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The Impact of Library Usage on Academic Performance Among Students in Tanzanian Higher Learning Education

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Abstract

Rationale of the Study - This study examines the association and significance of students' library behaviours regarding academic performance using Analysis of Variance (ANOVA), Z-Score, logistic regression, and Chi-square.

Methodology - This study employs a quantitative inferential research design approach, utilising statistical methods. Data were collected through a survey of 1,064 undergraduate students from five prominent Higher Learning Institutions (HLIs) in Tanzania.

Findings- The study revealed a significant association between studying, reading, and information-seeking habits and academic performance. However, resource utilisation and research habits were found to have a limited impact on student performance. The findings underscore the importance of fostering critical thinking, active learning, and information literacy in libraries to improve academic outcomes.

Implications - The study recommends the importance of effectively integrating study practices and information-seeking skills into the academic framework to enhance students' learning achievements.

Originality - Existing research has overlooked the influence of certain library behaviours, such as study techniques, reading habits, and information-seeking behaviours. The study identifies specific library behaviours, study techniques, reading, and information-seeking habits of students that significantly impact their performance in Tanzanian higher learning education.

Keywords

Higher learning institutions, library usage behaviours, information-seeking behaviours, and academic performance.

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1 Introduction

Academic success in higher education is influenced by various factors, including students' study habits, the availability of learning materials, and information-seeking behaviours. Among these, library usage has a significant impact on learning outcomes because libraries provide vital resources, a conducive study atmosphere, and opportunities for intellectual interaction. Globally, research has found a link between library use, such as frequency of visits, book borrowing, and digital resource utilisation, and higher academic attainment (Abid et al., 2023; Abu Bakar et al., 2023; Kamara et al., 2024; Rishidev et al., 2024). While research in developed countries emphasises the importance of library involvement, there is still a lack of understanding about how these behaviours apply to developing countries, notably Africa, where institutional resources and student study cultures may differ dramatically.

In the African context, higher education institutions face challenges, including limited budgets, inadequate library infrastructure, and varying levels of digital literacy, all of which may impact students' engagement with library resources. Some research in Nigeria, Kenya, and South Africa suggests that active library use enhances academic success. However, challenges such as congestion, outdated resources, and limited internet connectivity hinder optimal use (Adeoye & Olanrewaju,

2019; Magaya & Kotoroi, 2024). Furthermore, cultural and pedagogical differences may influence students' reading habits and study strategies, with some depending on lecture notes rather than library materials. This raises questions about how Tanzanian students interact with academic libraries and whether their usage habits have a significant impact on their performance compared to global and regional trends.

Tanzanian higher education institutions have made efforts to expand library services; however, there is a lack of empirical research on the direct relationship between library usage behaviour and student academic performance. Existing research frequently focuses on infrastructure rather than user behaviour, leaving a gap in understanding how students use available resources (Abid et al., 2023; Nkaya, 2020). This study aims to bridge that gap by examining how various library usage habits, such as study techniques, reading habits, and information-seeking behaviours, affect academic achievements among Tanzanian higher-learning students. The research aims to provide evidence-based recommendations for policymakers and educators to enhance library services, thereby supporting greater student achievement in Tanzania's higher education sector.

This study addresses these specific challenges and examines the key library usage practices that impact students' academic performance,

particularly as digital technology continues to evolve in Tanzania.

The objectives of the study were:

- i. Investigating the association between library usage behaviours and student academic performance in Tanzanian higher education.
- ii. Assessing the relative significance of each library usage behaviour in influencing academic performance among Tanzanian higher learning students.
- iii. Proposing evidence-based recommendations for improving library policies, resource accessibility, and digital integration to enhance student academic experiences in Tanzania.

2 Literature Review

The association between library use and academic achievement has been extensively investigated in various educational settings, with the majority of studies originating from developed countries (Abid et al., 2023; Abu Bakar et al., 2023; Kamara et al., 2024; Rishidev et al., 2024). However, little emphasis has been paid to how library usage practices, such as reading, studying, information seeking, researching, and resource utilisation, influence student achievement in Tanzanian higher education institutions, where resource restrictions, digital literacy gaps, and institutional issues can all shape library

engagement differently. This literature review summarises existing studies on library usage behaviours and their impact on academic performance, finding gaps in the Tanzanian context.

2.1 Library usage and academic performance: global perspectives

Numerous studies in various educational contexts have found a strong positive correlation between library usage and academic performance. Research indicates that students who actively engage with library resources, such as books, journals, and digital databases, are more likely to achieve higher grades and develop better critical thinking skills. For example, studies conducted in developed countries (Allison & Kaye, 2022; Jantti & Cox, 2020) show that frequent library visits, effective use of research materials, and participation in information literacy programs improve learning outcomes by encouraging independent study habits and better resource utilisation.

Similarly, evidence from developing countries emphasises the library's importance in closing educational gaps, although problems such as inadequate digital access and infrastructure frequently limit its influence (Abid et al., 2023; Abu Bakar et al., 2023; Kamara et al., 2024; Rishidev et al., 2024). While these global findings highlight the library's role as an academic enabler, their applicability to Tanzanian higher education is uncertain due to

contextual differences in resource availability, institutional support, and student preparedness, necessitating localised research to validate and adapt these insights.

2.2 Library usage behaviours and their academic impact

According to research, specific library usage behaviours such as active reading, structured studying, systematic information seeking, in-depth research, and strategic resource utilisation improve academic performance by encouraging critical thinking, knowledge retention, and independent learning skills (Abid et al., 2023; Adamu et al., 2024; Chapagai, 2024; Suman et al. 2023). Students who make regular and deliberate library trips achieve higher scores because these behaviours promote greater engagement with course topics, exposure to varied academic sources, and the development of research competencies required for higher education. However, the extent of this impact varies based on factors like the quality of library resources, user proficiency in navigating systems, and institutional support for information literacy. In Tanzanian higher learning institutions, where resource limitations and digital divides exist, the academic benefits of these behaviours may be moderated, underscoring the need for tailored strategies to maximise the library's role in student success (Adeoye & Olanrewaju, 2019; Magaya & Kotoroi, 2024).

2.3 The Tanzanian context: challenges and opportunities

In Tanzanian higher education, library usage behaviours are influenced by a distinctive combination of challenges and opportunities, where infrastructural limitations such as restricted physical space, outdated collections, and inconsistent electricity frequently obstruct optimal engagement while expanding digital initiatives offer new pathways for learning (Adetayo et al., 2024; Chang et al., 2023; de Jager et al., 2018; Tus, 2020). Due to uneven internet access and varying degrees of digital literacy, students often rely on traditional print materials; however, the growing availability of e-resources and institutional partnerships presents opportunities for enhanced accessibility and the development of research skills.

Socioeconomic gaps may influence usage patterns since students from impoverished backgrounds may have had less experience with library systems. However, targeted interventions, such as library orientation programs and extended opening hours, can potentially democratise access (Abid et al., 2023; Cox, 2023; Mirza et al., 2021; Nguyen, 2022). Despite these challenges, Tanzanian higher learning institutions can utilise libraries as transformative academic hubs by addressing resource gaps, promoting information literacy, and integrating technology to align with global trends while accommodating local realities,

resulting in improved academic performance and equitable learning outcomes.

2.4 Gaps in existing research

Limited studies have explored the relationship between library usage and academic performance. Therefore, a significant gap remains in research examining how specific library usage behaviours, such as reading, studying, information seeking, researching, and resource utilisation, impact student performance in Tanzanian higher education. Most prior research has been conducted in developed countries with well-resourced libraries, overlooking the unique challenges and dynamics of Tanzanian institutions, where limited infrastructure, digital divides, and varying literacy levels may influence library engagement differently (Allison & Kaye, 2022; Cox, 2023; Janti & Cox, 2020). This study addresses these gaps by providing a detailed, context-specific analysis of library usage behaviours and their academic implications in Tanzania. It offers insights to inform policy and practice in similar resource-constrained higher education settings.

3 Theoretical Framework

Based on Piaget and Vygotsky's constructivist learning theory, this study offers a crucial lens for understanding how students' active engagement with library resources fosters academic achievement. Piaget's cognitive schema theory highlights that real learning occurs when students interact with library

materials (reading, researching) to assimilate new information and accommodate existing knowledge systems (Al-Rahmi, 2020; Banihashem, 2022). Vygotsky's Zone of Proximal Development emphasises how library environments function as learning scaffolds, with librarian help and peer participation allowing students to master complex research skills beyond their current capabilities (Harland, 2021). This theoretical perspective views library usage patterns as dynamic cognitive processes in which students generate knowledge by purposeful engagement with information resources, directly impacting academic performance.

The theory's application demonstrates that distinct library practices have unique effects on learning outcomes. Reading and studying help students build their knowledge, whereas information-seeking and research enable them to develop higher-order thinking skills through problem-solving and evaluating the credibility of sources of information. Vygotsky's social constructivism emphasises how collaborative library activities (group study, research consultations) result in shared learning experiences that improve comprehension and retention. The constructivist theory explains why students who strategically use library resources perform better academically than those who engage in these learning opportunities superficially or infrequently (Banihashem, 2022).

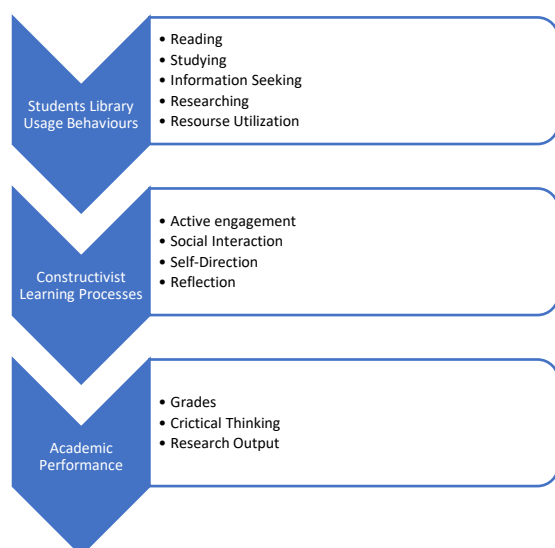


Figure 1: Constructivist Learning Theoretical Framework. Source (Banihashem, 2022)

4 Methods and Materials

This study aims to identify the most significant library usage behaviours commonly observed in various studies, employing a quantitative inferential research design approach. These behaviours include reading, studying, information seeking, researching, and resource utilisation. Understanding how significantly these behaviours affect students' performance will ensure the establishment of an effective predictive learning analytics model based on activities that HLI students perform in libraries. Therefore, the study surveys 1,064 undergraduate students from five Higher Learning Institutions (HLIs) to make this research possible. The category of students involved in the study is those from undergraduate programmes. This category was selected because undergraduate students are a large and representative segment of Tanzania's higher learning institutions (HLIs) (TCU,

2024). Including these students allows for a more effective generalisation of the results. Furthermore, the study focused on five institutions: The University of Dodoma (UDOM), the University of Dar es Salaam (UDSM), the Institute of Finance Management (IFM), the College of Business Education (CBE), and Mzumbe University. These institutions were chosen due to their significant size and extensive campus networks across the country, which support a broader applicability of the findings.

The total number of undergraduate students across the five chosen Higher Learning Institutions (HLIs) was estimated to be over 30,000 (TCU, 2024). The study targeted 1,400 students (300 from IFM, 500 from UDOM, 200 from Mzumbe, 200 from CBE, and 200 from UDSM, respectively) enrolled in Bachelor's degree programs. The distribution of the targeted students from each HLI was based on the number of students enrolled. The sample size was determined using a probability-based sampling technique called Cochran's formula. This formula is applicable when a sample size is relatively large. (Coyne et al., 2018). The following equation represents the formula. (Coyne et al., 2018).

$$n = (z^2 * p * (1 - p)) / E^2 \quad (1)$$

Where:

n = required sample size

z = Z-score corresponding to the desired confidence level

p = estimated population proportion

E = the desired margin of error

The Finite Population Correction (FPC) formula was applied to adjust the population size. The following equation represents the formula. (Rizzo & Rust, 2011).

$$n_{adj} = n / (1 + (n - 1) / N) \quad (2)$$

Where:

n_{adj} = adjusted sample size

n = initial sample size from the previous formula

N = population size

Finally, the Confidence Interval (CI) was computed using the standard formula, as represented by the following equation.

$$CI = p \pm Z * SE \quad (3)$$

Where:

CI = Confidence Interval

p = estimated population proportion

z = Z-score corresponding to the desired confidence level

SE = Standard Error

Table 1 shows the parameter values used in the formula and the corresponding results.

Table 1: Population and sampling

Population Size (N)	Confidence Level (Z)	Margin of Error (E)	Standard Error (SE)	Estimated Proportion (p)	Sample Size (n)
30,000	95% (Z=1.96)	3% (0.03)	3% (0.03)	0.5	1031

Data were collected through online questionnaires developed using Google Forms and distributed to respondents via an online platform. This method is relatively cheap and allows broader accessibility to respondents, regardless of their geographical location (Evans & Mathur, 2005). The questionnaire was organised into two parts: one for demographic information and the other for details on library usage. For further information on the questionnaire's structure, refer to the sample questionnaire in the appendix. The questionnaire included questions designed to gather qualitative data in the form of categorical and ordinal values. Respondents provided information by

selecting or checking the appropriate options in the structured, closed-ended questions.

The collected categorical data were analysed to produce the quantitative information in Table 1. From the table, the total number of responses for each category was recorded. The total number of each category concerning all responses (performance implication) is 1064. To foster easy analysis, process the total number of all respondents who agreed that a particular library usage habit was assumed to be an aggregate of "Strongly Agree" and "Agree" records. The data presented in Table 2 were then used to formulate the input variables for the models, as shown in Table 3

Table 2: Analysis of responses

Performance Implication	Usage Habits				
	reading	studying	researching	resource Utilisation	info Seeking
Strongly Agree	249	294	137	173	234
Agree	376	373	283	304	335
Neutral	326	272	501	432	370
Disagree	44	54	83	77	58
Strongly Disagree	68	70	59	77	66

Table 3: Sampling results

Library Usage Habit	Observed successes	Sample Size
Reading	625	1064
Studying	667	1064
Researching	420	1064
Resource Utilisation	477	1064
Info Seeking	569	1064

This research adopts quantitative methods, specifically descriptive statistics such as mean, median, and standard deviation, to determine the characteristics of each group (habit). Moreover, the research applies Analysis of Variance (ANOVA) to assess library usage habits' association with academic performance (dependency). Additionally, it uses Z-score and Chi-square methods to determine the significance level of each library usage habit in response to student performance. The information presented in Table 3 was then used to determine the association and significance of the variable using ANOVA. Z-score and Chi-square Methods are shown in Equations (4), (5), and (6).

$$F = \frac{\sum_{j=1}^k n_j (\bar{Y}_j - \bar{Y})^2}{df_B} \bigg/ \frac{\sum_{j=1}^k \sum_{i=1}^{n_j} n_j (\bar{Y}_{ij} - \bar{Y}_j)^2}{df_W} \quad (4)$$

Where:

F = F-statistic (used to compare variances between groups)

n_j = number of observations in group j

\bar{Y}_j = mean of group j

\bar{Y} = overall mean across all groups

\bar{Y}_{ij} = individual observation i in group j

df = degrees of freedom between groups = $k-1$, where k is the number of groups

df = degrees of freedom within groups = $N-kN$, where N is the total number of observations

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i} \quad (5)$$

Where:

χ^2 = Chi-square statistic

O_i = observed frequency in category i

E_i = expected frequency in category i

$$Z = \frac{\bar{x} - \mu}{\sigma / \sqrt{n}} \quad (6)$$

Where:

Z = Z-score (standardised score)

\bar{x} = sample mean

μ = population mean (expected value)

σ = population standard deviation

n = sample size

Informed consent was highlighted in the questionnaire's introduction to emphasise the research's ethical standards. Participants were made aware of this information before completing and submitting the form. Moreover, responses were anonymised and kept confidential to protect participants' privacy. Ethical guidelines and data protection regulations ensure the secure storage of collected data.

5 Findings of the Study

This section presents the findings of the study according to its objectives.

5.1 Response rate

There were 1064 valid responses from the 1400 undergraduate students targeted across five Higher Learning Institutions (HLIs), yielding a response rate of approximately 75.9%. Coordination with institutional

linkages and prompt online survey delivery during busy academic periods enabled this high response rate. The obtained rate is considered suitable for statistical analysis, thereby enhancing the legitimacy and practicality of the research findings.

5.2 Association between library usage and student performance

Results from ANOVA indicate an association between library usage habits (studying, reading, resource utilisation, information seeking, and researching) and class performance. Library usage habits are independent, whereas class performance is dependent on various factors. The existence of an association between the dependent and independent variables is inferred from the graph plots in Figures 2 and 3.

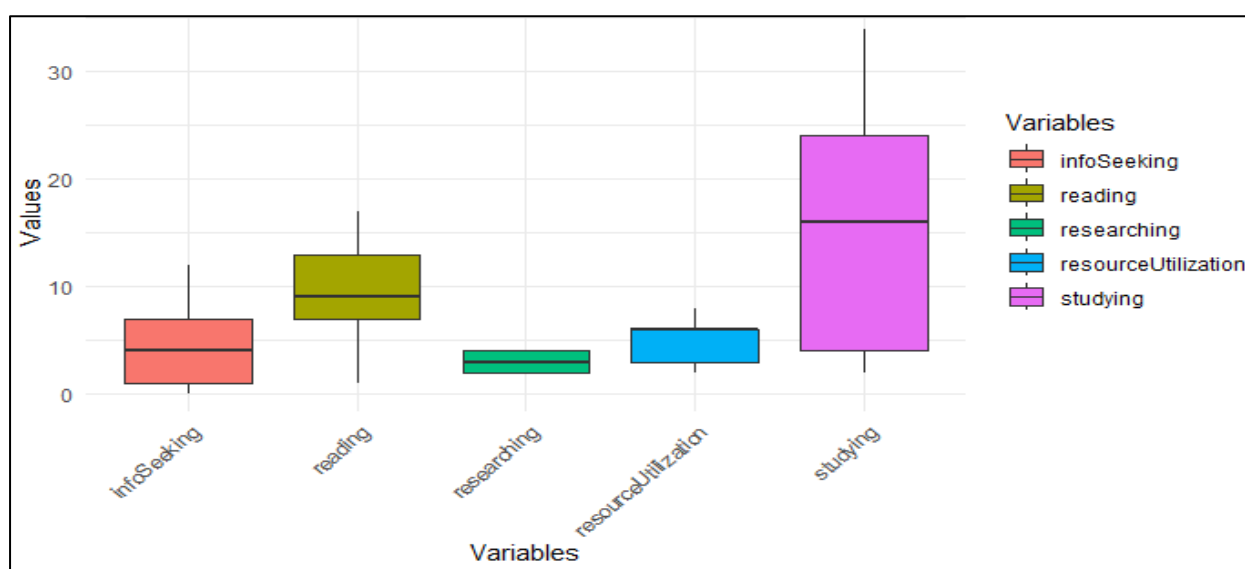


Figure 2: Analysis results using the ANOVA test

From Figure 2, the box plots of the habit groups do not seem to overlap.

Nonoverlapping boxplots indicate the existence of variability between the groups.

Additionally, the central tendencies of each group appear quite distinct. This difference suggests a significant association between library usage and class performance regarding the specified variables under discussion (studying, reading, resource utilisation, information seeking, and researching).

Moreover, examining the values of central tendency from each group reveals that studying and reading habits are more significantly associated with student performance. In addition to the association test, we also considered logistic regression analysis for comparison purposes.

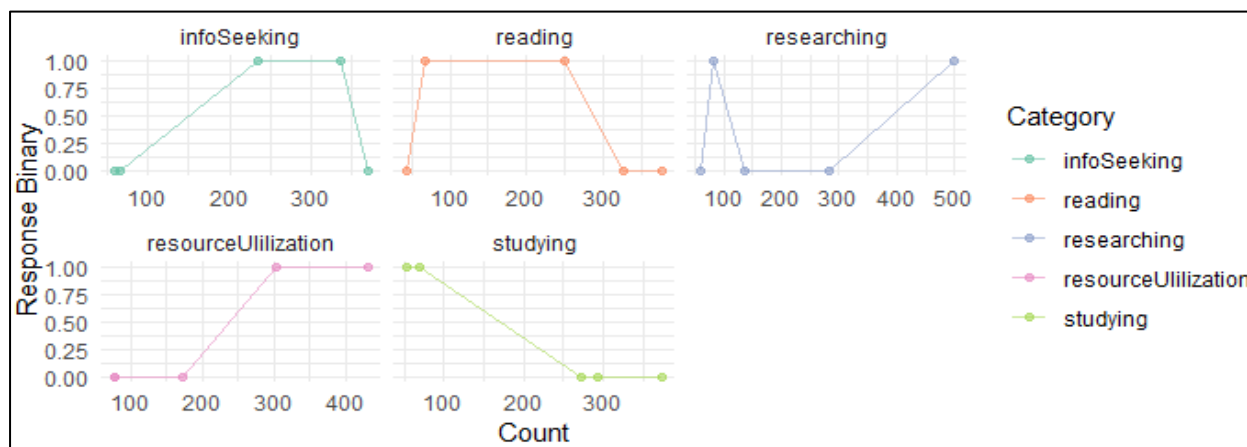


Figure 3: Association test with logistic regression

The results in Figure 3 show a change (either an increase or decrease) in the number of respondents who agree that library usage has positively or negatively influenced their academic performance. Small plateaus at the lower and higher values observed in the graphs indicate a lower dissociation or independence between the dependent variable (student

performance) and the independent variable (library usage habits).

5.3 Significance of each library usage habit

This subsection presents the results of the critical analysis, which utilised descriptive research statistics, Z-scores, and Chi-square tests. The results of the descriptive analysis are presented in Figure 4.

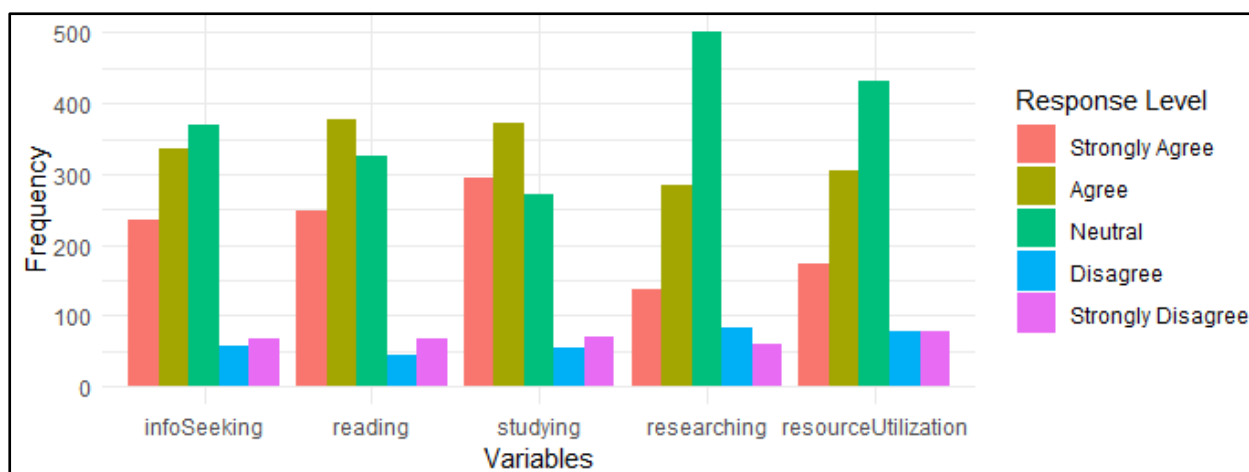


Figure 4: Frequency distribution histogram presenting library usage habits

Figure 4 portrays that reading, studying, and information-seeking habits have a significant impact on academic performance (considering the sum of "agree" and "strongly agree" frequencies). Additionally, research and resource utilisation habits appear to have a less

significant impact, and most students remain neutral. The subsequent paragraphs illustrate the significance level of each habit (variable) based on the Chi-square and Z-score tests shown in Tables 4 and 5.

Table 4: Results of the Chi-square test

Library Usage Habit	Observed successes	Expected Probability (Fair success)	Sample Size	Chi-square statistic	Expected Number of Success	% Discrepancy (from 50%)	Interpretation
Reading	625	0.5	1064	16.4	531.5	17.59	There is dependency (16.4 > 3.841)
Studying	667	0.5	1064	34.5	531.5	25.49	There is dependency (34.5 > 3.841)
Researching	420	0.5	1064	23.5	531.5	-20.98	There is less dependency (23.5 > 3.841)
Resource Utilisation	477	0.5	1064	5.59	531.5	-10.25	There is less dependency (5.59 > 3.841)
Info Seeking	569	0.5	1064	2.64	531.5	7.06	There is dependency (2.64 < 3.841)

Results in Table 4 indicate a high dependency (association) between studying, reading, and information-seeking habits with students' class performance in order of importance. The highness was observed from the percentage

discrepancy based on the probability of a fair success level (50%). Additionally, a reduced dependency was observed on resource utilisation and research habits. Significance test results using the Chi-square method are similar

to those from the Z-score analysis presented in Table 5.

Table 5: Results of the Z-Score test

Library Usage Habit	Observed successes	Expected Probability (Fair success)	Sample Size	Z-Score	Expected Number of Success	p-value	Implication
Reading	625	0.5	1064	5.73	531.5	2.2e-16	Highly Significant
Studying	667	0.5	1064	8.32	531.5	2.2e-16	Highly Significant
Researching	420	0.5	1064	-6.85	531.5	7.6×10^{-12}	Less Significant
Resource Utilisation	477	0.5	1064	-3.34	531.5	0.00083	Less Significant
Info Seeking	569	0.5	1064	2.3	531.5	0.0107	Significant

6 Discussion of the Findings

This section discusses the findings of the study following its objectives.

6.1 Association between library usage and student performance results

Reading, studying, and academic performance are highly associated, which supports earlier studies that found these behaviours to be important indicators of student success (Nkhata et al., 2020; Chapagai, 2024). These behaviours encourage extensive learning strategies and active participation, which improve retention and critical thinking. Also, the significant association between studying, reading, and information-seeking and student performance aligns with existing literature that emphasises the importance of active engagement in the learning process (Nkhata et al., 2020; Nkaya, 2020; Chapagai, 2024). Studying and reading are foundational

academic practices that increase knowledge and foster critical thinking skills.

On the other hand, a low association between research habits and academic performance and resource utilisation points to a disparity in how students use the resources at their disposal. According to Mshana et al. (2020) and Mwita (2021), access to resources is essential, but it does not guarantee meaningful use or learning gains. Due to unfamiliarity or information overload, students may find it challenging to utilise research materials efficiently or use them insufficiently. This study's comparatively low impact on research-related behaviours suggests that curriculum-based initiatives and more organised support are needed to help students develop their research competencies.

6.2 Significance of each library usage habit results

Studying and reading habits performed in a library are significant variables in students' performance. This observation is justified by the high significance level between these variables in determining students' likely performance. The findings align with the study by Lughugh et al. (2024). However, these findings contrast with those reported by the scholars in (Ferrer, 2024).

Additionally, the results indicate that the information-seeking habit has a moderately significant effect on determining students' performance. In contrast, research and resource utilisation habits are less significant, and thus, they are often disregarded when attempting to assess the impact of library usage behaviours on performance. The findings align with those found in the study by Rodrigues and Mandrekar (2021). However, this contrasts with the findings in the survey conducted by Suman et al. (2023).

7 Conclusion and Future Work

This study emphasises the critical role of studying, reading, and information-seeking behaviours in enhancing academic performance. By emphasising these habits, educational institutions can create supportive environments that foster academic success. The findings suggest that efforts to integrate effective study practices and information-seeking skills into the academic framework can

have a meaningful impact on students' learning experiences.

As we move forward, it will be essential for educators, administrators, and students alike to recognise the importance of these library habits. Investing in developing a culture that values and strengthens these skills will prepare students for academic challenges and equip them with lifelong competencies necessary for navigating an ever-evolving information landscape. As institutions refine their approaches to promoting effective library habits, they will significantly enhance student achievement and foster a love for learning.

While this study offers valuable insights, it also presents opportunities for further investigation. Future research could investigate the reasons behind the lesser significance of resource utilisation and research habits. For instance, studies could explore how differences in academic discipline or student demographics impact the effectiveness of various library habits on performance. Moreover, longitudinal studies could help determine how the impact of these library habits evolves over time or in response to specific interventions. By examining different educational contexts and student populations, researchers could better assess the relative importance of these habits and their influence on academic success.

8 Recommendations of the Study

The study recommends that library policies be revised to emphasise evidence-based initiatives that promote accessibility and student engagement in academic experiences, aligning with the research findings. Results showed that studying, reading, and information-seeking habits demonstrated a high and significant association with academic performance while researching and resource utilisation habits were found to be less significant. Therefore, libraries should expand their working hours and provide 24/7 digital access to accommodate the diverse schedules of students. This expansion aligns with the finding that studying and reading habits are highly associated with better academic performance. Furthermore, collection development plans must be aligned with curriculum demands through regular communication between lecturers and librarians, ensuring resources directly support coursework and research needs. Given that students benefit most from targeted reading and information-seeking, such alignment ensures that the available materials align with their learning goals.

To improve cost efficiency and relevance of resources, libraries should adopt a just-in-time acquisition model, relying on interlibrary loans and patron-driven e-book purchases. Since researching and resource utilisation habits showed less significance in the study, optimising acquisition practices toward

demand-based access may help better meet actual usage patterns. Regulations should also require the integration of information literacy across disciplines, as the study has shown that information-seeking habits significantly contribute to academic performance. Embedded training helps students develop their ability to identify, access, and utilise academic resources effectively.

Digital integration must be strengthened through user-centred platforms that simplify discovery and access. Libraries should invest in unified search systems that incorporate databases, e-books, and open educational resources (OERs), thereby reducing the barriers students face in accessing content, which is especially relevant for promoting information-seeking and reading habits. Additionally, libraries should expand their digital infrastructure to include cloud-based annotation tools and collaborative platforms, allowing students to engage more interactively with resources. Finally, proactive digital literacy programs could teach students how to analyse online sources critically and use citation management software, thereby addressing identified gaps in digital and research competencies.

9 Implications of the Findings

The findings of this study carry several implications for policy, educational practice, and theory:

Educational policymakers in Tanzania's higher education institutions should prioritise the enhancement of reading cultures, information literacy training, and organised support for study skills programs. These findings support the need for policies that set aside funds and training time to better these library usage behaviours, which are closely associated with student performance.

Libraries and higher learning institutions (HLIs) have to rethink how they foster and promote students' use of library resources. Although resources are available, this study demonstrates that effective use of them is not equivalent to merely having access to research tools and materials. Workshops that teach students how to utilise databases, conduct research, and strategically use library resources might assist them in performing better.

This study supports behavioural learning theories that highlight active participation (such as reading and studying) as having a greater influence than passive availability (such as resource access). It adds empirical support for incorporating behavioural measures into performance prediction models in African educational contexts, contributing to the literature on academic behaviour and learning analytics.

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