LANGGAM:
(International Journal of Social Science Education, Art and Culture)

Volume 5 Number 2 (2026) page 12-18
e-ISSN: 2828-1241
DOI: http://doi.org/10.24036/langgam

The Role of Philosophy of Science Learing Activities Using the Think Talk Write (TTW) Cooperative Learning Model

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Abstract. Social Studies (IPS) learning in schools is often still oriented towards memorization of material and is not fully supported by a philosophical foundation that encourages critical and reflective understanding of students. This article aims to reflect on the relevance of the role of philosophy of science in social studies learning activities through the implementation of the Think Talk Write (TTW) cooperative learning model. This study uses a qualitative approach with a descriptive-philosophical strategy through library research. Data were obtained from major works on the philosophy of science and academic literature discussing social studies learning and the TTW model. The results of the study indicate that philosophy of science plays an important role in strengthening the social studies learning process through the integration of ontological, epistemological, and axiological aspects that are manifested in the stages of thinking, speaking, and writing in the TTW model. The practical implication of this study is to provide a theoretical foundation for social studies teachers to apply the TTW model more meaningfully, not only as a learning technique, but as a means of developing scientific, reflective, and character-based thinking.

Keywords: philosophy of science, learning activities, Think Talk Write learning model.

INTRODUCTION

National education as mandated in the 1945 Constitution of the Republic of Indonesia states that the goal of national education is to educate the nation. Furthermore, Law No. 20 of 2003, Article 3, concerning the National Education System, explains that national education aims to develop students' potential to become people who believe in and fear God Almighty, have noble character, are healthy, knowledgeable, capable, creative, independent, and become responsible citizens. The formulation of these goals shows that education is not only oriented towards mastering knowledge, but also on the formation of ways of thinking, scientific attitudes, and character of students.(Sesriyenti, 2023)

However, in the practice of Social Studies (IPS) teaching, various problems persist, such as a tendency toward teacher-centered learning, memorization, and a lack of encouragement for students' critical and reflective thinking. As a result, IPS teaching is often superficial and fails to fully contribute to shaping students' character and social awareness as citizens. This situation demonstrates a gap between national education goals and classroom learning practices.

Education is not only aimed at transferring knowledge, but also at shaping the scientific thinking and attitudes of students. Philosophy of science plays a significant role in building a scientific, critical, and reflective foundation in the teaching and learning process. These developments in various aspects of education have undoubtedly impacted all those involved in the educational world, including teachers. Teachers play a significant role as the frontline in the educational process. In fact, the quality of human resources graduating from an educational institution is largely determined by the role of teachers.(Hasbi et al., 2023) Project-based learning is a model believed to be able to address this issue. One alternative considered capable of improving

students' conceptual understanding, creative thinking skills, and active and collaborative work in Social Sciences is project-based learning.(Prima & Anwar, 2022)

A method is a means used to achieve a predetermined goal. In the interactive process of teaching and learning, the methods a teacher needs vary depending on the desired goal after the lesson ends. A teacher will not be able to carry out their duties if they do not master any of the teaching methods formulated and proposed by educational experts. (MAZ, 2018)

Philosophy of science is a branch of philosophy that examines the foundations of thought and methods used in science. In the context of education, the philosophy of science plays an important role in shaping students' critical thinking. The philosophy of science teaches how to formulate the right questions, analyse information carefully, and evaluate various perspectives objectively (Mardiana et al., 2024).

Essentially, the philosophy of science is a philosophical study of matters related to science. In other words, the philosophy of science is an effort to study and deepen knowledge (Science), including its substantive characteristics, its acquisition, and its benefits for human life. This study is inseparable from the main references of philosophy, which are included in the fields of ontology, epistemology, and axiology, with various developments and deepening carried out by experts .(Tarigan et al., 2023)

Teachers in the 21st century act as facilitators who provide stimuli in the form of learning strategies, guidance and assistance when students encounter learning difficulties. One of the profiles of effective 21st century teachers is the ability to work collaboratively and guide students to collaborate in learning. Teachers can develop their teaching by using active and innovative learning methods or models so that students will be more motivated and enthusiastic when the teaching and learning process is taking place in the classroom. Mulyono (2021:96)

Vygotsky emphasized that students construct knowledge through social interactions with others. Cooperative learning is a social-based learning approach. Cooperative learning is developed based on cognitive, constructivist, and social learning theories. The constructivist learning approach to teaching broadly applies cooperative learning based on the theory that students more easily discover and understand difficult concepts if they discuss the problem with their peers. This learning can be used to teach relatively complex material and, most importantly, can help teachers achieve learning objectives. (Amalia et al., 2023)

Social studies learning has a strategic role in fostering citizens to build national character. Character is a set of values that have become a habit of life and thus become a permanent trait in a person. The Think Talk Write (TTW) cooperative learning model was introduced by Huinker and Laughlin in 1996. Basically, this learning is built through three main activities, namely thinking, talking, and writing. The think stage begins with, where students think about the problems given. This requires students to actively explore their ability to understand the problem, identify the data needed to solve the problem, generate various social studies ideas, and express them in writing for discussion with their group mates. (Sudrajat et al., n.d.)

Robert Ennis, one of the pioneers in the development of the critical thinking tradition, explains that critical thinking is logical and reflective thinking related to how to determine what should be believed or done. Project-based learning is a model believed to be able to address this issue. One alternative considered capable of improving students' conceptual understanding, creative thinking skills, and active and collaborative work in Social Sciences is project-based learning.(Hermana, 2022)

Therefore, this article aims to examine and analyze the Think Talk Write (TTW) learning model from a philosophical perspective. This study is expected to provide a stronger theoretical foundation for social studies teachers in implementing the TTW model more meaningfully, not only as a learning strategy but also as a means to develop scientific, critical, and character-based thinking in accordance with national education goals.

METHOD

This study uses a qualitative approach with a descriptive-philosophical strategy. The qualitative approach was chosen because this study does not aim to test hypotheses or measure quantitative relationships, but rather to explore in depth the meaning, conceptual foundations, and philosophical implications of the application of the philosophy of science in Social Studies (IPS) learning using the Think Talk Write (TTW) learning model. The descriptive-philosophical approach allows researchers to conduct conceptual and reflective analysis of the scientific theories, ideas, and values that underlie learning practices, particularly in developing students' scientific, reflective, and collaborative thinking skills.(Cicilia et al., 2022)

The type of research used was library research. This research was based on a systematic review of academic literature relevant to the topics of philosophy of science, social studies learning, and the Think Talk Write (TTW) learning model. The literature analyzed included philosophy of science textbooks, educational books, national and international scientific journal articles, and credible online academic documents.

The data sources in this study were divided into primary and secondary data. Primary data came from key works in the philosophy of science and philosophy of education that explicitly discuss the nature of science, the process of acquiring knowledge, and the value and purpose of science in education. These works included textbooks on the philosophy of science and philosophy of education, such as John Dewey's thoughts on reflective education, Karl Popper's ideas on rationality and scientific criticism, and contemporary philosophy of science literature discussing ontology, epistemology, and axiology in the educational context.

Secondary data included journal articles and books discussing social studies learning theory, cooperative learning, the Think Talk Write (TTW) model, as well as the results of previous research examining the effectiveness of TTW in learning, both from a cognitive, affective, and thinking skills perspective. Data collection was conducted through a documentation study with several systematic steps. The researcher conducted a literature search using academic databases such as Google Scholar, Garuda, and national and international journal portals. Keywords used included "philosophy of science in education," "philosophy of science in education," "social studies learning," "Think Talk Write model," "cooperative learning in social studies," and keyword combinations such as "Think Talk Write and philosophy of science." The researcher established inclusion and exclusion criteria for the literature. Included sources were thematically relevant to philosophy of science, social studies learning, and the TTW model, written by credible authors, and published within the last 5–10 years (2015–2025) to ensure the novelty and relevance of the study. The findings were relevant to the research objectives. Next, the data were classified based on key themes, such as the concept of philosophy of science, characteristics and stages of the TTW model, and the values of scientific thinking in social studies learning.

The data analysis, namely: data reduction to select and simplify information in accordance with the research focus. Classification and organisation of data according to themes, such as the concept of philosophy of science, characteristics of the TTW model, and the application of scientific values in social studies learning. Compilation of scientific narratives, which means presenting the results of the analysis in a systematic and reflective manner so as to build a comprehensive and mutual understanding of the relationship between the philosophy of science, social studies learning activities, and the application of the TTW model. This analysis stage is expected to present a conceptual and philosophical description of how values in the philosophy of science (such as rationality, objectivity, and critical reflection) can strengthen students' thinking and collaboration processes through the Think Talk Write (TTW) learning model.(Roisah et al., 2023)

RESULTS AND DISCUSSION

The study's findings demonstrate that the philosophy of science plays a fundamental role in developing meaningful Social Studies (IPS) learning. The philosophy of science serves not only as a theoretical framework but also as a reflective foundation that guides how knowledge is understood, acquired, and interpreted in the learning process. In this context, the Think Talk Write (TTW) learning model can be viewed as a pedagogical instrument capable of translating the principles of the philosophy of science into classroom learning practices. IPS learning grounded in the philosophy of science encourages students to go beyond memorizing social concepts to understanding social reality critically, reflectively, and with value. TTW provides a structured learning activity aligned with the scientific process: thinking (reflection), speaking (dialogue and verification), and writing (articulation and justification of knowledge). Therefore, the relationship between the philosophy of science and TTW is substantive, not merely technical.. (Hidayat et al., 2024)

Togain a deep understanding of the application of the Think Talk Write (TTW) model in the learning process, it is important to study the philosophy of science, which covers three main aspects: ontology, epistemology, and axiology. Ontology investigates things to be known about the theory of "being", or how the essence of an object is investigated to obtain knowledge. From an ontological perspective, TTW views learning as an active activity involving thinking, discussion, and writing. This view is in line with the idea that linguistic output, including students' writing, does not arise in a social vacuum, but is a reflection of the individual's environment and experiences (Usmaulidar & Fitria, 2024).

The Think Talk Write (TTW) learning model is an approach that is in line with the principles of the philosophy of science. (Fajriani et al., 2025) TTW not only emphasises the transfer of knowledge, but also creates a reflective, dialogical, and expressive thought process. In its implementation, TTW encourages students to think independently (think), communicate and test ideas (talk), and then record their scientific reflections (write). These three steps reflect a mini version of the scientific process that shows the stages of a scientist's thinking: formulating ideas, discussing, and compiling results in scientific form. Therefore, TTW

serves as a real bridge to apply the principles of the philosophy of science in the social studies learning process.(Setyawan, 2024)

1.1 Epistemological Aspects: in the *Think Talk Write* (TTW) Model

Epistemologically, the philosophy of science highlights how knowledge is acquired, validated, and accounted for. The TTW model implicitly represents the epistemological process in social studies learning. (Pajriani et al., 2023)

In the Talk stage, students acquire knowledge through intersubjective dialogue and discussion. This process allows for the testing of ideas, clarification of concepts, and validation of truth through rational argumentation. Knowledge is not passively received from the teacher, but is constructed through a process of negotiating meaning and logical proof with peers. From the author's perspective, the Talk stage is the epistemological core of TTW because it is here that the verification and correction of knowledge takes place. (Setiawaty et al., 2023.)

The Writing stage, there is an epistemic synthesis where students write down the results of their reflections and discussions in a structured scientific writing format. This writing marks the phase of epistemic justification, which is the process of organising tested knowledge into a logical structure that is academically accountable. In this case, TTW functions as an integrative medium that combines reflective thinking, scientific dialogue, and academic communication in a single learning process that focuses on strengthening scientific thinking patterns. In social studies learning, it is also closely related to the Think Talk Write learning model. (Salsabila et al., 2025)

Therefore, the application of the TTW model in social studies learning not only strengthens students' cognitive skills but also affirms their role as active epistemic actors in constructing and testing knowledge. This process is in line with the essence of epistemology in the role of scientific philosophy, which positions knowledge as the result of a dynamic interaction between reason, experience, and critical reflection in an effort to understand social reality scientifically. (Setiawaty et al., 2025)

1.2 Axiological Aspects : in the *Think Talk Write* (TTW) Model

The axiological aspect of the philosophy of science relates to values, ethics, and the purpose of using knowledge. In the context of social studies learning, TTW not only develops cognitive abilities but also instills scientific and humanitarian values. In the context of social studies learning, this dimension relates to how acquired knowledge is used to shape civilized social attitudes, values, and behavior. The Think Talk Write (TTW) model is a strategic vehicle for instilling scientific and humanitarian values through critical thinking, ethical dialogue, and reflective writing activities.(Roisah et al., 2023)

The Think phase fosters the values of intellectual honesty and individual responsibility in understanding social issues. Students are trained to think objectively, to avoid hasty conclusions, and to respect data and facts. The Talk phase fosters the values of empathy, tolerance, and ethical dialogue. Through discussion, students learn to respect differences of opinion, present arguments politely, and resolve differences rationally. (Santi et al., 2022).

The Write phase instills the values of academic integrity and social responsibility. Writing encourages students to express ideas honestly, systematically, and responsibly. From an axiological perspective, the authors view TTW as a learning model that is not only oriented toward learning outcomes but also toward the development of students' scientific character and social ethics..(Sinaga, 2019)

1.3 Ontological Aspects i: n the *Think Talk Write* (TTW) Model

From an ontological perspective, the philosophy of science examines the nature of reality, the object of scientific study. In social studies, social reality is understood as dynamic, complex, and multidimensional. The TTW model helps students understand the nature of this social reality through active and reflective learning stages.(Arifin et al., 2019).

In the Think stage, students are confronted with social problems or phenomena that require in-depth reflection. In this phase, students learn to recognize the essence of a social event, distinguish between fact and opinion, and realize that social reality is not singular. This stage builds ontological awareness that social phenomena are always related to the context of space, time, and human experience. (Gustina & others, 2025)

The Talk stage then enriches ontological understanding through social interaction and discussion among students. In dialogue, reality is viewed as a construct formed collectively through the exchange of meaning and experience. In this way, students learn that social truth is not singular but is created through shared understanding and negotiation of meaning among social individuals.(Hartono, 2022)

Tabel 1. Matrix Table of Relationships between TTW Stages and Philosophical Aspects of Science

TTW Stages	Epistemology (How to Acquire Knowledge)	Axiology (Values and Ethics)	Ontology (The Nature of Reality)
Think	Knowledge is constructed through reflection and initial contemplation.	Intellectual honesty, curiosity, responsible thinking	Students understand social reality as a complex and multidimensional phenomenon.
Talk	Knowledge is validated through discussion, dialogue, and argumentation.	Empathy, tolerance, ethical dialogue, and cooperation	Social reality is understood as the result of joint construction through interaction.
Write	Scientific justification and systematization of knowledge.	Academic integrity, social responsibility, and scientific ethics	Understanding of reality is crystallized in the form of written representations.

Based on the analysis, it can be concluded that the Think Talk Write (TTW) model is a practical representation of the application of the philosophy of science in social studies learning. TTW allows the integration of ontological, epistemological, and axiological aspects in a complete manner in one learning series, so that social studies learning is not only technical, but also meaningful, reflective, and oriented towards the formation of students' scientific character.

CONCLUSIONS AND SUGGESTIONS

Based on the study's findings, it can be concluded that the philosophy of science provides a strong conceptual foundation for implementing the Think Talk Write (TTW) learning model in Social Studies. The integration of ontological, epistemological, and axiological aspects within the TTW stages demonstrates that Social Studies learning functions not merely as a means of knowledge transfer but also as a process for developing scientific, reflective, and value-based thinking. Thus, TTW is not simply a cooperative learning model but a practical representation of the scientific process that enables students to understand social reality, construct knowledge rationally, and internalize human values.

The main implication of this research is that the success of TTW implementation does not lie solely in the final written product (Write), but rather in the quality of the scientific thinking process and dialogue that occur during the Think and Talk stages. Therefore, Social Studies teachers are advised to design TTW learning that provides ample space for open discussion, exchange of arguments, and critical reflection by students. Teachers should also give proportional weight to the dialectical process (talk), as this is the stage where knowledge is validated, truth is tested, and scientific attitudes and academic ethics are formed. Furthermore, the teacher explained that she facilitated the Think phase with contextual and reflective prompting questions, and positioned the Write phase as a means of synthesizing knowledge, not simply an administrative task. With this approach, the TTW model can be implemented more meaningfully and in line with the objectives of

social studies, which are oriented towards developing critical thinking skills, social responsibility, and students' scientific character.

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