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Research Article

Academic Performance of Second-Year BS Information Technology Students in IM 101 Fundamentals of Database Systems

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ABSTRACT

This study evaluated the academic standing of second-year Bachelor of Science in Information Technology undergraduates enrolled in IM 101 Fundamentals of Database Systems. Employing a descriptive research design anchored in document analysis, official student records were securely extracted via the university's Student Information and Academic System (SIAS). The research mapped out respondents' profile by sex alongside overall performance metrics in the database course. Descriptive measures such as frequencies, percentages, and means outlined the dataset, while an independent-samples t-test evaluated potential performance variances between male and female learners. The empirical results reveal a predominantly male cohort that generally demonstrated strong academic proficiency in database systems. Even so, a small subset of students recorded lower grades or incomplete marks, signaling an opportunity for targeted academic intervention. Furthermore, the inferential testing confirmed a statistically significant performance gap between male and female students. These insights offer valuable guidance for faculty members aiming to refine instructional strategies and enhance assessment practices moving forward.

Keywords: *Academic Performance, Database Systems, Information Technology Students, Document Analysis, Performance Gap*

Introduction

Modern information technology relies heavily on how data is organized, stored, and retrieved, making database systems a core pillar of computing curricula. Within the Bachelor of Science in Information Technology framework, courses centered on database foundations equip students with vital

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competencies in relational structures, data modeling, database design, and Structured Query Language (SQL). Tracing the evolution of this field, recent scholarship highlights that introductory database courses form the bedrock of a student's technical skill set, prompting educators to continuously adapt teaching methodologies, assessment frameworks, and digital tools to match technological advancements (Ishaq et al., 2023).

Mastery of SQL remains one of the most critical milestones for computing majors, as it dictates a student's ability to query and manage relational data effectively. Despite its central role, building true proficiency in SQL is rarely straightforward. Looking at a wide-ranging mapping of computing education literature, Taipalus and Seppanen (2020) pointed out that teaching query languages presents distinct pedagogical hurdles, making student learning difficulties a major focus of ongoing research across software engineering and computer science programs.

Beyond general conceptual grasp, a student's actual capacity to construct working queries often shifts depending on how intricate the underlying database schema happens to be. In an empirical examination involving 744 student participants, Taipalus (2020) observed that learners solved queries with notably higher accuracy when dealing with straightforward database structures compared to semi-complex or advanced environments. This points to a practical reality: database schema complexity directly alters a student's translation of real-world information needs into executable code, suggesting that performance assessments must look at hands-on tasks rather than relying purely on paper-and-pencil theory.

Recent investigations into student coding errors reveal specific stumbling blocks when learners interact with various query languages. Analyzing over 357,000 submission logs across 462 student cohorts, Alkhabaz et al. (2023) uncovered persistent mistakes spanning relational and non-relational database tasks, proving that learners struggle not just with syntax rules, but with the logic behind data operations. This mirrors observations by Shin (2022), who noted that the mental leap from a conceptual query plan to actual executable code is a common bottleneck. Together, these insights emphasize that evaluating database competence requires a balanced view of both theoretical comprehension and practical execution.

Naturally, instructional design and assessment strategies play a massive role in shaping how well students grasp these concepts. Scholars have documented various technology-backed approaches—including problem-based modules, learning analytics, and game-based assessments—aimed at boosting performance in introductory database courses (Alkhabaz et al., 2025; Ishaq et al., 2023). On a similar note, progressive pedagogical frameworks that steadily build a student's mental model of querying before introducing advanced analytics tools have proven effective in solidifying core database skills (Lee & Casterella, 2023).

Against this backdrop, evaluating how well third-year Bachelor of Science in Information Technology students master IM 101A Fundamentals of Database Systems becomes essential. Such assessments provide concrete data on whether learners are truly grasping core relational concepts, data definition, manipulation, and querying tasks. More importantly, they highlight specific areas where students excel versus areas requiring instructional intervention. Grounded in these realities, this study aims to evaluate the academic performance and proficiency of second-year BSINFOTECH students in IM 101 Fundamentals of Database Systems. Hence, the insights gathered seek to offer actionable evidence for strengthening departmental instruction, refining assessment routines, and shaping targeted academic interventions.

Methodology

Research Design

This study utilized a descriptive research framework combined with document analysis to evaluate the academic standing of second-year Bachelor of Science in Information Technology students. Through document analysis, the study focused on extracting and reviewing official final grades earned in IM 101

Fundamentals of Database Systems during the second semester of the 2025–2026 academic year. These institutional records were securely sourced via the university's Student Information and Academic System (SIAS). Additionally, the analysis factored in student sex profiles to examine whether performance outcomes varied noticeably across demographic lines.

Respondents of the Study

The respondents comprised 122 second-year BS Information Technology undergraduates officially registered in IM 101 during the second semester of Academic Year 2025–2026. This population was spread across three distinct class blocks: Section A with 41 students, Section B with 37 students, and Section C with 44 students. Official grade distributions and demographic markers were gathered directly from SIAS by the handling faculty member, ensuring the data remained authentic and dedicated strictly to the parameters of this research.

Data Collection

To initiate data gathering, formal clearance was secured from relevant institutional authorities to access authorized academic archives. Final grades for the IM 101 Fundamentals of Database Systems course alongside participant sex classifications were securely exported from SIAS, then systematically sorted and tabulated for subsequent statistical evaluation. Strict protocols governed this phase: only variables directly tied to the study's core objectives were compiled, and all retrieved figures were kept exclusively for academic inquiry.

Commitment to privacy and confidentiality guided every step of the process. All records harvested from SIAS were treated with strict security. To guarantee anonymity, any unique identifiers—such as full names and student identification numbers—were completely stripped from the final analysis dataset. Consequently, all findings are reported strictly in aggregate form, ensuring no individual participant can be identified.

Data Analysis

The compiled dataset was processed using a mix of descriptive and inferential statistical measures. Frequency distributions and percentages were applied to map out sample breakdowns across sex categories. Central tendency was measured using the mean to gauge overall academic standing in IM 101 Fundamentals of Database Systems. Independent-samples t-test (using equal variances not assumed) was used to test for significant differences in students' academic performance in IM 101 Fundamentals of Database Systems when grouped according to sex.

Results and Discussion

Distribution of Respondents According to Sex

Table 1. Distribution of Respondents According to Sex

Sex	Frequency	Percent
Female	44	36.07
Male	78	63.93
Total	122	100.00

The distribution of the respondents according to sex is presented in Table 1.

There were 122 respondents, of whom 78 (63.93%) were male and 44 (36.07%) were female. This means that males made up nearly two-thirds of the respondents, while females accounted for a little over one-third of the group. The difference in representation shows that the respondents were predominantly male, although both male and female students were sufficiently represented in the study. This distribution provides useful context when examining the respondents' academic performance. However, the difference in the number

of male and female respondents should be considered when interpreting comparisons between the two groups. Similarly, Trinidad (2020), using data from 7,233 Filipino students who participated in PISA 2018, found that students' achievement varied considerably across both students and schools. While factors such as gender and socioeconomic status were related to achievement, they did not fully account for differences in students' performance.

Distribution of Respondents According to Academic Performance in IM 101 Fundamentals of Database Systems

Table 2. Distribution of Respondents according to Academic Performance in IM 101 Fundamentals of Database Systems

Academic Performance	Frequency	Percentage
1 (99-100)	0	0.00
1.25 (96-98)	19	15.57
1.5 (93-95)	44	36.07
1.75 (90-92)	39	31.97
2 (87-89)	7	5.74
2.25 (84-86)	2	1.64
2.5 (81-83)	3	2.46
2.75 (78-80)	2	1.64
3 (75-77)	0	0.00
5 (Less than 74)	0	0.00
INC	6	4.92
Total	**122**	**100.00**
Mean = 92.40		

The distribution of respondents according to academic performance in fundamentals of database systems is presented in Table 2.

The largest group, comprising 44 students (36.07%), obtained a grade of 1.50 (93–95), followed by 39 students (31.97%) who obtained 1.75 (90–92), and 19 students (15.57%) who obtained 1.25 (96–98). Overall, 102 out of 122 respondents (83.61%) obtained grades ranging from 1.25 to 1.75, equivalent to scores between 90 and 98. Only a small proportion received grades below 2.00, and no student obtained a grade of 3.00 or 5.00. These results suggest that most respondents were able to perform well in the course and meet its academic requirements.

The favorable performance is notable because Fundamentals of Database Systems is an important component of computing education that requires students to develop knowledge of data modeling, database management, and database implementation (Ishaq et al., 2023). The high mean in the present study may indicate that the respondents were generally able to cope with the academic demands of the subject. However, the results should not be interpreted as proof of complete mastery of database competencies because course grades may reflect several forms of assessment and may not capture every practical skill involved in database development. Student achievement is influenced by a combination of personal, educational, and contextual factors (Haw & King, 2023). Thus, the high academic performance observed in this study may be understood as a positive indication of students' achievement in the course while recognizing that other learner and instructional factors may also contribute to their performance. The overall mean was 92.40, indicating that the students, as a group, achieved a relatively high level of performance in the subject.

Test of Significant Difference in Academic Performance in Fundamentals of Database Systems When Grouped According to Sex

Table 3. Test of Significant Difference in Academic Performance in Fundamentals of Database Systems When Grouped According to Sex

Sex	Mean	SD	t-test for Equality of Means			Decision	Interpretation
			t	df	Sig. (2-tailed)		
Female	94.181	2.153	5.352	113.281	0.000	Ho is rejected	Significant
Male	91.197	3.849					

Note. Equal variances were not assumed based on Levene's test (F = 7.642, p = 0.007). p < 0.05

The test of significant difference in academic performance in fundamentals of database systems when grouped according to sex is presented in Table 3.

The results show that there was a statistically significant difference in academic performance between the male and female respondents. The Levene's test produced an F-value of 7.642 with a significance value of 0.007. Since the significance value is below the 0.05 level, the assumption of equal variances was not met. For this reason, the results were interpreted using the equal variances not assumed row. Using the appropriate unequal-variances t-test, the analysis yielded a t-value of 5.352, with 113.281 degrees of freedom and a p-value of less than 0.001. Because the p-value is below the 0.05 level of significance, the null hypothesis stating that there is a significant difference in academic performance when respondents are grouped according to sex was rejected. The results further show that female respondents obtained a higher mean academic performance score (M = 94.181, SD = 2.153) than male respondents (M = 91.197, SD = 3.849). Thus, the statistically significant difference indicates that female respondents performed significantly better than male respondents in Fundamentals of Database Systems in the sample under study. The finding suggests that respondents' sex was associated with differences in academic performance. However, this result should not be interpreted as evidence that sex itself caused the difference, as academic performance may also be influenced by various learner-related and contextual factors. The finding may be viewed in relation to previous research indicating that differences in academic achievement across sex or gender groups can occur, although such differences may be influenced by multiple factors. Hauspie et al. (2023), in a study involving 5,016 first-year university students across 16 programs, found that gender interacted with several cognitive, affective, and demographic predictors of academic achievement. Their findings suggest that academic performance should be understood in relation to multiple factors rather than treating gender as an isolated explanation for differences in achievement. A 2026 study involving public elementary schools in Tawi-Tawi reported gender-related differences in student engagement and academic achievement based on teachers' perceptions, with girls generally perceived as more academically consistent in the participating schools (Abbani et al., 2026).

Conclusion

Reflecting on the study's empirical findings, several definitive conclusions are established regarding the second-year Bachelor of Science in Information Technology cohort. The profile variable distribution is predominantly male aligning with historical enrollment trends characteristic of computing disciplines. The student population exhibited robust academic performance in IM 101 Fundamentals of Database Systems as evidenced by favorable aggregate mean scores, with the vast majority achieving high performance tiers and only a marginal fraction recording deficient outcomes. Nonetheless, the presence of intermittent incomplete marks highlights localized academic hurdles, underscoring the necessity of proactive institutional monitoring and targeted

interventions. The inferential evaluation revealed a statistically significant discrepancy in academic achievement when categorized by sex, indicating that sex-related dynamics influence how students navigate complex database competencies and programmatic requirements.

Recommendations

Grounded in the conclusions of this study, recommendations are proposed. Faculty-in charge is encouraged to sustain instructional strategies that effectively promote student comprehension, while offering targeted interventions—such as individualized consultations, remedial reviews, and extra exercises—for students who secured lower marks. To deepen practical mastery, faculty- in charge may integrate more hands-on lab activities addressing database design, complex SQL querying, data normalization, and manipulation. For future studies, researchers are advised to explore external variables that might influence academic outcomes, including individual study habits, prior preparation, attendance patterns, student motivation, and resource accessibility. These findings can serve as a basis for curriculum planners and faculty looking to refine classroom delivery and assessment frameworks for IM 101 – Fundamentals of Database Systems. Finally, replicating this study across wider BS Information Technology cohorts would help verify whether parallel trends manifest in different academic environments.

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