

**DEVELOPING LEARNING MODEL OF ENVIRONMENTAL  
EDUCATION COURSE BASED ON ETHNO STEM FOR  
PRESERVICE TEACHERS TO ENHANCE SUSTAINABILITY  
LITERACY**

Submitted as fulfilment for Doctoral Degree in  
*Universitas Pendidikan Indonesia*




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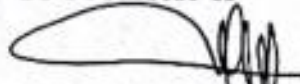
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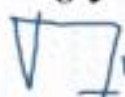
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## SHEET OF DECLARATION

I do hereby declare that every respect which is written in research paper entitled “Developing Learning Model of Environmental Education Course based on Ethno-STEM for Preservice Teachers to Enhance Sustainability Literacy” is genuinely pure result of my own original ideas, efforts, research, work and not copy or plagiarized from other papers. The opinions or findings of others which is contained in this research paper have been quoted or referenced based on scientific code of conduct and accordance with an ethical science that applies in scholarly society. This declaration is created truthfully and consciously, when subsequently it is found an infringement towards scientific ethics, or if there is a claim of any others towards the authenticity of this research paper, hence I am willing to responsible and accept academic sanctions correspond to applicable rules.

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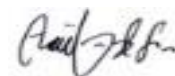
## PREFACE

All of praises and gratefulness are always raised to Allah SWT for all His mercy and grace so the writer can finished of the research paper to fulfillment of the requirement for Doctoral Degree's of Science Education at Universitas Pendidikan Indonesia. This research paper entitled "Developing Learning Model of Environmental Education based on Ethno-STEM to Enhance Sustainability Education". *Shalawat* and *salam* may always devoted to Prophet Muhammad SAW, to all his families, relatives, and also to all Muslims around the world.

The research was conducted to develop learning model to enhance sustainability education based on ethno-STEM. This research paper is the last demands and requirements for all university students in educational major to finish their study and obtain Doktor. There are five chapters in this research paper that describes how is learning model can be implemented in any subject matter including enhancing sustainability education, the research paper consists of introduction, supportive theory, research methodology, result and discussion of the research, conclusion and recommendation.

The perfection belongs to Allah SWT, the author realizes that this paper still has so many weakness that have to be improved. Therefore, the writer expects comments and suggestion are most welcome to improve the quality of learning process in the future. Hopefully the results that presented in this research paper can be useful and can be more improve by the other researcher.

Bandung, 2022



The Author

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# **DEVELOPING LEARNING MODEL OF ENVIRONMENTAL EDUCATION COURSE BASED ON ETHNO STEM FOR PRESERVICE TEACHERS TO ENHANCE SUSTAINABILITY LITERACY**

## **Abstract**

Indonesia, as a large nation have abundant human resources and local wisdom should be a play a great role in the development of science and technology. Integrating Indonesia local wisdom and STEM Education can be used by utilizing the principles of STEM based on local wisdom. This study aims to develop and validate a learning model that can improve the sustainability literacy of students by emphasizing Indonesian local wisdom. This study found a new model namely Ethno-STEM Learning Model, it was developed, validated, and implemented to enhance preservice teachers' sustainability literacy. Four sustainability literacy aspects were used there are conceptual awareness, identity development, skill development, and developing confidence. The main characteristics of Ethno-STEM are defining local-wisdom problem/local wisdom products design challenge, build possible solution to solve local wisdom problem/products design challenge, constructing functioning product of local wisdom, testing the prototypes of local wisdom products, and redesign the prototypes of local wisdom products and communicate the solution of local-wisdom problem. Design and Development Research was implemented in this study. The subjects in this study consist of 47 pre-service teachers of elementary education department who are taking environmental education courses at Esa Unggul University in Jakarta. Three themes of worksheet based on Ethno-STEM Learning Model were used in this study are eco-friendly boat, drying fish machine, and water purifying system. Those three themes were implemented in lectures for 1 semester in 14 meetings x 3 credits and 2 meetings for exams (middle and final exam). The projects were carried out in groups, each group carried out 3 projects starting from an eco-friendly boat, drying fish machine, and water purifying system. A set of sustainability literacy test were developed, validated and implemented. The results of this study Ethno-STEM Learning Model have been revised and validated by the experts and practitioners. Ethno-STEM Learning Model indicated there was significant improvement in sustainability literacy test after given Ethno-STEM learning model respectively.

**Keywords :** Learning Model, Ethno-STEM, Local Wisdom, Sustainability Indicators, Sustainability Literacy

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