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# Determinants of Academic Performance Among Computer Engineering Students with Disabilities in Bulacan State University

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## ABSTRACT

This study examines the factors affecting the academic performance of students with disabilities pursuing Computer Engineering. Using a quantitative descriptive design, data were gathered from 30 respondents (15 with disabilities and 15 without) through a structured survey employing a 5-point Likert scale. The study evaluated three major factors: Assistive Technology, Faculty and Teaching Facilities, and Discrimination and Societal Barriers. Instrument reliability yielded a Cronbach's alpha of 0.89, indicating high internal consistency. Findings show that inclusive learning environments, availability of assistive technologies, and societal attitudes significantly influence the academic performance and motivation of students with disabilities. Recommendations include improving classroom accessibility, strengthening faculty training, and integrating appropriate assistive technologies to foster an inclusive learning environment.

**Keywords:** assistive technology, inclusivity, disability, academic performance

## INTRODUCTION

In recent years, there has been a growing global emphasis on inclusive education, particularly in promoting equitable access and meaningful participation for students with disabilities. Although progress has been made, many higher education institutions still face persistent challenges in creating learning environments that fully support the academic and social needs of these learners. These challenges are even more pronounced in specialized fields such as Computer Engineering, where the curriculum requires complex technical competencies, extensive laboratory work, and the use of advanced technologies. Accessibility issues tend to become more visible in these settings.

According to Laudan and Pamela (2012), the Philippines has initiated policy and infrastructural improvements to enhance educational accessibility, yet the system continues to fall short in meeting the diverse needs of learners with disabilities. Financial constraints, inadequate identification of student needs, and restrictive curricula limit full participation in academic activities. In higher education, these challenges appear through inaccessible classrooms, limited assistive technologies, insufficient faculty training in inclusive teaching practices, and societal attitudes that reinforce stigma.

Disabilities can greatly influence students' learning processes and social interactions in the university setting. When barriers such as inaccessible facilities, the absence of necessary assistive equipment, or a lack of trained personnel are present, students may struggle to engage in coursework, join collaborative activities, or interact with peers. These barriers can lead to decreased confidence, increased stress, reduced academic performance, and a higher likelihood of withdrawal from the program.

In response to these concerns, this study seeks to examine the factors that affect the academic performance of students with disabilities who are pursuing a Computer Engineering degree at Bulacan State University. The study explores how disabilities influence learning experiences, academic outcomes, and social interactions, as well as how students with and without disabilities perceive assistive technologies, faculty support, and classroom accessibility.

By investigating these areas, the study aims to identify existing gaps and recommend strategies that will help build a more inclusive and accessible learning environment. The ultimate goal is to support ongoing efforts to promote equity in higher education and to ensure that students with disabilities can succeed academically and socially, particularly in demanding and highly technical disciplines such as Computer

## **Research Objectives**

This study aimed to determine the factors influencing the academic performance of Computer Engineering students with disabilities at Bulacan State University. Specifically, it sought to:

1. Assess the extent to which assistive technologies influence academic performance.
2. Determine how faculty support and teaching facilities affect learning experiences.
3. Examine the impact of discrimination and societal barriers on student motivation and academic outcomes. Engineering.

## **METHODS**

This section presents the methodological approach employed to examine the factors influencing the academic performance of students with disabilities. It details the research design, sampling procedure, data collection instrument, and analytical techniques used to generate credible and systematic results.

### **Research Design**

A quantitative descriptive research design was employed to analyze the perceptions of students with and without disabilities regarding factors influencing academic performance. The design allowed for systematic measurement of attitudes and experiences related to assistive technology, faculty support, and societal barriers.

### **Sampling Technique and Respondents**

Purposive sampling was used to select participants based on their relevance to the research objectives. The sample consisted of 30 respondents:

- **15 Computer Engineering students with disabilities**, and
- **15 students without disabilities** enrolled at Bulacan State University and comparable institutions offering the same program.

Purposive sampling ensured that participants possessed characteristics necessary to provide meaningful insights into the study variables.

### **Instrument**

Data were collected using a structured online survey divided into three sections:

1. Assistive Technology Factors
2. Faculty and Teaching Personnel Factors
3. Discrimination and Societal Factors

A 5-point Likert scale measured the level of agreement with each statement. The instrument underwent **expert validation**, and a **Cronbach's alpha of 0.89** confirmed high reliability and internal consistency.

## Procedure

The survey was administered through Google Forms. Respondents provided informed consent and were assured of anonymity and data confidentiality. Completed questionnaires were encoded and organized for statistical analysis.

## Data Analysis

Descriptive statistics—including frequency distribution, weighted mean, and ranking—were employed to summarize responses and identify patterns. Results reflect respondents' perceptions of the determinants affecting academic performance.

## RESULTS

Findings indicate that both students with and without disabilities recognize the significant influence of assistive technology, inclusive learning environments, and societal attitudes on academic outcomes.

### Accessibility and Infrastructure

Respondents reported several accessibility challenges, including:

- Absence of ramps and elevators
- Limited adjustable furniture in laboratories
- Insufficient assistive devices (screen readers, speech-to-text tools, mobility aids)

Such barriers hinder participation in laboratory tasks and group work—core components of Computer Engineering.

### Faculty Support and Teaching Practices

Respondents believed that instructors play an essential role in facilitating learning for students with disabilities. However:

- Many faculty members lack training in inclusive teaching practices
- Few are familiar with assistive technologies
- Instructional approaches are often not adaptive to diverse needs

### Societal Attitudes and Social Barriers

Students with disabilities reported experiencing:

- Misconceptions about their abilities
- Subtle forms of discrimination
- Feelings of exclusion during collaborative tasks

These social barriers were associated with reduced academic motivation and engagement.

## Summary of Quantitative Findings

**Table 1.** Summary of Weighted Mean Scores for Key Variables

Variables	Weighted Mean	Interpretation
Learning Environment Inclusivity	1.9	Not Inclusive
Academic Performance of Students with Disabilities	3.5	Moderately High Influence
Presence of Societal Barriers	3.7	High Presence of Barriers

Table 1 shows a clear pattern across the three variables examined. Learning environment inclusivity received a weighted mean of 1.9, interpreted as “Not Inclusive,” indicating that students—particularly those with disabilities—perceive classrooms and laboratories as lacking the necessary structural and instructional accommodations, such as assistive devices, adjustable furniture, and accessible facilities. Academic performance of students with disabilities obtained a weighted mean of 3.5 or “Moderately High Influence,” suggesting that while many students can adapt, their performance remains significantly affected by the availability of support, instructional strategies, technology access, and faculty preparedness. Meanwhile, societal barriers registered the highest weighted mean at 3.7, reflecting a “High Presence of Barriers,” with students reporting strong experiences of stigma, misconceptions, and subtle discrimination that negatively impact motivation and participation. Overall, the results show that environmental, academic, and societal factors jointly shape the experiences of students with disabilities, with societal attitudes emerging as the most pressing concern, thereby underscoring the need for improvements in accessibility, instructional support, and institutional culture.

## DISCUSSION

The findings align with global literature emphasizing the significance of assistive technology and inclusive learning environments in promoting academic success among students with disabilities. Consistent with Rosner and Perlman (2018), results confirm that assistive devices enhance functioning and participation, yet availability remains limited.

Structural barriers in facilities echo observations by Laudan and Saavedra (2012) regarding the Philippines’ incomplete implementation of inclusive education mandates. Respondents’ concerns also affirm Dyer’s (2018) assessment of ongoing challenges in accommodating diverse learners in higher education.

Faculty competence emerged as a central issue, supporting the findings of Bong and Chen (2021), who highlight the need for digital accessibility training among educators. Inclusive pedagogy and awareness of student needs are essential for improving academic outcomes.

The study’s scope is limited by its small sample size and focus on a single institution. Future research should involve multiple institutions and investigate long-term effects of assistive technology interventions.

## CONCLUSION

Technology, learning environments, and societal factors significantly shape the academic performance of Computer Engineering students with disabilities. The results reveal notable gaps in accessibility, faculty preparation, and social inclusion. Addressing these areas is necessary to support equitable participation and enhance academic outcomes.

## REVISED RECOMMENDATIONS

1. The institution should strengthen the availability and implementation of assistive technologies to support students with disabilities. These tools can enhance engagement, improve task performance, and allow monitoring of student progress with and without technological support.

2. The university should improve classroom and laboratory accessibility by providing ramps, adjustable furniture, and other necessary modifications. Creating inclusive spaces will allow students with disabilities to participate more effectively in academic activities.
3. Faculty members should be provided with sustained training on inclusive teaching practices and the appropriate use of assistive technologies. Increasing faculty competence will ensure that instructional strategies address the diverse needs of learners.
4. The institution should implement programs that reduce stigma and promote understanding of the experiences of students with disabilities. Establishing a safe and supportive social environment can help mitigate discriminatory attitudes and improve student motivation.
5. Future research should involve larger and more diverse samples to obtain a broader perspective on the academic experiences of students with disabilities. Studies may also examine long term outcomes of assistive technology use to establish stronger evidence for the effectiveness of these tools.

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