

THE PROFILE OF STUDENT'S CONCEPT MASTERY AND ENVIRONMENTAL  
AWARENESS IN LEARNING GLOBAL WARMING

RESEARCH PAPER

Submitted as Requirement to Obtain Degree of *Sarjana Pendidikan* in  
International Program on Science Education (IPSE) Study Program



Rizal Maulana Fikri

1506513

INTERNATIONAL PROGRAM ON SCIENCE EDUCATION  
FACULTY OF MATHEMATICS AND SCIENCE EDUCATION  
UNIVERSITAS PENDIDIKAN INDONESIA

2020

Rizal Maulana Fikri, 2020  
*THE PROFILE OF STUDENT'S CONCEPT MASTERY AND ENVIRONMENTAL AWARENESS IN  
LEARNING GLOBAL WARMING*

Universitas Pendidikan Indonesia | [repository.upi.edu](http://repository.upi.edu) | [perpustakaan.upi.upi.edu](http://perpustakaan.upi.upi.edu)

THE PROFILE OF STUDENT'S CONCEPT MASTERY AND ENVIRONMENTAL  
AWARENESS IN LEARNING GLOBAL WARMING

Arranged by  
Rizal Maulana Fikri  
1506513

Submitted as Requirements to obtain Degree of Sarjana Pendidikan in International  
Program on Science Education

©Rizal Maulana Fikri  
Universitas Pendidikan Indonesia

Agustus 2020

Copyright reserved

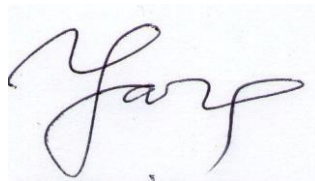
This thesis may not be reproduce in whole or in part, reprinted, copied or any other means  
without the permission of the author

## APPROVAL FORM OF RESEARCH PAPER

THE PROFILE OF STUDENT'S CONCEPT MASTERY AND ENVIRONMENTAL  
AWARENESS IN LEARNING GLOBAL WARMING

By:  
Rizal Maulana Fikri  
1506513

Approved and Authorized by  
Supervisor 1



Prof. Dr. Yayan Sanjaya, M.Si.  
NIP. 197112312001121001

Supervisor 2



Lilit Rusyati, S.Pd., M.Pd  
NIP. 198704202012122001

Perceived by,

Head of International Program on Science Education Study Program



Dr. Eka Cahya Prima, S.Pd., M.T.  
NIP. 199006262014041001

# **THE PROFILE OF STUDENT'S CONCEPT MASTERY AND ENVIRONMENTAL AWARENESS IN LEARNING GLOBAL WARMING**

Rizal Maulana Fikri

International Program Science Education

[rmaulanafikri@gmail.com](mailto:rmaulanafikri@gmail.com)

## **ABSTRACT**

In learning science, one of the most consideration and indicators of the success of the learning is Students 'concept mastery. Students' concept mastery is one of the most essential elements in learning science. Comprehending the concept is one the most crucial aspects in learning. Activities in learning cannot be excluded from concept mastery. The concept mastery can be elaborated with the application of the knowledge such as environmental awareness. Environmental awareness is one of brief visualization of the application of the study learned. However, the goal of this research is to analyze the profile of students' concept mastery and students' environmental awareness in learning global warming topic. In order to answer the research problem, there were 428 students of junior high school involved in this research. Students' concept mastery was analyzed by using 30 number of test items which consist of six level of cognitive domains. Meanwhile students' environmental awareness examined by using questionnaire that distributed virtually using online platform. Based on the result, the students' concept mastery shown the various result based on the cognitive domain level and subtopic of global warming while students' environmental awareness indicated that the students' have different result based on part of environmental awareness.

Keywords: students' concept mastery, students' environmental awareness, and global warming topic

# **PROFIL PEMAHAMAN KONSEP SISWA DAN KESADARAN LINGKUNGAN DALAM MEMPELAJARI TOPIK PEMANASAN GLOBAL**

Rizal Maulana Fikri

International Program Science Education

[rmaulanafikri@gmail.com](mailto:rmaulanafikri@gmail.com)

## **ABSTRAK**

Dalam pembelajaran sains, salah satu pertimbangan dan indikator keberhasilan pembelajaran adalah penguasaan konsep siswa. Penguasaan konsep siswa adalah salah satu elemen paling penting dalam pembelajaran sains. Memahami konsep adalah salah satu aspek terpenting dalam pembelajaran. Aktivitas dalam pembelajaran tidak dapat dikecualikan dari penguasaan konsep. Penguasaan konsep dapat dielaborasi dengan penerapan pengetahuan seperti kesadaran lingkungan. Kesadaran lingkungan adalah salah satu visualisasi singkat dari aplikasi studi yang dipelajari. Namun, tujuan dari penelitian ini adalah untuk menganalisis profil penguasaan konsep siswa dan kesadaran lingkungan siswa dalam mempelajari topik pemanasan global. Untuk menjawab masalah penelitian, ada 428 siswa sekolah menengah pertama yang terlibat dalam penelitian ini. Penguasaan konsep siswa dianalisis dengan menggunakan 30 jumlah soal yang terdiri dari enam kognitif. Sedangkan kesadaran lingkungan siswa ditentukan dengan menggunakan kuesioner yang dibagikan dengan menggunakan platform online. Berdasarkan hasil, penguasaan konsep siswa menunjukkan berbagai hasil berdasarkan tingkat kognitif dan subtopik pemanasan global. Sementara kesadaran lingkungan siswa menunjukkan bahwa siswa memiliki hasil yang berbeda berdasarkan bagian dari kesadaran lingkungan.

Kata kunci: penguasaan konsep siswa, kesadaran lingkungan siswa, dan topik pemanasan global

## LIST OF CONTENTS

ABSTRACT.....	i
PREFACE .....	iii
ACKNOWLEDGMENT .....	iv
LIST OF CONTENTS .....	vi
LIST OF TABLES.....	viii
LIST OF FIGURES .....	xi
LIST OF APPENDIX .....	xii
CHAPTER I INTRODUCTION .....	1
1.1 Background .....	1
1.2 Research Problem .....	4
1.3 Research Question .....	5
1.4 Limitation of Problem.....	5
1.5 Research Objectives.....	6
1.6 Research Benefit.....	6
1.7 The Organization of Research Paper .....	7
CHAPTER II LITERATURE REVIEW.....	8
2.1 Students' Concept Mastery .....	8
2.2 Students' Environmental Awareness.....	9
2.3 Global Warming Topic .....	11
2.3.1 The Greenhouse Effect .....	12
2.3.2 The Cause of Global Warming.....	13
2.3.3 The Effect of Global Warming.....	15
2.3.4 Human Effort in Reducing Global Warming .....	15
2.4 Relevant Research .....	17
CHAPTER III RESEARCH METHODOLOGY .....	18
3.1 Research Method and Research Design.....	18
3.3.1 Research Method .....	18
3.3.2 Research Design .....	18
3.2 Population and Sample .....	18
3.3 Operational Definition .....	19
3.4 Research Instrument .....	19
3.4.1 Objective Test.....	19
3.4.2 Questionnaire .....	24

3.5	Instrument Validation Result.....	30
3.6	Data Analysis Technique .....	30
3.6.1	Students' Concept Mastery Data Analysis.....	31
3.6.2	Students' Environmental Awareness Data Analysis .....	31
3.7	Research Procedure.....	31
3.7.1	Preparation Stage.....	31
3.7.2	Implementation Stage .....	32
3.7.3	Completion Stage .....	32
CHAPTER IV RESULT AND DISCUSSION .....		34
4.1	The Result of Student's Concept Mastery .....	34
4.1.1	Students' Concept Mastery Based on Cognitive Domain.....	34
4.1.2	Students' Concept Mastery Based on Sub-topic Of Global Warming Topic .....	39
4.2	The Result of Student's Environmental Awareness .....	43
4.2.1	Awareness of Environmental Concept .....	43
4.2.2	Awareness of Practices of the Need to Take Actions to Solve Environmental Problem .....	45
4.2.3	Awareness of Practice on the Need to Possess a High Degree Commitment.....	47
4.3	The correlation of Students' Concept Mastery and Environmental Awareness.....	49
CHAPTER V CONCLUSION AND RECOMMENDATION .....		52
5.1	Conclusion.....	52
5.2	Recommendation.....	53
REFERENCES .....		54
APPENDICES .....		59
AUTOBIOGRAPHY .....		163

## LIST OF TABLES

Table 2.1. Analysis of Core and Basic Competence on Global Warming Topic ..	11
Table 3.1. Subject of the Research.....	19
Table 3.2. Blueprint of Cognitive Test Item.....	20
Table 3.3. Validity Interpretation.....	21
Table 3.4. Reability Interpretation.....	22
Table 3.5. Difficulty Interpretation .....	23
Table 3.6. Classification of Discriminating Power.....	24
Table 3.7. Questionnaire of Environmental Awareness Part 1. ....	24
Table 3.8. Questionnaire of Environmental Awareness Part 2 .....	26
Table 3.9. Questionnaire of Environmental Awareness Part 3. ....	28
Table 3.10. The Recapitulation of Test Items Based on ANATES Analysis.....	30
Table 4.1. The result of Seventh Students' Concept Mastery Based on Students' Cognitive Domain.....	34
Table 4.2. The result of Eighth Students' Concept Mastery Based on Students' Cognitive Domain.....	35
Table 4.3. The result of Ninth Students' Concept Mastery Based on Students' Cognitive Domain.....	36
Table 4.4. Overall Result Students' Concept Mastery Based on Students' Cognitive Domain.....	36
Table 4.5. The result of Seventh Students' Concept Mastery Based on Global Warming Sub-topic.....	40
Table 4.6. The result of Eighth Students' Concept Mastery Based on Global Warming Sub-topic.....	40
Table 4.7. The result of Ninth Students' Concept Mastery Based on Global Warming Sub-topic.....	41
Table 4.8. Overall Result of Students' Concept Mastery Based on Global Warming Sub-topic.....	42



Table 4.9. The Result of Seventh Grade Students' Environmental Concept.....	43
Table 4.10. The Result of Eighth Grade Students' Environmental Concept.....	44
Table 4.11. The Result of Ninth Grade Students' Environmental Concept.....	44
Table 4.12. Overall Result of Students' Awareness of Environmental Concept.....	45
Table 4.13. Result of seventh Grade Students' Awareness of Practices of the Need to Take Actions to Solve Environmental Problem.....	45
Table 4.14. Result of Eighth Grade Students' Awareness of Practices of the Need to Take Actions to Solve Environmental Problem.....	46
Table 4.15. Result of Ninth Grade Students' Awareness of Practices of the Need to Take Actions to Solve Environmental Problem.....	46
Table 4.16. Overall Result of Students' Awareness of Practices of the Need to Take Actions to Solve Environmental Problem.....	47
Table 4.17. Result of seventh Grade Students' Awareness of Practices on the Need to Possess a High Degree of Commitment.....	47
Table 4.18. Result of Eighth Grade Students' Awareness of Practices on the Need to Possess a High Degree of Commitment.....	48
Table 4.19. Result of Ninth Grade Students' Awareness of Practices on the Need to Possess a High Degree of Commitment.....	48
Table 4.20. Overall Result Students' Awareness of Practices on the Need to Possess a High Degree of Commitment.....	49

Table 4.21. The Result of One Sample Kolmogorov-Sminov Test.....	50
Table 4.22. The Result Linearity Test.....	50
Table 4.23. The Correlation of Students' Concept Mastery and Enviromental Awareness.....	50

## LIST OF FIGURES

Figure 2.1. The Greenhouse Effect .....	13
Figure 2.2 The Situation of Deforestation.....	14
Figure 2.3. The Factory Resulted The Air Pollution .....	14
Figure 3.1. Research Procedurre.....	33

## LIST OF APPENDIX

### APPENDIX A

Appendix A.1 Objective test before Validation .....	60
Appendix A.2 Result of Objective Test Validation by ANATES.....	106
Appendix A.3 Final Form of Objective Test .....	109

### APPENDIX B

Appendix B.1 Result of Students' Concept Mastery.....	128
Appendix B.2 Result of Students' Enviromental Awareness.....	137

### APPENDIX C

Appendix C.1 Normality Test of Students' Concept Mastery and Environmental Awareness.....	156
Appendix C.2 Linearity test for Correlation Test.....	156
Appendix C.3 Correlation Test of Students' Concept Mastery and Environmental Awareness.....	157

## REFERENCES

- Al-Anwari A.M. (2014). Strategi Pembentukan Karakter Peduli Lingkungan di Sekolah Adiwiyata Mandiri. *TA'DIB*,20(19). 227-252.
- Aloraini, S. (2012). The Impact of Using Multimedia on Students' Academic Achievement in The College of Education at King Saud University. *Journal of King Saud University*, 24, 75-82.
- Anderson, C., Brion,S., Moore, D. A., & Kennedy, J.A. (2012). A Status-enhancement of overconfidence. *Journal of Personality and Social Pdychology*, 103(4), 718-735.
- Anderson, L. W., & Krathwohl, D.R., (2001). A Taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives, abridged edition. Allyn & Bacon. Baston, MA (Person Education Group.
- Arikunto, S. (2011). *Dasar-dasar Evaluasi Pendidikan*. Jakarta: PT Bumi Aksara.
- Arikunto, S. (2013). *Dasar-dasar Evaluasi Pendidikan*. Jakarta: PT Bumi Aksara.
- B. Uno, Hamzah.(2013). *Teori Motivasi dan Pengukurannya*. Jakarta: Bumi Aksara.
- Barraza, L. & Walford, R. A. (2002). Environmental Education: A comparison between English and Mexican school children. *Environmental Education Research*, 8, 171–186.
- Bonnet, M. & Williams, J. (1998). Environmental education and primary children's attitudes towards nature and the environment. *Cambridge Journal of Education*, 28, 159-175.
- Campbell, N. A., & Reece, J. B. (2011). *Biology : Ninth Edition*. San Fransisco: Pearson Education Inc.
- Cohen, L., Manion, L., & Marison, K. (2007). *Research Method in Education. Sixth Edition*. London: Routledge Taylor and French Group.
- Cottrell, S.T.& Graefe, A. R.(1997). Testing a conceptual framework of responsible environmental behavior. *The Journal of Environmental Education* **29** (1): 17-27
- F. Maulidiya., A. Mudzakir & Y. Sanjaya (2014). Case Study the Environmental Literacy of Fast Learner Middle School Students in Indonesia 3(1). *International Journal of Science and Research (IJSR)*.
- Fah Lay Yoon & Sirisena Anuthra. (2014). Realtionship Between the Knowledge, Attitude and Behavior Dimensions Of Environmental Litercy: A

Structural Equation Modeling Approach Using Smartpls. *Universiti Malaysia Sabah, 2SMK Chung Hwa, Tenom. Jurnal Pemikir Pendidikan (Journal for Educational Thinkers)*. Vol.5, pp. 119-144, ISSN 1985-3637.

- Fietkau, H.-J., & Kessel, H. (1981). *Umweltlernen* [Environmental learning]. Koenigstein: Hain.
- Fraenkel, J. R., wallen, N. E., & Hyun, H. H. (2011). *How to design and evaluate research in education*. New York: McGraw-Hill Humanities/Social Sciences/Languages.
- Gamanik, N.M, Sanjaya, Y., & Rusyati, L. (2019). Role-Play Simulation for Assesing Students' Creative Skill and Concept Mastery. *Journal of Sicence Learning*, 2(3), 71-78.
- GCRIO, (2011). Global Change Research Information Office, 2011. What human activities contribute to climate change? [www.gcrio.org](http://www.gcrio.org)
- Gonzaga, M.L. (2016). Awareness and Practices in Green Technology of College Students. *Applied Mechanics and Materials*, 848, 223-227. doi:10.4028/www.scientific.net/AMM.848.223
- Gul, A., Topay, M., Ozaydin, O., (2009). Against the threat of global warming, the importance of urban forest. In: Paper Presented at the International Davraz Congress, Isparta, Tu" rkiye.
- Halck, O. M., & Dahl, F. A. (1999). On Classification of games and evaluation of players-with some sweeping generalizations about the literarture. In *Proceedings of the ICML-99 Workshop on Machine Learning in Game Playing*, Jozef Stefan Institute, Ljubljana.
- Jaus, H. H. (1984). The development and retention of environmental attitudes in elementary school children. *Journal of Environmental Education*, 15(3), 33-36.
- Jordan, J.R., H.R. Hungerford and A.N. Tomera, (1986). Effects of two residential environmental workshops on high school students. *J. Environ. Educ.*, 8(1): 15-2.
- Kaplan, R. M., & Saccuzzo, D., P. (2009). *Psycological Testing Principles, Applications, and Issues. Seventh Edition*. Boston: Wadsworth, Cengage Learning.
- Kementerian Pendidikan dan Kebudayaan. (2013). Kurikulum 2014 Kompetensi Dasar Sekolah Menengah Pertama (SMP)/Madrasah Tsanawiyah (MTs). Kementerian Pendidikan dan Pendidikan
- King, S.H.,et.al,. (2009). *Project-Based Learning: Inspiring Middle School Students to Engage in Deep and Active Learning*. NYC Department of Education. 7-10

Rizal Maulana Fikri, 2020

**THE PROFILE OF STUDENT'S CONCEPT MASTERY AND ENVIRONTMENTAL AWARENESS IN LEARNING GLOBAL WARMING**

Universitas Pendidikan Indonesia | [repository.upi.edu](http://repository.upi.edu) | [perpustakaan.upi.edu](http://perpustakaan.upi.edu)

- Kuhlemeier, H., Bergh, H. V. D., & Lagerweij, N. (1999). Environmental Knowledge, attitude and behavior in Dutch Secondary education. *Journal of environmental education*, 30(2), 4-14.
- L. Rusyati., H. Firman (2016). Virtual test: A student-centered software to measure student's critical thinking on human disease. AIP Conference Proceedings **1708**. <https://doi.org/10.1063/1.4941195>
- Lee, D.C., Lu, J. J., Mau, K. M., Ling, S.H., yeh, M.C., \$ Hsieh, C.L. (2014). Does Teachers Charisma Can Really Induce Students Learning Interest?. *Procedia-Social and Behavioral Sciences*, 116, 1143-1148.
- Lin, J. (2017). Chinese Grade Eight Students' Understanding About the Concept of Global Warming. *EURASIA Journal of Mathematics Science and Technology Education*, 13(5),1313-1330.
- Lo, E. (2010). Environmental education in Hong Kong kindergartens: What happened to the blue sky? *Early Child Development and Care*, 180(5), 571-583.
- Makki, M. H., Abd-El-Khalick, F., & Boujaoude, S. (2003). Lebanese secondary school studentss' environmental knowledge and attitude. *Environmental Educational Research*, 9 (1), 21-33.
- Meece, J. L., Anderman, E. M., & Anderman, L. H (2006). Classroom goal structure, students motivation, and academic achievement. *Annu. Rev. Psychol.*, 57, 487-503
- Minimum, E., King, B. M., & Bear, G. (1993). *Statistical Reasoning in Psychology and Educationl*. California: John Wiley & Son.
- Osborne, J. (2010). Arguing to Learn in Science: the Role of Collaborative, Critical Disource, *American Association for the Advancement of Science*, 328, 463-466.
- Owens, S. (2000). Engaging the public: information and deliberation in environmental policy, *Environment and Planning A*, 32, pp. 1141–1148.
- Puri K., & Joshi R. (2017). Ecoclubs: an effective tool to educate students on biodiversity conservation. *Biodiversity International Journal*, 1(5):50-52.
- Rogayan, D. V. Jr. (2019). I Heart Nature: Prespective of University Students on Environmental Stewardship. *International Journal Of Engineering, Science and Technology*, 1(1), 10-16.
- Schusler, Tania Marie, and M. Krasny. (2010). "Environmental Action as Context for Youth Development." *Journal of Environmental Education* 41 (4): 208–223.

- Scott, D., & Willits, F.K. (1994). Environmental attitudes and behavior: A Pennsylvania survey. *Environment and behavior*, 36(1), 70-93.
- Shephard K (2007). Higher education for sustainability: seeking affective learning outcomes. *Int. J. Sustainability Higher Educ.*, 9(1): 87-98.
- Singh, R. (2015). Environmental awareness among undergraduate students in relation to their stream of study and area of residence. *Scholarly Research Journal for Interdisciplinary Studies*, 4(26), 2830-2845.
- Sterman, J., and L.B. Sweeney. (2007). "Understanding Public Complacency about Climate Change." *Climatic Change* 80: 213–238.
- Suyadi. (2013). *Strategi Pembelajaran Pendidikan Karakter*. Bandung: Reamaja Rosdakarya.
- Suyatna, A & Rosidin, U. (2016). Assessment model for Critical Thinking in Learning Global Warming Scientific Approach. *Proceedings of Internationale Conference on Educational Research and Evaluation*, 1-7. Yogyakarta: Yogyakarta State University.
- Tarrant, M.A., & Cordell, H.K. (1997). The effect of respondent characteristics on general environmental attitude-behavior correspondence. *Environment and Behavior*, 29(5), 618-637.
- Wright, J. W., & Wiedeger, R. V. (2007). *Motivated behaviors: The interacton of attention, habituation and memory*. In L.V. Brown (Ed), *Psychology of motivation* (p. 5-28). Nova Science Publishers.
- Zilahy, G., & Huisingh, D. (2009). The roles of academia in regional sustainability initiatives. *Journal of Cleaner Production*, 17(12), 1053-1056.
- Zimmerman, B. J. (1998). *Developing self-fulfilling cycles of academic regulation: An analysis of exemplary instructional models*. In D. H. Schunk & B. J. Zimmerman (Eds), *Self-regulated learning: From teaching to self-reflective practice* (p.1-19). Guilford Publications.
- Zsoka, A., Szerenyi, Z. M., Szechy, A., & Kocsis, T. (2013). Greening due to environmental education? Environmental knowledge, attitudes, consumer behavior and everyday pro- environmental activities of Hungarian high school and universities students. *Journal of Cleaner Production*, 48, 125-138.