

# ETHICS AND LOGIC ANALYSIS IN THE DEVELOPMENT OF SCIENCE, TECHNOLOGY, AND ARTS

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## Abstract

This article was written to explore the relationship between ethics, logic and art and science. The results of this article show that science is unlimited and in its use it should always be based on ethics which serves to contribute considerations about the good and bad, right and wrong of the use of science. Then between logic, ethics and art become an inseparable part of the development of science. This research uses a literature study method by looking for various sources of data from books, journal articles, proceedings and relevant seminars. Search for literature sources by utilizing the Google Scholar database, the Garuda Publication Indonesia Index (IPI) Portal, nationally accredited journals (SINTA), Google Books, Printed Books and other reference sources.

**Keywords:** ethics, logic, science and technology

## INTRODUCTION

The rapid development of Science and Technology (IPTEK) has now become a daily reality and is even a non-negotiable demand of society. The main goal of the development of science and technology is to change the future of human life that is better, easier, cheaper, faster and safer, provides no small benefits for humans, to meet various needs and help humans overcome some of the problems they face.

The relationship between ethics and science is like two sides of a coin that cannot be separated. In addition, when examined by nature, human ethics and science essentially come from religion and religion comes from God. As a challenge in this global era, how to integrate ethics and science for all of us so that a synergistic, systematic and functional relationship can be realized for both of us. Ethics does not keep science away, and likewise science does not leave ethics, but ethical scientists, and ethics with science. Not only the relationship between ethics and science and technology, but also with art which has many meanings and meanings for human life so that they can apply ethics according to its meaning.

## RESEARCH METHOD

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research is literature study or literature study by looking for various sources of data from books, journal articles, proceedings and relevant seminars. Search for literature sources by utilizing the Google Scholar database, the Garuda Publication Indonesia Index (IPI) Portal, nationally accredited journals (SINTA), Google Books, Printed Books and other reference sources.

## RESULTS AND DISCUSSION

### A. Basic Concepts of Ethics

#### Understanding Ethics Etymologically

Ethics comes from the Greek language, namely ethos which means character, moral character or customs where ethics is closely related to the concept of individuals or groups as a means of assessing the truth or evaluating something that has been done, while in English ethics is ethics. The term ethics comes from the ancient Greek language. The singular form of the word "ethics" is ethos, while the plural form is ta etha. Ethos has many meanings, namely: an ordinary place to live, a meadow, a stable, habits, morals, feelings, attitudes, ways of thinking, while the meaning of ta etha is customs. (Subhayni, 2017)

The meaning of this plural form is the background for the formation of the term ethics which Aristotle uses to denote moral philosophy. So, etymologically (the origin of the word), ethics has the meaning,

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According to the Big Indonesian Dictionary (KBBI), "ethics" has 3 meanings: The science of what is good and bad and about moral rights and obligations (morals) A collection of principles or values relating to morality. Values about right and wrong held by a group or society. Ethics is usually closely related to the word moral which is a term from Latin, namely "Mos" and in its plural form "Mores", which also means customs or a person's way of life by doing good deeds (decency), and avoiding bad action stuff. Ethics and morals have more or less the same meaning.

#### **Definition of Ethics According to the Terms**

Ethics is the science of what is good and what is bad and of moral rights and obligations (akhlak); a collection of principles or values relating to morality; values regarding the value of right and wrong, held by a group or society. (Big Indonesian Dictionary, 1989)

Ethics is a science that discusses how and why we follow certain moral teachings or how we must take a responsible attitude in dealing with various moral teachings. (Franz Magnis Suseno, 1987)

Ethics is actually more concerned with the basic principles of justification in relation to human behavior. (Louis O Kattsoff, 1986)

Based on some of the above thoughts, ethics according to Bertens, as quoted by Abdul Kadir, gives three meanings of ethics, namely:

1) Ethics is used in the sense of values and moral norms that become the guideline for

a person or group in regulating their behavior. This meaning can also be called a value system in individual human life or community life.

2) Ethics is used in the sense of a collection of moral principles and values, what is meant here is a code of ethics

3) Ethics is used in the sense of the science of good or bad. The meaning here is the same as moral philosophy

#### **B. Basic concepts of logic**

##### **Understanding Logic Etymologically.**

Logic is derived from the Greek adjective *logike*, which is related to the word *logos*, which means thoughts or words as statements of thought. Surajiyo, Sugeng Astanto, Sri Andiani (Surajito et al, 2005). Logic is derived from the word *logos* which means words or words. Another term used instead is *mantiq*, an Arabic word taken from the verb *nataqa* which means to say or speak. (Mundiri, 1994)

##### **Understanding Logic According to Terms**

Logic is the science and skill of righteous thinking. (Soekadijo, RG. 1999). Logic is a reasoning or thought that is regulated through words and expressed in language. (Jan Hendrik Rapar 2003). Logic is the science and skill of reasoning, thinking correctly. (W. Poespoprodjo, Ek. T. Gilarso, 2006) Logic is a method or technique created to examine the accuracy of reasoning. (Soekadijo, 1999)

Aristotle: logic is a teaching about thinking that scientifically discusses the form of the mind itself and the laws that govern the mind. (Harun Hadiwijono, 1980)

William Alston: logic is the study of inferences, more accurately an attempt to establish measures to separate valid and invalid inferences. (Surajiyo, et al. 2005)

##### **Understanding Logic in Daily Life**

Logic is a science in which the material object is thinking (especially reasoning/reasoning processes) and the formal object is thinking/reasoning in terms

of accuracy. Logic is a practical branch of philosophy. Practical here means logic can be practiced in everyday life. Logic was born together with the birth of philosophy in Greece. In an attempt to market his thoughts and opinions, ancient Greek philosophers often tried to refute other's ideas by pointing out fallacies of reasoning. (Bambang Kusbandrijo, 2016)

Logic as a science where the material object is thinking (especially reasoning/reasoning process) and the formal object of logic is thinking/reasoning in terms of accuracy. Reasoning is a human thought process that tries to arrive at a new statement which is a coherent continuation of another known statement (the premise) which will later be concluded.

Logic is also a skill to apply the laws of thought in practice, this is what causes logic to be called practical philosophy. In the process of thinking, there is consideration, describing, comparing and connecting one understanding to another. Logical investigations are not carried out with arbitrary thinking. The logic of thinking is seen from the point of straightness or accuracy. A logical thought will be called straight if the thought is in accordance with the laws and rules that have been set in logic. From all the things that have been explained above, it can be shown that logic is a guide or guide for thinking.

### **C. Contribution of ethics in the development of science and technology and the arts**

Ethics is an important thing in human life, because it is closely related that humans have customs which means having ethics in the human mind. Ethics is a good or bad human action that occurs in human life.

Likewise, science is used to refer to when humans know something. The element of knowledge is knowing, being known, and being aware of what it wants to know. Knowledge is the result of human

knowing something, or all human actions to understand the object it faces, the result of human efforts to understand a certain object. Science is taken from English science, which comes from the Latin *scientia* from the verb *scire* which means to study, to know.

Ethics in relation to science means dealing with issues of value in science, both in content and in its users. Ethics also has a relationship with art which has a broad meaning and a variety of meanings.

And closely related to art which has a broad meaning "art" (art) can be said to be anything made by humans, and not the result of natural activities (John Hospers, 1967). Here, a distinction is made between art in a broad sense and art in a narrow sense. The object of art in a narrow sense is what is called fine art. There are various theories about the essential nature and function and art

Some say that "ultimate form" is the only attribute that is important to art. Thanks to this characteristic, a work of art, especially visual art and music, can be recognized by various observers who come from various eras and cultural backgrounds. Another theory emphasizes art as an expression of human feelings. However, the word "expression" here can be intended as a process that occurs within the artist or what is implied in the work of art itself. The first emphasis is what happens inside the artist, where he is stimulated by an emotional urge whose origins are only clear when he finds a form of expression. This process is accompanied by a sense of relief and new understanding. While the second emphasizes the quality contained in the work of art itself which is an expression of human qualities and their experiences. (Sunarto, 2004)

Art has a theory and a broad or narrow meaning, but get it in a simple way that art is the result of human behavior as embodied in the good and bad behavior of humans contained in the human mind.

Although there is a great deal of variation in the ways in which the value of art is interpreted, there is fairly generally accepted agreement that the central norm for a work of art is its unity, which is often called organic unity (John Hospers, 1967). This norm emphasizes the unity between the parts of works of art, so that the parts must be integrated as a unified whole and balanced. In terms of works of art, if a certain yellow color is removed from a painting that originally had that color, the overall value of the painting will change completely.

In essence, ethics observes moral reality by examining habits, values, norms and moral views critically. In the *Ensyklopedia Brytannica* explained that ethics is the systematic study of the nature of value concepts, good, bad, ought, right, wrong, etc. and of the general principles which justify in applying them to anything educational institutions if ethical problems become involved in shaping character. In PA (Lukmasari, 2018)

#### **D. Contribution of logic in the development of science and technology and art**

In the previous chapter, the basic concepts of logic and ethics have been discussed, then the contribution of ethics in the development of science and technology. Next is about the contribution of logic in the development of science and technology.

We all know that the philosophy of science prioritizes ontologically in rationalizing knowledge, but the characteristic of rationalizing knowledge is basically logic itself. Therefore, the most important thing in the philosophy of science is not about understanding or not but logical or illogical.

Logic is basically a science that examines knowledge in the form of images and justifications that are already known as a path that leads us to unknown knowledge. (Martin Putra Perdana, 2021) Martin further

explained that logic is also a tool to regulate reason which, if obeyed, will be able to keep us from misguided thinking.

So it can be concluded that logic is a science that views knowledge from the side of right and wrong. Knowledge of right and wrong is based on arguments that can be justified with the suitability of reality. Therefore, in the process of knowledge, the position of logic can be interpreted as the main door to obtain correct knowledge.

This is also confirmed by Alfarabi in the journal Edwin Syarif that logic is a tool to seek the truth of knowledge. So logic is a form of reasoning to think systematically and rationally. (Edwin Syarif, 2016). Then logic as a tool for scientific thinking includes two forms of reasoning, namely inductive reasoning and deductive reasoning.

Reasoning is the ability to see and respond to what is seen. Because basically humans as creatures who develop knowledge. With the use of systematic logic, then humans make reasoning based on logical and illogical which ultimately gives birth to science.

Science cannot be separated from deductive reasoning, deductive reasoning is reasoning that discusses ways to reach conclusions if questions have been asked about a thing first. In the journal *El-Banat* stated that deductive reasoning is a framework or way of thinking that departs from an assumption or statement that is general in nature to reach a conclusion that is specific. (Imron Mustofa, 2016)

While inductive reasoning is a way of thinking to draw conclusions from observations of particular things into general or universal phenomena. (Imron Mustofa, 2016)

It is this reasoning ability that ultimately results in science whose rationality has been tested. In the end, this reasoning activity cannot be separated from logic itself in the journal *Widyatech* stating that basically knowledge is very closely related to

reasoning. Reasoning activities cannot be done apart from logic. Not just any thinking activity can be called reasoning. Because reasoning is an activity of thinking according to the principle of straightness of thinking or in accordance with the laws of logic. (I Nyoman Kartayasa, 2011).

The science of logic in guiding humans to think correctly, logically and systematically has many benefits in the development of science, namely:

- a. Make the power of thought become sharper and develop through thinking exercises. Therefore, they will be able to analyze and uncover problems coherently and scientifically.
- b. Making someone think right so they can put things in their place and do things at the right time (thinking effectively and efficiently)
- c. Makes a person able to distinguish the right line of thought and the wrong line of thought, so that one can produce the right conclusions and avoid drawing the wrong conclusions.
- d. Help everyone who studies logic to think rationally, critically, straight, steady, orderly, methodical and coherent.
- e. Improve the ability to think abstractly, carefully and objectively
- f. Increase intelligence and improve the ability to think sharply and independently
- g. Forcing and encouraging people to think for themselves using systematic principles
- h. Increase love for the truth and avoid thinking errors, mistakes and misguidance
- i. Able to analyze an event (Ainur Rahman Hidayat, 2018).

According to Vitaly Kiryushchenko in his writings, he said that the relationship of

logic to give birth to a science has been discussed by philosophers for a long time, especially in classical philosophy, which in the end is also closely related to the concept of aesthetics in art. (Vitaly Kiryushchenko, 2020)

In the end, the development of real science cannot be separated from great curiosity which is of course accompanied by serious efforts through logic, reasoning, experimentation, refinement and daring to take risks and then produce discoveries that are beneficial for generations and become a reference for consideration for future generations. the next generation to correct, refine and develop scientific findings.

## CONCLUSION

The conclusion of this article is that the relationship between ethics and science is that science is not limited in its use, it should always be based on ethics which serves to give consideration to good or bad, right or wrong from the use of science, so ethics becomes a reference or guide for science. in the realization of its development. Science in the teaching of ethics is an inseparable link. Ethics functions as behavioral signs, so that the meaning of science is so beautiful and peaceful to realize perfection and responsibility.

In addition to ethics with science and technology and art. The conclusions regarding logic with science and technology and art that have a real relationship cannot be separated from a great curiosity which is of course accompanied by serious efforts through logic, reasoning, experimentation, refinement and daring to take risks and then produce useful discoveries. for generations and become a reference for future generations to correct, refine and develop scientific findings.

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