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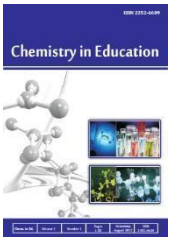

Correlation Between Student Learning Motivation and Learning Quality on Student Critical Thinking Skill on Atomic Structure Material

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ABSTRAK

Pendidikan pada abad ke-21 menuntut keterampilan yang hasur dikuasai. Keterampilan yang harus dimiliki peserta didik pada abad 21 disebut 4C yaitu critical thinking, creativity, communication skills, and collaboration. Sistem pendidikan di Indonesia pada saat ini menerapkan kurikulum merdeka yang berfokus pada pengembangan karakter dan kompetensi peserta didik serta berfokus pada materi esensial. Penelitian ini memiliki tujuan untuk mengetahui hubungan antara motivasi belajar dan kualitas pembelajaran terhadap kemampuan berpikir kritis. Kemampuan berpikir kritis merupakan salah satu keterampilan yang harus dikuasai peserta didik pada abad ke- 21. Penelitian ini memiliki tujuan untuk mengetahui hubungan antara motivasi belajar dan kualitas pembelajaran terhadap kemampuan berpikir kritis. Kemampuan berpikir kritis merupakan salah satu keterampilan yang harus dikuasai peserta didik pada abad ke-21. Penelitian ini merupakan penelitian model kuantitatif dengan metode survei. Sampel yang digunakan pada penelitian ini berjumlah 103 yang berasal dari siswa kelas X-E 5, X-E 10, dan X-E 11 SMA Negeri 12 Semarang. Analisis data yang dilakukan menggunakan PLS-SEM. Hasil uji hipotesis menggunakan PLS-SEM menunjukkan bahwa motivasi belajar tidak memiliki hubungan positif dan signifikan Terhadap kemampuan berpikir kritis dengan nilai p-values 0,413. Variabel kualitas pembelajaran memiliki hubungan positif namun tidak signifikan terhadap kemampuan berpikir kritis dengan nilai p-values 0,736. Variabel kualitas pembelajaran memiliki hubungan positif dan signifikan terhadap motivasi belajar dengan nilai p-values 0,000.

ABSTRACT

Education in the 21st century demands skills that must be mastered. The skills that students must have in the 21st century are called 4C, namely critical thinking, creativity, communication skills, and collaboration. The education system in Indonesia currently implements an independent curriculum that focuses on developing the character and competence of students and focuses on essential materials. This study aims to determine the correlation between learning motivation and learning quality on critical thinking skills. Critical thinking skills are one of the skills that students must master in the 21st century. This study is a quantitative model study with a survey method. The sample used in this study was 103 students from grades XE 5, XE 10, and XE 11 of SMA Negeri 12 Semarang. Data analysis was carried out using PLS-SEM. The results of the hypothesis test using PLS-SEM showed that learning motivation did not have a positive and significant correlation with critical thinking skills with a p-value of 0.413. The learning quality variable has a positive but insignificant correlation with critical thinking skills with a p-value of 0.736. The learning quality variable has a positive and significant correlation to learning motivation with a p-value of 0.000.

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INTRODUCTION

Along with the rapid development of technology and science that has an impact on several sectors of life, one of the sectors affected is the education sector. 21st-century education requires a person to have various skills; education should equip students with these abilities so that they can develop into better people (Jufriadi et al., 2022) . Education in the 21st century refers to educational concepts and approaches that are relevant to face the demands and changes of today's era. Education in the 21st century requires various skills that must be mastered. The 4C competencies, namely *critical thinking, collaboration, communication skills,* and *creativity,* are competencies that students must have in the 21st century (Maulidia et al., 2023) . Critical thinking skills are one of the skills contained in the skills that must be mastered in the 21st century. Critical thinking skills are very important because with good critical thinking skills, it will be easier for students to face and solve problems in everyday life. The ability of students to solve difficulties in everyday life is referred to as the development of critical thinking skills in general. This critical thinking ability is useful when carrying out chemistry learning activities for analysis, reasoning, evaluation, and problem solving. Critical thinking skills are not obtained directly by every human being, but must be honed and trained continuously. Critical thinking skills have several indicators, namely basic classification, providing reasons for a decision, concluding, further clarification, guesswork, and integration (Arif et al., 2019) .

Learning motivation is one of the factors that influences critical thinking skills (Liyanto et al., 2021). The quality of learning affects the level of student learning motivation because the better the quality of learning, the higher the level of student motivation will be, and vice versa. If there is good learning quality, students' thinking skills and learning motivation will be higher. This is in line with the research conducted (Primayana et al., 2020). If the quality of learning used is effective and helps in obtaining the desired knowledge, attitudes, and abilities, the quality of education will increase. From the results of observations that have been carried out at SMA Negeri 12 Semarang, it is known that learning has used the independent curriculum, with the learning resources used being LKS and textbooks, the learning model used is discovery learning, and students' interest in chemistry subjects is still low. The questions for the evaluation have used HOTS, but there are still few, and the level of students' critical thinking is still low.

Research (Sholikhah & Zahrotin, 2021) states that there is a relationship between learning motivation and students' critical thinking skills. The study showed that students with high learning motivation have high critical thinking skills, which is 68%. The learning motivation aspect is in the medium category, with moderate critical thinking skills, and has a percentage of 55.3%. Meanwhile, the learning motivation aspect is in the low category, with low critical thinking skills, has a percentage of

6.1%. Meanwhile, (Muwaffiq et al., 2020) stated that students' learning motivation does not have a significant relationship with students' critical thinking skills. From the statistical hypothesis test carried out, a significance value of 0.487 was obtained, which was greater than the level of significance test used. The research conducted (Primayana et al., 2020) stated that if the quality of learning used is effective and helps in obtaining the desired knowledge, attitudes, and abilities, the quality of education will increase.

The greatest force that drives a person to persist and overcome challenges in order to achieve a desired goal is called motivation. Motivation plays a very important role in a person's ability to learn (Mustikarini & Puspasari, 2021) . (Julia, 2023) states that learning motivation is a drive that makes someone take action to achieve a goal. Students will have high learning motivation if there is a goal or a problem that must be solved. This learning motivation is individual, so that each individual does not have the same learning motivation. Each individual has their own learning motivation depending on the problems faced or the goals they want to achieve. One of the factors that determines the level of activity in learning activities is learning motivation. If students have high learning motivation, then they will study seriously (Ulifiah, 2020) . Learning motivation plays an important role in measuring the level of student learning success. Learning motivation is an activity that can make someone have a strong desire to work hard to achieve the desired goal (Kusumawati, 2022) . Learning motivation is influenced by several factors, namely internal factors and external factors. Internal factors come from the students themselves. Internal factors include skills or abilities, attitudes adopted, experience, background, level of education, or individual perceptions. External factors include the social environment, family demands, friendship life. (Intan et al., 2023) .

One of the high-level thinking skills needed in developing 21st century skills is critical thinking skills. Every human being needs the ability to think critically to solve challenges in difficult situations and conditions. High-level critical thinking skills are abilities that consist of critical and creative thinking, analyzing, problem solving, and visualization (Rahardhian, 2022)

Based on the background that has been stated, there are several factors that have a relationship and are significant to critical thinking skills. These factors include learning motivation and learning quality. This study aims to analyze the correlation between learning motivation and learning quality on critical thinking skills in atomic structure material.

METHODS

The research was conducted using quantitative research with a survey method. The method used in this study is the survey method. This method is considered the most appropriate because this study aims to test the variables used to prove the relationship between student learning motivation and learning

quality on students' critical thinking skills. The instruments used in this study were questions and questionnaires. After the questions and questionnaires were completed by students, the data obtained were then analyzed and tabulated to prove the established hypothesis. The sample in this study was 98 students of class X SMAN 12 Semarang. The variables used were learning motivation (X1), learning quality (X2), and critical thinking skills (Y). The data analysis technique used was using the SEM-PLS application.

RESULT AND DISCUSSION

Result

Partial least square-structural equation modeling analysis is divided into 2 stages. The first stage is the evaluation of the measurement model, then continued with the second stage, namely the evaluation of the measurement model. Indicators can be declared valid if they have a loading factor value > 0.7. The results of the convergent validity calculation in the evaluation of the structural model are presented in Table 1.

Table 1. Loading Factor Values of Model 2

Construct	Learning Motivation	Learning Quality	Critical Thinking Skills	Information
X1-2	0.709			Valid
X1-3	0.777			Valid
X1-4	0.838			Valid
X1-5	0.789			Valid
X2-1		0.721		Valid
X2-2		0.755		Valid
X2-3		0.850		Valid
X2-4		0.739		Valid
Y -5			0.758	Valid
Y -6			0.774	Valid

Based on Table 1, the loading factor value of all constructs is >0.7, so the construct has been declared valid for use. The discriminant validity test can also be seen by looking at the average variance extracted (AVE) value. A construct can be said to be valid if it has an AVE value> 0.5. If the AVE value is <0.5, the construct is declared invalid. The AVE value of model 2 PLS-Algorithm is presented in Table 2. Based on Table 2, the AVE value of all constructs is >0.5, so the constructs have been declared valid for use. The reliability of each construct can be known by looking at the value of the composite reliability. The construct is declared valid if it has a composite reliability value > 0.7. The results of the reliability test of model 2 are presented in Table 3.

Table 2. AVE values of model 2

Construct	AVE	Information
Motivation to learn	0.608	Valid
Quality of Learning	0.590	Valid
Critical Thinking Skills	0.586	Valid

Based on Table 3, the composite reliability value of all constructs is > 0.5, so the construct has been declared reliable.

Table 3. Composite Reliability Values

Construct	Composite Reliability	Information
Learning Motivation	0.861	Reliable
Learning Quality	0.851	Reliable
Critical Thinking Skills	0.739	Reliable

In this model, 2 fit explains two types of models, namely, the saturated model and the estimated model. A saturated model is a model where the number of estimated parameters is the same as the number of observed data. The estimated model is a model that is being hypothesized. The model is declared fit if the SRMR value <0.1 and the NFI value <1. The results of the model fit are presented in Table 4.

Table 4. Model 2 fit results

Fit Summary	*Saturated Model*	*Estimated Model*
SRMR	0.095	0.095
d_ULS	0.497	0.497
d_G	0.145	0.145
Chi_Square	87,871	87,871
NFI	0.644	0.644

Based on Table 4, the SRMR value is <0.1, so the model is declared fit, and the NFI value is <1, so Model 2 is declared fit for use.

Structural model testing is done through the bootstrapping process. From the bootstrapping process, the results of the Path Coefficient value are obtained. The values used for hypothesis testing are t-statistic values or p-values. The results of the path coefficient of model 2 are presented in Table 5.

Table 5. Path Coefficients of Model 2

Konstruk	Sampel Asli (O)	Sampel rata-rata	Standari Deviasi	T-statistik	P-values
X1→ Y	-0.135	0.140	0.165	0.818	0.413
X2→ X1	0.412	0.432	0.076	5.386	0.000
X2→ Y	0.049	0.058	0.146	0.337	0.736

The hypotheses in this study were tested using the original sample values, t-statistics, and p-values. Based on the data presented in Table 5, three main findings were obtained. First, the correlation between learning motivation and critical thinking skills was found to be negative and not significant, with a correlation coefficient of -0.135 and a t-statistic of 0.818, which is lower than the critical value of 1.660. This indicates that students' learning motivation does not significantly influence their critical thinking abilities. Second, the correlation between learning quality and learning motivation was positive and statistically significant, as shown by a correlation coefficient of 0.412 and a t-statistic of 5.386, exceeding the critical value. This suggests that better learning quality is associated with higher student motivation. Third, the correlation between learning quality and critical thinking skills was positive but not statistically significant, with a correlation coefficient of 0.049 and a t-statistic of 0.337, which is below the critical threshold. These results imply that while learning quality may contribute to improving critical thinking skills, the effect is not strong enough to be considered significant in this study.

Discussion

The hypothesis that learning motivation has a positive and significant correlation with critical thinking skills is rejected. The results of this study indicate that learning motivation does not have a positive and insignificant correlation with critical thinking skills with an original sample value of -0.135 and a p value of 0.413. These results are in line with research conducted by (Muwaffiq et al., 2020) which states that there is no significant relationship between learning motivation and critical thinking skills. A different opinion was expressed by (Sholikhah & Zahrotin, 2021) which stated that there is a relationship between students' learning motivation and the results of students' critical thinking skills. (Bajung et al., 2021) also expressed the same opinion that there is a unidirectional relationship between learning motivation and students' critical thinking skills. . This is due to several factors such as motivation is the drive from each individual to succeed or achieve something. Based on interviews conducted with teachers and several students, it was stated that interest in chemistry subjects was still lacking. The curriculum used in grade X is still general so that students are still not classified according to their interests. (Muwaffiq et al, 2020) States that factors such as low conceptual understanding, lack of teacher approach, and learning methods used are factors that cause learning motivation to not have a positive and

significant relationship with critical thinking skills. Implementation of poor learning models is one of the factors that causes motivation to not have a positive and significant relationship with critical thinking skills. External factors such as family, environment, and physical factors can also affect research results. In addition, limitations in interdisciplinary learning resources and project-based learning models have been reported by chemistry teachers as significant barriers to fostering critical thinking, especially in the context of vocational and secondary education (Lestari et al., 2025).

The hypothesis that the quality of learning has a positive and significant correlation with critical thinking skills is rejected. The results of this study indicate that the quality of learning has a positive but insignificant correlation with critical thinking skills with an original sample value of 0.413 and a p value of 0.736. These results are in line with the research conducted by (Rihmahwati et al., 2024) which states that the quality of learning does not have a positive and significant relationship with critical thinking skills. Based on the results of interviews conducted by the teaching teacher, teachers still do not apply HOTS questions which cause students to be unfamiliar and have difficulty in working on HOTS questions. This is in line with research (Pardede, 2024) which states that there is a significant increase in critical thinking skills after using HOTS questions. The same thing was also conveyed by (Febrianti et al., 2021) which stated that HOTS-type questions can improve the critical thinking skills of students from various levels, both elementary, middle, and high school. Another factor is that the learning model is not suitable. The level of critical thinking ability of each student which is different for each individual is also one of the factors that influences the level of critical thinking skills. (Fahruddin et al., 2019) stated that if students experience failure or lack of self-confidence with low interest, students do not want to try again.

The hypothesis that the quality of learning has a positive and significant correlation with students' learning motivation is accepted. The results of this study indicate that the quality of learning has a positive and significant correlation with students' learning motivation with an original sample value of 0.049 and a p value of 0.000. This is in line with (Ajeng et al, 2024) which states that the quality of learning has a significant effect on students' learning motivation. The better the quality of learning, the higher the students' learning motivation. This is due to several factors such as the way the teacher conveys information to students, the way the teacher controls the class, and supporting facilities in learning activities. (Hananto, 2023) states that the quality of teachers has a significant influence on learning motivation, while learning facilities do not have a significant influence.

CONCLUSION

Based on the results of the research that has been conducted, it can be concluded that learning motivation does not have a positive and insignificant correlation with students' critical thinking skills

with a sample value of -0.135 and a p-value of 0.413, learning quality has a positive but insignificant correlation with students' critical thinking skills with an original sample value of 0.049 and a p-value of 0.736, and learning quality has a positive and significant correlation with learning motivation with an original sample value of 0.412 and a p-value of 0.000. From the results of the research that has been conducted, teachers are expected to train students more often with HOTS type questions and apply learning strategies that are oriented towards improving critical thinking skills so that students' critical thinking skills increase.

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