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Gender Differences in Academic Performance of University Library and Information Science Students in Information Retrieval Course (2020-2025): An Ex-post Facto Study

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Abstract: This study investigated gender-based differences in academic performance of university library and information science students in information retrieval course at Bayero University, Kano from 2020–2025. The specific objectives of the study were to determine gender distribution, compare mean performance, and test for statistical significance in achievement. Adopting an Ex-post Facto research design, the study utilized a census of 398 students (295 males, 103 females). Data were extracted from official departmental result sheets and analyzed using descriptive statistics and an Independent Samples T-test via SPSS. Findings revealed a male-dominated enrollment (74.1%), though female participation grew steadily to 32.8% by 2025. Descriptively, female students achieved a higher mean score (55.36) compared to males (51.37). The inferential analysis yielded a p-value of .008, indicating a statistically significant difference in favor of female students. These results challenge traditional stereotypes suggesting male superiority in technical ICT disciplines. The study concludes that while males dominate numerically, females demonstrate higher academic proficiency in technical IR competencies. The study recommended that include implementing outreach programs to encourage female enrollment in LIS, transitioning toward more practical-based laboratory sessions to elevate overall grade averages, and fostering gender-mixed peer support systems to enhance collaborative technical learning.

Keywords: Information Retrieval, Gender Performance, Library and Information Science, Academic Achievement

INTRODUCTION

Information Retrieval (IR) serves as a fundamental pillar of Library and Information Science (LIS), acting as the essential bridge between raw data and the specific needs of information seekers. In the contemporary digital age, IR has evolved into an increasingly technical discipline. It necessitates a sophisticated blend of database management, complex search algorithms, and the application of Boolean logic. At Bayero University, Kano (BUK), the course LIS2202 (Information Retrieval) represents a critical juncture in the undergraduate curriculum (Department of Library and Information Sciences, 2024). To succeed, students must demonstrate a dual mastery of theoretical frameworks and technical proficiency in the Information Retrieval (LIS2202) course, which acts as the essential bridge between raw data and the specific needs of information seekers. This study, therefore, investigates whether gender-based differences exist in the mastery of these essential competencies.

The assessment of such mastery is multifaceted. King, Porr, and Gaudine (2017) posit that academic performance is typically measured through a combination of examination results, active classroom participation, the timely completion of assignments, and the resulting Cumulative Grade

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Point Average (CGPA). However, the influence of gender on these metrics remains a subject of significant academic debate.

Recent empirical evidence suggests a shifting trend in gender-based academic achievement. For instance, Wrigley-Asante, Ackah, and Frimpong (2023) observed that while male students often outperformed females at the secondary school level, this dynamic appears to reverse at the tertiary level, where female performance shows marked improvement relative to their male counterparts. This shift is often attributed to evolving teaching methodologies, increased personal motivation, and the success of advocacy campaigns centered on women's empowerment. Conversely, the academic performance of males at the university level may be hindered by external pressures, such as engagement in extra-curricular activities, socio-economic hardships, and financial constraints that necessitate pursuit of economic ventures alongside their studies (Auta, 2022; Wrigley-Asante et al., 2023).

Furthermore, Yusuf and Elfaki (2022) highlight a global trend where women have significantly increased their educational achievements, outperforming men in public examinations across several countries and successfully breaking into previously male-dominated fields. Despite these gains, specific nuances in performance styles persist. For instance, the study by Asaju et al. (2025) suggests a divergence in strengths: female students often excel in theoretical coursework, while male students may perform better in hands-on, practical design tasks, even if their overall CGPA remains lower than that of their female peers. Against this backdrop of shifting gender dynamics and the increasing technicality of LIS education, this study seeks to evaluate the specific performance trends within the LIS2202 course at Bayero University, Kano, to determine how these global trends manifest in a local academic setting.

Statement of the Problem

Despite the global movement toward gender equity in higher education, persistent societal stereotypes continue to suggest that technical and ICT-oriented disciplines are more naturally aligned with male cognitive styles, while humanities and social-science-based courses favor females. As the field of Library and Information Science (LIS) undergoes a significant digital transformation, it has evolved into a highly technical discipline requiring mastery of database management, Boolean logic, and search algorithms.

At Bayero University, Kano (BUK), the course Information Retrieval (LIS2202) represents a critical juncture where students must demonstrate this technical proficiency. However, there is currently a lack of empirical data to determine whether these gender-based stereotypes reflect actual academic outcomes in the Nigerian context. This study addresses the empirical uncertainty regarding the influence of gender on academic success in technical LIS courses. While societal narratives often predict male superiority in ICT-heavy subjects, it is not known whether these stereotypes translate into a measurable performance gap among LIS students at BUK. Without a rigorous analysis of student performance data from 2020–2025, the Department cannot determine if its pedagogical methods are truly inclusive or if targeted gender-based interventions are required to ensure that all students, regardless of gender, are equally prepared for the technical demands of the modern information profession.

Objectives of the Study

The objectives of this study is to critically evaluate gender-based differences in the academic performance of Library and Information Science (LIS) students in Information Retrieval at Bayero University, Kano (BUK), between the 2020/2021 and 2024/2025 academic sessions. Specifically, the study seeks to achieve the following objectives:

1. To determine the demographic distribution of Male and Female LIS students in Information Retrieval at BUK.
2. To compare the mean academic performance (Examination scores) of Male and Female students.
3. To determine if the differences in performance are statistically significant.

METHODOLOGY

The study adopts the Ex-post Facto research design. This design is appropriate because the events under investigation (the examinations) have already taken place, and the researcher has no

direct control over the independent variable (gender). The study relies on historical data from academic records to examine the relationship between gender and academic performance.

The population for this study consists of all undergraduate students in the Department of Library and Information Science (LIS), Bayero University, Kano (BUK), who registered for and sat for the Information Retrieval (LIS2202/LIS202) examination during the five-year period covering the 2020/2021 to 2024/2025 academic sessions. A purposive sampling technique was employed for this study. This study utilized Total Enumeration (Census) of all available and valid result sheets for the specified course within the timeframe. The total sample size is 398 students, comprising all students with complete Continuous Assessment (CA) and Examination records across the four active sessions provided in the departmental records.

The study utilizes secondary data to extract the following variables from the official departmental result sheets:

1. Gender: Identified through the students' full names (categorized as Male or Female).
2. Continuous Assessment (CA) Score: (40 marks).
3. Examination Score: (60 marks).
4. Total Score: The aggregate score out of 100%.

The data collection was carried out through a documentary review of the Department of Library and Information Science's result archives. The researcher accessed the result sheets for LIS2202/202, manually sorted the students by gender based on naming conventions, and digitized the scores into a spreadsheet for statistical processing.

The data collected was analyzed using both Descriptive and Inferential statistics. Frequencies and Percentages were used to present Objective 1 (Gender Distribution). Mean and Standard Deviation were used for Objective 2 (Performance Comparison). An Independent Samples T-test was used to test the null hypothesis at a 0.05 level of significance. This determined if the difference in mean performance between male and female students is statistically significant. All statistical computations were performed using the Statistical Package for the Social Sciences (SPSS).

PRESENTATION OF RESULTS

The results of this study are presented in accordance with the research objectives.

Demographic Distribution of LIS Students by Gender

The first objective sought to determine the demographic distribution of male and female students enrolled in Information Retrieval.

Table 1: Gender Distribution of Students (2020–2025)

Academic Session	Male (%)	| Female (%)	Total
2020/2021	129 (77.2)	38 (22,8)	167
2022/2023	66(78.6)	18(21.4)	84
2023/2024	59 (68.6)	27 (31.4)	86
2024/2025	41(67.2)	20(32.8)	61
Total	295 (74.1)	103 (25.9)	398

Table 1 shows that over the five-year period, male students dominated the enrollment with 74.1% of the total population. However, the data indicates a progressive increase in female participation, rising from 22.8% in 2020 to 32.8% in 2025, suggesting a shifting demographic trend in the department.

Comparison of Mean Academic Performance

The second objective aimed to compare the average performance of male and female students in the course.

Table 2: Descriptive Statistics of Performance by Gender

Gender	N	Mean Score	Std. Deviation	Std, Error Mean
Female	103	55.36	13.42	1.32
Male	295	51.37	11.67	0.68

As illustrated in Table 2, female students achieved a higher mean score ({x}=55.36) compared to male students ({x}=51.37). This results in a mean difference of 3.99 points. The higher standard deviation among females (13.42) indicates a wider variance in individual performance within the female group compared to the males.

Test of Significant Difference

The third objective used an Independent Samples T-test to determine if the performance difference was statistically significant.

Table 3: Independent Samples T-Test Results

Variable	Mean Diff.	t-value	df	p-value (Sig.)	Remark
Gender Performance	3.99	-2.68	158.4	.008	Significant

Note: Significance level alpha = 0.05

The t-test results in Table 3 show a p-value of .008, which is less than the 0.05 significance level. Consequently, the null hypothesis is rejected. There is a statistically significant difference in the academic performance of LIS students in Information Retrieval at BUK based on gender, in favor of female students.

DISCUSSION OF FINDINGS

The analysis reveals that the Department of Library and Information Science at BUK has a significant gender imbalance in enrollment, with male students outnumbering females by a ratio of 2.8 to 1. This is in line with the assertion of National Universities Commission (NUC, 2022), that female students constitute slightly less than half of total enrollments, and significant disparities persist across disciplines, particularly in Science, Technology, Engineering and Mathematics (STEM) fields and professional programs. This may be attributed to many factors such as socio-cultural factors, like early marriage, parental expectations, and gendered socialization, frequently discourage girls from pursuing higher education (Ogunyemi & Adebayo, 2019). Economic factors are equally significant: poverty and limited family resources often compel parents to prioritize the education of male children, viewing female education as a less rewarding investment (Adedeji & Olanrewaju, 2018). Institutional factors such as inadequate campus security, absence of gender-sensitive policies, and lack of female role models in academia also contribute to the persistence of disparities (Oviawe & Okonkwo, 2021).

Regarding academic performance, female students achieved a higher mean score of 55.36 compared to the male mean of 51.37. This resulted in a mean difference of 3.99 points. Unlike previous anecdotal assumptions, the Independent Samples T-test yielded a p-value of .008, which is less than the 0.05 significance level. Therefore, the difference in performance is statistically significant in favor of female students. This finding corroborates the work of Hassan and Hassan (2016), who found that female students often demonstrate higher levels of seriousness and academic focus in tertiary settings. It also aligns with Sartain et al. (2023), who established that girls frequently outperform boys in technical subjects like mathematics when assessed through cumulative grades.

CONCLUSION

The conclusion of this research establishes that the traditional narrative of male superiority in technical and ICT-driven disciplines does not hold true within the Library and Information Science (LIS) program at Bayero University, Kano. Although the field of Information Retrieval has evolved into a highly technical subject, the study demonstrates that gender is not a primary determinant of academic success. Instead, both male and female students exhibit the capacity to master these essential competencies when provided with equal access to the undergraduate curriculum. Furthermore, the study indicates that, the field is undergoing a demographic shift, with female participation growing steadily over the five-year period. This trend, coupled with the high level of proficiency displayed by female students, suggests that historical societal stereotypes regarding gendered cognitive styles are increasingly irrelevant in the modern LIS context. Ultimately, the research confirms that the pedagogical methods employed in the course are inclusive enough to allow all students to achieve comparable results,

primarily within the "C" grade bracket. Consequently, the study refutes the idea that technical LIS courses are biased toward male success and highlights the need to move beyond gendered expectations in higher education. By fostering an environment that encourages diverse exchange and peer support, the department can continue to bridge the gap between raw data and the information needs of society regardless of a student's gender.

RECOMMENDATIONS

Based on the outcomes of the study, the following recommendations were made to enhance the academic environment and enrollment trends within the department:

1. Implement Targeted Outreach for Female Enrollment: The University should establish specialized outreach programs and advocacy campaigns designed to encourage more female students to enter the Library and Information Science program. These initiatives should leverage the fact that female students have proven their capability to excel in the most technical aspects of the curriculum, thereby challenging traditional socio-cultural stereotypes that often discourage them from pursuing higher education in ICT-related fields.
2. Transition to Practical-Based Laboratory Learning: To elevate the overall grade profile of the student body and move average performance from the "C" bracket into the "A" bracket, the Department of LIS should invest in more Information Retrieval (IR) laboratory sessions. Moving beyond theoretical frameworks to hands-on sessions that will allow both genders to improve their technical proficiency and achieve higher mean scores.
3. Foster Gender-Mixed Peer Support Systems: The Department of LIS should formally encourage the creation of study groups and peer support systems that intentionally mix male and female students. This collaborative approach allows for a diverse exchange of logical and organizational skills during coursework, helping to mitigate external pressures that may hinder performance and ensuring a more inclusive learning environment for all participants.

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