



## Constructivism-Based Science Practicum In Philosophy Perspective

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This article aims to describe philosophically related to Constructivism-Based Science Practicum. This article uses a qualitative descriptive approach. Information was obtained based on observations, experience, and a literature review from several journal literature. Philosophical studies can strengthen ontology related to the nature of constructivism-based science practicum, a science practicum that leads to constructing students' thinking so that knowledge, skills, and attitudes are increasing. Epistemologically (usefulness), constructivism-based science practicum can improve students' concepts and skills in understanding science concepts. Axiologically (Universal values) constructivism-based science practicum can be obtained from science practicum activities that shape scientific attitudes and behavior in general.

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## INTRODUCTION

Natural Science (IPA), as knowledge learned since childhood, is also expected to be useful for human life (himself) and others. IPA is formed based on factual events, then becomes a concept. In applying the idea, it is used procedurally and up to metacognitive. The concept of Science Education as an education that explains natural phenomena formed from scientific processes causes every individual who studies sains to be able to process scientifically and produce scientific products. The situation related to facts becomes a concept and then is elaborated in detail into procedures, and metacognitive cycles have new facts, ideas, and methods following the development of needs and knowledge itself. An example related to the existence of a practical tool that is often used is a magnifying glass (lup). Based on the development of Science, the need to carry out investigations, and the inability of a magnifying glass (lup) to observe tiny objects, a magnifying glass tool was developed to keep small things, namely a microscope. The development of Science is also in line with the development of natural Science (IPA). Science learning includes three components: scientific

attitudes, processes, and products [1]. Therefore, science learning in schools is concerned with students' mastery of scientific facts, concepts, and theories, but students are also required to understand more about how these facts, ideas, and views were discovered.

One of the concepts used in science learning in Indonesia is constructivism referring to 3 (three) aspects, namely cognitive, affective and psychomotor. Students are not seen as empty glasses. Students are seen as having initial abilities that can come from previous knowledge and the surrounding environment. This initial knowledge capability is constructed through various concepts, principles, and procedures provided through the scientific process. The impact of the construction of thoughts and actions through the scientific method will achieve meaningful understanding for students. Students will know what, why, and how the scientific knowledge obtained can be used and utilized in everyday life.

The presence of Science, especially natural Science, through scientific processes and products based on the scientific attitude possessed by humans, will discover the benefits of animals and plants around them. The scientific method can be carried out through a science practicum. The science practicum is an activity to develop and deepen knowledge by strengthening science process skills. Science practicum is a learning activity that aims to allow students to test and apply theory using laboratory facilities and outside the laboratory [2]. Referring to the demands of implementing the 2013 Curriculum, quality graduates at all levels have competence in knowledge, skills, and attitudes. To achieve competence in the realm of skills in science subjects, it is necessary to carry out science practicum activities.

The science practicum will train students' skills by observing a problem and communicating their findings' results [3]. Referring to the fulfillment of competencies in the realm of 2013 Curriculum implementation skills, students are expected to have competence in processing, serving, and reasoning in realm concrete (use, unravel, stringing, modify, and make) and realm abstract (write, read, count, draw, and compose) following which studied in school and source other which same in corner point of view/ theory.

Based on the review, the philosophy constructivism-based science practicum is based on origins, the process of its existence, and how the value is obtained for its existence. This study in Philosophy is called ontology, epistemology, and axiology.

## **RESEARCH METHODS**

The method used in this article is the literature review method. The library sources used are articles that match the title of the article. The analysis used is content analysis. Identify various sources of text in other papers to write this article. The next step is to look for links from multiple sources. The final step is to make conclusions

## **RESULTS AND DISCUSSION**

### **Constructivism-based Science Practicum Ontology Study**

Ontology is the most general part of philosophy. Ontology is part of metaphysics. The object of study is ontologically related to whether there is an attachment to the thing that is manifested. Ontology discusses something universal. After linking human philosophy, the natural world, knowledge, morals, and society, a description of the ontology is compiled. In metaphysics, it deals with nature. In essence, knowledge will be obtained to answer the questions therein. The study of ontology is empirical, namely everything that can be tested by the human senses [4]. In the study of ontology, Science is oriented toward practical matters.

Ontology philosophy deals with questions related to the object studied by Science, including: what is the object's proper form? What is the relationship between objects and human perception (e.g., thinking, feeling, and sensing)? In the implementation of a Constructivism-based Science Practicum, in this case, the form of a practicum implementation is based on the construction of knowledge, skills, and attitudes. This means that there is a relationship and connection between the performance of Science practicum and the concept of constructivism. The essence of constructivism is non-objective, temporary, constantly changing, and uncertain knowledge. Individuals who learn in constructivism will construct their knowledge from real experiences and can reflect and interpret. This

means terms of achievement; science practicum will gradually form a new understanding based on experience and perspectives used in analyzing.

Implementing the Science practicum aligns with the concept of Science as an object of Science. Several scientific objects are studied and deepened through various investigative activities. Based on the objects studied in Science, the objects of Science consist of material and formal objects. The content object is the entire area or material used as the object of investigation. This means that everything that becomes the object to be investigated is a material object. The formal object is the determination of the point of view of the content object. To examine the nature of empirical objects more deeply, Science makes several assumptions about that object. Deductions considered correct and beyond doubt are hypotheses that are the basis and starting point of all activities. The belief is necessary because that's the assumption statement provides direction and a foundation for study activities

There are several assumptions about empirical objects made by Science: First, assuming particular objects have similarities, for example, in terms of shape, structure, properties, etc. Second, think that a thing does not change within a certain period. Third determinism, namely assuming that all phenomena are not accidental events. The assumptions made by Science aim to gain knowledge that is analytical and able to explain the various connections in phenomena that are stuck in human experience. This assumption can also be developed if human experience is analyzed with multiple scientific disciplines by paying attention to several things; First, the assumptions must be relevant to the fields and objectives of scientific discipline studies. These assumptions must be operational and form the basis of theoretical assessments. Second, assumptions must be inferred from "the situation as it is," not "how things should be." The first assumption is an assumption that underlies scientific research, while the second assumption is an assumption that underlies morals. Therefore a scientist must know the assumptions used in his scientific analysis because using different assumptions means different concepts of thought are used. A scientific study should be based on the assumption that firm, namely explicit, because what has not been written is considered unknown or has not received a common opinion.

Constructivism-based Science Practicum Ontology is necessary for every human who wants to learn thoroughly about this universe. Ontology is the essence of what is studied or the Science itself. Ontology is a theory about the meaning of an object of knowledge. Ontology is a concept specification; in other words, ontology explains an idea and its interrelationships with that Science.

### **Epistemological Study of Constructivism-based Science Practicum**

Epistemology means the origin of knowledge, structure, method, and validity of knowledge. In this case, the practicum is carried out as a scientific process that uses logic to think from the concepts it has. The epistemology of Constructivism-based science practicum refers to questioning whether science practicum is related, whether constructivism understands and the relationship between the two things.

Practicum-based learning is practicum-centered learning. According to Kloper (1990 and White 1996) [5], practicum is a significant part of a learning activity, especially learning Science. This is partly because practicum activities can improve abilities in organizing, communicating, and interpreting observation results. Rustaman (2005) [6] argues that in science education, laboratory activities (practicum) are an integral part of teaching and learning activities, especially in biology. This shows how vital the role of practicum activities is to achieve the goals of science education. Education experts support the existence of practicum in science learning. Hodson (1996) in [6] states that the use of practicum in science learning can: (1) motivate students and stimulate their interests and hobbies, (2) teach skills that must be carried out in the laboratory, (3) help acquire and develop concepts, (4) develop a science concept and develop skills in implementing Science, (5) instill a scientific attitude, (6) encourage the development of social skills. Practicum functions: (1) clarify the concepts presented in class through direct examples with tools, materials, or natural events; (2) improve students' intellectual skills through observation or searching for complete and selective theoretical information that supports the mapping of practicum problems, trains in solving problems, applies knowledge and

skills to the situation at hand; (3) training in designing experiments, interpreting data and fostering a scientific attitude.

Epistemology of Constructivism-based Science Practicum talks about the basis, sources, characteristics, truths, and ways to gain knowledge about Constructivism-based Science Practicum. The most crucial aspect discussed in the epistemology of Constructivism-based Science Practicum is the sources and methods of this knowledge. So when the Constructivism-based Science Practicum is highlighted through epistemology, the discussion is directed at how the sources are used in developing this knowledge and what the methods are like because each type of knowledge has different sources and methods of knowledge. Epistemology discusses how knowledge is obtained and utilized. Thinking is a mental activity that can produce knowledge. The scientific method is needed to disclose the workings of the mind to make it easier to move the thinking activity. The scientific method is the foundation used in the epistemology of Science. The scientific method is the method used by Science to compile correct knowledge. The scientific method is a procedure for obtaining knowledge. Therefore, Science is knowledge obtained through the scientific method. The scientific method determines whether knowledge is feasible, and essential in building Science. Thus, it is hoped that the scientific method approach will make a science have specific characteristics, such as being rational and proven genuine.

One learning model where students need to get used to solving a problem, finding something useful for themselves, and struggling with ideas is the constructivism learning model [7]. Constructivism learning can support the implementation of effective Integrated Science learning. One of the tools that can be used to implement effective learning is science practicum activities. Science practicum is carried out with the support of laboratory equipment and instructions for Student Worksheets which become guides in science practicum work. Constructivism-based Integrated Science Worksheets are expected to provide activeness for students to find their knowledge and other things to develop themselves, improve learning outcomes, and develop students' creative thinking abilities.

### **Axiological Study of Constructivism-based Science Practicum**

Axiology is a branch of philosophy about the purpose of Science and how Science is used. The axiology wants to achieve from a constructivism-based science practicum is the essence of the benefits contained in knowledge, especially the implementation of a constructivism-based science practicum. Kaya and Boyuk (2009) in [7] laboratory activities ensure that students learn to use their thinking skills rather than just remembering the material. In addition, through practicum activities, positive attitudes can be fostered in learning physics, called scientific perspectives. This follows research conducted by Hayat (2011) in [8], namely that practicum-based learning can make students active in education and develop a scientific attitude. Carin (1997) in [6] states that a series of attitudes and values that can be grown through scientific work are: (1) cultivating curiosity (being curious) in understanding the world around it, (2) prioritizing evidence, (3) being skeptical, (4) willing to accept differences, (5) able to work together (cooperative); (6) be optimistic about failure.

Based on axiology, a scientific statement can be valid if it contains an axiological element, namely the existence of beneficial values for human life. Science has a spirit that wants the value the benefits of this knowledge, the practice of this knowledge must also be based on the values in society. Removing the axiological element from Science means weakening the position of that Science from the point of view of the philosophy of Science. Axiology provides benefits to anticipate adverse developments in human life so that Science continues to run on the path of humanity. The working power of axiology includes maintaining and giving direction so that the scientific process can find essential truths. Scientific behavior must be done honestly and not directed towards direct interests. Second, the selection of the object of study can be carried out ethically by not changing human nature, not demeaning human dignity, not interfering in life's problems, and being neutral from dogmatic values, the arrogance of power, and political interests. Third, knowledge development is directed at increasing the standard of living that considers human nature and dignity and the balance and preservation of wildlife through universal wisdom and findings.

## CONCLUSION

Constructivism-Based Science Practicum ontologically, the discussion focuses on the primary form of Constructivism-Based Science Practicum. Does learning exist? How is it different from other learning? Constructivism-Based Science Practicum tries ontologically to prove and examine that Science, in this case, Constructivism-Based Science Practicum, can indeed be proven to exist. Epistemologically, Constructivism-Based Science Practicum relates to the basis, sources, characteristics, truth, and how to apply Constructivism-Based Science Practicum. When there is a concrete manifestation of the application of Constructivism-Based Science Practicum, the Science must or has carried out an axiological test. So, in essence, the axiological study of Constructivism-Based Science Practicum discusses universal values and the value of benefits for human life for this knowledge.

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