

Students' Competency Improvement Through Group Investigation Implementation

I Ketut Suandi*, Cening Ardina, I Made Wijana, I Ketut Parnata

Accounting Department
Politeknik Negeri Bali
Badung, Indonesia
*ketutsuandi@pnb.ac.id

Abstract—The implementation of group investigation by paying attention to the students' input quality is believed to be able to create a fun learning process and be able to reach competency units under performance criteria. The study aims to explain the students' input quality and to explain the role of group investigation in accommodating the input quality to students' competency improvement. This study uses two-factor measurement with a factorial version of the non-equivalent pretest-posttest control group design. The variables in this study are competency, group investigation, and students' input quality. The total samples are 116 students and each treatment decided 25 subjects as an analysis unit. The results of the study are the students' input quality varies in the accounting cycle, especially to process some information related to the closing process and reversing process, and the group investigation model accommodates input quality in improving students' competency.

Keywords—competency, input quality, group investigation

I. INTRODUCTION

The learning model that is being implemented is teacher centred. This condition creates temporary understanding, while a complete and permanent understanding is indispensable in accounting learning. This understanding is required starting from the recording stage to the reporting stage, even up to the preparation stage to go to the next accounting period. All of these stages occur repeatedly, in accounting known as the accounting cycle. Each stage has several indicators to measure competency achievement. These indicators have been adopted in a cluster scheme, namely the preparation of financial reports. The competency test scheme provides clear performance indicators. All of these indicators must be used as a reference in the teaching and learning process, from planning to evaluation. The level of understanding of a student is measured on each performance indicator. The achievement or improvement of competence depends on several factors, one of which is the learning design. In general, the outcome of accounting learning is being able to provide accounting information or financial reports. The information presented in the financial statements is used as the basis for decision making by business entities. This ideal output cannot be realized optimally; it is necessary to make improvements to various

elements. Teaching materials that do not yet support the learning process are one of the elements that need to be redesigned. Model design and learning materials must be adjusted to the performance indicators in each competency unit. This condition causes educators to change their paradigm in handling the varying input quality. The input quality can't be separated from the selection path for prospective students. In general, admission selection is carried out in three stages, including that of vocational education in Bali. Each stage has different characteristics and qualities of the participants. Consequently, the sources and quality of learners vary widely. The profile of students who already have an accounting background is only 14.22%, while others do not have sufficient knowledge. This condition is a challenge for education practitioners in carrying out the teaching and learning process. The learning process must create a pleasant academic atmosphere for students. The problems are, (a) teaching materials have not referred to the certification scheme, (b) the current learning model tends to create passive students, (c) neglected input quality characteristics, and (d) the concept of idea transformation has not been implemented.

The teaching and learning process that takes place is monotonous as a result of the implementation of the explicit learning model. The implementation of this model assumes that the quality of students is relatively equal. The quality of input becomes the attention and consideration of educators in designing learning. Generally, humans try to synthesize their new experiences into previous knowledge. It cannot be denied that the quality of input represented by prior knowledge is the most important factor in learning. Students who are academically less capable, a competitive atmosphere greatly reduces their motivation to learn. The input quality accumulated in the prior knowledge has been claimed to be of key importance to achieving effective education. The input quality is determined by many factors. The quality of student input is also presented by a path of entry, gender, and school of origin. Another opinion states that support for the quality of student input, teacher commitment, and facilities and infrastructure simultaneously affects student learning independence [1]. Prior knowledge of accounting has an effect

on the process and achievement of the next stage of accounting learning. Prior study of accounting displays a spiralling effect emphasizing the importance of background knowledge of accounting in university study [2]. Based on this, researchers are interested in exploring whether the quality of input contributes to the achievement and improvement of competence. Apart from the input quality, the learning design also contributes significantly to the achievement of competencies. Learning designs that can create a conducive and enjoyable academic atmosphere can motivate students. The learning design that was able to create such conditions was the group investigation design. The investigation group learning design is a learning model that provides more opportunities for students to be involved in learning activities. Group investigations are a means to guide student involvement in learning and train student activeness, both individually and in groups. Nurhikmayati [3] stated that the Group Investigation learning setting is a learning model that plays a role in improving the quality of learning. The application of this learning model can train activeness, curiosity, critical attitude, and self-confidence of students in solving problems and concluding them. Besides, Group Investigation can improve critical thinking skills. The results of the study on learning indicate that Group Investigation is relevant to be applied in various fields of science and studies. The students' self-regulation skills improved after the implementation of the Group Investigation Integrated with Think Talk Write (GITTW) learning strategy [4]. The result of learning the basic of political science students treated by Group Investigation cooperative learning model is higher [5]. The Group Investigation method of cooperative learning affects academic achievement and learning motivation [6].

Politeknik Negeri Bali as the provider of vocational education has conducted a certification test for its students as a diploma supplement. The test is given to all students who will complete their studies. The results of the certification test were not as expected. This condition demands that learning be effective and under the certification scheme. The material presented must be able to meet the demands of the performance criteria in each competency element in a particular competency unit. Based on this, the learning model that can be implemented to achieve competency units in a particular cluster is the group investigation model. This learning design is expected to be able to facilitate students to achieve and improve their competence. Besides, this learning model is believed to be able to increase the activeness of students and apply the concept of transform in the teaching and learning process. The implementation of appropriate learning models and the ability to identify the quality profile of student input will have an impact on competency achievement. Competence is defined as the ability needed to do or carry out work based on knowledge, skills, and work attitudes. A competency is an underlying characteristic of an individual that is causally related to criterion-referenced effective and/or superior

performance in a job or situation. Competencies can be defined as the set of knowledge, skills, and experience necessary for the future, which manifests in activities [7]. Meanwhile, graduate competencies are qualifications of graduate abilities that include attitudes, knowledge, and skills under agreed standards. The industry needs competent human resources to support the performance of its operational activities. This condition becomes a challenge for educational institutions to provide it. In this case, the link and match between educational institutions as providers of human resources and industry as users must be optimal to create competent resources. Educational institutions must provide competent resources and match the industry needs. On the other hand, the industry must communicate the qualifications of its resources needed to educational institutions. Based on the description, the study aims are to describe the students' input quality and to describe the role of group investigation in accommodating the quality of inputs to competency improvement.

II. RESEARCH METHODS

A. Research Design and Sampling Technique

This quasi research design was Non-equivalent Control Group Design with a 2×2 factorial. The quality of student input is used as a moderator variable with two classifications or levels (high and low). The population access to this study was 308 students. While the sampling technique used is a cluster sampling technique. The steps for determining the sample start from class selection, determining the control class, and the experimental class. The next step is to determine the number of samples in each cell according to the research design. The data collection method used was to conduct tests to obtain data on the input quality and the achievement of competency scores.

B. Data Analysis Technique

Data on the input quality is collected before learning begins, by giving tests. The test is designed in the form of a multiple-choice test. The results of this test are immediately used as pretest results. At the end of the lesson, another test was conducted to determine the effect of treatment on competency achievement. The results of this test are immediately used as the post-test results. The analysis technique in this study used descriptive statistics and 2×2 factorial analysis. Descriptive analysis is used to describe the profile of students' input quality. Data analysis using two-way ANOVA. The normality test uses the Kolmogorov-Smirnov Test and Shapiro-Wilks Test statistics. If the resulting significance value is more than 0.05, then the frequency distribution of the variable scores is normal. The homogeneity test of variance between groups used Levene's Test of Equality of Error Variance. The test criterion is that the variance is said to be homogeneous if the resulting significance value is greater than 0.05.

III. RESULTS AND DISCUSSION

A. Students' Input Quality

Educational practitioners must identify the students' input quality before the learning process begins. If not, there will be obstacles in applying the concept of transform meaning to students. Learning that does not pay attention to the ideas that students already have, causes a wrong understanding of concepts. The concept that is understood becomes unscientific and tends to be difficult to change. Consequently, educators must pay special attention to the students of this group. The quality of students' self is used to interpret ideas and relate them to what they already know. The students' input quality in accounting learning related to the closing stage is presented in Table I. The input quality of this study is represented by the final stages of the period and the early stages of the next period. The final stage of the accounting cycle is closing entries, while the early stages of the next accounting period are represented by reversing entries. The input quality varies greatly in the two stages and these conditions must be handled properly. Table I can explain that, at the closing stage, students experienced difficulties in the process of creating closing entries, both in the experimental group and in the control group. The number of students who were able to do it correctly was only 12% in the experimental group and 10% in the control group. However, after being given the right threat, the ability to make closing entries increased significantly both in the experimental group and in the control group. The understanding of the closing effect also increased significantly from 20% to 80% in the experimental group. Meanwhile, in the control group, there was an increase from 17% to 75%.

TABLE I. INPUT QUALITY (CLOSING PROCESS)

Description	Experiment Group		Control Group	
	Pretest	Posttest	Pretest	Posttest
Closing process:				
1. Identify closed accounts	23%	73%	19%	70%
2. Closing Steps	25%	76%	22%	70%
3. Closing entries	12%	51%	10%	49%
4. Closing effect	20%	80%	17%	75%
Average	20%	70%	17%	66%

The steps to the next accounting period are preceded by reversing entries. The students' input quality in accounting learning related to the reversing stage is presented in Table II.

TABLE II. INPUT QUALITY (REVERSING PROCESS)

Description	Experiment Group		Control Group	
	Pretest	Posttest	Pretest	Posttest
Reversing process:				
1. Identify reversed journal	15%	81%	11%	76%
2. Reversing steps	25%	77%	20%	71%
3. Reversing entries	13%	70%	10%	69%
4. Reversing effect	15%	80%	15%	80%
Average	16%	77%	14%	74%

Based on Table II, it can be explained that at the reversing stage, students encounter problems in reversing entries. Only 13% of students were able to make reversing entries in the experimental group and 10% in the control group. A proud achievement is that there is a significant increase in understanding of the reversing effect. The number of students who can explain the reversing effect correctly is 80% both in the experimental group and in the control group. Closing effects and reversing effects are the most difficult subtopics to explain and to transform. However, if the concept has been well understood and thoroughly, the subtopic is very easy to understand. Different conditions occur with closing entries and reversing entries, students have difficulty determining accounts on the debit side and accounts on the credit side. This condition is quite difficult to change as a result of past learning experiences. Inadequate input quality should not be a barrier to provide quality outputs, as long as it is accompanied by an adequate process. The input quality affects the learning output. Ekaviana and Nurkhin [8] stated that the quality of student input, the school environment, and the future-oriented field of work has a significant positive effect on accounting competence. The students' input quality in higher education is a representation of the quality of the teaching and learning process at the previous level. This process forms a quality in humans, especially students in the field of accounting. Besides, the input quality can also be measured based on the results of a study obtained by a first-year student. Students who experience learning difficulties caused by new knowledge received do not have a relationship with prior knowledge.

The input quality can affect directly or indirectly on the learning process. Directly, it can simplify the learning process and lead to better learning outcomes. Indirectly, it can optimize the clarity of subject matter and increase the efficiency of using study and learning time. The quality of input is reflected in the prior knowledge of students. Blankenstein et al [9] stated that elaboration is helpful for students with more prior knowledge, but harmful for students with less prior knowledge. Prior knowledge is believed to be a determinant of success in learning. Higher prior-knowledge learners outperformed their lower prior- knowledge peers on performance measures [10].

Based on the explanation above, it can be said that the input quality has a very important role in the learning process. The input quality factor needs special attention in achieving competency units. Educators must be able to identify from the beginning with a method that is believed. Learning that does not pay attention to the ideas that students already have, can cause interference with academic performance.

B. Group Investigation and Input Quality

The results of the study before and after being given the treatment are presented briefly in Table III. The achievement of pretest scores showed that the scores in the two instructional models groups (n=50) were categorized as "sufficient". Although the score in the group investigation was higher than in the explicit learning group, the difference was not significant. Meanwhile, the viewpoint of the unit of analysis

(n=25), the score for the high-level input quality group is categorized as "sufficient" and for the low-level input quality group, it is categorized as "insufficient". If this condition occurs for a long time and without a solution, it can be believed that efforts to achieve student competence will be hampered. This condition appears at all levels of input quality and in all learning models.

TABLE III. MEAN SCORES (PRETEST-POSTTEST)

Input Quality	Learning models	Mean (pretest)	Mean (post-test)	Analysis unit
High	Group investigation	29.68	37.88	25
	Explicit learning	30.48	34.64	25
Low	Group investigation	25.12	34.48	25
	Explicit learning	24.20	34.68	25
Total	Group investigation	27.40	36.18	50
	Explicit learning	27.34	34.66	50

Based on Table III, it can be explained that the average post-test score in each unit of analysis (n=25) is in the range of scores that can be categorized as "good". Judging from the comparison between the input quality groups, it appears that the average score can be categorized as "good". Although categorized the same, when viewed from the average score, it shows that the high-level input quality group gets higher scores than the low-level input quality group. Descriptively, it can be said that the achievement of the scores of students who have high-level input quality is relatively higher than the low-level group. It can be explained that the achievement of competence for low-level groups is higher when the explicit learning model or conventional learning is applied than the group investigation model. Besides, it can be said that the Group Investigation shows higher mean scores than the explicit learning group. This condition indicated that group investigation contributed more to the efforts to achieve the competence of students.

Descriptively, there is a tendency that group investigations contribute to competency achievement. However, it is necessary to further analyse the role of group investigations in accommodating different levels of input quality. This study used a 2x2 factorial ANOVA design. Before the analysis is continued, the analysis requirements test needs to be carried out. This test is conducted to obtain facts about normality and homogeneity. The data normality test used the Kolmogorov-Smirnov Test and Shapiro-Wilks Test statistics. The Kolmogorov-Smirnov Test and Shapiro-Wilk statistical values show a significance value greater than 0.05, which means that the dependent variable data is considered normally distributed. The homogeneity test used Levene's Test of Equality of Error Variance. Homogeneity testing is carried out in two grouping categories. The test results show that the significant numbers of the Levene Statistic are greater than 0.05, which means that the variance between groups is homogeneous.

Hypothesis test results are presented briefly in Table IV. Based on Table IV, it can be summarized as follows, (1) the students' input quality has a significant effect on competency achievement ($p < 0.05$); (2) The instructional model has a significant effect on competency achievement ($p < 0.05$); and (3)

there is an interaction between the input quality and the instructional model in competency improvement ($p < 0.05$).

TABLE IV. SUMMARY OF ANOVA ANALYSIS

Source	df	Mean Square	F	Sig.
IQ	1	70.560	10.819	0.001
LM	1	57.760	8.857	0.004
QI*LM	1	73.960	11.341	0.001

Remarks: IQ=Input Quality; LM=Learning Models

Group Investigation has many concepts, one of which is students are responsible for their learning. Group Investigation emphasizes task specialization. This model allows students to plan and carry out learning by investigating. This learning model is a series of practical approaches to improve competence and create conditions that are preferred by students. Learning is designed in such a way that it can arouse students' learning abilities, making learning more enjoyable. Learning that is designed with a fun concept is able to motivate and realize the effectiveness of student learning. In addition, this learning model is able to create a democratic learning atmosphere.

While explicit learning is defined as learning that is used to being done, it is educator-centred. The implementation pays less attention to the learning situation. The characteristics of this learning are, learning activities are dominated by teachers, and students only carry out activities through the actions of educators. In this lesson, the teaching material consists of basic concepts and ignores the characteristics of the input quality. Consequently, they need complete and clear information. Teacher-centred learning activities emphasize the importance of teacher activities in teaching students. Students act as passive followers and recipients of the activities carried out. In addition, the characteristic of this learning is that it is not carried out through solving cases. In explicit learning, educators focus on the transfer of ideas into students, regardless of the input quality. On the other hand, on the group investigation model, educators focused on the construction of the meaning of knowledge. The results showed that the input quality and the learning model interacted with a significance of 0.001. This suggests that the learning model is able to accommodate the input quality in competency improvement. The implementation of an appropriate learning model for a certain level of input quality will determine the achievement of competency scores. The difference in competency achievement between the input quality groups is because in the high input quality group and the Group Investigation model there has been a complete meaning transformation process. Whereas in the explicit learning model there is a transfer process. Students who have a low-level of input quality have a slower ability to accommodate concepts. The students of this group, when they followed the group investigation and explicit learning, had different results. This difference is because in the group of students who take explicit learning and have a low-level of input quality there is a complete understanding, even though it is slow. On the other hand, in the group investigation and the

low-level input quality group, there was still a transfer process, but the understanding was temporary. Students only understand when learning is in progress and will forget all processes after leaving the classroom. This condition proves that their understanding is temporary and this occurs as a result of the transfer of ideas in learning.

Achievement or improvement of competency units cannot be provided with the temporary understanding, but a complete understanding is needed. Group investigation greatly contributed to increasing learning output. Group investigations are approximately effective in developing learners' overall Integrated Science Inquiry Skills [11]. Lubis et al [12] stated group investigation was effective in improving the learning outcomes of introductory accounting. The group investigation model produced better mathematics learning outcomes than the direct learning [13]. Widayanti [14] stated that the group investigation learning method was very effective in achieving mastery learning mathematics. The effectiveness of learning together and group investigation methods were determined by the experimental design applied [15]. The interaction profile between the learning model and the input quality means that the explicit learning model is better applied to students who have low-level input quality. On the other hand, the group investigation model is better applied to students who have a high-level of input quality.

IV. CONCLUSION

Based on the discussion, it can be concluded, (1) the students' input quality varies greatly in the completion of the accounting cycle especially in the closing process and reversing process. At the closing process, knowledge and understanding about the closing entries are only by 20% of learners, while in the reversing entries, their understanding only by 16% of learners, (2) group investigation model plays a role in accommodating the students' input quality to competency improvement. Students with adequate input quality categories are better applied to the group investigation model compared to the explicit learning model. Conversely, students in the category of inadequate better applied explicit learning model. It is recommended, educational practitioners can design innovative learning models in a variety of dynamic situations and conditions but still create a pleasant and meaningful academic atmosphere. In addition, identify the characteristics of the students' input quality.

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