SD = 1.101), indicating that a considerable proportion of students believe their academic results align with their expectations and the effort they invest in their studies. This reflects a sense of self-efficacy and perceived fairness between effort and achievement. Additionally, the statement "*I am satisfied with my final exam scores/grades*" also yielded a relatively high mean score (M = 3.54,

SD = 1.190), further supporting the view that students generally hold favourable attitudes toward their academic outcomes. The standard deviation values, which range from 1.101 to 1.190, indicate moderate variability in responses, suggesting that while perceptions of academic achievement are largely positive, some differences exist among students. Overall, these findings demonstrate that the respondents perceive their academic achievement to be above average, with most students expressing satisfaction and confidence in their examination performance.

Testing the Influence of Deep Learning Strategy on Academic Achievement

The influence of deep learning strategy on academic achievement was tested using simple regression analysis. Table 5 provides the results of the model summary.

Table 5: Model Summary of the Influence of Deep Learning Strategy on Academic Achievement

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.416 ^a	.173	.165	1.06352

a. Predictors: (Constant), Deep Learning Strategy

Source: Research Data (2026)

From Table 5, the coefficient of determination (R^2) was 0.173, and this implied that marketing agility explained 17.3% of the variation in the academic achievement of final year aviation college students at aviation training colleges in Mombasa County, Kenya. The remaining 82.7% was attributed to other factors that were not

covered by this study. The relationship between deep learning strategy and academic achievement was positive and moderate, with a correlation coefficient of $R = 0.416$. Table 6 provides the results of the Analysis of Variance (ANOVA) of the deep learning strategy and academic achievement.

Table 6: ANOVA^a Results of the Influence of Deep Learning Strategy on Academic Achievement

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	25.318	1	25.318	22.384	.000 ^b
Residual	121.024	107	1.131		
Total	146.343	109			

a. Dependent Variable: Academic Achievement

b. Predictors: (Constant), Deep Learning Strategy

Source: Research Data (2026)

The ANOVA table assesses whether the regression model provides a better fit to the data than a model with no predictors. The ANOVA

results in Table 6 indicated that the regression model was significant ($F = 22.384$, $p = 0.000$). This demonstrated that the relationship between

deep learning strategy and academic achievement is statistically significant. This means that deep learning strategy significantly predicts academic achievement and that the observed effect is unlikely to have occurred by chance. Overall, the ANOVA results confirm that the regression model is valid and that the deep learning strategy has a

significant influence on students' academic achievement, supporting the conclusion that adopting deep learning approaches contributes positively to academic performance. Table 7 provides the regression coefficients of the influence of deep learning strategy and academic achievement.

Table 7: Regression Coefficients of the Influence of Deep Learning Strategy on Academic Achievement

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.194	.470		2.540	.013
Deep Learning Strategy	.637	.135	.416	4.731	.000

a. Dependent Variable: Academic Achievement

Source: Research Data (2026)

The results in Table 7 indicated that $t = 4.731$ and $p = 0.000$, which implied that the deep learning strategy positively and significantly influenced the academic achievement of final year aviation college students in Mombasa County. The unstandardized regression coefficient also indicated that the deep learning strategy was significant ($\beta = 0.637$, $p = 0.000$). Therefore, these results led to the rejection of the study's null hypothesis, which stated that the deep learning strategy has no significant influence on the academic achievement of final year aviation college students in Mombasa County. This finding is in tandem with findings of studies by Bundi et al. (2022) and Elhassan et al. (2020), whose study results also indicated that a deep

learning strategy has a positive and significant effect on the academic achievement of learners. Another study by Li and Liu (2021) also reported that a deep approach to learning was significantly associated with higher academic achievement, concluding that students who employed deep learning strategies performed better academically than those who did not.

Testing the Influence of Surface Learning Strategy on Academic Achievement

The influence of surface learning strategy on academic achievement was tested using simple regression analysis. Table 8 provides the results of the model summary.

Table 8: Model Summary of the Influence of Surface Learning Strategy on Academic Achievement

Model	R	R Square	Adjusted R-Square	Std. Error of the Estimate
1	.117 ^a	.014	.004	1.06289

a. Predictors: (Constant), Surface Learning Strategy

Source: Research Data (2026)

Data from Table 8 shows that the correlation coefficient ($R = 0.117$) had a very weak but positive relationship between surface learning strategy and academic achievement. The R Square value of 0.014 shows that surface learning strategy explains only 1.4% of the variance in

academic achievement, with the remaining 98.6% being explained by other factors that this study did not focus on. This implies that the surface learning strategy had a minimal contribution to predicting students' academic performance. Table 9 provides the results of the ANOVA.

Table 9: ANOVA^a Results of the Influence of Surface Learning Strategy on Academic Achievement

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	1.666	1	1.666	1.475	.227 ^b
Residual	120.881	107	1.130		
Total	122.546	109			

a. Dependent Variable: Academic Achievement

b. Predictors: (Constant), Deep Learning Strategy

Source: Research Data (2026)

The results from Table 9 indicate that the calculated F-statistic is 1.475 and $p = 0.227$, and this implies that the regression model was not statistically significant. Therefore, the results suggest that the surface learning strategy does not have a significant influence on academic achievement among the students. The ANOVA findings confirm that surface learning strategy is

a weak and non-significant predictor of academic achievement, implying that reliance on surface learning approaches such as rote memorisation and exam-focused study does not meaningfully contribute to improved academic performance. Table 10 provides the regression coefficients of the influence of surface learning strategy and academic achievement.

Table 10: Regression Coefficients of the Influence of Surface Learning Strategy on Academic Achievement

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	3.262	.356		9.161	.000
Surface Learning Strategy	.133	.109	.117	1.214	.227

a. Dependent Variable: Academic Achievement

Source: Research Data (2026)

The results from Table 10 show that the unstandardized coefficient for surface learning strategy is $B = 0.133$, which indicates that a one-unit increase in the use of surface learning strategies would result in only a 0.133 unit increase in academic achievement, holding other factors constant. This suggests a very weak positive effect of surface learning strategy on academic achievement. The standardised beta coefficient ($\beta = 0.117$) further confirms that the effect of surface learning strategy on academic achievement is weak. Moreover, the t-value of 1.214 with a corresponding significance level of 0.227 ($p > 0.05$) indicates that surface learning strategy is not a statistically significant predictor of academic achievement. Therefore, these results led to the failure to reject the study's null hypothesis, which stated that surface learning strategy has no significant influence on the

academic achievement of final year aviation college students in Mombasa County. This finding is similar to that of Bundi et al (2022) and Elhassan et al. (2020), whose studies also provided results indicating that the surface learning strategy had no significant effect on academic achievement. Other empirical studies also support the finding that surface learning strategy does not have a significant effect on academic achievement, consistent with the results of the present study. For instance, a study by Ayalp (2021) also established that the surface learning approach had a negligible and non-significant effect on academic achievement compared to deep learning strategies. Furthermore, research by Mel (2021) among engineering students revealed that surface learning strategies did not significantly predict academic performance, emphasising that exam-

oriented and memorisation-based learning approaches were insufficient for enhancing achievement. These findings are further reinforced by broader reviews of learning approaches, which consistently indicate that surface learning strategies tend to have weak or inconsistent relationships with academic achievement when compared to deep learning approaches.

DISCUSSION OF FINDINGS

The findings of this study reveal a clear contrast between the effects of the deep learning strategy and surface learning strategy on the academic achievement of final year aviation college students in Mombasa County. The results demonstrated that a deep learning strategy had a positive and statistically significant influence on academic achievement, indicating that students who actively sought to understand concepts, integrate ideas, and apply knowledge meaningfully achieved better academic outcomes. This suggests that deep learning strategies enable learners to develop higher-order cognitive skills such as critical thinking, problem-solving, and conceptual understanding, which are particularly essential in aviation education, where mastery of complex and technical content is required. The significant predictive power of the deep learning strategy aligns with constructivist learning theory, which emphasises active engagement and meaning-making as key drivers of effective learning. These findings further corroborate previous empirical studies that consistently found deep learning strategies to be strong predictors of academic achievement across different educational contexts.

In contrast, the findings indicated that the surface learning strategy had a weak and statistically nonsignificant influence on academic achievement. Although the surface learning strategy showed a slight positive relationship with academic achievement, its effect was minimal and not significant, suggesting that approaches centred on rote memorisation, examination-focused studying, and minimal engagement with

learning content do not substantially enhance academic performance. This outcome implies that surface learning strategies may enable short-term recall sufficient for passing examinations but are inadequate for sustained academic success, particularly at advanced levels of study such as the final year of college. The failure of surface learning strategy to significantly predict academic achievement supports prior research findings, which similarly reported weak or non-significant relationships between surface learning approaches and academic performance.

Overall, the contrasting results underscore the importance of promoting deep learning strategies over surface learning approaches in higher education, especially in professionally oriented fields such as aviation. While surface learning may help students cope with immediate assessment demands, it does not provide the depth of understanding required for high academic achievement or professional competence. Therefore, the findings suggest that instructional practices, assessment designs, and curriculum structures should encourage deep engagement with learning content to enhance students' academic achievement and preparedness for professional practice.

CONCLUSION

This study set out to examine the influence of deep learning strategy and surface learning strategy on the academic achievement of final year aviation college students in Mombasa County. The findings provide clear and meaningful insights into how different learning approaches relate to students' academic outcomes at an advanced level of higher education. The study concludes that a deep learning strategy has a positive and statistically significant influence on academic achievement. Students who actively engage with course content, seek to understand underlying concepts, relate new knowledge to prior learning, and apply ideas meaningfully tend to achieve higher academic performance. This underscores the critical role of deep learning in enhancing conceptual understanding, critical thinking and

long-term knowledge retention. These are skills that are particularly essential in aviation education, where accuracy, problem-solving, and applied knowledge are fundamental. The rejection of the null hypothesis on the deep learning strategy confirms that meaningful engagement with learning content significantly contributes to improved academic achievement.

Conversely, the study concludes that the surface learning strategy does not have a significant influence on academic achievement among final year aviation college students. Although surface learning strategies such as memorisation and exam-oriented study showed a weak positive relationship with academic achievement, the effect was not statistically significant. This suggests that reliance on surface learning approaches may support short-term examination performance but is insufficient for achieving sustained academic success, especially at the final year level, where deeper understanding and application of knowledge are required. Overall, the study demonstrates that the quality of learning strategies adopted by students matters more than the quantity of study effort. Deep learning strategies emerge as more effective predictors of academic achievement than surface learning strategies. These findings highlight the need for higher education institutions, particularly aviation colleges, to foster learning environments, teaching practices, and assessment methods that promote deep engagement with course material. By encouraging deep learning approaches, institutions can enhance students' academic achievement and better prepare graduates for the complex demands of professional practice in the aviation industry.

Contributions of the Study

Contribution to Theory

The findings of this study make a significant theoretical contribution to Experiential Learning Theory (ELT) as proposed by Kolb (1984), which conceptualises learning as a cyclical process involving concrete experience, reflective

observation, abstract conceptualisation, and active experimentation. The results provide empirical support for the core assumptions of ELT by demonstrating that learning strategies which emphasise active engagement, reflection, and meaning-making, which are characteristics aligned with deep learning strategies, lead to higher academic achievement. The significant positive influence of deep learning strategy on academic achievement reinforces ELT's assertion that effective learning occurs when learners actively construct knowledge through experience and reflection rather than passively receiving information. Deep learning strategies such as seeking understanding, integrating concepts, and applying knowledge mirror the stages of reflective observation and abstract conceptualisation within the experiential learning cycle. The findings, therefore, extend ELT by empirically validating its relevance in the context of higher education and professional training, specifically within aviation education, where experiential and applied learning are central.

Conversely, the non-significant effect of surface learning strategy on academic achievement further strengthens ELT by highlighting the limitations of learning approaches that bypass the experiential cycle. Surface learning strategies, which rely heavily on memorisation and exam-oriented study, do not sufficiently engage learners in reflection, conceptualisation, or experimentation. This supports ELT's theoretical position that learning which lacks meaningful engagement with experience and reflection results in limited and superficial outcomes. Overall, the study contributes to theory by empirically linking experiential learning processes to measurable academic outcomes through the lens of learning strategies. It demonstrates that deep learning strategies function as practical manifestations of experiential learning, while surface learning strategies represent a departure from the experiential learning cycle. By confirming the explanatory power of Experiential Learning Theory in predicting academic achievement, the study not only reinforces the theory's applicability but also extends its use to the aviation education

context, thereby enriching its theoretical and contextual relevance.

Contribution to Policy

The findings of this study have important implications for education and training policy, particularly within higher education and professional training institutions such as aviation colleges. The clear evidence that deep learning strategies significantly enhance academic achievement, while surface learning strategies do not, provides a strong basis for policy reforms aimed at improving learning quality and graduate outcomes. First, the results suggest that curriculum development policies should emphasise experiential, student-centred, and competency-based learning approaches that promote deep learning. Education policymakers, including regulatory bodies overseeing aviation training, can use these findings to advocate for curricula that integrate problem-based learning, simulations, practical tasks, reflective activities, and real-world applications. Such policies would align instructional practices with Experiential Learning Theory and ensure that learning extends beyond rote memorisation to meaningful knowledge construction. Secondly, the study contributes to assessment policy by highlighting the need to move away from examination systems that reward surface learning behaviours. Policymakers can use these findings to support assessment frameworks that emphasise continuous assessment, authentic evaluation, practical demonstrations, and application-based testing. By aligning assessment methods with deep learning outcomes, institutions can discourage surface learning strategies and promote higher-order thinking and skill mastery.

Thirdly, the findings inform teaching and staff development policies by underscoring the importance of equipping lecturers with pedagogical skills that foster deep learning. Policies can be developed to mandate regular professional development for instructors in learner-centred and experiential teaching methodologies, particularly in technical and

professional disciplines such as aviation. Finally, the study contributes to quality assurance and accreditation policy by providing empirical evidence that learning strategies influence academic achievement. Accrediting agencies and quality assurance bodies can incorporate indicators related to experiential and deep learning practices when evaluating institutional effectiveness and program quality. Overall, the study supports policies that prioritise deep, experiential learning as a means of enhancing academic achievement, professional competence, and workforce readiness among higher education graduates.

Contribution to Educational Practice

The findings of this study offer valuable contributions to educational practice, particularly in higher education and professional training contexts such as aviation colleges. The demonstrated positive and significant influence of deep learning strategies on academic achievement provides practical guidance for lecturers, instructional designers, and academic administrators on how to enhance student learning outcomes. First, the results highlight the need for lecturers and instructors to adopt teaching practices that actively promote deep learning. In practice, this means shifting from predominantly lecture-based and content-heavy instruction to more experiential and learner-centred approaches, such as problem-based learning, simulations, case studies, group projects, and reflective discussions. These methods encourage students to engage meaningfully with content, relate theory to practice, and apply knowledge in realistic contexts, which is especially critical in aviation training.

Secondly, the findings inform assessment practices by emphasising the importance of designing evaluations that reward understanding and application rather than memorisation. Practitioners can use a mix of formative assessments, practical demonstrations, scenario-based tasks, and reflective assignments to encourage deep learning behaviours. Such

assessment practices reduce reliance on surface learning strategies and motivate students to develop higher-order cognitive and professional skills. Thirdly, the study contributes to student support and academic advising practices. Academic advisors and mentors can use these findings to guide students toward effective learning strategies by offering training in study skills that emphasise reflection, conceptual understanding, and active experimentation. Workshops and learning support programs can be tailored to help students move away from surface learning habits and adopt deeper, more effective approaches to learning. Finally, the findings provide practical insights for institutional management and instructional design. Academic leaders can use the evidence from this study to support the integration of experiential learning facilities such as simulators, laboratories, and industry attachments into training programs. By embedding deep learning opportunities into everyday teaching and learning practices, institutions can enhance academic achievement and better prepare students for professional practice in the aviation industry.

Recommendations of the Study

Based on the findings of this study, several recommendations are made to enhance academic achievement through the effective use of learning strategies, particularly within aviation colleges and similar higher education institutions. First, institutions of higher learning should deliberately promote deep learning strategies across all levels of instruction. Curriculum designers and academic departments should integrate experiential and student-centred learning activities such as problem-based learning, simulations, case studies, projects, and reflective tasks into course delivery. These approaches will encourage students to engage deeply with course content and develop higher-order cognitive and professional skills. Secondly, lecturers and instructors should be trained and supported to adopt teaching methodologies that foster deep learning. Regular professional development programs should be organised to equip educators

with skills in experiential teaching, learner-centred pedagogy, and assessment for learning. This will help lecturers move away from content transmission and instead facilitate meaningful learning experiences that align with Experiential Learning Theory.

Thirdly, assessment practices should be redesigned to discourage surface learning strategies. Examination bodies and institutions should adopt assessment methods that emphasise understanding, application, and problem-solving rather than rote memorisation. Continuous assessment, practical evaluations, simulations, and scenario-based assessments should be strengthened, especially in technical disciplines such as aviation. Fourth, students should be sensitised and guided on effective learning strategies. Institutions should provide academic skills training, orientation programs, and mentoring that emphasise the benefits of deep learning strategies and equip students with practical techniques for reflective and experiential learning. Finally, policymakers and regulatory bodies in aviation education should align training standards with deep and experiential learning outcomes. Policies should support curricula and instructional practices that promote deep learning as a pathway to improved academic achievement and professional competence.

Suggestions for Further Study

Several suggestions are proposed to guide future research and deepen the understanding of learning strategies and academic achievement. First, future studies could employ longitudinal research designs to examine how learning strategies evolve over time and how they influence academic achievement across different stages of students' academic progression. Such studies would provide deeper insights into the long-term effects of deep and surface learning strategies rather than relying on cross-sectional data. Secondly, future studies may consider including additional learning strategies or mediating variables, such as self-regulated learning, motivation, metacognition, learning environment, or teaching

methods, to provide a more comprehensive explanation of academic achievement. This could help explain the remaining variance in academic achievement not accounted for in the current study. Thirdly, qualitative or mixed-methods studies are recommended to explore students' lived experiences and perceptions of deep and surface learning strategies. Interviews, focus group discussions, and classroom observations could provide richer contextual data to complement quantitative findings and enhance understanding of how learning strategies are applied in practice. Finally, future research could investigate the effectiveness of specific experiential learning interventions in promoting deep learning strategies and improving academic achievement. Experimental or quasi-experimental studies would be useful in establishing causal relationships and informing evidence-based teaching practices and policy decisions.

Limitations of the Study

One limitation of the study was that it focused only on final year aviation college students in Mombasa, which may limit the generalizability of the findings to students in other academic levels, institutions, or regions. The learning environment, instructional methods, and academic demands in aviation colleges may differ from those in other tertiary institutions; therefore, the results may not fully represent all college students in Kenya. The study was also limited by the use of a cross-sectional research design, where data were collected at a single point in time. As a result, the study was only able to establish associations between learning strategies and academic achievement rather than causal relationships. Changes in students' learning strategies over time and their long-term effects on academic performance could not be adequately captured. In addition, academic achievement may have been influenced by other factors that were not included in the study, such as students' motivation, socio-economic background, teaching quality, access to learning resources, and psychological factors. The exclusion of these variables means that the study may not have fully explained all determinants of

academic achievement among final year aviation college students.

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