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THE CHEMISTRY INTEREST DIVIDE: MALE VS. FEMALE STUDENTS AT PENAJAM PASER UTARA HIGH SCHOOL

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Abstract

This study aims to determine the level of learning interest of male and female students in chemistry subjects. Designed as a quantitative descriptive study. This study uses Proportionate Stratified Random Sampling as a reference in sampling. The data collection technique uses a non-test technique in the form of a learning interest questionnaire. Data were obtained through a questionnaire in the form of positive and negative statements, the questionnaire refers to four aspects: students' feelings of pleasure, student involvement, student attention, and student interest. Based on the results of the study, the percentage of learning interest of male students was 72%, while female students were 82%, which means that both male and female students have a high interest in learning chemistry. Future research is expected to examine more deeply other factors that influence differences in student learning interest based on gender, such as family environment, teacher learning methods, and peer influence.

Keywords: chemistry, gender, learning interest

INTRODUCTION

Education is a process through which students develop their potential to become quality individuals and a generation that brings progress to the nation (Puteri et al., 2020). Through education, a superior, high-quality generation will be produced, possessing strong skills, broad insight, and in-depth knowledge, capable of driving national progress in the future (Aji & Rahayu, 2023). The compulsory education system for all Indonesians lasts 12 years, divided into several levels, one of which is senior high school (SMA) (Gusnita et al., 2025). In senior high school, students are taught various scientific fields, one of which is chemistry (Rusdiansyah et al., 2021).

Chemistry is a branch of natural science that studies the composition, structure, and properties of matter (substances), the changes that occur in matter, and the energy that accompanies these changes (Artini & Wijaya, 2020). Chemistry is an important subject to teach students, as humans are inextricably linked to the use of chemical substances in their daily lives (Nurmilawati et al., 2021). School experiences show that chemistry is considered boring and difficult by most students (Camelia, 2022). Students' difficulties in understanding chemistry require a deep understanding of the subject. Therefore, in the chemistry learning process, there are important aspects that students need to possess, one of which is learning interest (Harefa et al., 2020).

Interest in learning is an internal factor that can influence student learning outcomes (Bella, 2024). Interest can originate from within the student, where the desire and interest in understanding a particular subject or lesson emerge naturally (Situmeang et al., 2024). Low interest in chemistry can decrease learning motivation and impact student academic achievement (Harefa et al., 2020). According to Yolviansyah et al. (2021), there are four indicators of interest in learning: enjoyment, student interest, student attention, and student engagement.

Students' learning interests can change during a learning experience, which can be caused by several factors, including internal and external factors (Harefa et al., 2020). Gender can be an internal factor in the study of learning interests due to differences in social,

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psychological, and biological roles between men and women (Tumbularani & Diana, 2024). Gender can be defined as sex, where the division of roles between men and women can differ according to their environment (Nurhasanah & Zuriatin, 2022). Munawarah (2021) in her research explained that gender differences have a significant influence on students' learning processes, such as learning motivation, learning interest, and emotional intelligence. Several studies have shown that men and women often have different interest tendencies. For example, males tend to be more interested in logical activities, technical skills, or experimental practice, while females often show a higher interest in areas related to communication, verbal skills, or social aspects (Chiu & Toscano, 2024; Wang et al., 2023). This study focuses solely on internal factors such as gender because gender reflects individual characteristics. This study aims to examine the extent to which gender plays a role in students' chemistry learning outcomes.

Penajam Paser Utara (PPU) Regency is a regency in East Kalimantan Province, Indonesia, with a vast territory, mostly flat topography, and a tropical climate. This regency has four sub-districts: Penajam, Babulu, Waru, and Sepaku, with a relatively large population that is expected to continue to grow, especially after part of the area was designated for the development of the Indonesian National Capital (IKN) (Agustin & Kurniatun, 2023). Data from the Central Statistics Agency (BPS) of Penajam Paser Utara Regency in 2022 showed that there were eight public and private high schools in the Penajam area. This number is higher than that of the Babulu, Waru, and Sepaku sub-districts.

Various previous studies, such as Ahsani & Prodjosantoso (2024) related to science interest and scientific thinking habits of high school students in West Kalimantan Province, found that in general, both genders showed good science interest with a not very significant difference, with a slightly higher interest score for male students at 61.352, while female students were 61.326. Tumbularani & Diana (2024) research related to the role of gender on children's interest and participation in STEAM learning showed that overall female students were slightly better with an interest percentage of 75.56% and 76.25%, compared to male students at 73.60% and 75.50%. Research by Burhani et al. (2022) related to the analysis of PhET Simulations learning media on chemistry learning interest showed that male learning interest was slightly higher with a score of 81.55%, compared to female learning interest, with a score of 78.46%.

Therefore, this study was conducted to examine students' learning interest in chemistry lessons in the PPU region from a gender perspective. This study specifically analyzed chemistry learning interest based on gender among high school students in the PPU region, as part of the National Capital Region (IKN). Research studies on learning interest based on gender in this region are still very limited; this study was conducted. Based on the descriptions that have been outlined, the researcher is interested in examining student learning interest with the aim of describing the percentage of student learning interest based on gender in chemistry learning in high schools in the PPU region.

METHODS

The research design used was descriptive quantitative, describing students' learning interests based on gender in chemistry. Descriptive research is research to determine the value of an independent variable, either one or more variables, without making comparisons or linking them to other variables (Hulu & Telaumbanua, 2022). The population in this study was all 11th-grade high school students in the PPU region, totaling 272 students. The sampling technique used was Proportionate Stratified Random Sampling. The sample was drawn using the Slovin formula with a 10% margin of error, resulting in a total sample of 113 students, consisting of 47 boys and 66 girls.

This study is limited to a quantitative descriptive analysis of chemistry learning interest based on gender; the analysis is limited to systematic data presentation without involving statistical tests to determine the significance of differences. This study was

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conducted using a questionnaire instrument containing 28 questions related to internal factors affecting learning interest. This questionnaire consists of positive and negative statements covering four indicators of student learning interest (modified from Febrianti & Ferazona, 2024), as can be seen in Table 1.

Table 1. Blueprint for Student Learning Interest Questionnaire

Indicator	Question Items		Total Items
	Positive	Negative	
SFP	1,3,5,7	2,4,6,8	8
SIn	9,11,13,15	10,12,14,16	8
SA	17,19,21	18,20,22	6
SI	23,25,27	24,26,28	6

SFP : Student Feelings of Pleasure
SIn : Student Involvement
SA : Student Attention
SI : Student Interest

Before using the questionnaire, a validity test was conducted to measure the accuracy of the instrument. Validity testing can be performed using the following formula (Renita et al., 2020):

$$P\ (\%) = \frac{\textbf{Score obtained}}{\textbf{Maximum total score}} \times 100\%$$

Then the percentage value obtained will be referred to the interval guidelines adapted from Jusuf et al. (2022):

Table 2. Instrument Validity Categories

Score Interval	Description
81% ≤ NP < 100%	Very Valid
62% ≤ NP < 81%	Valid
43% ≤ NP < 62%	Quite Valid
33% ≤ NP < 43%	Less Valid
NP < 33%	Very Less Valid

The testing continued with a reliability test to determine the consistency of the questionnaire used. The reliability test was conducted using the Borich method, known as Percentage of Agreement (PA), as sourced from Pratiwi et al. (2021):

$$PA = \left(\mathbf{1} - \frac{\boldsymbol{A-B}}{\boldsymbol{A+B}}\right) \times \mathbf{100\%}$$

PA = Instrument reliability
A = Highest validator score
B = Lowest validator score

The Percentage of Agreement (PA) result is considered reliable if the value is ≥ 75%.

The questionnaire data analysis is presented in percentage form using the following formula:

$$P\ (\%) = \frac{\boldsymbol{Score\ obtained}}{\boldsymbol{Maximum\ total\ score}} \times 100\%$$

As for calculating the questionnaire data used to determine the percentage of students' interest in learning based on each indicator, it is as follows:

$$P\ (\%) = \frac{\boldsymbol{SUM\ of\ scores}}{\boldsymbol{Max\ score\ x\ Number\ of\ students}} \times 100\%$$

Then the percentage obtained will be classified based on the modified categories from Putri & Adirakasiwi (2021) as follows:

Table 3. Learning Interest Interpretation Scale

Percentage (%)	Category
0 - 20	Very Low
21 - 40	Low
41 - 60	Fair
61 - 80	High
81 – 100	Very High

The results of data processing presented in the form of percentages, are further interpreted in light of the analysis results, as shown in Table 4.

Table 4. Interpretation of Learning Interest (Asih & Imami, 2021)

Percentage (%)	Criteria
P = 0	Not A Single Person
0 < P < 25	A Small Portion
25 ≤ P < 50	Almost Half
P = 50	Half
50 < P < 75	A Large Portion
75 ≤ P < 100	Almost All
P = 100	All

RESULTS AND DISCUSSION

Instrument validation was based on assessments by both validators. The assessment results are listed in Table 5.

Table 5. Validation Result

	Validator 1	
Aspect	Percentage (%)	Category
Instructions	100	Valid
Content (Material)	83	Valid
Language	83	Valid

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Validator 2		
Aspect	Percentage (%)	Category
Instructions	83	Valid
Content (Material)	75	Valid
Language	100	Valid

Based on Table 5, the average results of instrument validation by validators 1 and 2 show a score of 91.5% for the instructions aspect, 79% for the content (material) aspect, and 91.5% for the language aspect. Therefore, the overall score obtained by validators 1 and 2 was 87%. Both the overall score and each indicator fall into the valid category and can be continued for use as an instrument.

After the instrument was declared valid, testing continued using a reliability test using the Borich method. The calculation results are listed in Table 6.

Table 6. Reliability Test Results

Percentage (%)	Criteria
98%	Reliable

Based on Table 6, the reliability test score was 98%, meeting the reliability criteria. The results of these validation and reliability tests serve as a reference for the instrument's use for data collection.

The results of the questionnaire analyzing students' learning interest in chemistry lessons at Penajam Paser Utara (PPU) High School can be seen in Figure 1 and Figure 2.

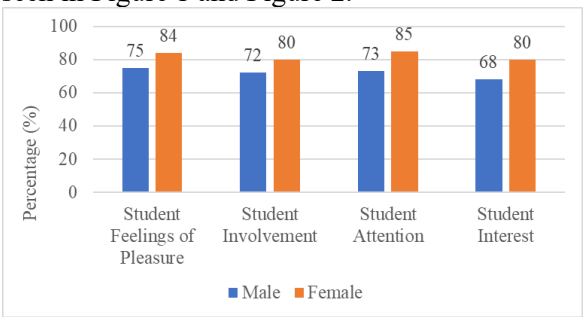

Figure 1. Interpretation of Student Learning Interests

The analysis shows that all measured indicators yielded positive results, as shown in Figure 1. The first indicator, a feeling of enjoyment toward chemistry learning, was categorized as high by 75% of male students, and categorized as very high by 84% of female students. These results indicate that both male and female students found chemistry learning enjoyable and understandable. According to the student questionnaire, this feeling of enjoyment stems from student satisfaction with chemistry lessons, as the instructor explained the material in a fun and easy-to-understand manner. Most students felt challenged by the questions posed by the instructor and felt happy and enthusiastic about participating in chemistry lessons. A sense of enjoyment can be reflected in students' enthusiasm for learning, their lack of boredom, and their consistent attendance during lessons. Similarly, Sarani et al. (2023) explain that when students learn with a sense of enjoyment, their curiosity about the learning material increases. With a positive mood, the learning process tends to run more smoothly. A sense of enjoyment toward a subject is a form of intrinsic motivation that supports students' interest in learning. This sense of enjoyment arises when students feel comfortable with the teaching method, relevant material, and a pleasant learning atmosphere (Nurmilasari et al., 2025). A sense of enjoyment can also stem from a comfortable classroom atmosphere and an engaging, interactive, and enjoyable teaching style. These conditions make students more active in the learning process. Similarly, Rakhmawati & Sulistianingsih, (2020) suggest that if a student is enthusiastic about a subject, the learning process will proceed without coercion.

The second indicator is student interest in chemistry learning, with 72% of male students in the high category and 80% of female students in the high category. These results indicate that both male and female students have a high interest in chemistry learning. According to the student questionnaire, interest in chemistry lessons is driven by the enjoyment of working on chemistry problems and a strong curiosity about chemistry lessons due to their understanding of their uses in everyday life. Furthermore, students' initiative to study independently at home without being asked demonstrates their

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interest in chemistry lessons. Students are very enthusiastic about participating in the learning process and actively engage when given material or assignments. This strong curiosity makes students not only listen to the teacher's explanations but also show interest in actively asking questions and working on chemistry problems seriously. In line with this, Sarani et al. (2023) explained that interest in a subject encourages students to be more actively involved in learning activities. Students will be more diligent in learning and strive to understand various knowledge related to the field, participate in learning with high enthusiasm, and go through the process without feeling burdened. Meanwhile, Rakhmawati & Sulistianingsih (2020) explained that students who are interested in a particular subject will appear enthusiastic about participating in learning and will always be punctual in completing assignments given by the teacher. Waruwu & Sitinjak (2022) also added that when students feel interested in the material they are studying, they tend to spend time and try to understand the concepts related to the subject. Thus, it can be said that interest in learning is not only about something being studied, but also involves curiosity that drives students to continue learning.

The third indicator is the presence of student focus in chemistry learning, the percentage of male students is 73% with high category and female students are 85% with a very high category. These results indicate that both males and females have a high level of attention in chemistry learning. According to the results of the student questionnaire, student attention in chemistry learning is triggered by the students' enthusiasm for learning, students feel focused every time chemistry learning begins, both theory and practicum. Students can concentrate during chemistry learning and diligently take notes on the material given by the teacher. This is evident in the students' ability to maintain concentration throughout the activity. Students are not easily distracted by things outside of learning so they can listen to the material attentively and take notes on explanations given by the teacher. Attention is a way to focus energy, mind, and soul on something seen, or using awareness to perform certain activities (Idrus, 2023). When students are interested in an object, they will automatically pay attention to that object. An example is seen when students listen to the teacher's explanation and take notes on the lesson material (Rakhmawati & Sulistianingsih, 2020). In line with this, Sarani et al. (2023) explained that the learning process will run well if students are able to focus their attention on the material being studied. Female students have higher attention than male students, this may be because female students pay more attention and take notes when the teacher explains, while male students tend not to take notes on what they learn (Supendi & Oktariani, 2025).

The fourth indicator is student involvement in chemistry learning, with 68% of male students in the high category, and 80% of female students in the high category. These results indicate that both male and female students are actively involved in chemistry learning. According to the student questionnaire, student involvement in chemistry learning involves students actively expressing opinions in class and group discussions. Students tend to actively ask or answer questions during learning, and actively seek out other learning resources, whether from books, teachers, friends, or other sources. Engagement indicates how actively students participate in discussions, ask questions, and experiment (Saputra et al., 2025). This active participation indicates that students do not merely passively receive information but also strive to contribute to developing shared understanding. Student engagement is also evident in their initiative to ask and answer questions during the activity. This demonstrates a high level of curiosity about the material being taught. Student engagement in the learning process impacts learning outcomes. Students who are actively involved in learning activities, especially in class, tend to achieve better performance than those who are less involved. This is in line with research by Sarani et al. (2023), which explains that the more actively students are involved in learning, the easier it is for them to understand the material presented by the teacher.

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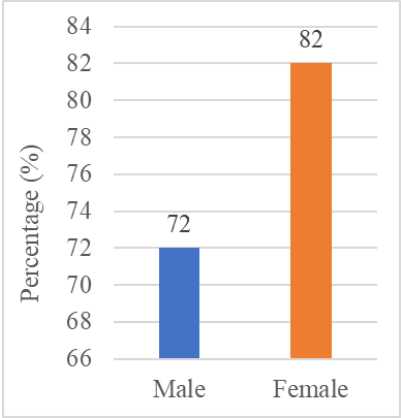

Figure 2. Average percentage of student learning interest

Overall, Figure 2 shows that female students have a slightly higher interest in learning with an average of 82% compared to male students with an average of 72%. These results indicate a difference in the level of interest in learning between male and female students, where female students tend to have a higher interest in learning chemistry than male students. This is supported by research by Wahyudiati (2021) which states that female students have better scientific attitudes because female students have higher self-confidence, curiosity, motivation, interest, perseverance, enthusiasm in completing assignments, and a positive attitude towards learning compared to male students. In addition, research by Nopriadi et al. (2022) states that female students have higher scientific literacy skills compared to male students, especially in chemistry learning.

Student learning interest can change during a learning process, which can be caused by several factors, such as internal and external factors (Harefa et al., 2020). Internal factors originate from within the individual, including psychological factors such as intelligence level (Alzufri, 2023). In addition to internal factors, it is also important to consider external factors that can influence student learning interest (Tumbularani & Diana, 2024). Several external factors can influence differences in student learning interest, such as the learning methods determined by teachers and the use of learning media during the learning process (Putri et al., 2022). Teaching methods are the methods used by teachers to deliver learning materials, both inside and outside the classroom, with the aim of ensuring that the material is received, understood, and utilized optimally by students (Budiasningrum et al., 2025). The ability to vary teaching methods is important to prevent students from getting bored during the learning process and to create a more engaging and interactive learning environment (Ikhsan et al., 2025). The use of unique learning media and an engaging teacher delivery style can increase student interest in chemistry (Dianti et al., 2023).

CONCLUSION

Based on the research results, it can be concluded that the average percentage of students' learning interest by gender in high schools in the PPU region is 72% for males and 82% for females. These results indicate that both males and females have a high level of interest in chemistry. This research is expected to serve as a reference for teachers and schools in designing more meaningful learning methods to increase student enthusiasm for learning through creative and engaging learning activities, enabling every student, both male and female, to actively participate in the learning process. This research is also expected to provide a snapshot of the actual state of student learning interest in high schools in the PPU region, thus providing a basis for efforts to improve the quality of learning in accordance with real-world conditions.

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