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The Implementation of Generative Learning Model on Physics Lesson to Increase Mastery Concepts and Generic Science Skills of Vocational Students

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Abstract The weakness of learning process is one of the problems faced by the education world. The learning model used has not been able to make students become active in the learning process on physics lessons. One of the learning model has been developed is the generative learning model. The students are required prepare themselves mentally and for understanding the material information studied on the generative learning activity. The knowledge with the mental a connection has been produced from the concept formulation by the active students in the learning process. This study represents a quasi experimental research design is the randomized pretest-posttest control groups design. The generative learning model provides a better impact in increasing mastery concepts of physics for vocational students. Generic science skills were developed on the lesson of vocational physics, mass and unit topic as well as particle kinematics are direct observation techniques, large scale consciousness of nature's objects, fluency using the symbolic language, proficiency perform logical inference, and proficiency make the mathematics modeling. The Generative learning model provides a better impact in increasing Generic Science Skills of Vocational Students.

Keywords: *the generative learning model, the mastery concepts, the generic science skills*

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1. Introduction

Facing rapid development of science and technology, our society should be literacy science, because it is very important in many jobs. There are so many jobs needs the high level skills, needs the workers who can learn, to think logically, to think creatively, to solve a problems and make a decision. The science comprehension and the process of science give the important contribution to these abilities [1].

The empirical observation result is indicated that most graduates of vocational high school are less able to adapt with the changes of science and technology, it is difficult to be retrained and they are less able to develop themselves. The finding has indicated that the learning is not yet touched or developing students' adaptability in vocational high school [2].

Level of the connectivity and the compatibility has been showed between the graduates with the workers needs are still low. Today, the result of education has not been showing the significance relevance with the needs of society. The society must be immediately feel the result of education, but instead burdening them. In the school the education of physics seems no impact on the ways of life and thinking of society [3].

The quality of education product is connected to the learning process which is influenced by many factors, such as: the curriculum, the staffs, the learning process, the infrastructure, the materials, the schools' management, the environments and the industrial cooperation. The curriculum has largely contributed at direct providers, the purposes and the grounding in philosophy of education. The curriculum should be developed in accordance with the dynamic development of science and technology, demands for needs of labor market, and dynamic of social change [4].

The weakness of learning process is one of the problems are faced by the education world. The process of learning in the class is only directed to the students' ability just memorize the information without required for connecting with the daily lives, instead in order to increase the quality of students' education has pressured at active and meaningful learning where the students learn to find with the environment oriented [5].

The usage of learning process is one of the main problems in the physic lessons. All this time the model of learning has used are not able yet to make the learning process of students become active. It is caused teaching-learning process always teacher centered, so the students are only receive the learning passively. This learning was conducted too mathematically; this is one of the other weaknesses on the implementation of physic learning at this time. The teachers tend too fast to involve the use of mathematical formula regardless to the students understanding [6]. For the students there are impact where appear the arguments where the biggest difficulty in the physics learning is mathematical completion [7].

For handling the problems of physics learning, the teachers are expected to develop the activity which could be supported the students for developing their learning and knowledge. The teachers should provide the procedures of learning which helped the students on formulate the new information or constructing their earlier knowledge through the provision of new information inference, elaborating the information detail, and produces the connection between the new information with the earlier knowledge. The study environment has been created could be supporting the students to learn the science through the concept of construction, so the teachers able to do the election of learning method accordance with the characteristics of learning material and learners also the election of correct strategy in implementing the learning in the class [8].

In recent years, a variety of efforts has been developed and implemented through series of research activities that is aimed to make a change the learning model. Based on the result of study has been shown that the use of student-centered learning can be further increased the mastery of physics concepts than teacher-centered [9]. One of the learning model has been developed is generative learning model. On the activity of generative learning, the students were demanded to prepare themselves mentally for understanding the material information taught. In the learning process, the active students are taking a part and producing the knowledge with the connections between mental concepts formation [10].

The generative learning is focused to the ways of strengthen for pushing of human internal drive to understand the environment with explore and organizing information, felt their problems and to seek solutions. The generative learning model also encourages students to think creatively and to explore the knowledge. This learning is focused to effort for active integration of new material with existing students' schema [11].

On the generative learning model, mental activity look like a memory function. While the short-term memory is connecting with the long-term memory, the memory of person was increased drastically if he may has some information was remembered. Basically, link was prepared by individual to build a new knowledge; therefore merging of knowledge on the existing structure could be more effective. The short-term memory is a new idea place. On the short-term memory, this idea is not only placed and deleted, but also has been connected with the existing knowledge on the long-term memory. After the connection is produced, the idea was no longer isolated in the short-term memory but entered into long-term memory and can be used to build the solution if necessary [12].

The generative learning activity is divided into two as follows; first the students are encouraged to produce the organizational relationships such as the title, the concentration, the questions, the objectives, a summary, the graphs, the place, and the main ideas. Second, the students are produces the integrated relationships between of what they see, hear and read with what they have in the memory of past experiences and learning by creating the metaphors, for examples: the analogies, the interpretations, the paraphrases and the conclusions [10].

There are five steps for the generative learning model (syntax) such as: (1) the orientation, (2) the disclosure of ideas, (3) the challenges and reconstruction, (4) implementation and (5) the evaluation [13]. The activities description of each of the phase can be explained as follows: (1) Orientation stage: The teacher gives change to the students for identify the topic which will be discussed and gives the idea concern to the topics, then teacher evaluate and classifies the ideas as starting point of learning to suggest the ideas, the students would be connect the experiences of learning which was experienced with the idea on the topic will be studied by themselves. (2) The disclosure of ideas: The teachers direct the students to construct the concepts in accordance with the scientific concepts which will be taught through the digging up the questions. (3) The challenges and reconstruction: The teachers give the opportunity to the students for sharing idea between each students, so the students could be compare his own idea with the others students. The teachers direct the students with give the questions which digging up the knowledge. (4) The implementation: The teacher gives the opportunities to the students for using the new conceptual mastery gotten in other contexts, and then students test the validity of the concept through the experiment. (5) The evaluation: The teachers make a discussion and the questions answers technique to compare the material studied based on the experiment with the early knowledge before do the experiment.

The mastery concept as one of the study results which could be meant as one the intellectual skills related to students' cognitive abilities. Then the intellectual skills could be meant as skills related to mastery of a person against the environment around through the signs or ideas. The study results could be observed as capabilities. These capabilities have been classified based on the forms of learning activities that can be done to generate these abilities. The capabilities may include: intellectual skills, cognitive strategy, the verbal information, and the motor skills. These capabilities can be shown from the operation intellectual who could be done by the students, through the discrimination, build the concrete concepts, build undefined concepts, the use of specific rules for solving a problem [14].

A student can be said that he was dominates the concepts if he able to define the concepts, to identify, and give the examples or not an example of the concept, so with these abilities the students take a concepts in other forms that is not the same as the textbook.

With their own mastery, a student able to identify the procedure or true and false the counting processing and able to states and interprets ideas for giving the inductive and deductive simple reasoning either orally, in writing, or demonstrating. The concepts of mastery in this study is a level when the students not only knows physics concepts, but also really understand it well, it has been shown by their abilities on the solving various problems, whether related with their own concepts and their application on the new situation.

Generally, based on the cognitive aspects, the mastery of concepts as follows: (1) **C1: Remembering:** recalling the information saved in long term memory. Considering is the cognitive processes of the most low-level; (2) **C2: Understanding:** constructing meaning or understanding based on the earlier knowledge owned, connecting the new information with the knowledge owned, integrating the new knowledge to the knowledge that has been owned integrate new knowledge into existing schemes in students' thinking. The conceptual knowledge is the basis for understanding caused the schema compilers is a concept; (3) **C3: Applying:** includes the use of a procedure to solve a problem or task. In order to that applying closely related to the procedural knowledge. But it does not mean that this category is only accordance for procedural knowledge; (4) **C4: Analyzing:** describe a problem or object to the elements and determine the interconnections between these elements and amount of the structure; (5) **C5: Evaluating**: make a judgment based on existing of criteria and standards; (6) **C6**: **Creating**: to combine several elements into a unified form. Making includes the ability to produce something new through organizing several elements or parts of a pattern or structure that previously did not seem [15].

One of an important think skills were developed through the learning of physics is generic science skills. The generic skill is an ability that is common, flexible base, not only the essential need for fields that are detailed but also for other fields. The generic skill is a base to build other high level of think skills [16]. Generic skills are always considered as a high level skills that can be taught and apply in all fields. Generic skills as a set of skills students need to succeed in learning and working in the life [17].

The results of some research on generic skills mentions there was not a single definition of the indicators of generic skills. The New Zealand Curriculum Framework suggested eight indicators of the generic skills as follows: the communication skills, the information skills, self-management and the competitive skills, the physical skills, the numeracy skills, the problem solving skills, the cooperative skills, the work and study skills [17]. The Qualification and Curriculum Authority (QCA) suggested six indicators of generic skills such as: the information technology skills, the application of number, the skills in working with others, the skills to improve learning and performance and problem solving skills [17].

In this research, the generic skills discussed are the generic skills on the science field, which basically stated there is the ability think are generic which can grow through learning in the sciences, including physics [16].

There are nine of science generic skills which can be grown by learning physics such as: (1) **Direct observation**, to observe the object directly by using the senses. For example, when we observing the refraction of light on the lens or prism; (2) **Indirect observations**, is the observation that using tools because of limited our senses; (3) large scale consciousness of nature's objects. Physics discuss events in case of nature both macro and micro. For long scale, physics discuss the size of a very large example of light year, but also discuss the size of a very small length for example the molecules or atoms size; (4) **Using the symbolic language**. Many natural behaviors cannot be expressed in the language of daily communication, especially the quantitative behavior. The nature of quantitative causes a necessity for using the quantitative language too. The expression of energy equation was done by gas when it expands isothermally is expressed on the form of differential equations are the use of symbolic language. On the studying physics, the use of symbolic language is very helped to communicate the complex idea into the simple; (5) **Thinking in terms of logic obeys the principle**. In physics, it is believed that the rules of nature has trait obey the principle of logic. Einstein's Theory of Relativity is example of thought. Before to Einstein's relativity theory is suggested, there is singularity between the laws of Newtonian mechanics and Maxwell electrodynamics. Before to Einstein's relativity theory is suggested, there is singularity between the laws of Newtonian mechanics and Maxwell electrodynamics. Electrodynamics will not be affected by the motion of the source and observed, whereas according to Newtonian mechanics that velocity of the object can be reduced or increased in accordance with the motion of the observer or the source. Before to Einstein's relativity theory is suggested, there is singularity between the laws of Newtonian mechanics and Maxwell electrodynamics. Electrodynamics will not be affected by the motion of the source and observed, whereas according to Newtonian mechanics that velocity of the object can be reduced or increased in accordance with the motion of the observer or the source. The singularity bridged by the Einstein's relativity theory, correcting logical Newtonian mechanics that obey the principle; (6) **the logical inference**. In physics known some discoveries of micro particle that has been preceded by a theoretical supposition that the particles are indeed mathematically exist. The scientists rely on logic inference to presents their assumption. Example for this case study is logic inference is done after the emergence of the Einstein's relativity theory, which questioned the speed of light until to the conclusion that there are a relationship between mass-energy equivalence with the relationship $E = mc^2$. The result of logical inference is finally really proved empirically; (7) **Causality**. Most of the rules of physics called "law" are a causal relationship. For example the second law of thermodynamics for heat engines state that the heat engine which works cyclically not possible to transfer heat from a reservoir, transform completely into a business without other effects. To reach the conclusion that the relationship variables in the law is really is causal, experimental observations that need to be repeated and with variable altered and must produce a result that is consistent changes in the variables of cause and effect laws, needs the experimental observations were repeated and with the variables were changed and must produce the effect that are consistent in accordance with these variable changes; (8) **Making a mathematics modeling**. Many expression rules in physics called "law" is stated in the mathematics language called formula. Formulas that describe the natural laws of physics are man-made who wants to describe the symptoms and the natural temperaments, either in the form of qualitative and quantitative. So we can call it a language model using a mathematical expression. Mathematical modeling is often called to as symbolic because the model is abstract and can be expressed symbolically in the form of formulas. Generally, the mathematics modeling is aimed to get a more accurate relationship in system of nature; (9) **Concept formation**. Not all symptoms can be understood by using daily language. Sometimes it takes a concept or new notions whose meaning is not found in daily language [16].

2. Materials and Methods

This study was used a quasi-experimental methods. The study design is used to test the learning device is "The randomized pretest-posttest control groups design" [18]. At first, randomly selected control group and the experimental group. Furthermore, the pre-tests were done on the two groups, after that both groups was given a different treatment, and ended giving the post test with the same device. The form design is shown in Table 1.

Table 1. Research Design

Class	Pre-Tests	Treatment	Post-Tests
Experimental	O_1, O_2	X	O_1, O_2
Control	O_1, O_2	Y	O_1, O_2

Explanation:
X: The implementation of Generative Learning Model
Y: conventional learning / regular
O_1: initial test and final test mastery concepts
O_2: initial test and final test generic science skills.

Increased mastery concepts and generic science skills on before and after the learning activities are calculated to normalized gain score (n-gain).

$$< g >= \frac{(\% < S_f > - \% < S_i >)}{(\% < S_m > - \% < S_i >)} \text{ [6]}$$

Explanation:
<g> is normalized gains
S_f is initial test mean scores
S_i is final test mean scores
S_m is the maximum scores.

Normalized gain score <g> or **n-gain** is a suitable method for analyzing the results of the initial test and final test results and is a better indicator to indicate the level of effectiveness of the treatment. The rate of **n-gain** categorized into three categories, such as:

Gain-high: (<g>)> 0, 7
Gain-medium: 0, 7 ≥ (<g>) ≥ 0, 3
Gain-low (<g>) <0, 3 [6]

The results of the comparison control group and the next experiment was done the statistical tests to test the difference of the two averages.

3. Result

3.1. Mastery of Physics Concepts

One indicator of the success of vocational learning physics is increasing mastery of physics concepts that achieved by students before and after the learning process. To determine the level mastery of physics concepts has been done the pre-test and post-test. Increased mastery concepts based on the scores are normalized gain (g) the experimental classes and control classes on mastery of concepts. The concept is examined consists of: mass, units and dimensions (KS1); measurements and significant figures (KS2); vector calculation (KS3), the distance and removal (KS4); Uniform *rectilinear motion* (KS5); and **Uniformly Accelerated Motion** (KS6). Description improvement mastery of concept is shown in Figure 1 below.

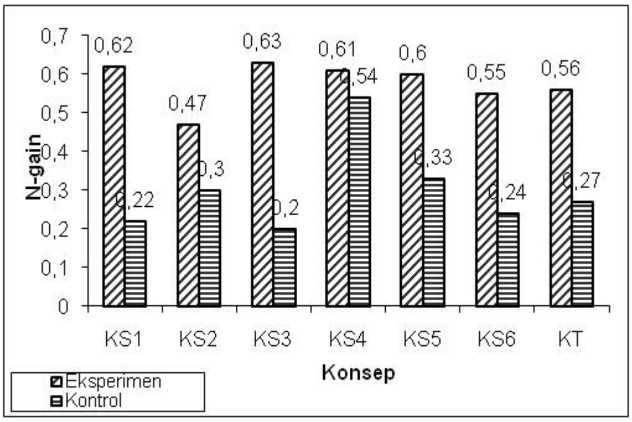

Figure 1. Increase Mastery of Physics Concepts

The representation mastery concepts of mass, units and dimensions (KS1) for the experimental class is pre-test score of 48.1 including category yet passed; post-test score of 80.1 is categorized good pass and score normalized gain of 0.62 including medium category. For control class pretest score of 47.0 including category yet passed; post-test score of 58.9 including category yet passed and score normalized gain of 0.22 is low. Further has been done the differences test between the experimental and control classes of improvement of concept mastery. The test results show that there were differences in the increase in gain scores were normalized to the concept of mass, units, and the dimension between the experimental and control classes. The analysis result showed that the generative learning model is better than the regular learning in increasing the amount of mastery concepts, units and dimensions of vocational students.

Mastery of measurement concepts and significant figures (KS2) of experimental class students are pre-test score of 49.1 including category yet passed; post-test score of 73.2 is categorized pass enough; and normalized gain scores 0.47 including medium category. For control class pretest score of 50.3 including category yet passed; post-test score of 65.0 is categorized pass enough. The results show that the gain scores were normalized experimental class is higher than the control class. Based on the result above, this inference can be drawn that the generative learning models increase the mastery of measurement concepts and significant figures better than regular learning.

Mastery of vector calculation concepts (KS3) of students in grade experiment and control classes before learning process is in the same category indicated by the pre-test score of 41.0 which includes category yet passed. After the learning process, for experimental class post test scores of 78, 0 included in good categories and 0.63 normalized gain scores including medium category. Whereas for the post-test scores of control class 53 including category yet pass and score normalized gain of 0.20 is low categories. The result of the average difference (t-test) shows the normalized gain scores of different experimental class with the control class. Based on this analysis it can be concluded that the generative learning model is better than the regular learning to improve mastery of the concept of vocational vector calculation of vocational students.

Description mastery of distance and removal concepts (KS4) for the experimental class is pre-test score of 47.0

including category yet passed; post-test score of 79.5 is categorized good pass and score normalized gain of 0.61 including medium category. For the control class pretest score 62.0 is categorized pass enough; post-test score of 82.5 is categorized good pass and score normalized gain of 0.54 including medium category. The results show that there is no difference increase the normalized gain scores both experimental and control classes. This means that the increase experienced by the experimental and control classes as large.

Description mastery of Uniform rectilinear motion concepts (KS5) for the experimental class is pre-test score of 47.0 including category yet passed; 78.8 post-test scores categorized as a good pass and score 0.60 normalized gain medium categories. For control class pretest score of 51.8 including category yet passed; post-test score of 67.6 is categorized pass enough and normalized gain scores 0.33 including medium category. The results show that there are differences in the increase in gain scores are normalized to the concept of uniform rectilinear motion between the experimental and the control class. This means that although being in the same category, the normalized gain scores experimental class better than the control class.

Description mastery of Uniformly Accelerated Motion concepts (KS6) for the experimental class is pre-test score of 50.9 including category yet passed; 77.8 post-test scores categorized as a good pass and score 0.55 normalized gain medium categories. For control class pretest score of 49.1 including category yet passed; post-test score of 61.5 is categorized pass enough and scores are normalized gain of 0.24 is low. The results show that there are differences in the increase in gain scores were normalized the experimental and control classes. This shows that the generative learning model is better than the regular learning in increasing mastery of Uniformly Accelerated Motion concepts.

Description mastery of physics concepts (KT) for the experimental class is pre-test score of 48.8 including category yet passed; 78.4 post-test scores categorized as a good pass and score normalized gain of 0.56 including medium category. For control class pretest score of 49.6 including category yet passed; post-test score of 63.2 is categorized pass enough and scores are normalized gain of 0.27 is low. The test results showed that there were differences in the increase in gain scores were normalized the experimental and control classes. This shows that the generative learning model is better than the regular learning in improving vocational students' mastery of physics concepts.

3.2. Mastery of Generic Science Skills

In this section describes the result of an increase in generic science skills of experiment and control class. Increase mastery of generic science skills are based on the score pre-test, post-test, and gain normalized. Components of generic skills that successfully grown physics lesson is direct observation techniques (PL), large scale consciousness of nature's objects (KSB), fluency using the symbolic language (BS), proficiency perform logical inference (IL), and proficiency make the mathematics modeling (PM). The description improved the mastery of generic science skills shown in Figure 2.

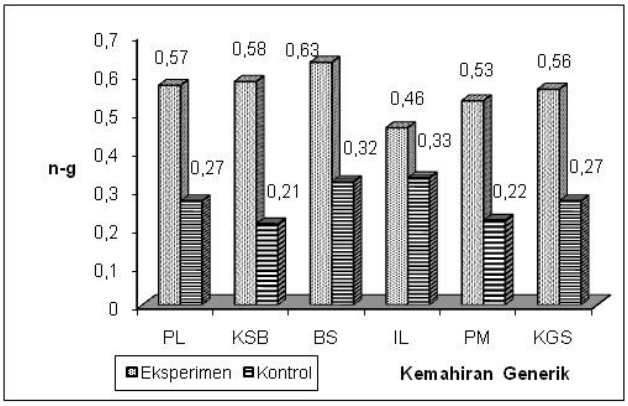

Figure 2. Increase the Mastery of Generic Science Skills

Description of generic skills mastery of direct observation for the experimental class pre-test score of 45.6 is low; posttest 76.9 includes both categories; and scores are normalized gain of 0.57 which includes the medium category. For control class pretest score of 52.6 is low; post-test score of 65.5 including medium category; and scores are normalized gain of 0.27 is low. Based on the test results were normalized gain difference scores experimental class is higher than the control class. These results indicate that the generative learning model is better than the regular learning in improving acquisition generic skills of direct observation techniques vocational students. This is consistent with the fact that in the learning process for the experimental class more activity measurements and observations compared with the implementation of the control class.

The description of generic skill level sense of scale of the experimental class is pre-test score of 45.3 which is low; post-test score of 77.3 which includes good categories; and a score of 0.58 which included a normalized gain medium category. For control class pretest score of 50.0 is low; post-test score of 60.3 which includes the medium category; and normalized gain scores 0,21 is low. The testing differences normalized gain scores showed that the normalized gain scores between the experimental and the control class has a significant difference. The analysis result showed that the experimental class has increased mastery of generic skills awareness about the mass scale natural objects is better than increasing mastery of the class control.

The description level of generic skills using symbolic language for the experimental class is pre-test score of 49.3 which is low; post-test score of 81.3 which includes a high category; and scores are normalized gain of 0.63 which includes the medium category. For control class pretest score of 48.5 which is low; post-test score of 65.1 which includes the medium category; and scores are normalized gain of 0.32 which includes the medium category. The results show that the experimental class has increased generic skills symbolic language better than the control class. Based on the results above, it can be drawn the inference that the generative learning model has been successful in increasing fluency using symbolic language better than regular learning.

The description of generic skills mastery perform logical inference for the experimental class is pre-test score of 54.8 is low; posttest 75.8 includes good categories; and scores are normalized gain of 0.46 which includes the medium category. For control class pretest score of 48.9 is low; post-test score of 65.8 including medium category; and a score of 0.33 normalized gain medium category. The results show that the difference scores were normalized gain generic skills perform logic inference meaningful significantly different between the experimental and the control class. These results indicate that the generative learning model is better than the regular learning in improving the mastery generic skills perform logical inference of vocational students.

The description level of generic skills makes mathematics modeling for the experimental class is pre-test score of 48.8 which is low; post-test score of 77.4 which includes a high category; and scores are normalized gain of 0.53 which includes the medium category. For control class pretest score of 47.8 which is low; post-test score of 59.5 which is low; and scores are normalized gain of 0.22 which is low. The results show that the experiment class has been increased the generic skills make the mathematical modeling is better than control class. Based on the results above, it can be drawn the inference that the generative learning model has been successful in increasing fluency makes the mathematics modeling.

Increase mastery of generic science skills for the experiment class is pre-test score of 48.8 which is low; post-test score of 77.4 which includes good categories; and scores are normalized gain of 0.56 which includes the medium category. For the control class pretest score of 49.6 which includes good categories; post-test score of 63.2 which includes enough categories; and scores are normalized gain of 0.27 which is low. The test results showed that the difference scores were normalized gain generic skills class science experiment and control classes different significantly. The analysis results show that the generative learning model is better than the regular learning in increase the mastery of science generic skills of vocational students.

4. Discussions

Mastery concepts are essential for intellectual development. In physics learning, mastery concepts are an absolute requirement for success in learning physics. With the mastery of physics concepts, the problems of physics can be solved, either physical problems that exist in daily life as well as physical problems in the form of physics questions at the school. This suggests that the physics is not the rote learning but more demanding the concept of comprehension even the concept application.

Students of vocational schools (SMK) who get a physics lesson with generative learning model are higher than students who get regular learning. This is consistent with the proposed by Ausubel statement stating in order to be a meaningful learning, so the new concepts or new information to be obtained by the student must be associated with concepts that already exist in the student's cognitive structure [14].

The high mastery of the concept is supported by research Schlenker indicate that generative learning model can improve the mastery of science, creative thinking and students become skilled in obtaining and processing information [19]. In the phase of generative learning model students are guided to be able to find their own concepts as proof of the hypothesis that they make and the phase looked back the teachers provide confirmation of the concept they have found when they are given about the application of the concept, they can use the correct concept at the questions.

Generative learning model is a model of student-centered learning. Several studies have shown that the learning involves the students actively provide better results than the regular learning. The learning model with high student participation can enhance the students' comprehension of the basics of sciences [20]. The experience and explore means involving the variety senses: see, smell, hear, touch, and taste. Increase students' comprehension of a concept and improve durability of the information in the minds of students. The results of the study revealed the 'pyramid learning experience' strengthen the statement that directly learning will be improving the survival of information in our minds. Generative learning model can be classified as active student learning. They are doing on the Student Worksheet (LKS), discuss, and implement the simple experiments. They learn to find concepts of physics and generic skills through physical and mental activity. This is in line with the emphasis of cognitive psychology that the active involvement of students through activity-based learning utilizing as many senses as possible and make the whole mind is involved in the learning process with regard to the functioning of all parts of the brain will have a positive impact on the student learning outcomes [21].

Generative learning model has managed to grow five generic science skills that direct observation techniques, large scale consciousness of nature's objects, fluency using the symbolic language, proficiency perform logical inference, and proficiency make the mathematics modeling. Increased generic science skills indicated the normalized gain scores (n-gain). For the experimental class of generic skills upgrading vocational physics grown by 0.56 were classified as medium, while the control class of 0.27 which is low category.

In phases of generative learning model involves the students to practice skills in formulating hypotheses through the experiments and observations directly the basis of the power of science. In addition to the phase of generative learning model students trained through indirect observation and interpreting of the data they collect in the implementation phase so that more students to master concepts learned and the students are able to read the scale indicated on the tool and convert it, so that it can be increase their skills in observing. That's the one of the causes of superior increased of generic ability of experimental class that implements a generative learning model.

The successful science learning is learning that takes into the process of science. The student is expected to be able to feel and appreciate what has been done by the scientists in order to increase their desire to learn science (physics). Basically learning model developed is learning those allows the student, both individually and in groups actively seek, explore, and find the concept and principles of holistic and authentic. This is what makes the level of mastery concepts and generic science skills grown by generative learning model are superior to the regular learning program.

Developed through learning, learners can reach direct experience, thus increasing the power to receive, store, and apply the concepts they have learned. Learning experiences gotten further show the link conceptual elements will make the learning process more effective. The conceptual connection studied by the relevant fields of physics will form a cognitive schema, so the students reach the knowledge integrity and determination.

5. Conclusions

The generative learning model provides a better impact in improving students' mastery of the concepts of physics of vocational students. The generic science skills developed at physics lesson and the topic of scale and units as well as the topic particle kinematics is direct observation techniques, large scale consciousness of nature's objects, fluency using the symbolic language, proficiency perform logical inference, and proficiency make the mathematics modeling. Generative learning model provides a better impact in improving generic science skills of Vocational students.

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