

# Exploring gender bias, belonging, and prejudice among IT students in higher education

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## ABSTRACT

This study investigates gender discrimination, inclusion, and belonging among information technology (IT) students in higher education, with specific objectives to assess their sense of belonging, classroom participation, and perceptions of gender bias. The research aims to identify persistent issues related to gender equity and propose actionable solutions to foster inclusivity. Using a descriptive research design, the study surveyed 180 student-leaders, purposively selected to represent various year levels and provide diverse insights into academic and extracurricular experiences. Data were collected through a structured questionnaire adapted and modified to fit the study's context. The instrument included Likert-scale items focusing on dimensions such as belonging, teaching environment, gender discrimination, and prejudice. Findings reveal that while most students feel respected by peers and professors, subtle forms of gender bias continue to affect female students, limiting role models and occasionally undermining their confidence and engagement. Practical implications highlight the need for gender-sensitive curricula, mentorship programs, and policy adjustments to create a more inclusive academic environment. Recommendations include increasing female representation in leadership roles, conducting gender sensitivity training, and diversifying course materials. These strategies aim to enhance gender equity, support student success, and establish a culture of inclusion within IT education.

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## 1. INTRODUCTION

In recent years, there has been a growing focus on understanding students' experiences within academic environments, particularly concerning issues of discrimination, prejudice, and inclusivity. Previous research highlighted the importance of these themes, noting that students' sense of belonging and perception of equity are critical to their academic satisfaction and engagement [1]. Similarly, another researcher emphasized the need for higher education institutions to create equitable learning environments that support diversity, ensure equal opportunities for all students, and foster a welcoming academic culture [2]. This focus is particularly urgent in fields like information technology (IT), where gender disparities have historically been pronounced [3], [4]. As the demand for skilled IT professionals grows, examining how gender influences students' perceptions of their academic experiences and sense of inclusion within IT education has become increasingly essential [5], [6].

To address these issues, the study poses the following question: how do gender discrimination, inclusion, and belonging impact the academic experiences and perceptions of IT students, particularly in higher education settings? Specifically, it examines whether students perceive gender biases in their academic environment and how these biases affect their sense of belonging, participation, and perceived support. The study's findings will inform a policy brief designed to guide bachelor of science in information technology (BSIT) program leaders in developing policies that promote gender fairness and inclusivity, thereby fostering a more supportive and equitable academic environment for all students. Respondents in this study consist of undergraduate IT students across different year levels, with a significant portion being student-leaders. The inclusion of student-leaders adds depth to the study, as they often shape campus culture through active engagement in both academic and extracurricular activities. As role models and advocates within the student body, their perspectives offer valuable insights into the broader institutional climate regarding gender and diversity issues, making them a representative sample for understanding the larger IT student population.

This study specifically investigates the experiences of gender discrimination, prejudice, and belonging among undergraduate IT students, with a focus on how gender dynamics influence their academic and social experiences. By examining gender-related challenges, the research seeks to understand how these factors impact students' perceptions of their own capabilities, the quality of support they receive from faculty and peers, and their overall satisfaction with their academic journey. This research is particularly valuable as it uncovers the extent to which female IT students perceive gender biases in their academic settings and identifies actionable areas for institutions to promote inclusivity. Understanding these dynamics is crucial, as experiences of discrimination and prejudice can significantly affect students' academic performance, emotional well-being, and sense of community, ultimately impacting retention and success rates in their chosen field [7].

## **2. LITERATURE REVIEW**

### **2.1. Gender discrimination in higher education**

Gender discrimination in higher education has been widely documented, with numerous studies highlighting its pervasive nature across various academic disciplines. Gender biases in the classroom can manifest in numerous ways, including unequal treatment by faculty, differences in classroom participation, and disparities in academic support [8]. Female students often face skepticism regarding their capabilities, particularly in traditionally male-dominated fields such as IT [9]. This skepticism can lead to decreased self-efficacy and increased feelings of alienation among female students [10].

### **2.2. Sense of belonging**

The concept of belonging is crucial for academic success and student retention. A strong sense of belonging significantly correlates with positive academic outcomes and overall satisfaction in higher education [11]. When students feel accepted and valued within their academic environment, they are more likely to engage actively in their studies and persist through challenges [12]. In contrast, a lack of belonging can lead to feelings of isolation and disengagement, particularly for marginalized groups [13]. This phenomenon is especially relevant in the context of gender, where female students in male-dominated fields may struggle to establish a sense of belonging [14].

### **2.3. Experiences of prejudice**

Prejudice in academic settings can significantly impact students' perceptions of their capabilities and future prospects. Students who perceive prejudice in their educational environments often experience diminished self-esteem and academic performance [15]. Female students, in particular, may feel that they are unfairly judged based on gender stereotypes, which can lead to increased anxiety and lower participation rates in class discussions [16]. Moreover, the perception of being treated unequally compared to male peers can contribute to a negative academic experience and hinder students' overall sense of belonging [17].

### **2.4. Gender representation in academic settings**

The representation of female role models in academic fields has been shown to influence the experiences of female students. Having female professors and role models can enhance the sense of belonging and encourage female students to pursue their academic and professional goals [18]. This representation helps to challenge stereotypes and provides tangible examples of success within the field [19]. It emphasizes the importance of inclusive curricula that represent diverse perspectives, which can foster a greater sense of belonging among all students [20]. Generally speaking, the existing literature indicates a strong relationship between gender discrimination, sense of belonging, and students' experiences of prejudice in higher education, particularly within male-dominated fields like IT. Addressing these issues through

targeted interventions and supportive academic environments is essential for enhancing the educational experiences of all students and promoting gender equity in higher education.

### 3. METHOD

This study employed a descriptive research design to investigate the perceptions of gender discrimination and prejudice among undergraduate students in the field of IT. It aimed to quantify student experiences and attitudes regarding belonging, academic support, and the influence of gender on their educational journey. The participants in this study were first- to fourth-year undergraduate students enrolled in IT program at a state university in Nueva Ecija, Philippines. A total of 180 students were purposely selected as respondents, with a specific focus on student-leaders who represent a diverse cross-section of the IT student body at Nueva Ecija University of Science and Technology (NEUST). This group was chosen because student-leaders are actively involved in both academic and extracurricular activities, providing valuable insights into the overall experiences of their peers.

Previous research conducted by the researcher has consistently shown that the BSIT program at NEUST is predominantly male-dominated. It reflecting broader trends in the IT field where gender disparities persist. Literature indicates that female representation in IT education is significantly lower than that of their male counterparts, with studies highlighting a cultural bias that often discourages young women from pursuing technology-related fields [21], [22].

Permission to gather data for the study was secured from the college dean to ensure compliance with ethical research guidelines. Participants were informed about the purpose of the study, their rights, and the voluntary nature of their participation. They were assured of the confidentiality of their responses, and no personally identifiable information was collected. Informed consent was obtained through a digital agreement embedded within the survey. Additionally, participants were allowed to withdraw from the study at any stage without penalty.

Data were collected using a structured questionnaire designed to assess various dimensions of student experience, focusing on perceived discrimination, belonging, and academic support. The tool used by Neuman in 2022 was adopted in this research with slight modification on some item statements to suit the purpose of this research [23]. The questionnaire included Likert-scale items ranging from 1 (strongly disagree) to 5 (strongly agree), allowing respondents to express their level of agreement with various statements related to their experiences and perceptions. The questionnaire was divided into four main sections: i) Belonging—assessing the students' sense of belonging within their department and the broader campus community; ii) Teaching environment—evaluating satisfaction with the academic experience and the perceived support from professors and peers; iii) Gender discrimination—examining the respondents' perceptions of how gender impacts their treatment in the classroom; and iv) Experienced prejudice—investigating perceptions of bias from classmates and professors based on gender.

The survey was distributed electronically to facilitate accessibility and encourage participation. Students were informed about the purpose of the study, their rights as participants, and the confidentiality of their responses. The collected data were analyzed using descriptive statistics to summarize the respondents' perceptions and experiences. Weighted mean (Wm) scores were calculated for each item, providing insight into the verbal descriptions (VD), general trends, and significant findings in the data. This methodology allowed for a comprehensive examination of the experiences of IT students, providing valuable insights into the dynamics of gender and academic environment in the context of IT education. The findings aim to inform institutional strategies, through policy brief, to foster a more inclusive and supportive learning environment for all students.

### 4. RESULTS AND DISCUSSION

This section presents a detailed analysis of the survey findings, highlighting the perceptions of female BSIT students regarding belongingness, teaching environment, gender bias, and prejudice.

#### 4.1. Belongingness

The results of this study reveal two significant findings regarding students' sense of belonging and experiences of gender-related challenges. Table 1 shows the survey results on their perceived belongingness in the department. This study's analysis of students' sense of belonging highlights several key insights. Table 1 shows that most students feel a strong connection within their academic departments, with a Wm of 4.11, as 78% of respondents agreed or strongly agreed that they "belong within (their) department." However, a sense of belonging within specific majors is less pronounced (Wm=3.70), indicating that while departmental support is perceived positively, students encounter challenges integrating fully within their chosen fields. Notably, nearly a quarter of respondents (23%) felt like outsiders in their major, with this item

receiving a Wm of 2.74, reflecting a need for increased support at the program level. Furthermore, 19% of students indicated that they experienced difficulties in their major due to gender (Wm=2.59), underscoring that, for some students, gender may influence their academic experience.

The implications of these findings suggest that departments and faculty can play a pivotal role in enhancing inclusivity by developing targeted interventions, such as mentorship programs and peer support systems, that are tailored to specific majors. Programs that include female role models, and diverse representation in curriculum materials, could further reinforce students' sense of belonging and challenge traditional biases, helping all students feel equally valued. Faculty training on gender sensitivity and bias reduction could also support an inclusive classroom environment that encourages equal participation and confidence [24]. Addressing these integration barriers may help retain students, reduce feelings of isolation, and increase engagement across diverse groups. These findings support the recommendation for educators to actively address gendered experiences through tailored support and resources [25].

Table 1. Survey results on their perceived belongingness in the department

No.	Item statements	5	4	3	2	1	Wm	VD
1	I feel I belong within my department	61	85	29	2	3	4.11	Agree
2	I feel like I belong in my major	38	72	54	10	6	3.70	Agree
3	I feel like an outsider in my major	13	28	64	49	26	2.74	Neutral
4	I don't think my gender will affect how others view me in my major	67	61	25	14	13	3.86	Agree
5	I feel accepted by my classmates	81	68	24	4	3	4.22	Strongly agree
6	I think my gender and my major are very compatible	43	61	63	8	5	3.72	Agree
7	I think I have experienced difficulties in my major because of my gender	17	29	39	54	41	2.59	Disagree
8	I think my gender will be an important factor in the type of career I decide to pursue	52	72	47	8	1	3.92	Agree
9	I see myself as a part of the campus community	47	74	50	7	2	3.87	Agree
10	I feel a sense of belonging to the campus community	51	72	49	7	1	3.92	Agree

#### 4.2. Teaching environment

The survey results, as shown in Figure 1, reveal generally positive perceptions of the teaching environment among students. Most respondents expressed satisfaction with their academic experience (Wm=3.84), a sense of acceptance (Wm=4.09), and comfort at their institution (Wm=3.98). A high percentage of students also feel respected by their professors (Wm=4.26), which suggests a supportive faculty-student dynamic that enhances academic engagement. However, responses indicate some challenges with classroom participation and representation in course materials. Specifically, while many students enjoy active participation (Wm=3.71), a significant portion still tries to say as little as possible (Wm=3.63), suggesting that some may feel hesitant to engage fully. Additionally, only a neutral mean of 3.22 was reported for the statement "I see myself represented in the course material," indicating that students may feel underrepresented in textbooks and course examples.

The findings suggest that while the academic environment is generally supportive, there is room to enhance student engagement and representation in course materials. Providing opportunities for students to participate actively in class through inclusive teaching strategies could foster greater confidence and reduce reluctance to speak. Faculty might also benefit from training in creating inclusive classrooms that encourage diverse voices and participation. Furthermore, revising course materials to include a broader range of representations and perspectives would likely improve students' sense of inclusion [26]. Including female role models and diverse case studies in coursework could help all students, particularly those from underrepresented groups, feel a stronger connection to their studies. In addition, regular feedback from students on representation in course materials could guide these improvements, aligning with the broader aim to foster an inclusive and empowering academic environment [27].

In sum, while students generally feel satisfied with their academic experiences and respected by their professors, improvements in fostering class participation and ensuring better representation in course materials are necessary to further enhance the educational environment. Similarly, groups of researchers also noted that there is a need for greater engagement through active class participation and more inclusive representation in the course content to create a more equitable learning environment [28], [29].

#### 4.3. Gender discrimination

Figure 2 presents the survey results on the perceptions of respondents about gender discrimination. The findings indicate a generally positive perception of gender equality within the classroom environment, with most students perceiving their professors as treating men and women equally. The highest (Wm=4.27) was for the statement "My professors treat men and women equally in the classroom," with the majority of

respondents strongly agreeing or agreeing. This reflects an encouraging level of inclusivity perceived among faculty-student interactions. However, areas of concern remain, as evidenced by lower mean scores on items related to specific instances of gender bias. For instance, the statement “I feel seen by my professors” received a Wm of 2.72, showing that some students feel overlooked or under-recognized. Additionally, items addressing dismissive or degrading comments from professors (Wm=2.23 and 2.24, respectively), as well as difficulties succeeding in the major due to gender (Wm=2.50), indicate that subtle forms of gender bias still exist. Though these mean scores fall below neutral, they highlight experiences that can impact students' sense of inclusion and confidence, particularly for female students.

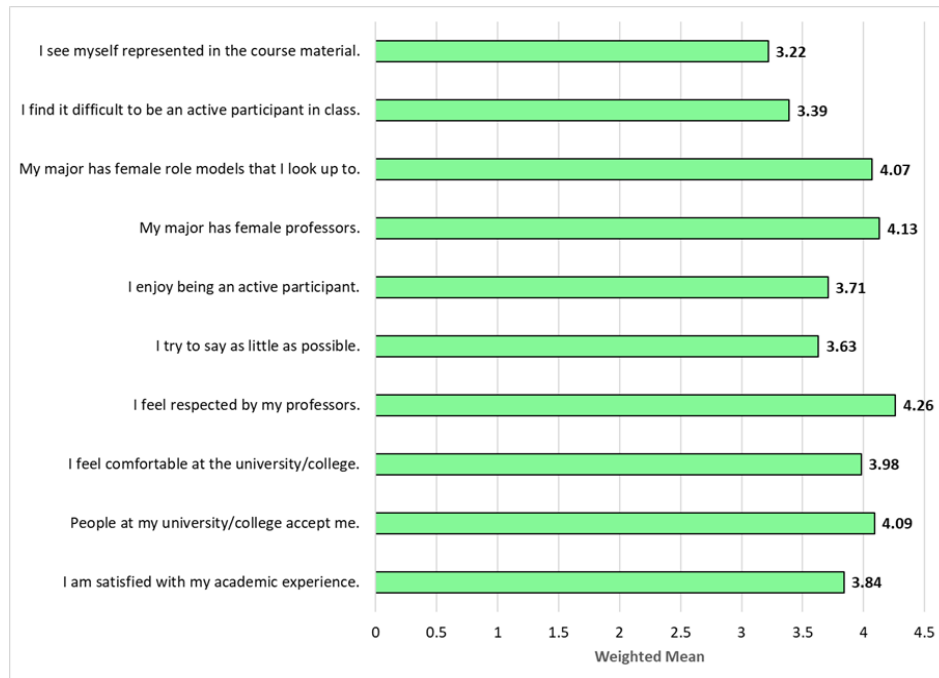


Figure 1. Perceptions about teaching environment

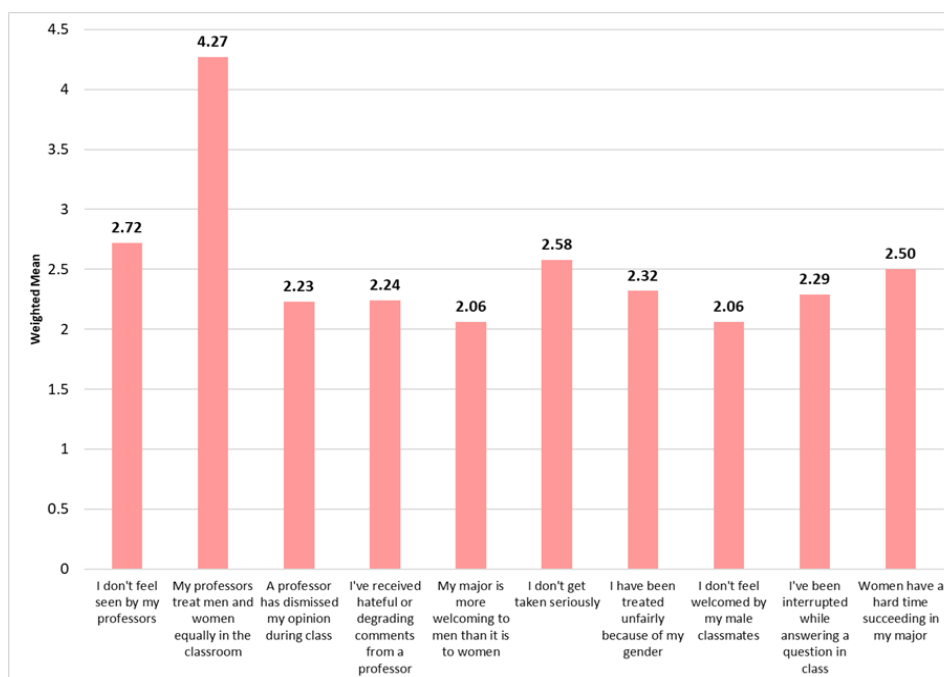


Figure 2. Results of the survey on gender discrimination

The findings suggest that while overt discrimination may be minimal, attention to subtle biases and overlooked behaviors remains crucial. Future efforts should focus on fostering an even more inclusive academic climate where all students feel valued and respected. Regular training for faculty on gender sensitivity, inclusivity, and classroom management techniques could help mitigate these biases, ensuring equitable support for all students [30], [31]. Additionally, creating open fora or feedback mechanisms would allow students to express concerns regarding gender-based experiences and propose solutions [32]. Mentorship programs and visible support for women in male-dominated fields can further strengthen students' sense of belonging and success potential [33], [34]. By actively addressing these concerns, institutions can make meaningful strides toward fostering a truly inclusive environment for students across gender lines [35].

Overall, while the majority of students perceive a fair and equitable treatment by professors, there are areas where gender discrimination may still be subtly present, particularly in interpersonal interactions and class participation dynamics. These findings suggest the need for continued efforts to foster gender inclusivity, not just from faculty, but also among peers, to ensure that all students feel equally valued and respected in their academic pursuits. Research studies stressed out the importance of having gender-transformative policies and its effective implementation process; having women-specific support structures and having women in leadership positions as crucial for promoting gender equality [36], [37].

#### 4.4. Experienced prejudice

Table 2 shows data on the perceptions of the respondents as regards the experiences they had on the issue related to prejudices. While the data largely reflects a positive perception of fairness, some responses suggest subtle perceptions of gender-based prejudice among a subset of students. For instance, the statement “I often feel that prejudice exists in the classroom,” received a Wm of 2.35, indicating that, although the majority do not perceive prejudice, a minority do feel it exists. Additionally, “I get more help than my male peers because of my gender,” (Wm=2.56) suggests a slight perception among some respondents that gender may influence the allocation of support in the classroom. Responses regarding external judgments, such as “My relatives think that I should be in this specialization because of my gender” (Wm=2.06) and “Other people don’t think that I should be in this major because of my gender” (Wm=2.23), further reveal that students largely reject the notion that their gender affects how others view their academic choices.

These perceptions indicate that students generally feel confident about their gender not dictating others’ expectations, yet the presence of residual gender-based judgments underscores the need for vigilance in maintaining an equitable academic setting. This is supported by the significant findings of the study, where they mentioned that in traditional science, technology, engineering, and mathematics (STEM) fields such as computer science and engineering where large gender equity gaps exist, adapting critical lens that examines power asymmetries is a timely and principled necessity in 21st century science and society [38]. Overall, the data suggests that while the perception of experienced prejudice is low, there are still areas for improvement in fostering an inclusive academic atmosphere. Engaging in open dialogues about gender dynamics and ensuring equitable support mechanisms can further enhance the educational experience for all students, reinforcing the values of diversity and inclusivity within the academic setting [39], [40]. To support these efforts, a policy brief (see Appendix) has been developed based on the study’s findings, aimed at guiding school administration in promoting gender equity and inclusive academic practices.

Table 2. Distribution of the respondents according to their perception about experienced prejudice

No.	Item statements	5	4	3	2	1	Wm	VD
1	My classmates think that I’m less capable because of my gender	12	10	14	79	65	2.03	Disagree
2	My professors think that I need more help than others because of my gender	9	14	25	68	64	2.09	Disagree
3	The professors don’t think I can handle myself	7	18	16	71	68	2.03	Disagree
4	My classmates don’t think I can handle myself	6	18	14	72	70	1.99	Disagree
5	I get help even though I didn’t ask for it	20	44	59	30	27	3.00	Neutral
6	I get more help than my male peers because of my gender	9	28	53	55	35	2.56	Disagree
7	I often feel that prejudice exists in the classroom	8	20	45	61	46	2.35	Disagree
8	My relatives think that I should be in this specialization because of my gender	5	19	25	63	68	2.06	Disagree
9	Other people don’t think that I should be in this major because of my gender	9	18	38	56	59	2.23	Disagree
10	Other people don’t think that I will succeed in this major	12	16	31	55	66	2.18	Disagree

## 5. CONCLUSION

This study reveals important insights into the experiences of IT students regarding gender discrimination, prejudice, and belonging within a higher education institution. The data highlights several

significant findings, notably that while students generally report feeling a sense of belonging and being accepted by their peers and professors, there are lingering perceptions of gender bias and subtle forms of discrimination that still persist. Female students, in particular, report feeling less confident about their ability to succeed and handle challenges in the IT field, reflecting deeper societal stereotypes about gender roles in technology-related disciplines.

The findings also emphasize that while direct instances of overt discrimination may be limited, the subtle, often unspoken forms of gender bias—such as assumptions about women needing more help or being less capable—affect students’ sense of inclusion and belonging. These biases can undermine academic confidence and contribute to a less supportive environment for female students. In contrast, male students appear to perceive fewer barriers to their success and are less likely to report experiences of gender-based discrimination. The presence of female professors and role models within the IT field has been acknowledged as a positive factor that contributes to creating a more inclusive atmosphere.

To address the challenges highlighted by this study, the recommendations are proposed to reduce gender discrimination and to foster a more inclusive and supportive environment for all IT students. In the future, this research can serve as a foundation for ongoing investigations into gender dynamics within IT programs. It will be instrumental in guiding policy reforms and academic practices that prioritize diversity, equity, and inclusion. Additionally, the insights gained can inform the development of workshops and training sessions aimed at raising awareness of gender bias among faculty and students, ultimately fostering a culture of respect and collaboration that empowers all individuals in the academic setting.

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C : <b>C</b> onceptualization	I : <b>I</b> nvestigation	Vi : <b>V</b> isualization
M : <b>M</b> ethodology	R : <b>R</b> esources	Su : <b>S</b> upervision
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CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

INFORMED CONSENT

Informed consent was obtained from all participants included in the study.

DATA AVAILABILITY

The author confirms that the data supporting the findings of this study are available within the article.

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## APPENDIX

### POLICY BRIEF

#### Enhancing Gender Equity and Inclusion in Information Technology Education

(Insights from the study "Exploring gender bias, belonging, and prejudice among IT Students in higher education" by Ruth G. Luciano)

#### Introduction

This policy brief presents the insights gained from the significant findings of the study that focused on students' experiences related to belongingness, teaching environments, gender discrimination, and perceived prejudice within academic institutions. The results highlight both positive aspects and areas needing improvement to foster a more inclusive and equitable academic experience for all students.

#### Key findings

The study revealed several crucial insights listed below:

##### 1. Sense of belonging

- **High belonging in departments.** Seventy-eight percent of students feel included within their college or department (weighted mean of 4.11), indicating a generally supportive environment.
- **Lower inclusion in majors.** Despite departmental belonging, only 72% feel a sense of belonging in their specific majors (weighted mean of 3.70), suggesting potential barriers at this level.
- **Gender-related challenges.** Approximately 19% of students reported experiencing difficulties in their major due to their gender, indicating the need for targeted support interventions.'

##### 2. Teaching environment

- **Overall satisfaction.** Students express high satisfaction with their academic experiences (weighted mean of 3.84) and feel respected by their professors (weighted mean of 4.26), suggesting a generally positive academic atmosphere.
- **Participation and representation challenges.** Some students struggle with class participation (mean of 3.63) and feel underrepresented in course materials (mean of 3.22). These factors may hinder engagement and a sense of belonging.

### 3. Gender discrimination

- **Perception of equal treatment.** Most students believe professors treat men and women equally (weighted mean of 4.27). However, subtle issues of gender bias persist, such as feeling overlooked in class discussions (mean of 2.72) and discomfort in interactions with male peers (mean of 2.06).
- **Barriers to success.** Mixed feelings exist regarding women's success in their majors (mean of 2.50), pointing to a need for increased support and encouragement for female students.

### 4. Experienced prejudice

- **Perceptions of prejudice.** While a majority do not perceive significant prejudice (mean of 2.35), a subset of students remains concerned about its presence. Additionally, 18% of students feel that their gender influences the support they receive (mean of 2.56).

## Recommendations

To foster a more inclusive and equitable academic environment, it is essential to implement targeted strategies that address the identified challenges related to belongingness, teaching dynamics, and gender discrimination among students.




1. **Enhance major-level inclusion.** Develop targeted initiatives to improve student integration within specific majors, ensuring that all students, especially those facing gender-related challenges, receive the support they need.
2. **Foster active participation.** Implement training for faculty to create more inclusive classroom dynamics that encourage active participation from all students, with a focus on building confidence and comfort in contributing to discussions.
3. **Diversify course materials.** Review and revise course content to ensure it reflects the diversity of the student body. Incorporating diverse perspectives in materials can help students feel more represented and engaged.
4. **Monitor gender dynamics.** Conduct regular assessments of classroom dynamics and student interactions to identify and address any subtle forms of gender bias. Establishing peer support programs can also help foster a more inclusive atmosphere.
5. **Support structures for female students.** Implement mentorship programs connecting female students with role models and leaders in their fields. These structures can empower female students and address specific challenges they face.
6. **Create awareness campaigns.** Develop awareness programs that address gender stereotypes and promote equitable treatment in academic settings, fostering a culture of respect and support for all students.

## Conclusion

The findings of this study underscore the importance of creating an inclusive and supportive academic environment for all students, particularly in addressing gender-related challenges. By implementing these recommendations, academic institutions can enhance students' sense of belonging, improve engagement, and promote gender equity, ultimately contributing to a more equitable educational experience. Continued research and proactive measures are essential to ensure that all students feel valued and supported in their academic journeys.

## BIOGRAPHY OF AUTHOR



**Ruth G. Luciano**    earned her B.S. in computer science and master of arts in Education major in Educational Management at the M.V. Gallego Foundation Colleges, Inc., Cabanatuan City in 2001 and 2004, respectively. She finished her Ph.D. major in Education Management at the Nueva Ecija University of Science and Technology in 2008 and her Master of Information Technology degree at Angeles University Foundation in 2014. Presently, she is an associate professor V of the College of Information and Communications Technology at the Nueva Ecija University of Science and Technology (NEUST), where she continues to shape the trajectory of education and technology by mentoring and guiding the IT faculty and student-researchers. She can be contacted at email: rcgluciano@gmail.com; rcgluciano@neust.edu.ph.