The Effect of Gender Towards Self-Discipline Attitudes and Student Learning Outcomes in Physics at Public Senior High School

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Abstract: This study aims to determine the effect of gender towards self-discipline attitudes and student learning outcomes in Physics, the effect of self-discipline attitudes towards student learning outcomes in Physics. This is comparative method. The population is 86 of XI grade students of Public Senior High School 2 and 7 of 2019/2020 school year. Data collection was done using questionnaires, tests, and documentation methods. The results conclude that there is an effect of gender towards students' self-discipline attitudes; no effect of gender towards student learning outcomes in Physics; no effect of self-discipline attitudes towards student learning outcomes.

Key Words: gender; self-discipline attitudes; physics learning outcomes

Abstrak: Penelitian ini bertujuan untuk mengetahui pengaruh jenis kelamin terhadap sikap disiplin diri dan hasil belajar fisika siswa, pengaruh sikap disiplin diri terhadap hasil belajar fisika siswa. Penelitian ini menggunakan metode komparatif. Populasi dalam penelitian ini adalah siswa kelas XI SMA Negeri 2 dan 7 tahun pelajaran 2019/2020 yang berjumlah 86 siswa. Pengumpulan data dilakukan dengan metode angket, tes, dan dokumentasi. Hasil penelitian menyimpulkan bahwa ada pengaruh jenis kelamin terhadap sikap disiplin diri siswa; tidak ada pengaruh jenis kelamin terhadap hasil belajar Fisika siswa; tidak ada pengaruh sikap disiplin diri terhadap hasil belajar siswa.

Kata kunci: jenis kelamin; sikap disiplin diri; hasil belajar fisika

INTRODUCTION

Character education is a program currently emphasized in education in Indonesia, particularly by the Indonesian Ministry of National Education of the Cabinet of Indonesia Bersatu II. It is launched by the government to provide education outside of the delivery of knowledge so that later Indonesian students will not only excel in science but also have a good attitude towards God and others. A study conducted by Raharjo (2014) stated that there are four low standards in obtaining accreditation scores, including infrastructure, process, competency and, teaching staff, and educational staff standards. Based on the above explanation, it can be understood that education is essential in preparing the nation's successors. It should be planned systematically so that the learning atmosphere and learning process run optimally including in determining the quality of teaching by teachers.

The 2013 curriculum was designed to prepare Indonesian people to be able to live as faithful, productive, creative, innovative, and effective individuals and citizens and can contribute to the life of society, nation and state in world civilization (Ulfa Hidayah, Ida Bagus Putrayasa, 2016). The curriculum applied in Indonesia also clearly explains that character education is listed in the core and basic competencies in implementing the learning objectives. Core competence is the level of ability to determine the graduation competency standards that must be possessed by students at each level, class, or program. It consists of four abilities, including spiritual, attitude, scientific, and skill abilities. In attitude ability, students are expected to appreciate and practice honest, disciplined, polite, and caring behavior (cooperation, collaboration, tolerance, peace), responsible, responsive, and pro-active in interacting effectively in accordance with children's development in the environment, family, school, society, and surround-

ing natural environment, nation, state, regional area, and international area (Permendikbud 2016 No. 21, n.d.).

Behavior expected to be embodied in students' personal core competencies is disciplinary behavior. The application of discipline in schools is often related to classroom management because it associates with how to teach self-control to students. Essentially, discipline can be trained. Discipline training is expected to foster self-control, character or order, and efficiency. Discipline is more associated with a form of behavior that complies with rules and regulations. It is always related to regulations, organization, cooperation, understanding and obeying rules and procedures and paying attention to others (Gordon, 1989). Discipline is an orderly situation where people who are part of a system are gladly subject to the regulations (Mulyasa, 2004). It is a product of socializing attitudes, a process of habituation, and learning that produces permanent behaviors so that students' external factors can affect the formation of disciplinary attitudes. In the initial process, the formation of discipline needs to instill by parents as well as understanding the values and norms of proper behavior by training or being used to.

Biologically, males and females are different. The difference is clearly shown in the different reproductive organs and hormones between them. Psychologically, their differences lead to differences in treatment, causing gender bias. The causes of gender differences in learning achievement include social and cultural factors. Both factors comprise familiarity with subjects, perceptions of specific subjects, male and female styles of appearance, and teacher treatment. Differences in teacher treatment of male and female students in the class can contribute to gender bias. Gender bias leads to differences in learning achievement among students (Hidayat & Dwiningrum, 2016). Male and female students have different learning styles (Honigsfeld & Dunn, 2003). Research on gender stated that male and female students differ in understanding Physics, affecting learning outcomes. It is because Physics learning is related to the real context in accordance with students' daily lives. This suitability involves three aspects, including (1) the relationship between learning content and daily life, (2) patterns of understanding body language, and (3) events that touch feelings and emotions (Gunawan et al., 2018). Besides biological factors, other factors that affect student learning achievement are psychological. Psychologically, males and females are different. Among psychological factors that exist in humans are linked to intelligence, attention, interest, talent, discipline, maturity, and readiness. Given these factors, the degree of

discipline amongst male and female students is also different. It gives an impact on learning outcomes between both genders, which results in a gap between learning outcomes (Riana, 2013). Besides, according to Solihin (2017), discipline becomes one of the personal factors that can affect student achievement. A good or high learning discipline of the students will be able to encourage them to achieve high achievements as well.

Learning outcomes are changes in overall behavior and can be manifested as a person's success in the learning process. Based on the 2013 curriculum, learning outcomes are divided into three, including learning outcomes of knowledge aspects, attitude aspects, and skill aspects. Physics is one of the branches of science that underlies the development of technological advances and the concept of living in harmony with nature. According to Mundilarto (2010). learning outcomes in Physics can be classified into competencies in the form of behavioral and non-behavioral objectives. Competencies in the form of specific behaviors must be shown by students that there has been a learning process, both in the realm of knowledge, attitudes, and skills.

The results of the study related to this research are conducted by Setiawati & Arsana (2018) entitled The Effect of Learning Motivation and Gender on Science Learning Achievement of Bilingual Class Students of SMP (SLUB) Saraswati 1 Denpasar. It concluded that there is no significant effect between sex on the learning outcomes of science students in bilingual classes. Another study conducted by Ekawati & Wulandari (2011) showed that there is no gender difference between male and female students in their learning outcomes. Hoang (2008) in a study entitled The Effects of Grade Level, Gender, and Ethnicity on Attitude and Learning Environment in Mathematics in High School concluded that there are differences in scale of attitude in the learning environment between male and female students. Research conducted by Bates et al., (2013) entitled Gender differences in conceptual understanding of Newtonian mechanics: a UK cross-institution comparison concluded that there was no significant difference between gender with the results of the final test of Physics material mechanics at three UK universities.

Based on the research above, gender is found to affect psychological factors including discipline. Eventually, the self-discipline of students requires them to be organized in their learning patterns and influence the attitude of their self-control to realize the goals they want to achieve. The goal of students is to be able to

understand the concepts of science they learned while at school by producing satisfying learning achievements. This study aims to investigate the effect of gender on self-discipline attitudes and student learning outcomes in Physics. Meanwhile, since discipline is closely related to learning outcomes, this study are eager to know whether student self-discipline attitudes can affect the learning outcomes in Physics that have been categorized in the three levels of the high, medium, and low self-discipline possessed by the students.

METHOD

This research used comparative method. The independent variable in this study is the gender of students, while the two dependent variables are self-discipline attitudes and learning outcomes Physics. The self-discipline attitudes referred to in this study is the attitude of self-control, self-regulation, understanding of norms, and determination of purpose. Meanwhile, the results of learning Physics were obtained from tests of Physics knowledge with the material of Elasticity and Hooke's Law. Data collection techniques in this study used a questionnaire technique to see the results of students' self-discipline attitudes, written test techniques to see students' Physics learning outcomes, and documentation techniques to categorize students' gender. The questionnaire used in the study consisted of 35 statements based on four indicators of self-discipline attitudes which used a Likert scale assessment. The student learning outcomes test in Physics used cognitive tests of the material of elasticity and Hooke's Law consisting of 30 questions that have been tested and validated using the QUEST program. Gender data were obtained from students' attendance in each class taken as the sample.

Data was collected on 2-16 October 2019 at Public Senior High School 2 Surakarta and Public Senior High School 7 Surakarta in class XI MIPA in semester 1 of 2019/2020 school year as the study population. The research sample consisted of 86 students, selected using random sampling techniques. After obtaining research data including gender, self-discipline attitudes, and student learning outcomes Physics, a prerequisite test analysis of the normality and homogeneity tests were performed. The normality test was done using the SPSS 16 Liliefors method, while the homogeneity test was done using the Levene test. The significance level α of 0.05 was used to determine the test decision. The results of the study were declared normally distributed and had homogeneous data if the value (sig) was more than 0.05. After the prerequisite test analysis is fulfilled, the research hypothesis test was conducted using one-way multivariate analysis (MANOVA) to determine the effect of gender on self-discipline attitudes and learning outcomes Physics, and one-way analysis of variance test (ANOVA) was performed to determine the characteristics of self-discipline attitudes towards student learning outcomes in Physics.

RESULTS

The results of this study are questionnaire scores of self-discipline attitudes of 86 students showed that the highest score is 134 out of a true score of 150. The lowest score on self-discipline attitudes is 70 out of a true score of 150 with a standard deviation of 12. The following is the data summary of the data distribution of the frequency score of students' self-discipline attitudes.

Table 1 indicates that the highest frequency is in the 90-99 interval with a percentage value of 33.72% and the lowest frequency is in the 130-139 interval with a percentage of 1.16%. In this study, the self-discipline attitudes possessed by students are at an average value between 90-99. The highest category of students' self-discipline attitudes only obtained by one student with a score of 134 of the total score of 150. Meanwhile, the lowest category of students' self-discipline value is obtained by 2 students with a value of self-discipline between 70-79.

Data on student learning outcomes in Physics were obtained from the test results on Elasticity and Hooke's Law when the research was conducted in an odd semester of the 2019/2020 school year. Cognitive test questions on the material of Elasticity and Hooke's Law have been validated by experts using the QUEST program, which shows that all questions are valid and proper to be used in collecting research data. Based on data obtained from sample classes, the highest score obtained by students is 94 and the lowest score obtained by students in learning outcomes in Physics is 30 with a

Table 1. Distribution of the Frequency Score of Students' Self-Discipline Attitudes

Interval	Function	Percentage
70-79	2	2.33%
80-89	9	10.47%
90-99	29	33.72%
100-109	24	27.91%
110-119	15	17.44%
120-129	6	6.98%
130-139	1	1.16%

range of 64. The following is a distribution table summary of the frequency of student learning outcomes in Physics.

Table 2 shows that the highest frequency is in the 70-79 interval with a percentage value of 32.56% and the lowest frequency is in the 30-39 interval with a percentage of 1.16%. Data on student learning outcomes in Physics of the material of Elasticity and Hooke's law have an average of 69 with a standard deviation of 13.

Table 2. Frequency Distribution of Student Learning Outcomes in Physics

Interval	Function	Percentage
30-39	1	1.16%
40-49	8	9.30%
50-59	7	8.14%
60-69	22	25.58%
70-79	28	32.56%
80-89	17	19.77%
90-99	3	3.49%

The prerequisite test analysis was carried out once the data of students' gender, students' self-discipline attitudes, and student learning outcomes in Physics had been collected. Data on learning outcomes and disciplinary attitudes are categorized based on the gender of male and female. The prerequisite test analysis which comprises of the normality and the homogeneity tests is done using the SPSS 16.0 program. The normality test used is the Kolmogorov-Smirnov test because the data obtained are more than 50 with a 5% acceptance level. Data is stated as normal distribution if the value (sig) $\alpha > 0.05$. The results of the normality test of the self-discipline attitudes and learning outcomes in Physics can be seen in Table 3.

The results of the normality test presented in Table 3 show that all values (sig) $\alpha > 0.05$ so that it can be stated that all data on learning outcomes and students' self-discipline attitudes in the male and female categories are normally distributed.

A homogeneity test is used to test whether the data variance is the same or not. The homogeneity test in this study uses the Levene method with a significance level of 5%. Data will be declared homogeneous if the value (Sig.) $\alpha > 0.05$ and if otherwise, the data are not homogeneous. The table 4 is the result summary of homogeneity of research data.

Table 4 shows that the significance value is greater than 0.05 so that the data of the students' self-discipline attitudes and learning outcomes in Physics are homogeneous.

Once the prerequisite test analysis has been met, the research hypothesis test is performed using a one-way multivariate analysis (MANOVA). In this test, the significance value used is 5% so that the value (Sig.) of $\alpha < 0.05$ shows a difference between the self-discipline attitudes of male and female students, and there is a difference between the learning outcomes in Physics of male students and women. Conversely, the value (Sig.) of $\alpha > 0.05$ shows no difference between the self-discipline attitudes of male and female students, and there is no difference between the learning outcomes of male and female students in Physics. The table 5 is a summary of multivariate test results.

Table 5 shows the value (Sig.) of $\alpha < 0.05$ for data on students' self-discipline attitudes. It indicates that there is a difference in the average self-discipline attitudes of male students towards the average self-discipline attitudes of female students. Value (Sig.) of $\alpha > 0.05$ for

Table 3. The Results of Normality Test of *Kolmogorov-Smirnov*

Variables	Gender	Value (Sig.)	Test Decision
Students' Self Discipline	Male	0.200	Normally Distributed
	Female	0.200	Normally Distributed
Student Learning Outcomes in Physics	Male	0.098	Normally Distributed
	Female	0.065	Normally Distributed

Table 4. The Results of Homogeneity Test of *Levene's Test*

Variables	Value (Sig.)	Test Decision
Students' Self Discipline	0.362	Homogeneous Data
Student Learning Outcomes in Physics	0.081	Homogeneous Data

Table 5. The Results of One-Way Multivariate Analysis (MANOVA)

Independent Variable	Dependent Variables	Value (Sig.)	Test Decision
Gender	Students' Self Discipline	0.023	There is a difference
	Student Learning Outcomes in Physics	0.285	There is no difference

student learning data in Physics, showing that there is no difference in the average learning outcomes of male students towards the average learning outcomes of female students. The results of the test decision above are supported by the average value of self-discipline attitudes and learning outcomes of male and female students in Physics which can be seen in the Figure 1.
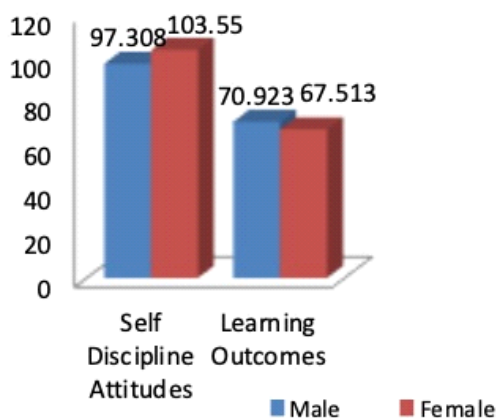

Figure 1. Graph of Average Self-Discipline Attitudes and Student Learning Outcomes in Physics

The graph in Figure 1 explains the average score of the self-discipline of male students of 97.308 and the average score of the self-discipline of female students of 103.550. The average score of male student learning outcomes in Physics is 70.923 and the average score of female students is 67.513. The results of the average scores of students' self-discipline attitudes show a significant difference between male and female students compared to the average score of student learning outcomes in Physics. It indicates that gender affects students' self-discipline attitudes. Female students have superior self-discipline attitudes towards male students' self-discipline attitudes.

The second purpose of the research is to prove the effect of self-discipline attitudes towards student learning outcomes in Physics. Student learning outcomes in Physics are often associated with students' attitudes in learning. Students who are disciplined and undisci-

plined in learning will affect their learning outcomes. To prove whether self-discipline attitudes affect student learning outcomes in Physics, this study use one-way analysis of variance tests. Students' self-discipline attitudes are categorized into three, including students who have high, medium, and low self-discipline attitudes. The summary results of the average value of students' self-discipline attitudes that have been categorized are as follows (Table 6).

Table 6. Data of the Average of Learning Outcomes

Discipline Category	Average	Standard Deviation
High	74.857	6.830
Medium	68.363	1.807
Low	65.433	3.995

The prerequisite test analysis was performed again to prove that the student learning outcomes in Physics that had been classified as high, medium, and low self-discipline were normally distributed and homogeneous. Normality tests using the Shapiro-Wilk test on Physics learning data categories of the high, medium, and low self-discipline attitudes proved to be normally distributed with Sig. α for high self-discipline attitudes of 0.200 > 0.05, moderate self-discipline attitudes of 0.075 > 0.05, and low self-discipline attitudes of 0.103 > 0.05. The homogeneity test for data on learning outcomes in Physics showed Sig. α of 0.559> 0.05. Therefore, it indicates that the learning outcomes data in Physics is homogeneous.

Once the prerequisite tests were fulfilled, a one-way analysis of variance test (ANOVA) was performed using the SPSS 16.0 program to prove the effect of high, medium, and low discipline on Physics learning outcomes of students. Test decisions were used with a 5% acceptance limit. If the results of Sig. α > 0.05, then there is no difference in the average learning outcomes of students who have high, medium, and low self-discipline attitudes, or in other words, the discipline attitudes do not affect student learning outcomes. Further, if the results of Sig. α < 0.05, there is a difference in the average learning outcomes of students who

have high, medium, and low self-discipline attitudes, or in other words, the discipline attitudes affect student learning outcomes. The results of the one-way analysis of variance test with the ANOVA test are shown in Table 7.

Table 7. Test Results of One-Way Analysis of Variance Test (ANOVA)

Dependent Variable	Value (Sig.)	Test Decision
Student Learning Outcomes in Physics	0.071	There is no difference

The data above shows that the Sig. 0.071 > 0.05. It indicates that there is no significant difference in the average learning outcomes of students who have a high, medium, and low discipline attitudes. In this case, the students' self-discipline attitudes do not affect their learning outcomes in Physics. Students with high self-discipline attitudes have an average value of learning outcomes in Physics that are almost the same as those with moderate and low categories. The following is a percentage diagram of the average value of student learning outcomes with high, medium, and low self-discipline categories.

The results of Figure 2 indicate that learning outcomes in Physics with a category of high self-discipline attitudes are at a percentage of 36% or have a mean score of 74.857. Student learning outcomes in Physics with a category of medium self-discipline attitudes are at a percentage of 33% or have a mean score of 68.336. Student learning outcomes in Physics with low self-discipline attitudes are at a percentage of 31% or have an average score of 65.433. The difference of the average value and the percentage of students' self-disci-
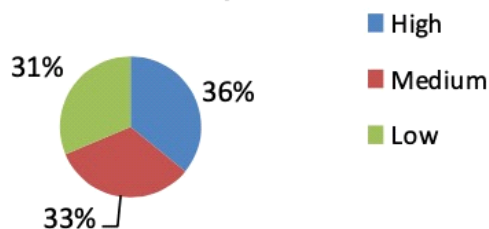

Figure 2. Diagram of Average of Learning Outcomes in Physics in the High, Medium, and Low Discipline Attitude Category

pline attitudes are not too far at 30% and the results of the one-way analysis of variance tests (ANOVA) above prove that there is no significant difference between the student learning outcomes in Physics who have high, medium, and low self- discipline attitudes. It proves that students' self-discipline attitudes do not significantly affect student learning outcomes in Physics.

DISCUSSION

This research has two objectives, the first is to prove whether there is an effect of gender towards the self-discipline attitudes and student learning outcomes in Physics, and the second is to prove whether there is an effect of high, medium, and low self-discipline attitudes of students towards student learning outcomes in Physics in Public High School 2 and Public High School 7 of Surakarta. The first hypothesis testing has been proven that there are differences in the self-discipline attitudes between male and female students and there is no difference in learning outcomes in Physics between male and female students in class XI MIPA of Public High School 2 and Public High School 7 of Surakarta. This study concludes that gender affects one's self-discipline attitudes, in which self-discipline attitudes of male and female students is different. The self-discipline of attitudes of female students is superior compared to that of male students. In addition, female students do not always have better learning outcomes compared to male students.

The statement that gender supports the discipline of someone is based on research from Riana (2013) that in addition to biological factors, psychological factors affect student achievement. The Psychological factors possessed by humans are related to intelligence, attention, interest, talent, discipline, maturity, and readiness. Given these factors, the degree of discipline between male and female students is also different. The results of research from Pratamawati and Tiurlina Siregar (2016) stated that there is a difference between students learn the discipline of male and female. Based on the categorization shows that female gender has a very good family psychological condition, and discipline is categorized as high on average when compared to male gender (Muthahharah, 2016). Furthermore, Sutarman (2015) which stated that there is a significant relationship between gender and one's discipline. Portillo and Dehart-Davis (2009) researched gender and adherence to the rules that apply to an organization. The results provided a picture that female public servants are more obedient to the rules compared to men.

The learning outcomes in Physics in this study were not affected by the gender of the students themselves. Not all female students have superior learning outcomes in Physics to male students or not all male students have superior learning outcomes in Physics to female students. In this study, the learning outcomes of male students in Physics are superior while female students' self-discipline attitudes are superior to that of male students. Success factors in learning that are manifested by the learning outcomes are not necessarily affected by one's gender. Many factors affect learning outcomes including the intelligence of each individual, learning style, and external factors during the learning process that can affect student learning outcomes. There was a positively significant correlation between intellectual intelligence and physics learning outcomes (Sari et al., 2019). Purwanto and Ngalim (2004) argued that the factors affecting learning can be divided into two, including (1) the factors that exist in the individual or often referred to as individual factors, and (2) factors that exist outside the individual or usually called social factors. In this case, individual factors include maturity/growth, intelligence, exercise, motivation, and personal factors. Meanwhile, social factors include family/household conditions, teachers and the way of teaching, equipment used in teaching and learning, the environment and opportunities, and social motivation.

In this study, the statement those male and female students have differences in understanding Physics which eventually can affect learning outcomes is not entirely correct. As far as we know, so far people assume that female students are always academically superior compared to male students because the former are more diligent and orderly in learning. In general, gender does not affect the level of misconception of senior high school (Utami et al., 2017). Many factors can affect students in gaining knowledge about Physics that affect their learning outcomes. Factors that affect student learning outcomes are not only physical factors in individual students but also external factors that have been mentioned above. The results of research on the relationship of gender to student learning outcomes are supported by studies conducted by Setiawati and Arsana (2018) and Bates et al. (2013), which have been mentioned in the introduction above. The results of the two studies concluded that there was no significant difference between genders on the results of the final Physics exam.

The second research objective is to determine the effect of the category of self-discipline attitudes towards student learning outcomes in Physics. Therefore, it indicates that there is no difference in the average learning outcomes of students with high, medium, and low discipline attitudes significantly. In this case, the self-discipline attitude possessed by the students does not affect the student learning outcomes in Physics. It does not mean that students with high self-discipline attitudes will obtain high learning outcomes as well, and vice versa. Many factors are considered in influencing student learning outcomes in Physics. It is not only the factor of student self-discipline but also their understanding of the concept of Physics. In addition, it shows that the factors of a good learning process that can be understood by students will also affect student learning outcomes in Physics. This study found that students who have high self-discipline attitudes have an average score of learning outcomes in Physics that are almost the same as those with medium and low self-discipline attitudes. The statement that discipline alone does not affects the student learning outcomes in Physics is based on the research from Solihin (2017) which concludes that discipline does not affect the performance of Benai 1 High School students. It is because of discipline only contributed to supporting achievement in a small part. Achievement of student learning indicated by the score of learning outcomes still need to be supported by other aspects such as motivation, intelligence, and others.

CONCLUSION

This study found that student learning outcomes are not affected by gender, but gender affects the student self-discipline attitudes. Learning outcomes possessed by male students have an average value that is almost the same as the learning outcomes of female students, resulting in no significant differences. However, the self-discipline attitudes of female students are superior to that of male students with a significant difference value.

Self-discipline possessed by students does not significantly affect student learning outcomes in Physics because many factors affect the student learning outcomes in Physics including the factors of the intelligence of each individual, learning style, and external factors when teaching and learning.

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