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Gender Influence on Students' Interest, Classroom Participation, Academic Achievement and Academic Performance in Science

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ABSTRACT

This study examined the influence of gender on interest, classroom Participation, academic achievement, and academic performance of Bachelor of Secondary Education (BSED) Science students at Sultan Kudarat State University. The study sought to assess the respondents' profile in terms of gender and grade level, assessing the extent of gender influence and connection Among students' interest, classroom participation, academic achievement, and Academic performance based on gender. The study employed a descriptive comparative-correlational research design and utilized complete enumeration in obtaining the data. The results revealed a higher number of female respondents, compared to boys, exhibiting stronger interest in science subjects and higher Participation in classes. Despite gender variations in interests, there was no significant impact on classroom participation and academic achievement. Academic performance indicated that both genders performed well, with females excelling in the top score ranges. The positive association between interest and participation was consistent across genders, emphasizing the importance of engagement in student learning. However, the study found no direct relationship between interest, participation, and academic achievement, suggesting that other factors may have influenced students' performance.

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1. INTRODUCTION

Gender plays a significant role in classroom participation and teacher-student interaction. Teachers may interact differently with male and female students, which can impact their engagement and success in the classroom. Understanding the influence of gender on classroom dynamics can help educators create more inclusive and equitable learning environments for all students.

Research indicates that male students participate more in class discussions and activities than female students. Leraas *et al*. (2018) found male graduates are 1.5 times more likely to be engaged and complete degrees faster. Strategies like cooperative education and research capstone courses can boost participation. Professors can enhance engagement by addressing students' emotional involvement. Encouraging and recognizing contributions can significantly improve the learning process.

External factors such as teachers, parents, peers, and the curriculum played a greater role in promoting boys' classroom participation than girls, who were more influenced by the classroom atmosphere as stated by Aziz *et al*. (2018). Hence, boys showed higher participation in class compared to girls, even though both genders faced similar internal and external factors influencing their classroom engagement.

In the local setting, particularly in Notre Dame of Tacurong College Ahmad *et al*. (2021) found that second to fifth-year undergraduate students faced difficulties in classroom participation. These challenges include personal factors such as anxiety about speaking in front of the class, fear of humiliation when corrected in English, lack of immediate response to questions, low confidence in reciting, and reluctance to share opinions in large groups. Additionally, students' perceived English proficiency affects their engagement, with poor pronunciation and limited vocabulary hindering their ability to express themselves effectively. The challenges and difficulties encountered in learning various scientific subjects impact students' interest, engagement in class, and academic performance in those subjects. This prompts us to investigate how gender influences BSED Science students' interest, classroom engagement, and academic success.

This study aimed to determine the gender differences, interests, classroom participation, academic achievement, and academic performance of BSED Science students.

Specifically, this study sought to answer the following questions in

(i) What is the profile of the respondent in terms of: Gender; and Year Level.
(ii) To what extent is the gender influence among BSED Science students in terms of: Interest; Classroom Participation; and Academic Performance
(iii) What is the level of academic achievement of BSED Science students?
(iv) Which gender is significantly different among BSED Science students in terms of: Interest; Classroom Participation; and Academic Performance
(v) Is there a significant association between students' interest, classroom participation, academic achievement, and academic performance as grouped according to their gender?.

2. METHODS

This quantitative study employed a descriptive-comparative-correlational method to explore the association between interest, classroom participation, academic achievement, and academic performance based on gender among BSED Science students (see **Figure 1**). A comparative-descriptive design is used to evaluate any differences between and among the

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variables being studied. It contrasts descriptive data from numerous categories, including gender, age, educational level, and others.

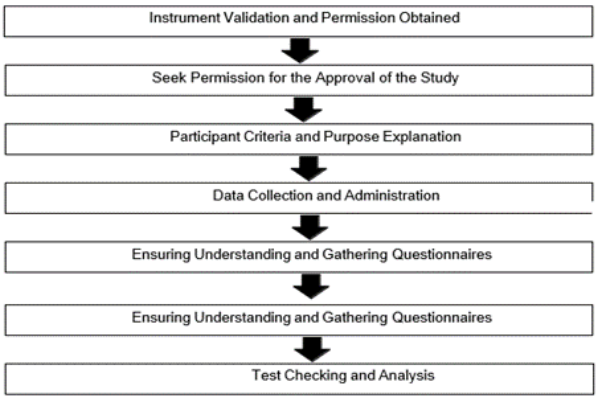

Figure 1. Waterfall diagram.

This study was conducted at the Sultan Kudarat State University Access Campus located in EJC Montilla, City of Tacurong, Province of Sultan Kudarat. Particularly the College of Teacher Education.

The participants in this study were specifically chosen from the first-year and second-year students of the BSED Science program at Sultan Kudarat State University during the second semester of the academic year 2023-2024.

This study employed census sampling, or complete enumeration, of the respondents. This technique was used as an effective way to get more factual information about the influence of gender on the interest in classroom participation of BSED Science students. The population of the respondents was composed of 1st and 2nd year students, with a total population of 83 students taking up the Bachelor of Secondary Education Major in Science (BSED SCIENCE).

This technique provides a true population, and there was no sampling error. The respondents were chosen purposefully because we believed that through a complete enumeration or census, they would acquire the right information needed for this study. By including every member of the population, the study ensures comprehensive and accurate data collection.

After the instrument was validated, we obtained a written permit to request permission from the research adviser, the research coordinator, and the school dean. Upon obtaining permission, we elucidated the study's purpose to the respondents and verified that each participant met their predetermined criteria. We collected the data using a survey questionnaire that comprised the profiles of the respondents by their gender and grade level. The questionnaires were personally given to the respondents during their free time to avoid class disturbance. This was done by ensuring that the respondents understood the instructions to answer the questions correctly. The questionnaires were gathered after we gave them enough time to answer. The answers were analyzed and encoded. The gathered data were studied and managed by statistical procedures. The problems encountered by the respondents were identified through the second part of the survey questionnaire that was given to them. After the respondents have taken the tests, the papers are checked, tallied, interpreted, and analyzed.

3. RESULTS AND DISCUSSION

The study on “Gender Influence on Students’ Interest, Classroom Participation, Academic Achievement, and Academic Performance in Science.” Various results are presented in the

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succeeding tables. The data were presented sequentially according to the order of the research problem.

Table 1 presents the gender distribution, in which females make up the largest portion of the respondents at 72.3%, followed by males at 22.9%. A smaller segment is categorized as "others," accounting for 4.8% of the sample. The year-level distribution reveals a slight majority of first-year students (55.4%). Second-year students take up the remaining slots, representing 44.6% of the respondents. In essence, this data shows a sample population skewed towards females and first-year students.

Table 1. Profile of the respondent in terms of Gender and Year Level.

Gender	**Frequency**	**Percent**
Female	60	72.3
Male	19	22.9
Others	4	4.8
Total	83	100.0
Year Level	**Frequency**	**Percent**
1st Year	46	55.4
2nd Year	37	44.6
Total	83	100.0

Table 2 illustrates the extent of gender-based differences in interest among BSED Science students. It reveals that female students have a slightly lower mean interest score (M = 4.23) than male students. Despite this, female students still demonstrate a high level of interest in science subjects, although their enthusiasm is marginally less than that of their male peers.

This observation aligns with findings indicate that while female students find science engaging, enjoy learning, feel motivated, actively seek additional resources, and participate in class discussions, these behaviors are somewhat less pronounced compared to male students.

In comparison, male students exhibit the highest level of interest among respondents, with a mean score of M = 4.54. This score reflects their strong engagement and enjoyment in science, as well as their motivation to seek additional resources and participate in discussions.

Overall, **Table 2** suggests that gender plays a role in shaping students' interest in science, with male students showing slightly more curiosity. Nevertheless, both male and female students' express satisfaction with their science studies and find them inspiring, illustrating a shared appreciation despite the slight differences in intensity of interest.

Table 3 highlights gender differences in classroom participation among BSED Science students. Male students display highly participative behavior, with a mean score of M = 4.29, reflected in their active involvement in science discussions, contributions to classroom activities, and frequent questions during class. They also feel well-supported by both teachers and classmates.

In comparison, female students have a slightly lower mean score (M = 4.00), indicating a small gap in participation levels compared to their male counterparts. However, this score still represents a high level of engagement. Female students actively participate in class, ask questions, and feel supported by their teacher and peers, just to a slightly lesser extent than the male students.

These findings align with research by Crombie *et al*. (2003), suggesting that both male and female students are engaged in classroom activities, though a minor disparity exists. This observed gap in participation emphasizes the need to explore the underlying causes and

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develop strategies to foster an inclusive learning environment that encourages all students to engage fully and confidently in classroom activities.

Table 2. Extent of gender influence among BSED Science students in terms of Interest.

Gender		N	Mean	SD	Verbal Description
Female	1. I find science subjects more engaging.	60	4.40	0.53	Highly Interested
	2. I enjoy learning new things in science subjects.	60	4.53	0.50	Highly Interested
	3. I am motivated to learn science subjects.	60	4.22	0.58	Highly Interested
	4. I am eager to seek out additional resources to learn more about science subjects.	60	4.32	0.62	Highly Interested
	5. I am enthusiastic about participating in class discussions related to science subjects.	60	3.97	0.58	Interested
	6. I am curious to explore different aspects in science subjects.	60	4.50	0.50	Highly Interested
	7. I engage and involve when learning science subjects.	60	4.10	0.54	Interested
	8. I actively engage in science subjects outside of class.	60	3.95	0.67	Interested
	9. I enjoy working on my assignments or projects related to science subjects.	60	3.92	0.62	Interested
	10. I participate more when the topic in science subjects aligns with my interests.	60	4.37	0.66	Highly Interested
	Overall Mean on Student Interest	**60**	**4.23**	**0.39**	**Highly Interested**
Male	1. I find science subjects more engaging.	19	4.74	0.45	Highly Interested
	2. I enjoy learning new things in science subjects.	19	4.68	0.58	Highly Interested
	3. I am motivated to learn science subjects.	19	4.53	0.61	Highly Interested
	4. I am eager to seek out additional resources to learn more about science subjects.	19	4.58	0.51	Highly Interested
	5. I am enthusiastic about participating in class discussions related to science subjects.	19	4.32	0.58	Highly Interested
	6. I am curious to explore different aspects in science subjects.	19	4.63	0.60	Highly Interested
	7. I engage and involve when learning science subjects.	19	4.58	0.51	Highly Interested
	8. I actively engage in science subjects outside of class.	19	4.26	0.81	Highly Interested
	9. I enjoy working on my assignments or projects related to science subjects.	19	4.26	0.73	Highly Interested
	10. I participate more when the topic in science subjects aligns with my interests.	19	4.84	0.37	Highly Interested
	Overall Mean on Student Interest	**19**	**4.54**	**0.45**	**Highly Interested**

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Table 3. Extent of gender influence among BSED Science students in terms of Participation.

Gender		N	Mean	SD	Verbal Description
Female	1. I actively participate in science discussions.	60	3.97	0.64	Participative
	2. I am comfortable sharing my opinions and ideas in science class.	60	3.80	0.71	Participative
	3. I contribute to group activities and projects in class.	60	4.28	0.58	Very Participative
	4. I ask questions and seek clarification during class.	60	3.90	0.71	Participative
	5. I engage in collaborative learning activities with my peers.	60	3.95	0.62	Participative
	6. I volunteer to present or share my work in front of the class.	60	3.43	0.85	Participative
	7. I actively listen and respond to my classmates' contributions.	60	4.07	0.66	Participative
	8. My teachers encourage me to participate in class.	60	4.05	0.75	Participative
	9. My classmates support me when I participate in class regardless of my gender.	60	4.32	0.60	Very Participative
	10. My contributions are valued and respected by others in class.	60	4.18	0.79	Participative
	Overall Mean on Classroom Participation	**60**	**4.00**	**0.49**	**Participative**
Male	1. I actively participate in science discussions.	19	4.26	0.56	Very Participative
	2. I am comfortable sharing my opinions and ideas in science class.	19	4.05	0.85	Participative
	3. I contribute to group activities and projects in class.	19	4.42	0.61	Very Participative
	4. I ask questions and seek clarification during class.	19	4.05	0.71	Participative
	5. I engage in collaborative learning activities with my peers.	19	4.26	0.65	Very Participative
	6. I volunteer to present or share my work in front of the class.	19	4.05	1.03	Participative
	7. I actively listen and respond to my classmates' contributions.	19	4.26	0.56	Very Participative
	8. My teachers encourage me to participate in class.	19	4.32	0.58	Very Participative
	9. My classmates support me when I participate in class regardless of my gender.	19	4.58	0.61	Very Participative
	10. My contributions are valued and respected by others in class.	19	4.68	0.48	Very Participative
	Overall Mean on Classroom Participation	**19**	**4.29**	**0.47**	**Very Participative**
Others	1. I actively participate in science discussions.	4	3.75	1.26	Participative
	2. I am comfortable sharing my opinions and ideas in science class.	4	4.00	1.41	Participative
	3. I contribute to group activities and projects in class.	4	4.50	0.58	Participative
	4. I ask questions and seek clarification during class.	4	3.25	0.96	Very Participative
	5. I engage in collaborative learning activities with my peers.	4	4.25	0.50	Participative

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Table 3 (continue). Extent of gender influence among BSED Science students in terms of Participation.

Gender		N	Mean	SD	Verbal Description
	6. I volunteer to present or share my work in front of the class.	4	3.00	0.82	Very Participative
	7. I actively listen and respond to my classmates' contributions.	4	4.50	0.58	Neutral
	8. My teachers encourage me to participate in class.	4	4.75	0.50	Very Participative
	9. My classmates support me when I participate in class regardless of my gender.	4	4.75	0.50	Very Participative
	10. My contributions are valued and respected by others in class.	4	3.75	1.26	Very Participative
	Overall Mean on Classroom Participation	**4**	**4.05**	**0.66**	**Participative**

The data presented in **Table 4** depicts the diverse viewpoints held by BSED Science students concerning how gender impacts their academic success. Female students generally strongly believe that their efforts and diligence significantly contribute to their academic achievements, with a mean score of 4.37. However, they express uncertainty regarding the influence of gender on their confidence in showcasing their academic abilities, scoring an average of 2.62. Female students, on the whole, tend to disagree with the notion that they face gender-related biases in their academic journey, reflected in their mean score of 2.25. Similarly, they disagree with the idea that their gender affects their learning styles and academic performance, as indicated by their mean score of 2.37.

Overall, female students are uncertain about how gender influences their academic success, with an overall mean score of 2.96. Conversely, male students generally strongly agree that their efforts contribute significantly to their academic success, with a higher mean score of 4.53. However, they also express uncertainty about the influence of gender on their academic achievements, with an overall mean score of 2.77. Finally, a smaller group labeled as "Others" tends to disagree with the notion that gender impacts various aspects of academic performance, with lower mean scores across most items and an overall mean of 2.60, suggesting disagreement with the idea that gender affects academic achievement.

This result is supported by the study of Kisigot which found that there is no significant difference in science achievement between male and female students. This indicates that gender was not a determining factor in students' performance in this subject.

The **Table 5** above shows the level of academic performance of 1st year and 2nd year BSED Science students of College of Teacher Education, in which categorized by their gender. Each category is further divided into five score ranges: 93-95, 90-92, 87-89, 84-86, and 81-83.

The "Frequency" column shows the number of students who scored within each range. The "Percent" column shows the percentage of students in each category who scored within each range. Most of the students scored between 87-89 and 90-92, regardless of gender. There are very few students who scored between 81-83. Females seem to have a higher percentage of students scoring in the higher brackets (90-95 and 87-89) compared to males.

Overall, the table suggests that the BSED Science students performed well academically.

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Table 4. Extent of gender influence among BSED Science students in terms of Academic Achievement.

Gender		N	Mean	SD	Verbal Description
Female	1. My efforts and hard work contribute to my academic success.	60	4.37	0.52	Strongly Agree
	2. My gender affects my confidence to show my abilities to succeed academically.	60	2.62	1.19	Not Sure
	3. I experience any gender-related biases in my academic journey.	60	2.25	1.02	Disagree
	4. My gender elevates sense of responsibility towards my academic progress.	60	3.05	1.05	Not Sure
	5. My gender affects my learning styles and academic achievement.	60	2.37	1.06	Disagree
	6. I believe my gender affects my level of motivation to excel in academics.	60	2.58	1.15	Not Sure
	7. My gender influences the way I handle schoolwork and learning.	60	2.60	1.06	Not Sure
	8. My gender affects the level of support I received for my academic endeavors.	60	2.50	1.05	Disagree
	9. I am contented with my current academic performance in science subjects.	60	3.55	0.79	Agree
	10. My gender encourages equality in education to improve my overall academic achievement.	60	3.68	0.93	Agree
	Overall Mean on Classroom Participation	**60**	**2.96**	**0.64**	**Not Sure**
Male	1. My efforts and hard work contribute to my academic success.	19	4.53	0.61	Strongly Agree
	2. My gender affects my confidence to show my abilities to succeed academically.	19	3.00	1.29	Not Sure
	3. I experience any gender-related biases in my academic journey.	19	2.26	1.15	Disagree
	4. My gender elevates sense of responsibility towards my academic progress.	19	3.11	1.20	Not Sure
	5. My gender affects my learning styles and academic achievement.	19	2.16	1.21	Disagree
	6. I believe my gender affects my level of motivation to excel in academics.	19	2.11	1.20	Disagree
	7. My gender influences the way I handle schoolwork and learning.	19	2.26	1.15	Disagree
	8. My gender affects the level of support I received for my academic endeavors.	19	2.32	1.11	Disagree
	9. I am contented with my current academic performance in science subjects.	19	2.95	1.22	Not Sure
	10. My gender encourages equality in education to improve my overall academic achievement.	19	3.00	1.29	Not Sure
	Overall Mean on Classroom Participation	**19**	**2.77**	**0.73**	**Not Sure**

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Table 4 (continue). Extent of gender influence among BSED Science students in terms of Academic Achievement.

Gender		N	Mean	SD	Verbal Description
Others	1. My efforts and hard work contribute to my academic success.	4	4.25	0.50	Strongly Agree
	2. My gender affects my confidence to show my abilities to succeed academically.	4	2.50	0.58	Disagree
	3. I experience any gender-related biases in my academic journey.	4	2.75	0.50	Not Sure
	4. My gender elevates sense of responsibility towards my academic progress.	4	2.25	0.96	Disagree
	5. My gender affects my learning styles and academic achievement.	4	1.75	0.96	Strongly Disagree
	6. I believe my gender affects my level of motivation to excel in academics.	4	2.00	0.82	Disagree
	7. My gender influences the way I handle schoolwork and learning.	4	2.00	0.82	Disagree
	8. My gender affects the level of support I received for my academic endeavors.	4	2.00	0.82	Disagree
	9. I am contented with my current academic performance in science subjects.	4	2.75	1.50	Not Sure
	10. My gender encourages equality in education to improve my overall academic achievement.	4	3.75	1.26	Agree
	Overall Mean on Classroom Participation	**4**	**2.60**	**0.63**	**Disagree**

Table 5. Level of Academic Performance of BSED Science Students.

Gender		Frequency	Percent	Interpretation
Female	93-95	5	8.3	Very Good
	90-92	17	28.3	Above Average
	87-89	22	36.7	Above Average
	84-86	13	21.7	Average
	81-83	3	5.0	Average
	Total	60	100.0	
Male	93-95	2	10.5	Very Good
	90-92	5	26.3	Above Average
	87-89	8	42.1	Above Average
	84-86	3	15.8	Average
	81-83	1	5.3	Average
	Total	19	100.0	

Table 6 shows the result of the one-way analysis of variance to test the significant difference on the extent of students' interest of BSED Science students when grouped according to gender. Findings revealed that there is a significant difference among the three groups on students' interest F (2,80) = 4.58, p=.013. This means that gender has an influence on students' interest levels in science.

The F-value (4.58) indicates the ratio of the variance between groups to the variance within groups. In this case, it suggests that there is more variation in interest levels between gender

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groups than within each gender group. The p-value (0.013) is below the conventional threshold of 0.05, indicating that the observed difference in interest levels among gender groups is statistically significant.

Furthermore, the Tukey Honestly Significant Difference (HSD) test is used to determine which specific groups differ significantly from each other. The Tukey HSD test revealed that there is a significant difference between male and female students in terms of interest levels. This implies that, on average, either male students or female students have a significantly higher level of interest in science compared to the other gender.

The findings suggest that gender plays a role in influencing students' interest in science among BSED Science students. Male and female students exhibit different levels of interest in science, with one gender showing a significantly higher interest compared to the other. Educators and policymakers should consider gender differences when designing science curriculum and activities to engage all students effectively. Strategies may need to be tailored to address the specific interests and needs of male and female students in science education. Understanding the factors that contribute to gender differences in interest in science can inform efforts to promote diversity and inclusivity in STEM fields.

It contradicts the study of Siregar *et al*. (2023) which states that gender differences in interest in STEM are not significant. However, it is indisputable that there are still differences between male and female students' interest in STEM fields.

Table 6. Significant Difference Among BSED Science Students in Terms of Interest.

	Mean	Sum of Squares	df	Mean square	F	p-value	Interpretation
Female	4.23[a]						
Male	4.54[b]						
Others	4.51[a]						
Between Groups		1.60	2	0.801	4.51	0.13	Significant
Within Groups		13.99	80	0.175			
	Total	15.59	82				

Table 7 shows the result of the one-way analysis of variance to test the significant difference on the extent of classroom participation of BSED Science students when grouped according to gender. Findings revealed that there is no significant difference among the three groups on classroom participation F (2,80) = 2.71, p=.073. This suggests that gender does not have a significant influence on classroom participation levels in science. The F-value (2.71) indicates the ratio of the variance between groups to the variance within groups. In this case, it suggests that there is not much difference in participation levels between gender groups compared to the variation within each gender group.

The p-value (0.073) is above the conventional threshold of 0.05, indicating that the observed difference in classroom participation levels among gender groups is not statistically significant. The findings suggest that gender does not play a significant role in influencing classroom participation levels among BSED Science students. Male and female students participate in the classroom at similar levels in science education. The result findings agree with the research study of Shoeib (2022) which states that both males and females had a neutral opinion of the gender influence in terms of classroom participation.

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Table 7. Significant Difference Among BSED Science Students in terms of Classroom Participation.

	Mean	Sum of Squares	df	Mean square	F	p-value	Interpretation
Female	4.00 a						
Male	4.29a						
Others	4.05a						
Between Groups		1.30	2	0.649	2.79	0.073	Not Significant
Within Groups		19.15	80	0.239			
	Total	20.45	82				

Table 8 shows the result of the one-way analysis of variance to test the significant difference on the extent of academic achievement of BSED Science students when grouped according to gender. Findings revealed that there is no significant difference among the three groups on academic achievement F (2,80) = 1.01, p=.369. This implies that gender does not have a significant influence on academic achievement levels in science.

The F-value (1.01) indicates the ratio of the variance between groups to the variance within groups. In this case, it suggests that there is not much difference in academic achievement levels between gender groups compared to the variation within each gender group. The p-value (0.369) is above the conventional threshold of 0.05, indicating that the observed difference in academic achievement levels among gender groups is not statistically significant. The findings suggest that gender does not play a significant role in influencing academic achievement levels among BSED Science students. Male and female students achieve similar academic outcomes in science education.

Educators and policymakers may not need to focus specifically on gender when addressing academic achievement in science. Resources and interventions aimed at improving academic achievement in science can be designed to benefit all students regardless of gender. While gender may not be a significant factor in academic achievement levels, other factors such as teaching quality, study habits, and socioeconomic status may still influence academic performance.

This study agrees with the study of Rooj it highlights the role that a student's motivation and attitude play in their ability to adapt to academic settings. Interestingly, the study also reveals that gender does not have a significant impact on academic performance, suggesting that individual differences in motivation and attitude are more important determinants of academic outcomes than gender.

Table 8. Significant Difference Among BSED Science Students in Terms of Academic Performance.

	Mean	Sum of Squares	df	Mean square	F	p-value	Interpretation
Female	2.96a						
Male	2.77a						
Others	2.60a						
Between Groups		0.881	2	0.440	1.01	0.369	Significant
Within Groups		34.87	80	0.436			
	Total	35.75	82				

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Table 9 illustrates the relationship between students' interest, classroom participation, academic achievement, and overall academic performance, categorized by gender. The data analysis reveals a significant relationship between students' interest and classroom participation in females (r =.596, p<.05) and males (r =.713, p<.05). The analysis reveals a significant positive relationship between students' interest and classroom participation for both females ($r = 0.596$, $p < 0.05$) and males ($r = 0.713$, $p < 0.05$). This suggests that regardless of gender, students who show higher interest in the subject matter tend to participate more actively in class discussions and activities. This finding underscores the importance of cultivating interest to enhance student engagement and participation in the classroom.

Interestingly, both male and female students exhibit a similar pattern in the relationship between interest and participation, with males showing a slightly stronger correlation. This suggests that while there may be differences in the overall levels of interest and participation between genders, the underlying relationship between these variables remains consistent. While students' interest, classroom participation, and academic achievement do not significantly correlate with their academic performance across all genders (male, female, and others), Despite the significant correlation between interest and participation, the analysis indicates that there is no significant relationship between students' interest, classroom participation, and academic achievement for all genders.

This finding may indicate that interest and participation are important factors influencing student engagement, but they may not directly translate to improved academic performance. Other factors, such as study habits, the learning environment, and individual differences, could play a significant role in academic achievement. Educators can utilize the findings to design instructional strategies that foster students' interest and encourage active participation in the classroom. Providing diverse and engaging learning materials, incorporating interactive teaching methods, and promoting a supportive learning environment can help stimulate students' interest and enhance their participation. However, interest and participation are important for student engagement but may not guarantee academic success. Therefore, educators should consider a holistic approach that addresses various factors contributing to academic achievement.

The findings revealed a significant predominance of female respondents among BSED Science students in both 1st and 2nd-year levels, with females comprising 72.3% and males 22.9%. A small percentage identified as "others" (4.8%). Male students exhibited the highest interest in science (mean score: 4.54) compared to females (mean score: 4.23), and also showed higher classroom participation (mean score: 4.29) than females (mean score: 4.00). In academic performance, males scored slightly higher (mean score: 4.53) than females (mean score: 4.37), though females generally performed well, with a higher percentage in the upper score ranges of 90–95 and 87–89. The study found a significant difference in interest levels based on gender, with males showing higher interest ($F(2,80) = 4.58$, $p = .013$), but no significant difference in classroom participation ($F(2,80) = 2.71$, $p = .073$) or academic performance ($F(2,80) = 1.01$, $p = .369$). There was a significant positive association between interest and participation for both genders, highlighting the importance of cultivating interest to boost student engagement. However, no significant relationship was found between students' interest, classroom participation, and academic achievement, suggesting that while interest and participation are crucial for engagement, they may not directly improve academic performance.

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Table 9. Association Between Students' Interest, Classroom Participation, Academic Achievement, and Academic Performance as Grouped According to Their Gender.

Gender		Student Interest	Classroom Participation	Academic Achievement	Academic Performance
Female	Student Interest	1			
	Classroom Participation	0.596**	1		
	Academic Achievement	-0.040	-0.105	1	
	Academic Performance	0.078	0.057	0.145	1
Male	Student Interest	1			
	Classroom Participation	0.713**	1		
	Academic Achievement	0.117	-0.285	1	
	Academic Performance	-0.040	-0.186	0.430	1
Others	Student Interest	1			
	Classroom Participation	0.829	1		
	Academic Achievement	0.587	0.884	1	
	Academic Performance	0.549	0.704	0.365	1

*** correlation is significant @0.01 level two-tailed*

4. CONCLUSION

In both year levels, there is a higher proportion of female respondents compared to male respondents, with a small percentage identifying as "Others" in both groups. Male BSED Science students exhibit a stronger interest in science subjects than females, although both genders find science engaging and express satisfaction with the courses. Although both genders actively participate in discussions and feel supported, male students show higher levels of engagement in classroom participation than females, highlighting the need to address participation gaps for inclusivity. Female BSED Science students believe in their efforts for academic success but are uncertain about how gender influences their confidence and abilities, while male students' express confidence in their efforts but are unsure about gender's impact on their achievements. Academic achievement among 1st and 2nd year BSED Science students, categorized by gender, shows that females scored higher in the top score ranges, indicating strong academic performance. While there are significant differences in student interest levels based on gender, gender has no statistically significant impact of gender on classroom participation and academic achievement within the BSED Science student group. The relationship between students' interest, classroom participation, academic achievement, and academic performance based on gender reveals a positive association between interest and participation for both males and females. However, there is no significant link between interest, participation, and academic achievement for all

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genders, suggesting that while interest and participation are crucial for engagement, they may not directly influence academic performance.

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6. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

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