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# Contribution of Basic Education to Earth Governance Systems and Future Social Sciences

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## ABSTRACT

Scientific literacy has become a fundamental focus of Education and is related to the ability to criticize scientific discussions. From the beginning we are required to be able to make decisions by individuals and have a sense of responsiveness to public issues related to science but do not rule out access to get it all must be good both in terms of learning in elementary school. Learning is divided into two, namely conventional and problem based learning based on scaffolding. The result of this article is the need to increase mathematical modeling skills in students with a problem based learning approach is higher than conventional. So Problem based learning will certainly have a positive effect to tackle global warming by applying five main challenges and correlating the relationship of the earth's governance system to social science with elementary education input as the spearhead of generational change for the better.

**Keywords:** Problem based learning based on scaffolding, mathematical modeling, elementary school, earth's governance system, social science

## INTRODUCTION

Scientific literacy as a comprehensive concept which includes the development of knowledgeable citizens who are able to consider and examine complex social issues related to science [1]. Scientific literacy is a centered fundamental of education. The initial construction of scientific literacy, which involves contextual learning, a list of facts, views on scientific literacy integrating understanding of scientific content in the context of socio issues whose resolution mediates the nature of scientific practice, moral and character development and cultural perspectives needed for responsible citizenship [2, 3]. The argument for scientific literacy reflects the orientation and interest to actualize scientific literacy. It can be distinguished in 4 choices, namely: (1) Culture: knowledge from reading and comprehend issues related in the media; (2) Utilitarian: possesses important knowledge, skills and attitudes as scientists, engineers or researchers; (3) Democratic: exploring knowledge and understanding of science that includes science, technology, and society; and (4) Economy: developing knowledge and capabilities that are essential for economic growth and facing effective competition in global markets [4, 1].

Someone reads and comprehend issues related to science and technology, then can make decisions from that information is a culture of scientific literacy. Scientific literacy is how to understand essential knowledge, skills, and attitudes [5, 6]. According to, a scientific literacy framework consists of four aspects: (1) scientific knowledge; (2) the nature of scientific investigations; (3) science as a way of thinking; and (4) interaction of science, technology, and society [7, 8]. Scientific literacy enables one to become aware and responsive to public issues related to science (such as health, energy, natural resources, food, and the environment). Therefore, humans must have a broad knowledge and understanding of science - including the implementation of science, technology and society. People

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has scientific literacy must be aware of public issues related to science, be able to make decisions making and hence improve their quality of life. It is based on educational skills that involve intellectual, attitude, communicative and social learning obtained in basic education and the community environment.

The current problem faced by scientists is the balance of the earth's governance system to the social sciences studied by [9, 10, 11, 12, 13] which requires addressing the instillation of love of nature since elementary education so that the impact of the social system on the system Earth's governance in the future can be less than the past. In Indonesia, there are still many basic learning standards, one of which is speaking politely. The learning is good, it's just that the level of learning is too basic so character building will be slow [14]. Therefore, The role and update of elementary school teachers knowledge are very much needed to support basic science and love of nature. This research was conducted with a qualitative approach, a way whom press with the facet of exhaustive understanding of a problem than perceive to the problem for generalization study [15]. Literature studies at least provide benefits to increase the sensitivity of the researcher's theory to find object that are necessary to the data and comprehend it [16]. Therefore, this article has many literary links that discuss early education in elementary education, earth governance systems and social sciences which are collaborated by looking at the relationship between one another. As for later this article discusses the strategy of Biermann by answering five criterion challenges that link its relationship with elementary education.

## SCIENTIFIC LITERACY IN ELEMANTARY EDUCATION

Scientific literacy has a goal of education in which educators and scientific literacy-based organizations have developed thoughts and highlighted the characteristics of knowledge and skills. Scientific literacy as knowledge and understanding of scientific concepts and processes needed for personal, cultural, and socioeconomic decision making [17, 18]. Each individual should be able to (a) answer questions that arise from anomaly of individual about daily event; (b) analyze and forecast the emergence of native phenomena; (c) reasoning information in the media and engaging in public social discussions; (d) identifying scientific problems globally; (e) decisions making posit scientific technological and scientific knowledge; (f) analyzing scientific information posit on the suitability and validity of the source; and (g) evaluating information based on scientific evidence [19]. Students who have mastered scientific literacy since basic education will be more proficient in the life of the community and the state.

The PISA framework formulates scientific literacy as the ability to implement scientific knowledge and processes to decide on changes in human activities [20, 21]. According to PISA, scientific literacy helps individuals in identifying scientific problems; reasoning new knowledge; identify phenomena and infer science-related issues based on evidence and facts; explain the characteristics of science embodied in the research and human knowledge that shapes intellectuals and culture.

[22] argues that students have to be able to understand and apply the impact of science and technology in daily life, utilizing scientific and technological progress; apply scientific concepts and processes in decision making. Science literacy reflects some of the abilities, development and implementation of abilities as a growth process and which grows for life. Scientific literacy is structured from implementing the essential concepts of science and technology to making understanding more complete. The scientific literacy framework consists of: nominal, functional, conceptual and procedural, and multidimensional. While the lowest level, nominal scientific literacy, consists of minimal knowledge about names and terms from the fields of general science, the highest level, multidimensional [23, 24].

Scientific literacy as a mental process in solving scientific problems, knowledge used to solve this process and aspects of student attitudes in the problem solving process. An understanding of how science and technological development shape us, the intellectual and cultural environment. Availability to be involved in issues related to science and with science ideas, as reflective students.

## SOCIO SCIENTIFIC

The relationship between STS and the nature of science is enhanced in science teaching that centered on social scientific problem, thinking, and scientific opinion. [25] states that science teachers do the initial introduction of socio-scientific problems in the classroom. This study detects that science teachers are an initial bridge in providing an understanding of socio-scientific teaching in basic education. teachers believe this problem is based on the scientific value of books, knowledge from society, personal experience and social ethics.

This research shows that science teachers perceive socio-scientific problem-based teaching in a way to introduce

information about the nature of science. [26] provide examples of classrooms that show how to develop instruction based on socio-scientific issues on the problem of global warming. About issues that have to do socially with student life in today's society. The ability that developed in this way necessary for student take part in community discussions about their future growth to be scientifically literate citizens.

The definition of PISA and the STS predicts that students will be able to apply scientific knowledge in which rational thinking, evidence and conclusions are linked to make integrated and sustainable decisions in the face of personal, social and global life. the use of empirical arguments can help communicate effectively, otherwise their voices will not be heard.

The learning ideology is divided into two visions, namely (1) scientist-centered and focused on decontextual science subjects, (2) student-centered and context-driven, with the aim of integrating students into local, national, and global communities [27]. [28] suggest that there are two senses that interact with each other from the literacy of contemporary disciplines: fundamental understanding and hereditary understanding. Fundamental understanding classifies the ability, emotional disposition, and information and communication technology, while the understanding obtained summarizes purpose of the content associated with comprehensions great ideas of science, the nature of science, scientific inquiry, technology design, and the relationship between STSEs.

Recently, science education researchers called vision III which emphasizes the combination of abilities, skills, dispositions, and knowledge on STSE [29]. Based on the work of [30, 31] identifying three interacting groups involved in vision III: fundamental literacy in science, understanding of big ideas, and fuller participation in public debates on socio-scientific issues that result in system-based decisions. earth governance.

In 2001, the four global change programs DIVERSITAS, the International Geosphere-Biosphere Program, the World Climate Research Program, and the International Human Dimensions Program. This research group sure to the earth system now operates far from common conditions and even human activity exceeds natural variability [9]. Changes in the global environment will be hard to stop. That's why we must ready for fast changes and sustainable livelihoods if the earth's governance system touch livelihoods.

## **MATERIAL AND METHODS**

This research is a descriptive study, which describes the contribution that basic education must make to Earth Governance Systems and Future Social Sciences starting from now. This research instrument is based on previous research, namely [9, 10, 11, 12, 13] which focuses on earth governance systems with five research challenges, namely agency, architecture, accountability, allocation and adaptiveness. This research is related to the relationship of social science in the future. This study describes the contribution that basic education must make as an initial bridge to introduce the synergy between nature and social science. The research procedure has several stages: (1) investigating the phenomena that occur in elementary school teachers; (2) looking for problems from the phenomenon; (3) find solutions to problems; (4) carry out further investigations or research; (5) conducting a literature review; (6) compiling research instruments, namely connecting Biermann research with social science; (7) conduct analysis; (8) draw conclusions. Data collection in the form of scientist unrest and the role of basic teachers with reference to German research collaboration and social science.

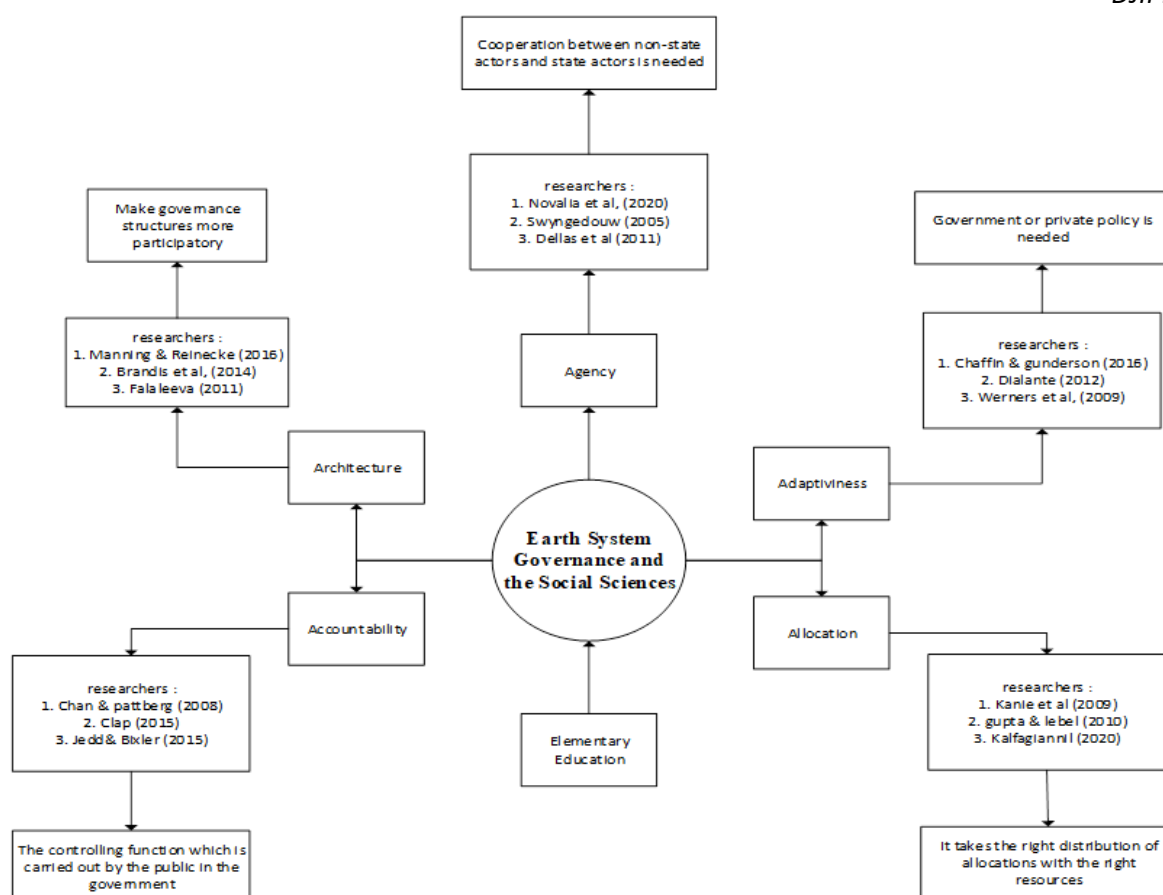


Figure 1. Five Research Challenges

This research mapping is drawn from the overall conclusion of the literature on the development of the relationship between social and earth management systems where the input is elementary education as an initial education introducing environmental and social issues. The results of these five challenges are as follows:

1. Architecture, how to make the governance structure more participatory.
2. Agency, there is cooperation and mutual care between the people and the government in terms of creating a good governance system.
3. Adaptiveness, Adaptive governance is not the only answer to problems related to governance of the earth system. Therefore, government and private sector policies are required following a dynamic change in governance systems.
4. Accountability, government accountability in issuing policies
5. Allocation, the right allocation to answer the problems of earth governance so that do not waste resources.

## RESULTS AND DISCUSSION

Early childhood education is the beginning of forming an environmentally friendly character. Building character here is education that implant knowledge, love, and inculcation of good behavior in which the value of this character must be repeated in order to become a daily habit. In general, the mathematics learning model has not emphasized the problem-solving ability, there are still many teachers using conventional models that explain the material, provide examples and practice questions so that students are trained to work on problems such as machines and tend to be textbooks and are less related to daily life. So we need a PBL (Problem Based Learning) model with schoology-assisted scaffolding which is learning where students exert their ability to find and develop their own knowledge and are oriented towards mathematical daily experience to apply mathematics in daily life, and with school logic students can see the material / material aired every time so that it can grow its independence and not depend on others [32].

The application of the PBL (Problem Based Learning) model with schoology-assisted scaffolding in the mathematics learning process will help students strengthen their problem solving abilities and independent

character [33]. Thus students will be able to formulate, break and interpret mathematics in various contexts. The hope, teachers can present learning material online (smartphones and tablets) and offline that is easily accessible to students. Teachers can upload learning materials in various forms and formats such as documents, audio, video, etc. that can be downloaded via devices such as smartphones, tablets or computers. This learning method has many advantages such as being easy to carry anywhere (portable) and without the limitations of space and time in accessing learning.

There is an increased Mathematical Modeling Ability in students who are given learning with PBL based on scaffolding compared to traditional learning. The results of data processing with Univariate Analysis of Variance are presented. The use of PBL learning methods will certainly have a big effect on students starting from elementary education on earth management systems. The development of a learning model can reduce the risk of environmental damage by building character. The future, of course, will be a change of generations where the younger generation will make a better earth management system by applying the five main principles of research based on architecture, agency, adaptability, accountability and allocation. These five challenges, of course, each challenge has its own challenges that must be corrected and has a strong correlation between the environment, government, society, non-government actors and policies that must all be followed and obeyed.

## CONCLUSION

Based on the data and discussion, it can be concluded that there is an increase in the ability and influence of the interaction between mathematics learning approaches in students who are given scaffolding-based PBL learning compared to traditional learning. Therefore, good basic education is needed to reduce the negative impacts of changes in the earth's governance system through a character in loving the environment and being responsible. an approach to overcome it requires these five challenges and a sense of responsibility to preserve the earth in every individual, be it the community, government or private.

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