

A CORRELATIONAL ANALYSIS OF LEARNING RESOURCES, INSTRUCTIONAL FACILITIES, AND ACADEMIC PERFORMANCE AMONG MATHEMATICS EDUCATION STUDENTS

Marrah Shane E. Gaer

Negros Oriental State University, Negros Oriental, Philippines

Email: marrah.gaer@norsu.edu.ph

ABSTRACT: *Institutional learning resources, instructional facilities, library services, and study spaces are considered vital in teacher education, yet their direct relationship with academic performance in mathematics remains underexplored. Addressing this gap, the present study examined students' satisfaction with institutional resources and their relationship with academic performance and program satisfaction among Bachelor of Secondary Education major in Mathematics students. Using a descriptive–correlational design, data were collected from fifty-five BSEd Mathematics students at the College of Teacher Education, Negros Oriental State University. Quantitative data were analyzed using descriptive statistics and Spearman rho correlation, while qualitative responses were examined through thematic analysis. Findings revealed generally high academic performance, with most students obtaining Very Good and Good GPAs. Students reported high satisfaction with learning resources, instructional facilities, library services, and study spaces, and strongly perceived these resources as supportive of their learning and professional preparation. The library and quiet study areas emerged as the most important academic support spaces. However, no significant relationships were found between GPA and students' satisfaction with resources, perceived contribution of institutional resources, or overall program satisfaction. Qualitative results indicate that institutional resources enhance focus, independent learning, collaboration, and overall learning experiences, although challenges such as limited materials, weak internet connectivity, and congested spaces persist. Overall, the study shows that while institutional resources strongly support students' learning experiences and satisfaction, their influence on academic performance is indirect rather than reflected in GPA outcomes.*

Keywords: learning resources, instructional facilities, library services, study spaces, academic performance.

1. INTRODUCTION

Academic performance in higher education is shaped not only by students' cognitive abilities and effort but also by the quality and availability of institutional resources that support teaching and learning. Learning resources, instructional facilities, library services, and study spaces constitute essential components of the educational environment that collectively influence students' engagement, learning processes, and academic outcomes. In teacher education programs, particularly in Mathematics Education, these resources play a crucial role in facilitating conceptual understanding, problem-solving skills, and pedagogical readiness.

A growing body of empirical research has demonstrated that the availability of educational resources is positively associated with students' academic performance, interest, and learning outcomes across different educational contexts. Studies conducted in Africa, Asia, and Europe have consistently shown that access to libraries, instructional materials, laboratories, and well-managed facilities enhances students' academic achievement [1-3]. In mathematics-related disciplines, library resources and instructional facilities provide students with reference materials, digital resources, and conducive environments that support independent learning, research, and sustained academic engagement [4; 5].

Beyond mere availability, the quality and management of institutional facilities have been found to significantly affect students' academic performance. Research on facilities management in higher education indicates that well-maintained classrooms, functional e-learning systems, libraries, and study spaces significantly predict academic achievement when analyzed using correlational and regression techniques [6]. Similarly, Ramli and Mohd Zain

[3] reported that learning environments, teaching aids, and library services collectively explained a substantial proportion of variance in students' academic performance, underscoring the multifaceted nature of institutional support systems.

Recent studies have also emphasized the importance of students' satisfaction with learning resources and instructional facilities as a determinant of academic success. User satisfaction research in library and educational settings suggests that students who perceive institutional resources as accessible, adequate, and supportive tend to report higher levels of academic engagement and satisfaction with their learning experience [7; 8]. In teacher education institutions, satisfaction with facilities and learning environments has been linked to students' preparedness, confidence, and overall program satisfaction, highlighting the relevance of institutional resources in professional formation.

In parallel, research on learning spaces has expanded beyond traditional classrooms to include study spaces, collaborative environments, and technologically enhanced learning settings. Systematic reviews and empirical studies have shown that physical learning environments, including classroom layout, acoustics, seating arrangements, and study spaces, influence students' attention, collaboration, motivation, and academic outcomes [9-11]. These findings suggest that institutional resources function not only as physical infrastructures but also as psychosocial and cognitive enablers of learning.

However, scholars have cautioned that resource availability alone does not automatically translate into improved academic performance. Harder [12] emphasized the distinction between resource availability and actual resource utilization, noting that while availability provides a sense of

security and support, effective use of resources is more closely associated with learning strategies, self-regulation, and achievement. Similarly, Adebayo *et al.* [1] found that although educational resources significantly affect academic performance, their impact is often moderated by factors such as school management, accountability, and learner-related variables.

Despite the extensive international literature on learning resources and educational facilities, there remains a relative scarcity of empirical studies focusing on Mathematics Education students in teacher education programs, particularly within the Philippine context. Existing studies often examine resources in isolation or focus on basic or secondary education, leaving a gap in understanding how multiple dimensions of institutional resources collectively relate to academic performance, satisfaction, and students' perceptions at the tertiary level.

Specifically, it purports to shed light to the following questions:

1. What is the level of academic performance (GPA) of BSEd Mathematics students?
2. What is the level of satisfaction of BSEd Mathematics students in terms of:
 - 2.1 Learning Resources; and
 - 2.2 Instructional Facilities?
3. What is the respondents' perception of the contribution of the institutional resources in terms of learning resources, instructional facilities, library services, and study spaces to their academic performance?
4. What is the students' perception of the overall contribution of institutional resources to their academic performances?
5. What is the level of students' overall satisfaction with their BSEd Mathematics learning experience?
6. Is there a significant relationship between the BSEd Mathematics students GPA and their level of satisfaction in terms of:
 - 6.1 Learning resources; and
 - 6.2 Instructional facilities?
7. Is there a significant relationship between students' GPA and their perception of the contribution of the institutional resources in terms of learning resources, instructional facilities, library services, and study spaces to their academic performance?
8. Is there a significant relationship between students' GPA and their perception of the overall contribution of institutional resources to their academic performances?
9. Is there a significant relationship between students' overall satisfaction with the BSEd Mathematics program and their GPA?
10. What qualitative insights do BSEd Mathematics students provide regarding their experiences with learning resources and facilities in terms of:
 - 10.1 Learning resources or facilities that most supported their academic performance;
 - 10.2 Challenges encountered regarding learning resources or facilities;
 - 10.3 How institutional resources helped prepare them as future special education teachers; and
 - 10.4 Suggested improvements for the BSEd Mathematics program?

2. REVIEW OF RELATED LITERATURE

Learning Resources and Academic Performance

Learning resources are fundamental components of the teaching and learning process, serving as tools that facilitate knowledge acquisition, skill development, and independent study. Empirical evidence across educational contexts consistently demonstrates that the availability and quality of learning resources significantly influence students' academic performance.

Adebayo *et al.* [1], using data from the Trends in Mathematics and Science Study, found that educational resources significantly affected student academic performance in South Africa, although their magnitude was smaller relative to factors such as school management and learner characteristics. Similarly, Mulatya *et al.* [13] reported a strong positive relationship between learning resource availability and learner outcomes, with resource availability explaining a substantial proportion of variance in academic performance. These findings reinforce the view that learning resources play a critical role in shaping academic outcomes when embedded within supportive institutional structures.

In mathematics-related contexts, library resources emerge as particularly important. Muchena and Michubu [4] found a strong positive relationship between library resources and mathematics performance among secondary school students in Kenya, highlighting the role of books, digital materials, and computer access in enhancing learning outcomes. Uwitatse and Niyibizi [5] further emphasized that libraries support mathematics learning by providing access to relevant materials and quiet environments, although challenges related to accessibility and relevance persist.

Studies conducted in Nigeria similarly affirm the contribution of learning resources to academic performance. Fakunle [14] found that the availability and utilization of school library resources significantly promoted students' learning activeness, particularly when resources were aligned with assignments and assessment preparation. Eyenaka and Umoren [15] demonstrated that regular access to laboratory and library facilities enhanced students' interest, engagement, and performance in science subjects, suggesting that resource availability fosters both cognitive and affective learning outcomes.

Instructional Facilities and Facilities Management

Instructional facilities refer to physical and technological infrastructures such as classrooms, laboratories, teaching aids, and digital learning systems that support instructional delivery. Research indicates that both the availability and effective management of these facilities significantly influence students' academic performance.

Ramli and Mohd Zain [3] found that learning environments, teaching aids, and library services significantly predicted students' academic achievement, collectively explaining over half of the variance in performance. Likewise, Zurainan *et al.* [6] reported that classrooms, e-learning facilities, libraries, and hostels had significant effects on students' academic achievement when analyzed through correlation and regression techniques. These findings underscore the importance of facilities management as a mechanism through which institutional resources translate into academic outcomes.

In basic and secondary education, Abidoye *et al.* [16] showed that the availability of laboratory facilities significantly influenced students' performance in basic science. Baafi [2] similarly established that students in schools with conducive physical environments outperformed those in less favorable settings, reinforcing the role of physical facilities in creating supportive learning climates.

Within teacher education contexts, Swai *et al.* [8] found that student teachers' satisfaction was strongly predicted by in-class teaching aids, practical materials, and ICT facilities, highlighting the importance of instructional facilities in professional preparation. These findings are directly relevant to Mathematics Education programs, where instructional clarity and practical engagement are essential.

Library Services, Study Spaces, and Learning Environments

Libraries and study spaces function not only as repositories of information but also as learning environments that support concentration, collaboration, and independent study. Research consistently shows that these spaces contribute meaningfully to students' academic experiences.

Alokluk [17] found that students generally held positive attitudes toward library use, particularly for studying and accessing digital resources, although dissatisfaction with study space comfort was noted. Amarasekara and Marasinghe [7] further demonstrated that students were generally satisfied with library facilities, services, and resources, with reliability confirmed through Cronbach alpha testing. However, gaps in information literacy programs and digital access remained evident.

Beyond libraries, the broader design of learning spaces has attracted increasing scholarly attention. Llorens-Gámez *et al.* [10] established that built environment features such as lighting, acoustics, spatial configuration, and color significantly affect attention and memory. Nja *et al.* [11] similarly found that classroom seating arrangements and acoustics significantly predicted academic grades, collaboration, and interest among students.

Systematic reviews reinforce these findings. Leijon *et al.* [18] and Papaioannou *et al.* [19] highlighted that physical learning spaces in higher education influence engagement, collaboration, and pedagogical practices, although the field remains fragmented and under-theorized. Baars *et al.* [9] emphasized the interrelationship between physical and psychosocial learning environments, noting that alignment between space and pedagogy enhances the effectiveness of innovative teaching approaches.

Student Satisfaction and Perceived Contribution of Institutional Resources

Student satisfaction is increasingly recognized as an important indicator of educational quality and effectiveness. Research suggests that satisfaction with institutional resources mediates the relationship between facilities and academic outcomes.

Swai *et al.* [8] demonstrated that student teachers' satisfaction with facilities and learning environments was influenced by teaching aids, ICT facilities, and library services. Similarly, Amarasekara and Marasinghe [7] found that overall satisfaction with library resources and services

was high, though areas for improvement affected perceptions of service quality.

Coelho *et al.* [20] introduced the Survey on Student School Spaces as an inclusive tool for capturing students' perceptions of learning environments, emphasizing the value of student feedback in improving educational spaces. Their participatory approach highlights the importance of understanding students' lived experiences when evaluating institutional resources.

Resource Availability Versus Resource Utilization

While many studies affirm the importance of resource availability, emerging literature cautions that availability alone is insufficient. Harder [12] distinguished between resource availability and actual usage, demonstrating that learning strategies, self-regulation, and deliberate practice are more closely associated with academic achievement than mere possession of resources. This distinction underscores the importance of examining students' perceptions and satisfaction alongside objective measures of resource availability.

Nurmayani *et al.* [21] further noted that the impact of educational resources on learning motivation depends heavily on teacher creativity and effective integration into instruction. Similarly, Festiyed *et al.* [22] found that the lack of ICT-based enrichment materials limited students' opportunities for self-directed learning, despite the presence of basic resources.

3. SIGNIFICANCE OF THE STUDY

This study is significant as it contributes empirical and practical insights into the role of learning resources and instructional facilities in shaping academic performance, satisfaction, and learning experiences of Bachelor of Secondary Education major in Mathematics students. By examining both students' level of satisfaction and their perceptions of the contribution of institutional resources alongside objective academic performance indicators, the study offers a more comprehensive understanding of how institutional support systems function within teacher education programs.

For Mathematics Education students, the findings of this study provide evidence on how learning resources, instructional facilities, library services, and study spaces support their academic performance and overall learning experience. Understanding these relationships may help students become more aware of how effective use of institutional resources can enhance their learning strategies, academic engagement, and preparation as future mathematics teachers.

For teacher education institutions and program administrators, the results of this study offer data-driven insights that can inform planning, prioritization, and improvement of learning resources and instructional facilities. By identifying which institutional resources are perceived as most contributory to academic performance and satisfaction, administrators may allocate resources more strategically and implement targeted interventions to improve teaching and learning environments within Mathematics Education programs.

For faculty members and curriculum developers, this study provides evidence on the importance of aligning instructional practices with available learning resources and facilities.

Insights from the qualitative component may help instructors refine teaching strategies that maximize the use of libraries, instructional materials, and study spaces, thereby enhancing students' academic engagement and conceptual understanding in mathematics.

For policy makers and higher education planners, particularly in teacher education, this study contributes empirical support for decisions related to infrastructure development, facilities management, and learning environment enhancement. The findings may serve as a reference in evaluating institutional readiness and compliance with quality assurance standards, including those related to student support services and instructional facilities.

For future researchers, this study extends the existing literature by integrating academic performance, satisfaction, and perceived contribution of multiple institutional resources within a single correlational framework. It also demonstrates the value of combining quantitative and qualitative approaches in examining learning environments in higher education. The findings may serve as a basis for further studies across other disciplines, institutions, or educational levels, as well as for longitudinal or experimental research designs.

4. METHODOLOGY

Research Design

This study employed a descriptive–correlational research design to examine the relationships among learning resources, instructional facilities, students' perceptions of institutional resource contribution, overall satisfaction, and academic performance of Bachelor of Secondary Education major in Mathematics students. The descriptive component was used to determine the levels of students' academic performance, satisfaction, and perceptions regarding institutional resources, while the correlational component examined the extent of relationships between students' grade point average and their satisfaction and perceptions of institutional resources. In addition, a qualitative component was incorporated to obtain in-depth insights into students' experiences, challenges, and suggested improvements related to learning resources and facilities. This mixed approach allowed a more comprehensive understanding of the phenomenon under investigation.

Research Locale

The study was conducted at the College of Teacher Education of Negros Oriental State University, a public higher education institution offering teacher education programs, including the Bachelor of Secondary Education major in Mathematics. The college provides instructional facilities, learning resources, library services, and study spaces intended to support pre-service teachers' academic and professional development. The locale was selected due to its relevance to teacher education and the accessibility of respondents necessary for the conduct of the study.

Respondents of the Study

The respondents of the study were all 55 Bachelor of Secondary Education major in Mathematics students enrolled at the College of Teacher Education of Negros Oriental State University during the period of data collection. A total enumeration sampling technique was employed, as the population size was manageable and allowed the inclusion of

all eligible respondents. This approach ensured comprehensive representation of Mathematics Education students and increased the accuracy and reliability of the findings.

Research Instruments

Data were collected using a researcher-developed questionnaire and a set of open-ended questions. The questionnaire consisted of several sections designed to measure students' level of satisfaction with learning resources and instructional facilities, their perceptions of the contribution of institutional resources in terms of learning resources, instructional facilities, library services, and study spaces, and their overall satisfaction with the BSEd Mathematics learning experience. Responses were measured using a Likert-type scale. The qualitative instrument comprised open-ended questions that elicited students' insights regarding resources or facilities that most supported their academic performance, challenges encountered, the role of institutional resources in preparing them as future teachers, and suggested program improvements.

Validity and Reliability of the Instrument

To establish content validity, the research instruments were subjected to evaluation by experts in education and research methodology. Their comments and suggestions were incorporated to ensure clarity, relevance, and alignment with the objectives of the study. The reliability of the quantitative instrument was determined through a pilot test using Cronbach's alpha coefficient. The resulting reliability index indicated acceptable internal consistency, confirming that the instrument was suitable for data collection.

Data Gathering Procedure

Prior to data collection, permission to conduct the study was secured from the appropriate university authorities. The researcher explained the purpose of the study to the respondents and assured them of the confidentiality and anonymity of their responses. The questionnaires were administered personally to the respondents, allowing sufficient time for completion. The qualitative responses were gathered simultaneously through the open-ended section of the instrument. All completed questionnaires were retrieved, checked for completeness, and prepared for analysis.

Data Analysis

Quantitative data were analyzed using descriptive and inferential statistical techniques. Descriptive statistics, including frequency counts, percentages, means, and standard deviations, were used to describe students' academic performance, levels of satisfaction, and perceptions of institutional resource contribution. Inferential statistics, specifically correlation analysis, were employed to determine the significant relationships between students' grade point average and their satisfaction with learning resources and instructional facilities, as well as their perceptions of institutional resource contribution and overall satisfaction. Qualitative data were analyzed using thematic analysis, wherein responses were carefully examined, coded, and grouped into emerging themes that represented common patterns in students' experiences.

Ethical Considerations

Ethical standards in research were strictly observed throughout the conduct of the study. Participation was

voluntary, and informed consent was obtained from all respondents. The identities of the participants were kept confidential, and the data collected were used solely for academic purposes. Respondents were informed of their right to withdraw from the study at any time without any form of penalty.

RESULTS AND DISCUSSION

Table 1.1 Respondents GPA

Grade	GPA	
	f	%
95 & above Excellent (E)	0	0.00
92-94 Very Good (VG)	29	52.73
90-91 Good (G)	17	30.91
88-89 Very Satisfactory (VS)	7	12.73
85-87 Satisfactory (S)	2	3.64
Total	55	100.00

Legend:

- 95 & above Excellent (E)
- 92-94 Very Good (VG)
- 90-91 Good (G)
- 88-89 Very Satisfactory (VS)
- 85-87 Satisfactory (S)
- 83-84 Fairly Satisfactory (FS)

Table 1.1 presents the distribution of the respondents’ grade point average (GPA) among the 55 Bachelor of Secondary Education major in Mathematics students. The results indicate that the majority of the respondents demonstrated high academic performance, with more than half of the students, or 52.73% (f = 29), obtaining a GPA classified as Very Good (92–94). This finding suggests that a substantial proportion of the respondents consistently achieved strong academic outcomes in their coursework.

In addition, 30.91% (f = 17) of the respondents attained a Good (90–91) GPA, while 12.73% (f = 7) were classified as Very Satisfactory (88–89). Only a small portion of the respondents, 3.64% (f = 2), fell under the Satisfactory (85–87) category. Notably, none of the respondents achieved a GPA of Excellent (95 and above) during the period covered by the study. Overall, the GPA distribution reflects a generally high level of academic performance, with 96.36% of the respondents obtaining GPAs classified as Very Satisfactory to Very Good.

This pattern of results aligns with previous research suggesting that teacher education students often demonstrate strong academic achievement when supported by adequate learning resources and instructional environments. Studies have shown that access to learning resources, instructional facilities, and supportive academic environments contributes to sustained academic performance among students [3; 2]. The predominance of respondents in the Very Good and Good GPA categories further supports the view that favorable institutional conditions may play a role in promoting academic success.

Moreover, the absence of respondents in the Excellent GPA category may reflect the rigorous academic demands of Mathematics Education programs, which emphasize analytical reasoning, problem-solving, and conceptual mastery. Similar findings have been observed in studies indicating that while educational resources significantly

support academic performance, outcomes are also influenced by curriculum rigor, assessment standards, and learner-related factors [1; 12].

Table 2.1 Level of Satisfaction of BSEd Math Students in Terms of Learning Resources

Learning Resources	Mean	SD	Interpretation
Required instructional materials for my mathematics courses are available.	3.89	0.85	Agree
Reference materials related to Mathematics Education are sufficient.	3.87	0.84	Agree
Digital learning resources for mathematics are accessible when needed.	4.05	0.80	Agree
Learning materials support my understanding of mathematical concepts.	4.36	0.80	Strongly Agree
Composite Mean	4.05		Agree

Table 2.1 presents the level of satisfaction of BSEd Mathematics students with respect to learning resources provided by the institution. The results show a composite mean of 4.05, interpreted as Agree, indicating that students were generally satisfied with the availability, accessibility, and usefulness of learning resources in supporting their mathematics education.

Among the indicators, “Learning materials support my understanding of mathematical concepts” obtained the highest mean score of 4.36 (SD = 0.80), interpreted as Strongly Agree. This finding suggests that the learning materials used in the program effectively facilitate conceptual understanding, which is a critical component of success in mathematics education. Previous studies have consistently emphasized that appropriate and well-aligned learning resources enhance comprehension, promote deeper learning, and improve academic performance, particularly in mathematically intensive programs [4; 1].

The item “Digital learning resources for mathematics are accessible when needed” yielded a mean of 4.05 (SD = 0.80), interpreted as Agree. This result indicates that students perceive digital resources as generally accessible, supporting flexible and self-directed learning. The availability of digital and technology-based learning materials has been shown to enhance students’ engagement and learning efficiency, especially when integrated effectively into instructional practices [22; 12].

With respect to the availability of printed and reference materials, “Required instructional materials for my mathematics courses are available” and “Reference materials related to Mathematics Education are sufficient” recorded mean scores of 3.89 (SD = 0.85) and 3.87 (SD = 0.84), respectively, both interpreted as Agree. These findings indicate satisfactory levels of availability, although they also suggest potential areas for enhancement. Prior research has highlighted that sufficient and up-to-date reference materials are essential for supporting academic tasks, independent study, and research-oriented activities among education students [17; 7].

Overall, the findings in Table 2.1 demonstrate that BSEd Mathematics students hold a positive perception of the

learning resources available to them, particularly in terms of their contribution to conceptual understanding and access to digital materials. These results are consistent with existing literature which underscores the role of learning resource availability and quality in promoting effective learning, academic engagement, and achievement in mathematics education [2; 13].

Table 2.2 Level of Satisfaction of BSEd Mathematics Students in Instructional Facilities

Instructional Facilities	Mean	SD	Interpretation
Classrooms provide adequate space for mathematics learning activities.	4.09	0.84	Agree
Classroom layouts support effective teaching and learning in mathematics.	4.04	0.74	Agree
Learning spaces are free from unnecessary distractions.	3.71	0.94	Agree
Instructional buildings are physically accessible.	3.89	0.79	Agree
Facilities allow independent movement within campus.	4.04	0.74	Agree
Facilities are well-maintained and conducive to learning mathematics.	4.00	0.79	Agree
Composite Mean	3.96		Agree

Table 2.2 presents the level of satisfaction of BSEd Mathematics students with instructional facilities in terms of classroom space, layout, accessibility, maintenance, and overall conduciveness to mathematics learning. The results reveal a composite mean of 3.96, interpreted as Agree, indicating that students were generally satisfied with the instructional facilities provided by the institution.

Among the indicators, “Classrooms provide adequate space for mathematics learning activities” obtained the highest mean score of 4.09 (SD = 0.84), interpreted as Agree. This finding suggests that students perceive classroom spaces as sufficient to support mathematics-related instructional activities, discussions, and problem-solving tasks. Adequate classroom space has been widely recognized as a critical factor in supporting learner engagement and effective instructional delivery, particularly in subjects that require active participation and board work such as mathematics [2]; [3].

Similarly, “Classroom layouts support effective teaching and learning in mathematics” recorded a mean of 4.04 (SD = 0.74), also interpreted as Agree. This result highlights the role of classroom arrangement and physical design in facilitating interaction, visibility, and instructional flow. Prior studies have shown that well-designed learning spaces enhance student–teacher interaction and collaborative learning, thereby improving academic outcomes [11].

The indicator “Facilities allow independent movement within campus” yielded a mean score of 4.04 (SD = 0.74), while “Facilities are well-maintained and conducive to learning mathematics” obtained a mean of 4.00 (SD = 0.79). Both items were interpreted as Agree, suggesting that students recognize the importance of accessibility and maintenance in creating a supportive learning environment. Research on facilities management has consistently demonstrated that

well-maintained instructional buildings contribute positively to students’ concentration, comfort, and academic performance [6; 8].

In contrast, “Learning spaces are free from unnecessary distractions” recorded the lowest mean score of 3.71 (SD = 0.94), though still interpreted as Agree. This finding implies that while students generally perceive the learning environment as acceptable, distractions remain a minor concern. Existing literature indicates that noise levels, acoustics, and environmental disturbances can affect students’ attention, memory, and overall learning efficiency, particularly in cognitively demanding tasks [10; 23].

Overall, the results of Table 2.2 indicate that BSEd Mathematics students hold positive perceptions of the instructional facilities provided by the institution. The findings affirm that adequate space, supportive classroom layouts, accessibility, and proper maintenance collectively contribute to a conducive learning environment. These results support earlier studies emphasizing that the quality of instructional facilities plays a significant role in shaping students’ academic experiences and supporting effective mathematics instruction [19; 18].

Table 3.1 Respondents’ Perception of the Contribution of the Institutional Resources in Terms of Learning Resources, Instructional Facilities, Library Services, and Study Spaces to their Academic Performance

Learning Resources, Instructional Facilities, Library Services, and Study Spaces	Mean	SD	Interpretation
Learning resources help me understand mathematics concepts.	4.40	0.83	Agree
Learning resources support my completion of mathematics-related academic requirements.	4.35	0.78	Agree
Instructional facilities help me focus during mathematics learning activities.	4.15	0.80	Agree
Facilities support my independent study of mathematics topics.	4.13	0.75	Agree
Library resources support my coursework in mathematics education.	4.02	0.83	Agree
The library provides a conducive environment for studying mathematics.	4.07	0.81	Agree
Library services help me prepare for mathematics examinations.	4.13	0.77	Agree
Campus study spaces help me concentrate on mathematics-related tasks.	3.84	0.79	Agree
Quiet study areas support my independent learning in mathematics.	4.53	0.74	Strongly Agree
Group study spaces support collaboration on mathematics academic tasks.	4.24	0.94	Agree
Composite Mean	4.20		Agree

Table 3.1 presents the respondents’ perception of the contribution of institutional resources in terms of learning resources, instructional facilities, library services, and study spaces to their academic performance in mathematics education. The results indicate a composite mean of 4.20, interpreted as Agree, suggesting that students generally perceive institutional resources as making a positive contribution to their academic performance.

Among the indicators, “Quiet study areas support my independent learning in mathematics” obtained the highest mean score of 4.53 (SD = 0.74), interpreted as Strongly Agree. This finding underscores the importance of quiet and well-designed study spaces in supporting concentration, cognitive processing, and independent learning. Prior studies have consistently shown that reduced noise levels, appropriate acoustics, and dedicated quiet spaces enhance students’ attention, memory, and academic outcomes, particularly in cognitively demanding subjects such as mathematics [10; 11].

Indicators related to learning resources also received high ratings. “Learning resources help me understand mathematics concepts” recorded a mean of 4.40 (SD = 0.83), while “Learning resources support my completion of mathematics-related academic requirements” obtained a mean of 4.35 (SD = 0.78), both interpreted as Agree. These findings support existing evidence that the availability of relevant instructional and reference materials facilitates conceptual understanding, task completion, and academic achievement [4; 1]. Studies further emphasize that learning resources are most effective when they are accessible, relevant, and aligned with course objectives [12].

With respect to instructional facilities, “Instructional facilities help me focus during mathematics learning activities” yielded a mean of 4.15 (SD = 0.80), while “Facilities support my independent study of mathematics topics” obtained 4.13 (SD = 0.75), both interpreted as Agree. These results suggest that the physical condition and design of instructional spaces contribute to students’ ability to sustain attention and engage in independent learning. This aligns with research highlighting the role of classroom layout, environmental comfort, and facilities management in promoting effective learning and academic performance [6; 3].

Library-related indicators also showed positive perceptions. “Library resources support my coursework in mathematics education” recorded a mean of 4.02 (SD = 0.83), while “Library services help me prepare for mathematics examinations” obtained 4.13 (SD = 0.77). Additionally, “The library provides a conducive environment for studying mathematics” yielded a mean of 4.07 (SD = 0.81). These findings are consistent with studies demonstrating that well-equipped libraries and effective library services enhance students’ academic performance by providing access to quality information resources, study support services, and conducive learning environments [17; 7; 14].

In terms of study spaces, “Group study spaces support collaboration on mathematics academic tasks” obtained a mean of 4.24 (SD = 0.94), interpreted as Agree, while “Campus study spaces help me concentrate on mathematics-related tasks” recorded a slightly lower mean of 3.84 (SD = 0.79). These results suggest that both collaborative and

individual study spaces contribute to learning, although students place greater value on quiet areas for independent study. This finding supports previous literature indicating that flexible learning spaces that accommodate both collaboration and individual work are essential for optimizing educational outcomes [19].

Overall, the results of Table 3.1 indicate that students perceive institutional resources as significant contributors to their academic performance in mathematics education. Learning resources, instructional facilities, library services, and study spaces collectively support conceptual understanding, independent study, collaboration, and examination preparation. These findings reinforce the broader literature emphasizing that academic achievement is strongly influenced by the availability, quality, and effective use of institutional resources, rather than by instructional factors alone [2, 13; 12].

Table 4.1 Perceived Overall Contribution of Institutional Resources to Students’ Academic Performance and Preparation as Mathematics Education Teachers in Terms of Campus Learning Resources and Facilities, Library, and Study Spaces

Learning Resources, Instructional Facilities, Library Services, and Study Spaces	Mean	SD	Interpretation
Learning resources contribute positively to my academic performance in mathematics.	4.40	0.71	Strongly Agree
Instructional facilities support my academic success in mathematics courses.	4.27	0.73	Strongly Agree
Library services and study spaces help improve my academic outcomes.	4.20	0.76	Agree
Composite Mean	4.29		Strongly Agree

Table 4.1 presents the respondents’ perceived overall contribution of institutional resources in terms of learning resources, instructional facilities, library services, and study spaces to their academic performance in mathematics education. The results show a composite mean of 4.29, interpreted as Strongly Agree, indicating that students perceive institutional resources as highly influential in supporting their academic success.

Among the indicators, “Learning resources contribute positively to my academic performance in mathematics” obtained the highest mean score of 4.40 (SD = 0.71), interpreted as Strongly Agree. This finding underscores the central role of accessible and relevant learning resources in promoting academic achievement in mathematics. Previous studies have consistently shown that the availability of quality instructional and reference materials enhances students’ conceptual understanding, learning motivation, and academic outcomes [1; 13]. Moreover, Harder [12] emphasizes that learning resources are most effective when students are able to actively utilize them in their learning processes, thereby translating availability into academic gains.

The statement “Instructional facilities support my academic success in mathematics courses” recorded a mean of 4.27 (SD

= 0.73), also interpreted as Strongly Agree. This result highlights the importance of well-designed, accessible, and adequately maintained instructional facilities in fostering concentration, engagement, and sustained academic performance. Empirical evidence suggests that classroom design, spatial adequacy, and overall facility management significantly influence students' learning experiences and achievement, particularly in structured and cognitively demanding disciplines such as mathematics [3; 6; 2].

In addition, "Library services and study spaces help improve my academic outcomes" yielded a mean of 4.20 (SD = 0.76), interpreted as Agree. This finding indicates that while students strongly value learning resources and instructional facilities, they also recognize the supportive role of libraries and study spaces in enhancing their academic performance. Prior research has demonstrated that effective library services, access to information resources, and conducive study environments contribute to improved study habits, examination preparation, and academic achievement [17; 7; 14].

Overall, the results of Table 4.1 suggest that students hold a very positive perception of the collective contribution of institutional resources to their academic performance in mathematics education. The strong ratings across learning resources, instructional facilities, and library-related services reinforce existing literature which posits that academic success is shaped not only by instructional quality but also by the availability and quality of institutional support systems and learning environments [19; 18].

Table 5.1 Level of Students' Overall Satisfaction with their BSEd Mathematics Learning Experience

Learning Resources, Instructional Facilities, Library Services, and Study Spaces	Mean	SD	Interpretation
I am satisfied with my learning experience in the BSED–Mathematics program.	4.18	0.72	Agree
The program supports my academic development in mathematics education.	4.40	0.60	Strongly Agree
I would recommend the BSED–Mathematics program to prospective students.	4.25	0.73	Strongly Agree
Composite Mean	4.28		Strongly Agree

Table 5.1 presents the level of students' overall satisfaction with their learning experience in the BSEd Mathematics program in terms of learning resources, instructional facilities, library services, and study spaces. The results show a composite mean of 4.28, interpreted as Strongly Agree, indicating a very high level of overall student satisfaction with the program.

Among the indicators, "The program supports my academic development in mathematics education" obtained the highest mean score of 4.40 (SD = 0.60), interpreted as Strongly Agree. This finding suggests that students perceive the BSEd Mathematics program as effectively contributing to their academic growth and mastery of mathematical concepts. Previous studies have highlighted that strong academic

support structures, including adequate learning resources and instructional facilities, are essential for fostering student development and achievement in teacher education programs [8; 13].

Similarly, "I would recommend the BSEd Mathematics program to prospective students" recorded a mean of 4.25 (SD = 0.73), also interpreted as Strongly Agree. This result reflects students' positive overall evaluation of the program and their confidence in its quality. Research has shown that students' willingness to recommend an academic program is a strong indicator of satisfaction, perceived value, and program effectiveness [7; 17].

The statement "I am satisfied with my learning experience in the BSEd Mathematics program" yielded a mean of 4.18 (SD = 0.72), interpreted as Agree. Although slightly lower than the other items, this result still indicates a high level of satisfaction. This finding suggests that students' learning experiences are positively shaped by the collective influence of learning resources, instructional facilities, library services, and study spaces. Prior research supports the notion that students' overall satisfaction is closely linked to the quality and accessibility of institutional resources and the conduciveness of the learning environment [9; 19].

Overall, the findings in Table 5.1 indicate that BSEd Mathematics students are highly satisfied with their learning experience and the support provided by the program. The strong composite mean reinforces existing evidence that well-resourced and well-managed learning environments contribute significantly to student satisfaction, academic development, and positive program perceptions in teacher education institutions [3; 18].

Table 6 Relationship Between the Perceived Quality of Study Spaces and the Academic Performance of BSEd Mathematics Students

GPA	Spearman Rho	Degree of Relationship	p-value	decision
Learning resources	0.021	Negligible	0.881	Non-Significant, Fail to Reject the Null
Instructional facilities	-0.098	Negative Negligible	0.477	Non-Significant, Fail to Reject the Null

*Adapted from Calmorin

An r ± 0.00 denotes zero correlation.

An r from 0.01 to ± 0.20 deals on negligible correlation

An r from ± 0.21 to ± 0.40 denotes low or slight relationship.

An r from ± 0.41 to ± 0.70 indicates marked or moderate correlation.

An r from ± 0.71 to ± 0.90 shows high relationship.

An r from ± 0.91 to ± 0.99 denotes very high correlation.

An r ±1.0 indicates perfect relationship.

Table 6 presents the relationship between the academic performance of BSEd Mathematics students, as measured by GPA, and their perceived quality of institutional resources in terms of learning resources and instructional facilities. Spearman rho correlation analysis was employed to determine the strength and significance of the relationships.

The results reveal that the relationship between learning resources and GPA yielded a Spearman rho value of 0.021, interpreted as a negligible relationship, with a p-value of 0.881. Since the p-value exceeds the 0.05 level of

significance, the relationship is not statistically significant, leading to the decision to fail to reject the null hypothesis. This finding indicates that students' perceptions of learning resources were not meaningfully associated with variations in their academic performance.

Similarly, the relationship between instructional facilities and GPA produced a Spearman rho value of -0.098, described as a negative negligible relationship, with a p-value of 0.477, which is also not statistically significant. This result suggests that students' satisfaction with instructional facilities did not significantly influence their GPA, thus supporting the null hypothesis of no significant relationship.

These findings imply that although students generally rated learning resources and instructional facilities positively in earlier tables, such perceptions did not translate into measurable differences in academic performance. This supports previous research indicating that educational resources and facilities often function as supportive or enabling conditions rather than direct determinants of academic achievement. Adebayo et al. [1] found that while resource availability influences learning, its direct effect on academic performance is relatively small compared to factors such as learner motivation, school management, and instructional practices.

Furthermore, Harder [12] emphasized that resource availability alone is insufficient to improve academic outcomes unless it is accompanied by active and effective utilization by students. In the context of higher education and teacher education programs, facilities and resources may enhance satisfaction, engagement, and learning experiences, but academic performance is often more strongly influenced by self-regulation, study habits, and instructional quality [8; 3].

Table 7 Relationship Between Students' GPA and their Perception of the Contribution of the Institutional Resources in Terms of Learning Resources, Instructional Facilities, Library Services, And Study Spaces to their Academic Performance

GPA	Spearman Rho	Degree of Relationship	p-value	decision
Perception of the Contribution of the Institutional Resources	0.104	Negligible	0.449	Non-Significant, Fail to Reject the Null

*Adapted from Calmorin

An $r \pm 0.00$ denotes zero correlation.

An r from 0.01 to ± 0.20 deals on negligible correlation

An r from ± 0.21 to ± 0.40 denotes low or slight relationship.

An r from ± 0.41 to ± 0.70 indicates marked or moderate correlation.

An r from ± 0.71 to ± 0.90 shows high relationship.

An r from ± 0.91 to ± 0.99 denotes very high correlation.

An $r \pm 1.0$ indicates perfect relationship.

Table 7 presents the relationship between students' academic performance, as measured by GPA, and their perception of the contribution of institutional resources in terms of learning resources, instructional facilities, library services, and study spaces to their academic performance. Spearman rho correlation analysis was used to determine the strength and significance of the relationship.

The results show that the correlation between students' GPA and their perceived contribution of institutional resources

yielded a Spearman rho value of 0.104, which is interpreted as a negligible relationship, with a p-value of 0.449. Since the p-value exceeds the 0.05 level of significance, the relationship is not statistically significant. Thus, the null hypothesis stating that there is no significant relationship between students' GPA and their perception of the contribution of institutional resources is failed to be rejected.

This finding indicates that although students generally perceived institutional resources as supportive of their academic performance, such perceptions were not significantly associated with differences in GPA. This result is consistent with earlier findings in this study showing non-significant relationships between GPA and specific resource domains such as learning resources and instructional facilities. Together, these results suggest that students' academic performance is not directly determined by their perceived contribution of institutional resources alone.

The result aligns with previous studies which emphasize that educational resources, while essential for creating enabling and supportive learning environments, do not independently predict academic achievement. Adebayo et al. [1] found that although resource availability has a statistically significant effect on student outcomes, its magnitude is relatively small when compared with other factors such as learner characteristics, school management, and accountability mechanisms. Similarly, Harder [12] underscored that resource availability must be complemented by effective utilization, deliberate practice, and self-regulated learning in order to influence academic achievement.

Studies in facilities management and learning environments further indicate that institutional resources tend to exert an indirect influence on academic performance by shaping students' satisfaction, motivation, and learning experiences rather than their grades per se. Ramli and Mohd Zain [3] and Zurainan *et al.* [6] noted that facilities and learning environments contribute more strongly to students' comfort, engagement, and readiness to learn than to direct gains in academic performance. In teacher education contexts, Swai *et al.* [8] likewise reported that institutional resources are stronger predictors of student satisfaction than of academic achievement.

Table 8 Relationship Between Students' GPA and Their Perception of The Overall Contribution of Institutional Resources to Their Academic Performances

GPA	Spearman Rho	Degree of Relationship	p-value	decision
Perception of the Overall Contribution of Institutional Resources	0.079	Negligible	0.568	Non-Significant, Fail to Reject the Null

*Adapted from Calmorin

An $r \pm 0.00$ denotes zero correlation.

An r from 0.01 to ± 0.20 deals on negligible correlation

An r from ± 0.21 to ± 0.40 denotes low or slight relationship.

An r from ± 0.41 to ± 0.70 indicates marked or moderate correlation.

An r from ± 0.71 to ± 0.90 shows high relationship.

An r from ± 0.91 to ± 0.99 denotes very high correlation.

An $r \pm 1.0$ indicates perfect relationship.

Table 8 presents the relationship between students' academic performance, as measured by GPA, and their perception of the overall contribution of institutional resources to their academic performance. Spearman rho correlation analysis was employed to determine the strength and statistical significance of the relationship.

The findings indicate that the relationship between students' GPA and their perception of the overall contribution of institutional resources yielded a Spearman rho value of 0.079, which is interpreted as a negligible relationship, with a p-value of 0.568. Since the p-value is greater than the 0.05 level of significance, the relationship is not statistically significant. Consequently, the null hypothesis stating that there is no significant relationship between students' GPA and their perception of the overall contribution of institutional resources is failed to be rejected.

This result suggests that although students strongly perceived institutional resources as beneficial to their learning experience and academic performance, such perceptions did not significantly correspond to variations in GPA. This finding is consistent with earlier results in the present study showing non-significant relationships between GPA and specific domains of institutional resources, including learning resources, instructional facilities, library services, and study spaces.

The finding aligns with existing literature emphasizing that institutional resources often function as enabling or supporting conditions rather than direct predictors of academic achievement. Adebayo et al. [1] demonstrated that while the availability of educational resources has a statistically significant relationship with student performance, its effect size is relatively small compared to other determinants such as learner motivation, school management, and accountability mechanisms. Similarly, Harder [12] highlighted that resource availability alone does not guarantee improved academic outcomes unless it is accompanied by effective utilization and self-regulated learning behaviors.

Studies on facilities management and learning environments further support the notion that institutional resources exert a stronger influence on students' satisfaction, engagement, and learning experiences than on their grades. Ramli and Mohd Zain [3] and Zurainan *et al.* [6] reported that well-managed facilities enhance students' comfort and focus, which may indirectly support learning but do not necessarily translate into immediate improvements in academic performance. In teacher education contexts, Swai et al. [8] likewise found that institutional facilities were stronger predictors of student satisfaction than of academic achievement.

Table 9 Relationship Between Students' Overall Satisfaction with the BSEd Math Program and Their GPA

GPA	Spearman Rho	Degree of Relationship	p-value	decision
Overall Satisfaction with the BSEd Math Program	0.084	Negligible	0.541	Non-Significant, Fail to Reject the Null

*Adapted from Calmorin

An $r \pm 0.00$ denotes zero correlation.

An r from 0.01 to ± 0.20 deals on negligible correlation

An r from ± 0.21 to ± 0.40 denotes low or slight relationship.

An r from ± 0.41 to ± 0.70 indicates marked or moderate correlation.

An r from ± 0.71 to ± 0.90 shows high relationship.

An r from ± 0.91 to ± 0.99 denotes very high correlation.

An $r \pm 1.0$ indicates perfect relationship.

Table 9 presents the relationship between students' overall satisfaction with the BSEd Mathematics program and their academic performance, as measured by GPA, using Spearman rho correlation analysis.

The results show that the correlation between overall satisfaction with the BSEd Mathematics program and GPA yielded a Spearman rho value of 0.084, which is interpreted as a negligible relationship, with a p-value of 0.541. Since the p-value is greater than the 0.05 level of significance, the relationship is not statistically significant. Thus, the null hypothesis stating that there is no significant relationship between students' overall satisfaction with the BSEd Mathematics program and their GPA is failed to be rejected.

This finding indicates that although students reported a high level of overall satisfaction with the program, such satisfaction did not significantly correspond to differences in academic performance. This result is consistent with earlier findings of the study, which likewise showed non-significant relationships between GPA and students' perceptions of learning resources, instructional facilities, library services, study spaces, and the overall contribution of institutional resources. Collectively, these results suggest that students' satisfaction with their academic program does not directly translate into higher academic performance as reflected in GPA.

The finding aligns with previous literature emphasizing that student satisfaction and academic achievement represent related but distinct constructs. Swai et al. [8] observed that institutional facilities and program support strongly predict students' satisfaction but are weaker predictors of academic outcomes. Similarly, Ramli and Mohd Zain [3] and Zurainan et al. [6] reported that while favorable learning environments enhance students' comfort, engagement, and perceptions of program quality, they do not necessarily result in immediate improvements in academic performance.

Moreover, Harder [12] highlighted that academic achievement is more strongly influenced by factors such as self-regulation, learning strategies, and deliberate practice than by satisfaction alone. Students may feel satisfied with program quality and institutional support, yet variations in GPA are shaped primarily by individual learner characteristics, study habits, and instructional processes. This perspective is further supported by systematic reviews of learning spaces research, which argue that the influence of physical and institutional environments on grades is often indirect and mediated through psychosocial and pedagogical factors [18; 19].

Qualitative Findings

Students' Experiences on Learning Resources, Facilities, and Academic Support in the BSEd Mathematics Program

The qualitative data were generated from open-ended responses of BSEd Mathematics students regarding the learning resources and facilities that supported their academic performance, the challenges encountered, the role of library

and study spaces, and suggested program improvements. Thematic analysis was employed to identify recurring patterns and meanings across responses. Five major themes emerged from the analysis.

Theme 1: Library as the Central Academic Support Space for Mathematics Learning

The library consistently emerged as the most frequently cited facility supporting students' academic performance in mathematics. Students emphasized the library's quiet environment, availability of reference materials, access to digital resources, and overall conduciveness to focused study. Many respondents identified the library as their primary study space, especially when classrooms and departmental rooms were fully occupied.

Students reported that the silence and structure of the library enabled deeper concentration, particularly when solving complex mathematical problems. Access to textbooks, reference books, tablets, and in some cases digital hubs, further strengthened independent learning and preparation for examinations.

These findings resonate with previous studies emphasizing the role of libraries as critical academic support environments that enhance focus, engagement, and learning persistence, especially in cognitively demanding disciplines such as mathematics [15; 8; 14].

Theme 2: Digital and Online Learning Resources as Supplemental Learning Tools

Online learning resources, including video tutorials, YouTube lessons, PDF files, e-books, and educational platforms, were identified as essential supplementary tools for understanding difficult mathematical concepts. Students valued video-based explanations for their step-by-step demonstrations, particularly in problem-solving and procedural mathematics. However, reliance on digital resources was frequently constrained by unstable internet connectivity, limited access to devices, and difficulty in evaluating the credibility of online materials. Several students expressed uncertainty in determining accurate and reliable mathematical resources, highlighting the need for guided digital resource curation.

This theme supports earlier findings that digital resources enhance understanding and motivation but are highly dependent on infrastructure quality, access equity, and instructional guidance [19; 13; 21].

Theme 3: Challenges Related to Resource Availability, Internet Connectivity, and Space Congestion

A dominant theme across responses involved systemic challenges related to limited learning resources and facilities. Students frequently cited insufficient or outdated textbooks, limited access to calculators, modules not being distributed in advance, overcrowded classrooms, congested libraries, and restricted availability of study spaces during peak periods.

Poor internet connectivity within the campus and at students' homes emerged as one of the most persistent barriers, affecting access to online learning platforms, video tutorials, and digital references. These challenges often led to anxiety, reduced preparedness for class discussions, and difficulty engaging in self-paced learning.

These findings mirror international literature indicating that while institutional resources positively shape learning

experiences, inadequacies in access and infrastructure can undermine their academic impact [2; 3; 12].

Theme 4: Study Spaces as Enablers of Focus, Independent Learning, and Collaboration

Students consistently emphasized that study spaces, particularly quiet and well-ventilated areas, supported concentration, cognitive clarity, and sustained engagement in mathematics tasks. Quiet study spaces were associated with improved productivity, deeper focus, and better problem-solving performance.

Some students also highlighted the importance of group study spaces and peer collaboration, noting that sharing ideas, engaging in discussions, and collaborative problem-solving enhanced understanding and confidence. Peer mentoring and informal study groups were viewed as effective, especially during exam preparation and difficult topics.

These findings align with studies that underscore the interaction between physical learning spaces and psychosocial learning processes such as collaboration, motivation, and academic interest [1; 19].

Theme 5: Suggested Program Improvements Focused on Practice, Technology, and Academic Support

Students proposed several improvements aimed at strengthening the BSEd Mathematics program. Key suggestions included increasing access to updated mathematics resources, improving internet connectivity, integrating educational technologies such as GeoGebra and Desmos, and providing curated digital materials exclusive to mathematics majors.

There was also a strong call for more hands-on activities, real-life problem applications, peer mentoring programs, tutoring or removal sessions, and extended instructional time for complex topics. Students expressed the need for stronger guidance on how to teach mathematics effectively, not only how to solve mathematical problems, reflecting their identity as future mathematics teachers.

These recommendations echo literature emphasizing the need for contextualized learning, practice-oriented instruction, and technology-integrated pedagogy in teacher education programs [8; 13; 19].

CONCLUSION

This study examined the academic performance of BSEd Mathematics students and their perceptions of learning resources, instructional facilities, library services, and study spaces, including how these institutional supports relate to GPA and how students describe their lived learning experiences. Overall, the findings indicate that the respondents demonstrated generally high academic performance, with most students falling within the Very Good and Good GPA categories. This pattern suggests that the cohort is academically strong within the context of Mathematics Education, a program that demands sustained conceptual mastery, problem-solving competence, and rigorous academic engagement.

In terms of institutional support, students expressed favorable perceptions of the learning environment. They reported general satisfaction with learning resources and instructional facilities, particularly emphasizing that learning materials effectively supported their understanding of mathematical

concepts and that classrooms were generally adequate for mathematics learning activities. Students also perceived institutional resources as contributory to academic performance, with quiet study areas emerging as especially valuable for independent learning in mathematics. Collectively, these perceptions translated into a very high level of overall satisfaction with the BSEd Mathematics learning experience, indicating that students view the program environment as supportive of their academic development and preparation as future mathematics educators.

However, correlation analyses revealed that GPA was not significantly associated with students' perceived quality of learning resources and instructional facilities, nor with their perceived contribution of institutional resources, overall contribution ratings, or overall program satisfaction. The negligible and non-significant relationships suggest that while students value and recognize institutional resources as important enablers of learning, these perceptions do not directly correspond to variations in academic performance as measured by GPA. This implies that academic achievement in this cohort likely reflects a more complex interplay of factors beyond perceived resource quality, including individual learner characteristics, study behaviors, self-regulation, and instructional processes.

Qualitative findings provide important context for these statistical results. Students consistently described the library as a central academic support space, particularly due to its quiet environment, access to references, and availability of digital resources. Online and digital learning materials were likewise viewed as essential supplements for understanding difficult concepts, especially through video-based demonstrations, although students noted persistent constraints such as unstable internet connectivity, limited or delayed access to materials, and congestion of learning spaces during peak periods. Students also emphasized the functional value of study spaces in enabling concentration, independent work, and collaborative learning through peer interaction and informal mentoring. Taken together, the qualitative evidence reinforces that institutional resources strongly shape students' learning experience, study habits, and perceived academic support, even if these do not appear as direct statistical predictors of GPA.

In sum, the study concludes that BSEd Mathematics students generally achieve high academic performance and report strong satisfaction with institutional learning supports. Institutional resources, especially libraries and study spaces, are perceived as meaningful contributors to learning and academic engagement in mathematics. Nevertheless, GPA differences among students are not statistically explained by perceptions of resources and facilities alone, indicating that academic performance in Mathematics Education is shaped by multiple interacting academic, personal, and instructional factors.

RECOMMENDATIONS

Based on the findings of the study, it is recommended that the College of Teacher Education continuously strengthen the provision and management of learning resources to sustain students' positive learning experiences in the BSEd Mathematics program. Although students generally expressed

satisfaction with existing instructional materials, facilities, library services, and study spaces, qualitative findings revealed issues related to limited access, outdated resources, and inconsistent availability. Regular updating of mathematics textbooks, reference materials, modules, and digital content should therefore be prioritized to ensure alignment with current curricular demands and pedagogical trends in mathematics education.

Improving campus internet connectivity and access to digital infrastructure is also strongly recommended. Students heavily rely on online platforms, video tutorials, and digital references as supplementary learning tools, yet unstable or limited internet access emerged as a major challenge. Strengthening campus-wide connectivity, expanding access to digital hubs, and ensuring sufficient bandwidth in libraries and study spaces would enhance equitable access to online academic resources and support self-directed and flexible learning.

In terms of learning spaces, it is recommended that the institution further develop and optimize both quiet and collaborative study areas. Students clearly valued quiet spaces for independent mathematical problem-solving and concentration, while also recognizing the importance of group study spaces for peer discussion and collaborative learning. Expanding and managing study spaces to reduce congestion, especially during peak academic periods, may help maximize their effectiveness in supporting diverse learning needs.

Academic support mechanisms should likewise be strengthened through structured peer mentoring, tutoring, and removal or review sessions, particularly for students who struggle with advanced or abstract mathematical concepts. The qualitative findings suggest that students benefit from guided discussions, collaborative problem-solving, and extended instructional time for complex topics. Institutionalizing these forms of academic support can help bridge learning gaps and reinforce conceptual understanding. Finally, the integration of educational technology and practice-oriented pedagogy is recommended to enhance students' preparation as future mathematics teachers. Training in the use of mathematics software and applications such as GeoGebra and Desmos, alongside increased emphasis on real-life problem applications and teaching demonstrations, may improve both content mastery and pedagogical readiness. Such initiatives would help ensure that learning resources are not only available but are effectively utilized to enrich learning experiences and professional competence in mathematics education.

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