

ARTICLE

Analysis of the Structure and Content of the Independent Curriculum on Global Warming Material

Maesa Aulianda Putri ^a, Zonalia Fitriza ^b

^a Department of Chemistry, faculty of Mathematics and Natural Science, Padang State University, Padang, Indonesia.

^b Department of Chemistry, faculty of Mathematics and Natural Science, Padang State University, Padang, Indonesia.

maesaaulianda42@gmail.com

ABSTRACT

An independent curriculum gives teachers the freedom to be able to design, and plan learning according to the needs of students where the content will be more optimized. This study aims to describe the suitability of the structure and content of the independent curriculum on global warming material based on the revised bloom taxonomy, Dave and Dyers' taxonomy and chemical standard textbook. The method used in this study is a qualitative descriptive method. This study used a content structure analysis research design from the Model of Educational Reconstruction (MER). The data analysis techniques carried out are the data analysis techniques of Milles and Hubberman. The instruments used are content standard analysis tables and structure analysis tables. Structural analysis was performed with reference to the revised bloom taxonomy, Dave and dyers taxonomy. The broadness content analysis is guided by the high school book issued by the Ministry of Education and Culture and the depth of the material is guided by the global climate change textbook by Suruchi Singh. The results of the research obtained in the structural analysis are: (1) The elements of chemical understanding are in accordance with the revised bloom taxonomy, (2) The process skill element only dominates abstract skills, (3) pancasila profile elements there are abstract skills and attitude realms. Meanwhile, in the content analysis, namely: (1) the breadth of material in the global warming CP is appropriate in the high school book from the Ministry of Education and Culture, (2) the depth of the material there are some materials that are not suitable based on the chemistry textbook by Suruchi Singh.

ARTICLE HISTORY

Submission: March 30th 2023

Reviewed: April 13th 2023

Accepted: April 13th 2023

Published: May 29th 2023

Citation:

Keywords: Content structure analysis, Global Warming Material and Independent Curriculum.

This is an open access article under the [CC-BY](https://creativecommons.org/licenses/by/4.0/) license.



This is an open access article distributed under the Creative Commons 4.0 Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. ©2022 by author.

1. Introduction

The independent curriculum exists in order to create independence for students or teachers in undergoing education both in terms of content and administration [1],[2]. In the independent curriculum, the government provides learning outcomes (CP) which will later be developed by teachers into learning objectives (TP) and learning objectives flow (ATP) into teaching modules according to the needs of students. The teacher plays a role in analyzing CP and reducing it to TP or developing it to become ATP independently or in collaboration to produce learning designs [3] . Besides that, teachers also play an important role in planning and developing curriculum in schools not only in administration but also for organizing and organizing learning processes and activities in class [4] . The independent curriculum gives freedom to the teacher independently to translate the curriculum before it is translated to students, so that the teacher is able to answer every student's needs during the learning process [5]. Not only that, teachers are also required to be able to plan learning by preparing structure and content in advance and paying attention to the needs and potential of the students .

Before reviewing content or material, teachers are often faced with *scope* and *sequence problems* . *Scope* is intended to express the breadth and depth of the material, while *sequence* concerns the sequence of curriculum content [6]. The breadth of the material relates to the amount of material content contained in the book based on the subject matter that has been determined. While the depth of the material relates to how detailed the concepts students have to learn based on the amount of material content in the subject matter [7]

Based on this description, it is necessary to carry out an analysis of the structure and content of the independent curriculum in high school chemistry subjects. Structural analysis was carried out by analyzing the suitability of learning outcomes (CP) based on the dimensions of knowledge on revised bloom taxonomy, skills and processes as well as Pancasila profiles that are guided by abstract skills and affective domains. Content analysis is carried out by analyzing the breadth and depth of the material in the form of material coverage and material sequence chemistry according to standard textbooks which are limited by high school textbooks from the Ministry of Education and Culture.

2. Methodology

The type of research used in this research is descriptive qualitative research. This study uses a content structure analysis research design from *the Model of Educational Reconstruction* (MER). Structural analysis discusses the appropriateness of the level of knowledge, skills and attitudes based on the revised Bloom's taxonomy, Dave and Dyers' taxonomy. While content analysis discusses the sequence and suitability of material from standard textbooks which are limited to science textbooks from the Ministry of Education and Culture.

Data collection through documentation which is a step in collecting data to obtain the required documents [8] . Data analysis techniques using Miles and Hubberman. The research instrument is a content standard analysis table, a table of analysis of the level of knowledge, attitudes and skills on global warming material . Sources of data in research are subjects from which data can be obtained [9]. Obtained from teacher books and student books in Natural Sciences issued by the Ministry of Education and Culture, *Global Climate Change books* , and Learning Outcomes issued by research, development and bookkeeping agency decision number 28 of 2021.

3. Results and discussions

3.1 Analysis of content standards.

The results of the content standard analysis are carried out by analyzing the learning outcomes and the main material contained in the book issued by the Ministry of Education and Culture and university textbooks . The results of the content standard analysis are in table 1.

Table 1. Analysis of content standards on global warming material.

Learning Achievement (CP)	Ministry of Education and Culture		Textbook	
	Material	Sub material in the Teacher's Book and Student's Book	Material	Sub material in textbooks
Explain the phenomenon of global warming .	Global warming.	1. Environmental change facts	Environmental changes	1. Introduction and fuel (carbon cycle). 2. Threat to existence (threat to human existence) 3. Rising temperatures and global warming 4. Environmental change facts <ul style="list-style-type: none"> • temperature rise and global warming. • Melting glaciers and polar ice. • Sea level rise, ocean shape and ocean composition. • Climate change • heat wave
		2. The increase in atmospheric CO ₂ levels behind the increase in earth's temperature	Rivet curve, greenhouse effect and the mechanism of the greenhouse effect	
		3. Human activities cause environmental changes	Land conversion, burning and exhaust gas.	
		4. The solution to overcome global warming	Renewable energy and lifestyle.	

Based on the results of the analysis of content standards, the materials presented in the book published by the Ministry of Education and Culture have several main materials, including starting from the facts of environmental change , increasing atmospheric CO₂ levels behind the increase in earth's temperature, human activities that cause environmental changes and solutions to overcome

global warming. . While the results of the analysis are based on textbooks *Global Climate Change* by Suruchi Singh , namely: introduction (fuels and the global carbon cycle) , existential threats (threats to human existence) , temperature rise and global warming , facts of environmental change. In general, in terms of structure and content, it is almost the same as teacher and student books. Global warming material itself is in Phase E for class X high school in the independent curriculum [10] .

3.2 Analysis of the level of knowledge, attitudes and skills on global warming material

The results of this analysis use the learning outcomes that have been issued by the Ministry of Education and Culture which consist of three elements, namely: elements of understanding chemistry, elements of process skills and Pancasila profiles. The results of the analysis are presented in tabular form contained in table 2 as follows:

Table 2. Knowledge level analysis

Learning Achievement (CP)	Knowledge Level
Explain the phenomenon of global warming	<ul style="list-style-type: none"> ● Explain (C 2)
1. Observe Able to choose the right tools to make measurements and observations. Pay attention to relevant details of objects	<ul style="list-style-type: none"> ● Select (C1)
2. Question and predict Identify questions and problems that can be investigated scientifically. Students connect the knowledge they already have with new knowledge to make predictions	<ul style="list-style-type: none"> ● Predict (C2) ● Identify (C1)
3. Plan and conduct investigations Students plan scientific investigations and carry out operational steps based on the correct references to answer questions. Students measure or compare the dependent variable using appropriate tools and pay attention to scientific principles	<ul style="list-style-type: none"> ● Do (C3) ● Compare (C2)
4. Processing, analyzing data and information Interpret the information obtained honestly and responsibly. Analyze using appropriate tools and methods, assess the relevance of the information found by including references, and conclude the results of the investigation	<ul style="list-style-type: none"> ● Processing (C3) ● Analyze (C4) ● Interpret (C2) ● Assess (C5) ● Summing up (C5)
5. Evaluate and reflect Students are brave and polite in evaluating conclusions through comparisons with existing theories. Demonstrate the advantages and disadvantages of the inquiry process and the effect it has on the data. Point out problems in the methodology and propose suggestions for improvement for the next investigation process.	<ul style="list-style-type: none"> ● Evaluate (C5)
6. Communicating results Communicating the results of the investigation as a whole including considerations of safety,	<ul style="list-style-type: none"> ● Show (C1)

environment and ethics supported by arguments, language and scientific conventions that are appropriate to the context of the investigation. Demonstrate a pattern of systematic thinking according to the specified format.	
--	--

Based on the results of the analysis that has been carried out on the formulation of Learning Outcomes (CP) of the independent chemistry curriculum, it can be seen that the analysis was carried out on the knowledge dimension referring to the revised Bloom's taxonomy by Anderson and Krathwohl, the skills domain (abstract skills and concrete skills), as well as the affective/attitude domain proposed by Krathwohl and Bloom. In accordance with Permendikbud No.20 of 2016 concerning Graduate Competency Standards, "Graduate competency standards which are criteria regarding the qualifications of graduates' abilities which include attitudes, knowledge and skills".

Based on Permendikbud No. 20 of 2016, at the high school level students must have factual, conceptual, procedural and metacognitive knowledge where this knowledge comes from the knowledge dimension in the revised bloom taxonomy. This is also in line with Permendikbud No.21 on content standards and Permendikbud No.56 on process standards, namely knowledge obtained from the activities of remembering, understanding, applying, analyzing, evaluating and creating. (1 1) . While skills are also obtained from the activities of observing, asking, trying, reasoning, presenting and creating (12) . Based on this, structural analysis can be carried out by analyzing the CP formulation guided by the revised bloom taxonomy

The material for global warming is contained in the learning outcomes in the elements of understanding chemistry, namely " Explaining the phenomenon of global warming ". In this CP, in the analysis of the level of knowledge, there is one dimension of cognitive processes, namely explaining (C 2) . Explaining is constructing meaning or understanding based on prior knowledge, associating new information with existing knowledge (13) . This is in line with CP's formulation, namely in explaining the phenomenon of global warming so that the Operational Verbs (KKO) used are to explain .

The analysis on process skill elements consists of 6 (six) elements, namely observing; question and predict; planning and conducting investigations; processing, analyzing data and information; evaluate and reflect; communicating results . Process skill analysis will be explained in Table 3 below as follows:

Table 3. Skill level analysis

Learning Achievement (CP)	Concrete Skills	Abstract Skills
Explain the phenomenon of global warming .		
1. Observe Able to choose the right tools to make measurements and observations. Pay attention to relevant details of objects	Do (P2)	Observing (KA1)
2. Question and predict Identify questions and problems that can be investigated scientifically. Students connect the knowledge they already have with new knowledge to make predictions		Ask (KA2)
3. Plan and conduct	Do (P2)	Tried (KA3)

investigations Students plan scientific investigations and carry out operational steps based on the correct references to answer questions. Students measure or compare the dependent variable using appropriate tools and pay attention to scientific principles		
4. Processing, analyzing data and information Interpret the information obtained honestly and responsibly. Analyze using appropriate tools and methods, assess the relevance of the information found by including references, and conclude the results of the investigation		Reasoning (KA4)
5. Evaluate and reflect Students are brave and polite in evaluating conclusions through comparisons with existing theories. Demonstrate the advantages and disadvantages of the inquiry process and the effect it has on the data. Point out problems in the methodology and propose suggestions for improvement for the next investigation process.	Show (P3)	Reasoning (KA4)
6. Communicating results Communicating the results of the investigation as a whole including considerations of safety, environment and ethics supported by arguments, language and scientific conventions that are appropriate to the context of the investigation. Demonstrate a pattern of systematic thinking according to the specified format.		Serving (KA5)
1. Critical Reasoning		Reasoning (KA4)
2. Creative		Create (KA6)

Based on the results of the analysis on the process skill element, there is the first element, namely observing which is a form of abstract skill (KA1). The purpose of observing this process skill is that students have attention time in observing an object (paying attention to the relevant details of the object) [14]. The second element of process skills is questioning and predicting. This can be

categorized into abstract skills (KA2), namely asking questions which is an activity related to the type, quality and number of questions asked by students [14]. In this second process skill, students can identify questions and problems that can be investigated scientifically and students can connect existing knowledge with new knowledge to make predictions. This is in accordance with Abstract Skills (KA2), namely asking questions.

The third process skill is planning and conducting investigations. In this element students make a scientific investigation plan, do according to the steps based on the correct source to answer the question. As well as students measuring or comparing the dependent variable by using appropriate tools by paying attention to scientific principles. Based on this, the second element of process skills can be categorized into abstract skills (KA3), namely trying which is the number and quality of sources used, the validity of the information collected and the instruments used to collect data [14].

The fourth process skill is processing, analyzing data and information. In this element, students can analyze the information obtained such as students can use the right tools and methods and assess the appropriateness of the information obtained. This element can be categorized into in abstract skills (KA4) namely reasoning because students can develop interpretations, arguments and draw conclusions from that information [14]. The fifth process skill is evaluating and reflecting. This element can also be categorized into abstract skills (KA4), namely reasoning because students can evaluate or assess and reflect through comparisons with existing theories so that it shows a theoretical relationship from 2 or more sources that are not contradictory.

The sixth process skill is communicating results. In this element, students can communicate the results of investigations based on considerations and ethics in arguing and using language according to the context of the investigation. Based on this, it can be categorized into abstract skills (KA5), namely presenting because students can present or communicate the results of the study (from observing to reasoning) in the form of writing, graphics, electronic media and others.

Pancasila profile analysis also consists out of 6 (six) namely Faith, Fear of the Almighty God, and noble character; global diversity; worked together; independent; critical reasoning; and creative. Analysis of process skills will be explained in table 5:

Table 4. Analysis of the level of attitude (Pancasila profile)

Learning achievement	Attitude
Explain the phenomenon of global warming .	
1. Observe Able to choose the right tools to make measurements and observations. Pay attention to relevant details of objects	<ul style="list-style-type: none"> ● Choose (A2) ● Noticing (A3)
2. Question and predict Identify questions and problems that can be investigated scientifically. Students connect the knowledge they already have with new knowledge to make predictions	<ul style="list-style-type: none"> ● Connect (A4)
1. Have faith, fear the Almighty God, and have a noble character	<ul style="list-style-type: none"> ● Practice (A 5)
2. Global Diversity	<ul style="list-style-type: none"> ● Practicing (A5)
3. Cooperate	<ul style="list-style-type: none"> ● Practicing (A5)
1. Independent	<ul style="list-style-type: none"> ● Practicing (A5)

Elements of the pancasila profile Faithful, pious to the Almighty God and have a noble character; global diversity; working together and independently can be categorized into the affective domain (A5) practice. Because the activities contained in the first to fourth Pancasila profiles are activities in the form of practice. According to Krathwohl & Bloom in [15]. practice or characterization is a form of integration of all value systems that a person has that can influence his personality and behavior patterns. While the fifth element is critical reasoning where students can obtain and process information and ideas, analyze and evaluate reasoning, reflect on thoughts and thought processes and make decisions. In this regard, critical reasoning can be categorized into abstract skills (KA4), namely reasoning which is a form of developing arguments and conclusions that show the relationship of facts/concepts/theories from 2 or more sources that are not contradictory. [14] .. The sixth Pancasila profile element is creative which is an activity carried out by students in making or designing something according to their own thoughts. Based on this creative can be categorized into in abstract skills (KA6) namely creating which can produce ideas, designs or decisions.

3.3 Analysis The depth of the material and the breadth of the material (content analysis) on global warming material.

In the content analysis, a literature review was carried out in the form of science textbooks for class X SMA on global warming material from the Ministry of Education and Culture by examining the scope of the material analyzed in terms of the breadth and depth of material in the Science textbooks from the Ministry of Education and Culture which were limited to the standard textbooks from Suruchi Singh . Analysis of the depth and breadth of the material is carried out to produce recommendations for the sequence of material that is suitable for study on global warming material. The breadth of the material relates to the amount of material content contained in in a book based on the subject matter that has been determined. While the depth of the material relates to how detailed the concepts students have to learn based on the amount of material content in the subject matter [7] . the depth of the material is related to the content of the dimensions of knowledge contained in the subject matter which is related to the cognitive level of students. Not only science content but processes and views about science can also be involved. The research method for clarifying subject matter is analytical in nature and content and text analysis can be carried out [16] .

Based on the content analysis that has been carried out, the depth and breadth of the material in the CP formula studied on the topic of global warming is almost the same as the standard textbook, namely *global climate change* by Suruchi Singh . Where does the book begin of (1) introduction (fuel and cycle global carbon); (2) Existential threats (threats to human existence); (3) temperature rise and global warming; (4) facts of environmental changes. In general, in terms of structure and content, the discussion is almost the same as the book from the Ministry of Education and Culture.

Based on the results of this analysis, it can be concluded that overall the depth of material and breadth of material on the topic of global warming contained in the CP formula is appropriate based on the standard textbook, namely the *Global Climate Change book*. by Suruchi Singh et.al (2021).

3.4 Analysis of the relationship between CP and sequence in global warming material.

It can be concluded from the results of the CP analysis to the analysis of the depth and breadth of the material to produce an analysis of the CP relationship and the order of the material which is the result of the content structure analysis in this study. Based on the results of CP analysis and the order of the material, it can be seen that there is little difference in the order of the material between the textbooks and the teacher's and student textbooks issued by the Ministry of Education and Culture . However, in terms of structure and content it is still the same. The demands of the material that must be studied are contained in the CP formula which is formulated in the independent curriculum and the formulation of the structure of elements of understanding chemistry, elements of process skills

and Pancasila profiles that are in accordance with the scientific principles used (revised bloom taxonomy, skill domain and affective domain) .

4. Conclusion

Structural analysis of the CP formulation in the independent chemistry curriculum with the revised bloom taxonomy shows the suitability of the CP formulation for elements of understanding chemistry. As for the elements of process skills and the Pancasila profile, there is compatibility based on Dave and Dyers' taxonomy, namely abstract skills and the affective domain. In content analysis, there is a slight difference between the sequence of material based on the *Global Climate Change* textbook , which is limited to the high school textbook from the Ministry of Education and Culture. There is a match between CP and content structure. However, further evaluation is needed for analysis of the CP formulation regarding the suitability of the material and structure of the CP formulation.

Acknowledgments

References

- [1] Rahayu, Restu., et. al., (2022). "Implications of the Independent Curriculum in Driving Schools", *Basicedu Journal* , 6 (4), 6313 – 6319 .
- [2] Nurani, D., Anggraini, L., Misiyanto, & Mulia, KR (2022). *All-round independent curriculum* . Directorate of Elementary Schools of the Ministry of Education and Culture.
- [3] Purnawanto, A, T. (2022). Meaningful Learning Planning and Independent Curriculum Assessment. *Journal of Pedagogy*, 20 (1), 75-94.
- [4] Anggraini, DL, Yulianti et, at., (2022). *The Role of Educators in Developing the Independent Curriculum*. 1 (3).
- [5] Ainia, DK (2020). "Freedom Learning in the View of Ki Hadjar Dewantara and Its Relevance to the Development of Character Education." *Indonesian Journal of Philosophy* , 3 (3), 95–101.
- [6] hamdi. M. Mohamad. (2018). Scope of the Curriculum. *Journal of Islamic Education* , 2(1) Minister of Cultural Education, R. and T. (2022). *Copy of Decree of the Minister of Education, Culture, Research and Technology of the Republic of Indonesia Number 56/M/2022 concerning Guidelines for Implementing Curriculum in the Framework of Learning Recovery*.
- [7] Setiawan, A., Jalmo, T., & Surbakti, A. (2018). *Analysis of Appropriate Material Scope of Biology in Class X High School Textbooks . 1* .
- [8] Purnawanto, A, T. (2022). Meaningful Learning Planning and Independent Curriculum Assessment. *Journal of Pedagogy*, 20 (1), 75-94.
- [9] Arikunto, S. (2011). *Research procedure: a practical approach* (Ed. Rev. V). Rineka Cipta.
- [10] Balitbangku. (2021). *Decree of the Head of the Agency for Research and Development and Bookkeeping Number 028/H/KU/2021 concerning Learning Outcomes* .
- [11] Permendikbud. (2016). Law of the Republic of Indonesia Number 21 of 2016 concerning Content Standards for Elementary and Secondary Education. *International Science* , 5 , 1–238
- [12] Permendikbud. (2013). Minister of Education and Culture No. 65 of 2013 concerning Process Standards for Elementary and Secondary Education. *Journal of Chemical Information and Modeling* , 2011 , 1–18 .
- [13] Anderson, LW, & Krathwohl, DR (2014). *Framework for Learning, Teaching, and Revision of Bloom's Taxonomy of Education* (I). Student Library.

- [14] Dyers, J. . (2011). *Innovators DNA: Mastering the Five Skills of Disruptive Innovators*. *Harvard Business Reviews* .
- [15] Ariyana, yogis. (2019). *Learning handbook oriented towards higher order thinking skills* (Vol. 15).
- [16] Money, R., & Tesch, M. (2010). *On the role of the experiment in science teaching and learning – Visions and the reality of instructional practice* . 17–30.
- [17] Widodo, A. (2005). *Learning Objectives Taxonomy* . 4 , 61–69.