Measuring Learning Discipline with Peer Group Assessment of Engineering Vocational High School Students in Bali Province

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ABSTRACT

Involving students through group assessment helps them to build good discipline in the learning process in the classroom. The purpose of this study was to develop an instrument of learning discipline for SMK students using the peer group assessment method, to measure student learning discipline, and to look for the influence of learning discipline on learning outcomes for SMK students. Quantitative research method used in this study. The research was carried out for one year. The research population is students of State Vocational Schools in the Province of Bali. The sample of this research is 375 students determined by using cluster random sampling. The peer group assessment method assessment instrument was developed based on the Borg and Gall development model. The data collection on the results of the learning discipline assessment was carried out by distributing questionnaires using the peer group assessment method. The results of this study were very surprising, namely 3% of students had very good learning discipline, 31% of students had good learning discipline, 25% of students had good learning discipline, 25% of students had good learning discipline, and 41% of students had bad learning discipline.

1. INTRODUCTION

Peer assessment is a process in which a student assesses the learning outcomes of friends or other students who are at the same level. Peer assessment can be used to assist students in developing the ability to cooperate, criticize the learning processes, formative assessment, receive feedback or criticism from others, provide in-depth to summative assessment (Bloxham et al., 2015; Russell et al., 2017; Verkade & Bryson-Richardson, 2013). Peer assessment encourages students to have a sense of responsibility for their learning process so that students can be independent, train evaluation skills that are useful for lifelong learning and encourage deep learning (Azarnoosh, 2013; Wei et al., 2021). Peer and self-assessment has good validity if carried out in accordance with assessment methods and standards. These criteria include: physics content, relevant representations, situation modelling, problem solving strategies and reasonableness of answers. The criteria were selected based on solving literary problems in

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physics and science education. Peer and self-assessment has less reliability. This is caused by factors, namely the social gap between assessors and participants and from the examinee’s personality (Maba, 2017; Paul et al., 2021; Selman & Jaedun, 2020).

Self-assessment, peer assessment, or self and peer assessment have similarities, all of them refers or assess openly individual students from students. In self-assessment peer group assessment assesses one of the other students and self and peer assessment compares self-ability with one of his friends (Gurbanov, 2016; Paul et al., 2021; Zheng et al., 2017). These three assessment results become biased when students act dishonestly and there is cooperation between the appraiser and the student being assessed. To suppress this biased result, peer group assessment can be an alternative. Peer group assessment is carried out where each student assesses his group or groups without assessing himself and without referring to the name being assessed but referring to the student group (Buchal & Songsore, 2018; Sumtsova et al., 2018). By using a mathematical equation, the value for each individual student can be obtained.

In order to maintain good discipline in the learning process in the classroom, previous research suggested that students should be involved in assessment through self-assessment (Briggs & Sommefeldt, 2002). Through self-assessment, weaknesses and strengths can be revealed so that it can trigger enthusiasm to train oneself to eliminate these weaknesses. Discipline to study regularly and efficiently is not always easy, practically the learning environment is crucial to increase better learning opportunities (Lumbantobing & Purnasari, 2021; Saputro & Pardiman, 2012; Sugarto et al., 2019). Self-discipline is important in every endeavor of life. It is best defined as the ability to regulate one’s behavior by sound principles and judgment, not by social drives, desires, or conventions.

The main function of the discipline of learning is to teach self-control easily, respect and obey the rules related to the above explained as follows: (a) Apply knowledge and social understanding, including knowing the property rights of others (b) Understanding and immediately obeying to carry out obligations and feel understand the prohibitions (c) understand good and bad behavior (d) learn to control yourself, desire and do something without feeling threatened by punishment. (e) Sacrificing one's own pleasure without warning from others (Budiani & Sholikhah, 2020; K. M. S. Dewi, 2018; L. S. N. Dewi et al., 2020). So in instilling education in children it is necessary to instill discipline education, meaning to grow and develop notions that is a process to train and teach children to behave and behave according to expectations (Wahyuni et al., 2016; Yasmin et al., 2016).

Learning outcomes in the form of changes in behavior, both concerning cognitive, psychomotor, and affective. The learning outcomes occurred mainly thanks to the teacher’s evaluation. Learning outcomes can be in the form of teaching impacts and accompanying impacts (Azmi et al., 2017; Magdalena et al., 2021). The impact of teaching is student learning outcomes that can be measured immediately or directly. Accompanying impact is student learning outcomes that appear indirectly or are transfers of learning outcomes. Learning outcomes are divided into three domains, namely cognitive domain, affective domain and psychomotor domain (Achmad et al., 2022; Fitrah & Ruslan, 2020). These three domains become the object of assessment of learning outcomes. Among the three domains, the cognitive domain is the most widely assessed by teachers in schools because it relates to the ability of students to master the content of teaching materials (Erfan et al., 2020; Pratiwiningtyas et al., 2017; Safitri & Ratulangi, 2018).

On the other hand, students will be more honest in responding to a situation with a group of friends. This assessment of an attribute of a group of students is what the authors call a peer group assessment (Liu et al., 2017; Ubaque Casallas & Pinilla Castellanos, 2016). In peer group assessment, two work steps are carried out to get the value of learning discipline for each individual student. First, students provide an assessment of their own group without considering themselves. Second, the group scores were analyzed using a matrix equation in mathematics to obtain the scores for each individual student. This method of assessment has never been carried out by SMK teachers in the Province of Bali. This peer group assessment method is a new method that the authors have developed, modified from peer assessment and mathematical matrix equations. The aims of this study were: 1) To create a study discipline instrument for SMK students using the peer group assessment method, 2) To measure the learning discipline of SMK students using the peer group assessment instrument, 3) To determine the effect of discipline learning using the peer group assessment method on the learning outcomes of SMK students.

2. METHOD

There are 2 types of research activities, namely initial research and main research. Preliminary research concerns the problem of developing the instruments used to collect data in the main research.
Main research is studying peer group assessment of learning outcomes. Thus, in general this research uses more numbers so that this research is more of a quantitative research approach.

The populations of this study were all students of Technology and Engineering Vocational High School Class XI in the Province of Bali. Samples were selected by cluster random from the existing population. The population of which is N (about 6000 people) is divided into 3 regions, namely the southern, central (city) and northern parts. Each of these areas was chosen randomly to determine the sample. The number of samples (n) is determined based on the slovin formula. By using this formula, the sample size is around 375 people. The variables of this study include peer group assessment instruments for initial research and student learning discipline. For primary research, the variables include the influence of learning discipline with peer group assessment on student learning outcomes in class XI.

In this study there were two activities, namely initial research and main research. Initial research was carried out in the context of preparing instrument documents used in data collection in the main research. The instrument to be used was developed using the Borg and Gall development model according to Figure 1.

Figure 1. Development Model for Peer Group Assessment Instruments

Based on Figure 1, in the first stage the study was conducted by collecting data related to the preparation of a grid of peer group assessment instruments. Stage 2, instrument grids are made based on the results of stage 1. In stage 3, instrument items are created based on the grids made. Stage 4, the validity of the items assembled in an instrument began to be tested including the content validity test from the expert and the instrument legibility test from the student as the subject. Stage 5, the instrument is revised based on input from the content expert as the subject. Stage 6, the instrument that has been repaired is tested in the field involving several students. This is intended to get suggestions for improvement from students if there are items that are not understood by students. Stage 7, data from the trial results were collected and then revised based on input from the trial students. Stage 8 collecting learning discipline data by distributing instruments to research samples. Stage 9, research data is tabulated, based on this data validation of each item is carried out using the product moment. After that, reliability testing was carried out. Stage 10 standardized the instrument items using variance-based SEM analysis and the instrument which was one of the outputs of this study was declared ready to be implemented in schools. However, in this study, stages 8 to 10 were not carried out due to limited research funds.

3. RESULT AND DISCUSSION

Result

Information Gathering

First, small research stages and information gathering were carried out at SMKN 3 Singaraja, SMKN 1 Denpasar, and SMKN 1 South Kuta. The sample of this research is one teacher in each SMK with interview as the data collection method. Discipline in student learning has decreased over time, measuring
student discipline in learning is difficult, the results of measuring discipline in learning are not carried out in every school, and there is no proper or appropriate instrument for measuring learning discipline. There are several aspects that are considered suitable as forming the attributes of learning discipline, namely measurements are carried out. Discipline in learning is an attitude in training mentally (imagination and emotion) and physically repeatedly to comply with rules and regulations, control oneself, and show awareness of responsibility for tasks and obligations in learning both in the school environment and outside the school environment for self-development (building healthy character and preventing behavioral problems).

Aspects of forming learning discipline include obedience to school rules at school, obedience to learning activities at school, obedience in doing lesson assignments, self-control at school, obedience to learning activities and doing assignments outside of school related to school assignments, self-control outside of school related to school work, obedience in learning a skill that is not taught at school, and self-control outside of school related to self-development.

Planning
At this stage, the researcher plans and creates a lattice instrument for the influence of student learning discipline. The instrument grid is shown in Table 1.

Table 1. Grid of Learning Discipline Instruments

<table>
<thead>
<tr>
<th>No</th>
<th>Indicator</th>
<th>Item Number</th>
<th>(+)</th>
<th>(-)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Obedience to school rules at school</td>
<td>1,2</td>
<td>3,4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Obedience to learning activities at school</td>
<td>7,8</td>
<td>5,6</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Obedience in doing the tasks of the lesson</td>
<td>10,12</td>
<td>9,11</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Self-control at school</td>
<td>13,14,15,16,17,18</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Obedience to learning activities and doing lesson assignments outside of school is related to schoolwork</td>
<td>19,20</td>
<td>21</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Self-control outside of school is related to school work</td>
<td>25</td>
<td>22,23,24</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Obedience in learning a skill that is not taught in school</td>
<td>26,27,28,29,30</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Self-control outside of school is related to self-development</td>
<td>31,32,33,34</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>14</td>
<td>10</td>
<td>34</td>
<td></td>
</tr>
</tbody>
</table>

Develop Preliminary of Product
At this stage, it was attempted to construct instrument items based on predetermined instrument grids. There are 34 items in the learning discipline instrument with a scoring scale using a 5-choice Likert model, namely Very Appropriate (SS), Appropriate (S), Neutral (N), Not Appropriate (TS), and Very Unsuitable (STS). For positive statement items the assessment is SS = 5, S = 4, N = 3, TS = 2, and STS = 1. For negative statement items the assessment is SS = 1, S = 2, N = 3, TS = 4, and STS = 5.

Preliminary Field Testing
The expert test was conducted using the Gregory method, using 3 experts, namely a vocational school teacher, a PEP (Educational Research and Evaluation) expert from Ganesha University of Education (Undiksha), and an expert in educational psychology from Ganesha University of Education (Undiksha). There were 3 instrument items which were declared invalid based on the expert test so that 31 items were declared valid.

Main Product Revision
There was nothing specific that was suggested by the instrument experts and the 31 items of the instrument were declared suitable for measuring learning discipline. Some typos are suggested to be fixed. Then the typo errors were corrected by the researcher. All indicators are represented by instrument items. Thus 31 items are assembled in one learning discipline instrument.

Main Field Test
Then 10 students were asked to look at the items of the instrument that had been assembled, whether the meaning of the statements could be understood by students. As a result, the 10 students stated that they understood what was meant by each item of the instrument.
**Operation Product Revision**

At this stage there was nothing specific to be done by the researcher because there was nothing important that was suggested by the students in improving the instrument, there were only some improvements to the dots. All students can understand the meaning of each item.

**Operation Field Testing**

After it was felt that the instrument was good, it had been corrected according to student input, the student learning discipline instruments were distributed to SMK students in Bali, namely at SMKN 3 Singaraja, SMKN 1 Denpasar, and SMKN 1 South Kuta. There were 375 students who could be sampled in this study. Data on learning outcomes were collected through document studies provided by teachers at each SMKN.

**Final Product Revision**

Student learning discipline data was tabulated using the Ms Excel application program, based on the product moment method, all items were declared valid, instrument reliability was calculated using the Cronbact Alpha method, an Alpha coefficient of 0.887 was obtained. This figure means that the reliability of the instrument can be categorized as very good.

**Dissemination and Implementation**

In this stage, instrument standardization was carried out using variance-based SEM analysis. The results are in accordance with Figure 2.

![Figure 2. Item Prediction Model for Indicator Measurements](image)

From Figure 2, there are strong items describing indicators and weak items describing indicators. Items that do not strongly describe indicators are items no. 17, 24, 25, and 27. Apart from these items, they can describe indicators strongly. Thus, at this stage, 4 items were dropped so that overall there were 27 items that were good for describing the existing indicators. The acquisition of raw student learning discipline scores is shown in Figure 3, and Table 2.

![Figure 3. Bar Chart of Learning Discipline Raw Scores](image)
Table 2. Descriptive Statistics of Student Learning Discipline Scores

<table>
<thead>
<tr>
<th>No</th>
<th>Descriptive statistics</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mean</td>
<td>105.8053</td>
</tr>
<tr>
<td>2</td>
<td>Standard Error</td>
<td>0.972414</td>
</tr>
<tr>
<td>3</td>
<td>Median</td>
<td>105</td>
</tr>
<tr>
<td>4</td>
<td>Mode</td>
<td>93</td>
</tr>
<tr>
<td>5</td>
<td>Standard Deviation</td>
<td>18.83071</td>
</tr>
<tr>
<td>6</td>
<td>Sample Variance</td>
<td>354.5957</td>
</tr>
<tr>
<td>7</td>
<td>Kurtosis</td>
<td>-0.15366</td>
</tr>
<tr>
<td>8</td>
<td>Skewness</td>
<td>0.059526</td>
</tr>
<tr>
<td>9</td>
<td>Range</td>
<td>108</td>
</tr>
<tr>
<td>10</td>
<td>Minimum</td>
<td>49</td>
</tr>
<tr>
<td>11</td>
<td>Maximum</td>
<td>157</td>
</tr>
<tr>
<td>12</td>
<td>Sum</td>
<td>39677</td>
</tr>
<tr>
<td>13</td>
<td>Count</td>
<td>375</td>
</tr>
</tbody>
</table>

The standard score of the learning discipline latent variable analyzed using the variance-based SEM method according to Figure 2 produces a standard Z score, then converted to a standard T score according to Table 3.

Table 3. Shows the Learning Discipline Achievement Categories of SMK Students in Bali

<table>
<thead>
<tr>
<th>No</th>
<th>T Score Range</th>
<th>Category</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>68 ≤ x &lt; 80</td>
<td>Very good</td>
<td>3 %</td>
</tr>
<tr>
<td>2</td>
<td>56 ≤ x &lt; 68</td>
<td>Good</td>
<td>31 %</td>
</tr>
<tr>
<td>3</td>
<td>44 ≤ x &lt; 56</td>
<td>Enough</td>
<td>25 %</td>
</tr>
<tr>
<td>4</td>
<td>32 ≤ x &lt; 44</td>
<td>Not good</td>
<td>41 %</td>
</tr>
<tr>
<td>5</td>
<td>20 ≤ x &lt; 32</td>
<td>Very Not Good</td>
<td>0</td>
</tr>
</tbody>
</table>

Discussion

There are 8 indicators that have been successfully developed in student learning discipline instruments. The 8 indicators consist of obedience to school rules at school, obedience in doing lesson assignments, self-control at school, obedience to learning activities and doing assignments outside of school related to school assignments, self-control outside of school related to school assignments, obedience in learning a skill that is not taught at school, and self-control outside of school related to self-development.

Based on the analysis of the total score of learning discipline, 41% of students have poor learning discipline. This condition is far from the target desired by educators, schools, and the government. Based on student data, the fifth indicator (obedience to learning activities and doing assignments outside of school related to schoolwork) and sixth (self-control outside of school related to schoolwork) has a very low score. Students outside of school tend not to be able to control themselves to do the tasks given by their teachers at school. Students do not try to independently do their assignments. Homework tends to be done by only a few high-ability students, while other students only copy the work of their smarter friends. Furthermore, the eighth indicator (self-control outside of school related to self-development) also has a low score. Students rarely want to develop themselves, for example in developing English language skills, abilities for life skills such as welding skills, repairing electrical equipment in the household, repairing electrical installations that have been damaged, and so on.

The seventh indicator also has a less good score. There are almost no additional skills that students can practice. There are some students who have learned to play musical instruments and sing. Many students like to play online games using their gadgets and don’t even remember going home. Addiction to playing this game can have an impact on learning achievement, health, and can also have an impact on addiction (Ariston & Frahasini, 2018; Itsna & Rofi’ah, 2021; Yanizon et al., 2019). If this continues, students may be less focused on schoolwork and the results can affect their academic performance. Spending a lot of time in front of a computer or screen can affect your physical and mental health. As well as game addiction can make a person dependent on games and unable to escape from these activities (Syifa et al., 2019; Widya, 2020). Situations like this need the attitude of parents.

In general, rules at school are made so that students learn to be disciplined while studying at school. For students, the implementation of this rule affects student learning outcomes (Mabuka, 2021;
The discipline in SMK is more complex than the rules in SMA because SMK focuses more on practical learning. For example the use of workshop clothes for students who will practice in the lab. The use of these clothes makes it easier for students to carry out practice so that competence or practical learning objectives can be more easily achieved. Obedience in learning activities at school and outside school also plays a role in achieving the learning objectives of electrical installation practice. Teachers or practitioners feel more willing to give their practical experience to students who seem obedient or are serious about learning.

The association of good students, especially outside of school, often leads students to become less self-controlled (self-control). Students who can control themselves both at school and outside of school tend to be better able to understand and master lessons at school because students have a better focus on learning. Electrical installation practical learning competencies require a good focus of mind or attention because lesson competencies prioritize practical skills or skills. So that students who have better self-control abilities get better learning outcomes in electrical installation practices as well.

These findings support the theory written by previous studies that improve students' learning outcomes in installation practice by increasing learning discipline (Burton & Bartlett, 2020). This supports the results of research which states that in addition to motivation and learning strategies, learning outcomes can be improved by increasing student learning discipline (Javed & Nasreen, 2014). Students are also required to be disciplined in studying at internships or in the field because students are required to be ready to work after graduation. This is in accordance with the results of the study that students must be able to learn from practitioners to get better skills, there needs to be disciplined learning activities in practice (Sandal et al., 2014).

The implications of this study provide an overview related to the disciplinary instrument of vocational students' learning with the peer group assessment method which is made by validating 8 indicators. This research can be a guide in student learning discipline, especially vocational students. However, this research was limited because it did not carry out stages 8 to 10 due to limited research funds. Stage 8 is collecting learning discipline data by distributing instruments to research samples. Stage 9 when research data is tabulated, based on this data validation of each item is carried out using the product moment. Stage 10 standardized the instrument items using SEM analysis. Researchers also provide recommendations that there needs to be collaboration between teachers, parents, and the community to monitor students' attitudes outside of school. There is a strong suspicion that students' poor learning discipline results in poor student learning outcomes at school.

4. CONCLUSION

This research produced an instrument of learning discipline for vocational students using the peer group assessment method which was made by validating 8 indicators. These indicators consist of obedience to school rules at school, obedience to learning activities at school, obedience in doing lesson assignments, self-control at school, obedience to learning activities and doing assignments outside of school related to school assignments, self-control outside of school related to school assignments, obedience in learning a skill that is not taught at school, and self-control outside of school related to self-development. The eight indicators are reduced to 31 statement items. The results of measuring the learning discipline of SMK students in Bali show that students have poor and apprehensive learning discipline.

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