

ANALYSIS OF THE COMPATIBILITY OF TEACHING MATERIALS ON THE ECOLOGY TOPIC DEVELOPED BY THE TEACHERS WITH CURRICULUM 2013

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Abstract

This research aimed to describe the compatibility of the teaching materials on the ecology topic developed by teacher with the Curriculum 2013. The teaching materials included lesson plan, teaching source, student worksheet, assessment and media learning. The sampels in this research were 3 schools in Surabaya that used Curriculum 2013. Researchers have developed research instruments and teaching material that have been validated by 2 validators, and the teaching materials were used to be as example to compare with the teacher's teaching materials. Assessment of teaching material based on the completion component of lesson plan, compatibility of lesson plan content, compatibility of assessment with indicator, compatibility of instructional materials, compatibility of instructional media, and compatibility of student worksheet that have been developed. The data analysis was descriptive qualitative. Based on the data analysis, the percentage of teaching materials was 70.8%. It can be concluded that the teaching materials developed by the teacher was compatible with the Curriculum 2013.

Keywords: Teaching materials, ecology, Curriculum 2013

INTRODUCTION

In 2013, *Kurikulum Tingkat Satuan Pendidikan* (KTSP) have been improved. The government continues to improve in 1947, 1952, 1964, 1968, 1975, 1984, 1994, 2004 Competence-based Curriculum (KBK), and KTSP (Halimah, 2009: 1). The curriculum 2013 is a curriculum developed by integrating the competence of knowledge, skills, attitudes applied through the learning process (Kemendikbud, 2014).

Curriculum changes should be supported by teachers in learning activities, then the teachers play an important role in curriculum change. No matter how good the curriculum is, if the teachers who teach it do not master their professional component, the curriculum will not work properly (Prastowo, 2013). In addition, the implementation of science process skills training will be able to improve student creativity (Aktamis and Ergin, 2008). Thus, the successful implementation of the curriculum mostly lies in the hands of teachers.

The teachers who have good learning planning will be able to direct the learning activities in accordance with the basic competence (KD) operated through the learning objectives. Prior to the implementation of the learning, the teacher should prepare teaching materials developed, both individually and in groups (Kemendiknas, 2013).

Teachers' competencies affect their values, behaviors, communication, aims and practices in school and also they support professional development and curricular studies (Selvi, 2010).

Based on the Curriculum 2013, teachers do not need to make syllabus as in KTSP. The syllabus and teaching materials have been provided by the government, while the teachers only have to prepare the lesson plans and learning media (Muzamiroh, 2013). Teaching materials to be developed include Lesson Plan, Student Worksheet, Assessment compatible to the Curriculum 2013. The teacher's knowledge and understanding of Curriculum 2013 will determines the outcome of the lesson plan's quality.

Based on research conducted by Wati, et al. (2015), there were several components of lesson plan that many of deficiency such as remedial material, ancillary material, remedial assessment and ancillary assessment, as well as core activities of observing, questioning and associating. In addition, based on research that has been done by Febrina, et al. 2016 on the feasibility of ecological materials in accordance with the demand of the Curriculum 2013 showed that teachers still have difficulties in compiling the rubric of assessment in accordance with the Curriculum 2013. These indicates that the readiness of teachers in implementing compatible

learning Curriculum 2013 determines the successful implementation of the Curriculum 2013.

One way to find out the understanding and skills of teachers in implementing the Curriculum 2013 can be done by analyzing the teaching materials that have been developed by teachers, because teaching materials already include the Lesson Plans, Student Worksheets (Lembar Kegiatan Peserta Didik), Learning Media, and assessment used. The teaching materials are used for guidance in carrying out activities that will be implemented in achieving the standards of competence that have been determined and in accordance with the Curriculum 2013.

The lesson plan that has been developed by the teacher then implemented during the learning process. The lesson plan in the Curriculum 2013 must be in accordance with the Minister of Education and Culture Regulation number 22nd of 2016 on Standard Process of Primary and Secondary Education and refers to Syllabus. In the revised Curriculum 2013, the lesson plan does not have to include core competence-1 (KI-1) to core competence-2 (KI-2), where the competencies are conducted by religion studies (PABP) and civic (PPKn) subjects, but are still carried out with core learning activities integrating the 5M scientific approach (observing, questioning, collecting data, and communicate), 4C (Critical thinking, Creativity, Collaboration, Communication), HOTS (Higher Order Thinking Skill) and Literacy.

The teachers must be able to train the scientific activities (5M) and HOTS in learning which can be contained in the Student Worksheets that have been developed by the teachers. Good student worksheet can be seen from the technical aspects, construction, content, and characteristics of a scientific approach. Student worksheet can facilitate teachers in guiding students during learning activities. Scientific learning activities able to train students to be able to think critically, and develop independence. Siska et al. (2013) in his research states that the integration of scientific process skills able to trick the activities of communicating, interpreting, predicting, applying concepts, and doing experiments combined with inquiry-based learning on the discussion rate discussion increased the students activity reached 71.9%.

Based on the data, it is necessary to research more about the implementation of the Curriculum 2013 concerning the development of teaching materials developed by high school teachers in Surabaya on ecological materials, which aims to describe the compatibility of lesson plan, student worksheet, assessment and instructional media in accordance with the Curriculum 2013.

METHOD

This research was descriptive quantitative research that the research gives exposure from result of data obtained. The collected data were described in the form of a written word using scientific methods. The target in this research were teaching materials developed by biology teachers at 3 schools in Surabaya that implement Curriculum 2013. Researcher have developed research instrument and learning material which have been validated by 2 validators, and the teaching materials were used to be as example to compare with the teacher's teaching materials. Assessment of teaching materials based on the completeness of lesson plan components, compatibility of lesson plan content, compatibility of assessment with indicators, compatibility of learning materials, compatibility of learning media, and compatibility of student worksheet that have been developed. The data collection in three senior high schools in Surabaya that applying Curriculum 2013 in January to February 2018, by taking the teacher's teaching materials and analyzed the compatibility using assessment instrument. Data analysis conducted at Surabaya State University on March till June 2018. Data collection techniques in this study were documentation, observation, and questionnaires. Data were analyzed using quantitative descriptive method.

RESULT AND DISCUSSION

Based on the results of research conducted in three schools target implementation of Curriculum 2013 in Surabaya, obtained three lesson plans and three assessments of ecology that have been developed by teachers, and three questionnaires self-assessment of the teachers.

The following is the data of completeness of lesson plan component and the compatibility of lesson plan content, assessment, student worksheet, learning materials and learning media developed by the teacher.

1. The Completeness Component and Compatibility Content of Lesson Plan with the Curriculum 2013

a. Completeness of Lesson Plan Component

The analysis of data on the completeness of the lesson plan component was evaluated based on the presence or absence of lesson plan composition components based on Permendikbud number 22nd of 2016 on Basic and Secondary Education Process Standards that consisting of school identity, subject

identity, class/semester, subject matter, time allocation, learning objectives, basic competencies and indicators of achievement of competencies, learning materials, learning methods, learning media, learning resources, learning phase, assessment of learning outcomes. The data of the analysis results are shown in Table 1.

Table 1. Completeness of lesson plan component with Curriculum 2013

No	Component of lesson plan	Percent Completeness (%)		
		Lesson plan 1	Lesson plan 2	Lesson plan 3
1.	Identity of lesson plan	100%	100%	100%
2	Core, Basic and Indicator Competencies	66.6%	66.6%	100%
3	Learning objectives	100%	100%	100%
4	Learning materials	100%	100%	100%
5	Learning methods Preliminary Activity Core activities (5M) Closing activity	100%	100%	100%
6	Assesment Assesment technics Assesment instrument Remedial learning Ancillary learning	100%	100%	50%
7	Equipments / media, Materials, and Learning resources	100%	100%	0%

Note :

- Lesson plan 1 : Sample taken from SMAN 7 Surabaya
- Lesson plan 2 : Sample taken from SMAN 8 Surabaya
- Lesson plan 3 : Sample taken from SMAN 19 Surabaya

Based on the Table 1 it can be seen that the core competency component and the indicator gets the percentage of 66.6% in lesson plan 1 and lesson plan 2 because the lesson plan does not contain the Core Competence (KI). The assessment at the lowest percentage was in the lesson plan 3 with the percentage of 50% because there was no remedial learning and ancillary learning. While in the equipment / media, materials and learning resources the lowest percentage was in lesson plan 3, because the lesson plan there was no component at all about equipment / media, materials and learning resources used.

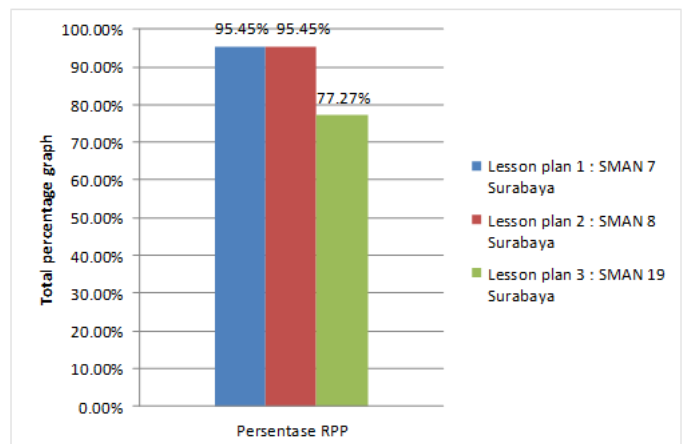


Figure 1. Total percentage graph completeness components of lesson plan

Figure 1 shows the percentage of completeness of the components in each lesson plan of the sample schools at SMAN 7 Surabaya, SMAN 8 Surabaya and SMAN 19 Surabaya. Based on Figure 1 it can be seen that the lesson plan 1 and lesson plan 2 get percentage of 95.45% and followed by lesson plan 3 which get 77.27% percentage. From these results obtained average percentage of the three lesson plan was 89.39%, completeness lesson plan components can be categorized in compatible with the demands of components Curriculum 2013.

The completeness of lesson plan according to Permendikbud number 22nd on Basic and Secondary Education Standard Processes in 2016 explained that lesson plan contains at least school identity, subject identity, class/semester, subject matter, time allocation, learning objectives, basic competence and competency achievement indicator, learning materials, learning methods, learning media, learning resources, learning steps and assessment of learning outcomes. In the learning media and learning resources is a tool of learning process to help convey the subject matter can be a book, print and electronic media, the surrounding nature or other relevant learning resources

b. Compatibility of Lesson Plan Content

Teaching materials which included lesson plan that have been obtained were analyzed the compatibility of its content from several aspects such as aspects of the identity, formulation of indicators, learning materials, learning activities, assessment, selection of instructional media, selection of teaching materials, and selection of learning resources. The percentage of compatibility

content of the lesson plan developed by high school teachers in Surabaya is shown in Table 2.

Table 2 The percentage of the compatibility of the lesson plan content Developed by Senior High School Teachers in Surabaya with the Curriculum 2013.

Aspects	Percentage		
	Lesson plan 1	Lesson plan 2	Lesson plan 3
Identity	100%	100%	100%
Indicators formulation	58.33%	75%	58.33%
Learning materials	25%	25%	25%
Learning activities	100%	100%	100%
Assesment	100%	100%	62,5%
Selection of instructional media	100%	100%	25%
Selection of learning materials	100%	100%	25%
Selection of learning resources	100%	100%	25%

Note :

Lesson plan 1 : Sample taken from SMAN 7 Surabaya
Lesson plan 2 : Sample taken from SMAN 8 Surabaya
Lesson plan 3 : Sample taken from SMAN 19 Surabaya

Based on Table 2 it can be seen that in the aspect of indicators formulation in the three lesson plans get percentage less than 100%, because not write for basic competence (KD) 1 and basic competence (KD) 2 also indicators for basic competence 3.10 and 4.10 not compatible. In addition to the lesson plan 1 and lesson plan 3 basic competence used were not in accordance with the latest syllabus that has been issued by Kemendikbud, so get the lowest score of 58.33%. Aspects of learning materials in all three lesson plans also get percentages below 100%, which was 25%, because the material presented in lesson plan was only general material, where only in the form of points without being elaborated so that can not be associated with the experience of students and the development of science and technology. In addition, there were no remedial and ancillary lessons in lesson plan 3. Aspects of the assessment of lesson plan 3 get 62.5% percentage because there were no ancillary and remedial assessments. In the aspect of the selection of learning materials lesson plan 3 has the lowest score of 25% because there was no component in the lesson plan although the learning process mentioned using teaching materials, so it can not be associated with the characteristics of students.

Lesson plan with the lowest percentage was lesson plan 3 because the indicators used were not in accordance with the latest syllabus, the material presented not systematically, equipments / media,

materials and learning resources are not presented and does not display the assessment of remedial learning and ancillary learning.

According to the data analysis on the compatibility content of the lesson plan, it is known that there were deficiencies in the aspect of the indicators formulation, that 2 of 3 lesson plan does not include the core competencies in the developed lesson plan, although according to Curriculum 2013 Revise was allowed to not include the core competence, but it would be better if core competence is still included as a reminder for teachers in implementing better learning. In addition, there was a shortage of basic competence in lesson plan of the teacher, that the basic competence should be adjusted to the latest in 2016 issued by the Ministry of Education and Culture, but in fact 2 of 3 lesson plans still used basic competence that were not in accordance with the the latest biology of 2016. So that with this error can also affect the indicator that will be derived from basic competence. Good indicators that include the material to be measured, include measurable and operational verbs, and verbs that are closely related to the material (Kunandar, 2013).

The next aspect was the aspects of learning materials. In this aspect it also has shortcomings after being studied, because the ecology learning material was written in the form of sub-chapters of points without any concise material presented, so that it cannot be associated with the experience of students and the development of science and technology about the current ecology, besides there were no remedial and ancillary learning materials. At permendikbud number 59th about the Curriculum 2013 High School / Madrasah Aliyah it was mentioned that learning materials should be relevant, and written in the form of items in accordance with the formulation of indicators of achievement of competence.

The core activities in accordance with the Curriculum 2013 should contain 5 scientific process skill points like observing, questioning, collecting data, associating, and communicating. The closing activities as stated in permendikbud 103 years 2014 consist of teachers' activities with students to conclude lessons, reflect on activities that have been done, provide feedback, conduct assessment, submit follow-up activities, and submit plans for further learning. Competencies categorized by: cognitive ability in subjects (understanding and utilization of convergent knowledge), advanced thinking ability (creativity, problem-solving ability, critical thinking ability, ability

to use information, and decision-making ability), ability to contribute to the community (communication ability, ability to engage in social relationships, and cooperative ability), and individual emotional ability (self-respect, positive emotion, considerateness, and civil awareness), which are part of the 4C (creativity, caring, convergence, and communication) as defined by Baek et al. (2012).

Aspects of assessment include the compatibility of techniques, instruments and compatibility with indicators. The compatibility of the technique and the instrument was assessed from the assessment component with Ecological material, in accordance with authentic assessment techniques, there was an assessment instrument, there was a scoring rubric. While the compatibility with the indicators examined from the assessment component in accordance with indicators that have been developed from basic competence. The results of lesson plan documentation indicate that there were some shortcomings in the aspect of the assessment as mentioned in the lesson plan were mentioned various types of indicators but in the assessment, the indicators were not assessed or there were no test items relevant to the indicator. Supposedly, when a basic competence was downgraded to an indicator, then the indicator must be reached at the end of the lesson and the tool to see the achievement of the indicator is an assessment which in this case enters as a test item.

Remedials can be given in three forms: first, re-learning with different media and methods if the remedial participant was more than 50%, secondly with group assignments if the remedial participants range from 20% to 50%, and third with specific guidance if the participants remedial less than 20%. Ancillary lessons were only for the competencies / materials that the student have not yet learned and can be given in the form of group learning, self-study, theme-based learning, or curriculum compilation (Directorate of High School Development, 2010).

2. Compatibility of Indicator with assesment

Assessment of the test (cognitive) was analyzed based on the compatibility between the cognitive dimension indicators and the test items developed by the teacher. Referring to the taxonomy of bloom, the cognitive domain consists of C1-C6 and the dimensions of knowledge with 4 categories namely factual, conceptual, procedural, and metacognitive.

There were three categories in assessing this point, which were compatible, incompatible and non-existent.

Can be said compatible if in developing the test items, teachers pay attention to indicators that have been made before so there was compatibility between indicators and test items created. For example, in the development of an indicator the teacher developing an indicator of the context C1 of the food chain, then in the assessment to be carried out there must also be a test item of value C1 with the context of the food chain. Furthermore, the assessment sheet was said to be incompatible if the development of the test items in the realm does not match the realm of the indicator. For example, there were indicators that have the C6 aspect of the energy flow context, but the test item has the C1 realm even in the same context, as it may impact the unexpected assesmsnte. And lastly, the assessment sheet is said to be non-existent if the lesson plan was listed in the indicator but in the assessment there were no suitable test items. For example, there were indicators that have a C6 domain on biogeochemistry, but in the assessment there was no suitable test item to test students' abilities in the indicator.

The compatibility between indicator and assessment is shown in Table 3.

Table 3. The compatibility percentage of process dimension of cognitive indicator with teachers-made test on ecology topic at Senior high school Surabaya

The assessment sheet	Percentage		
	Appropriate	Inapropriate	Non-existent
The assessment sheet 1	46 %	30.3%	23.7 %
The assessment sheet 2	53.8%	7.6%	38.46%
The assessment sheet 3	33.3%	16.7%	50%

Information :

- Compatible : cognitive indicators were compatible with the test items presented
- Incompatible : cognitive indicators were not compatible with the test items presented
- Non-existent : there were test items but there were no achievement indicators or there were indicators of achievement but there were no test items

Based on Table 3 shows the compatibility level of cognitive dimension indicator with dimension of test items of teachers made from three target schools such as SMAN 7 Surabaya, SMAN 8 Surabaya and SMAN 19 Surabaya. The highest percentage of indicators in accordance with the ecological material test items obtained percentage of 53.8% that was on the assessment sheet 2, while the lowest percentage of cognitive dimension indicators corresponding to the test items

dimension of ecological materials was 33.3% on the assessment sheet 3. Percentage of overall indicators of cognitive dimensions the test items of ecological material test is 44.36% which categorized as the less compatible category.

Table 3 also shows unknown results because there was indicator without test item or there was test item without indicator. The highest percentage of 38.46% was on the assessment sheet 2, it is because on the 2nd assessment sheet has many indicators but there were no test items that match with the indicator that has been written. The lowest percentage of 23% was on the assessment sheet 1. The assessment sheet 1 has sufficient test items for the indicator that has been written. Goal or achievement expressions in a program must include both low- and high-level thinking skills in a balanced way, because it is not possible to shift to the high-level without gaining the low-level thinking skills (Gezer & İlhan, 2014).

Table 4. The National Examination Results (UN) at Target Schools

No	School Name	The average UN of Science concentration in 2017	Ranking
1.	SMAN Surabaya	19 57.85	16
2.	SMAN Surabaya	7 57.76	17
3.	SMAN Surabaya	8 55.96	19

Based on the data that researchers have conducted, researchers get data about the results of national examinations (UN) from the three target schools. From these results there was a surprising thing, where the value of compatibility indicator with the assessment of SMAN 19 Surabaya has the lowest value of the three target schools, but in the National Exam results SMAN 19 Surabaya has a higher value than the other two schools. The national examination scores are sequentially from SMAN 19 Surabaya, SMAN 7 Surabaya and SMAN 8 Surabaya that is 57.85, 57.76 and 55.96.

3. The compatibility of Learning Materials and Student Worksheet with Good Preparation of Student Worksheet as Characteristic of Scientific Approach

Learning materials used by teachers as well as learning materials have been given by Kemendikbud, namely BSE (Electronic School Book) that has been declared eligible and compatible for learning biology class X.

The student worksheet was analyzed based on several aspects of good student worksheet preparation requirements including technical requirements, construction, content and characteristics of a scientific approach (basic and integration process skills) trained in accordance with the requirements of Curriculum 2013. Researchers in search of data did not get student worksheet developed by biology teachers from 3 target schools Curriculum 2013. In learning activities in 3 target schools, teachers only provide tasks / manual activities only with oral course, without any structured student worksheet.

In interviews that have been conducted, the teachers preferred to use student worksheet that has been developed by the publisher rather than develop their own student worksheet due to various considerations of efficiency in learning. The teachers feels that the duties and demands of the Curriculum 2013 were very heavy and did not has the time to develop student worksheet on every biological material so entrust the publisher in the matter of this student worksheet.

4. The result of Developing Teaching Materials Curriculum 2013

The researcher also developed a teaching material Curriculum 2013 on ecology topic which validated by two validators. The teaching materials were stated compatible in accordance with the Curriculum 2013 revised if the assessment results reach $\geq 70\%$ with the compatible interpretation (Kemendikbud, 2013). The following was a table of validation results of teaching materials developed by researchers.

Table 5. The results of teaching materials validation

No.	Aspects observed	Score	
		V1	V2
A. Identity of Lesson Plan			
1.	Completeness component of lesson plan	4	3
B. Formulation of Indicators			
1.	Compatibility of Core Competence (KI)	4	4
2.	Compatibility of Basic Competence (KD)	4	3
3.	Compatibility of the use of operational verbs with measured competencies	3	3
C. Learning materials			
1.	Compatibility with the criteria of the students	4	3
D. Learning Activities			

	1. Show preliminary activities, core and cover clearly	4	3
	2. Preliminary activities	4	3
	3. Compatibility of core activities with scientific approach	4	3
	4. Closing activity	3	3
E.	Assessment		
	1. Compatibility with techniques and assessment instrument	4	3
	2. Compatibility with indicators	4	3
F.	Selection of Learning Media		
	1. Compatibility with scientific approach	4	4
	2. Compatibility with character of the students	3	4
G.	Selection of Learning Materials		
	1. Compatibility with learning materials	4	4
H.	Selection of Learning Resources		
	1. Compatibility with KI and KD	4	4
	2. Compatibility with scientific approach	4	4
	3. Compatibility with character of the students	3	4
	Total	64	58
	Score percentage (%)	94,11%	85,29%

The result of student worksheet validation which has been developed by the researcher gets the score of 86.2% percentage of validator I and 71,4% from validator 2, the average percentage of 2 validator value was 78,8% with category 'compatible'. In the aspect of technical requirements, student worksheet was not getting perfect value because the design was less interactive for current students. The design should be developed to attract the attention of learners, other than that the compatibility of the letter should also be compatible and can be read by learners. Where in the preparation of a good student worksheet should be able to contain technical terms, namely consistency of writing used, clarity, the proportion of effective images for the achievement of information transferred to learners. Appearance should also be able to build the spirit of learners and help learners to construct material (Widjajanti, 2011).

CLOSING

Conclusion

Based on the research that has been done, it can be concluded that the compatibility of biology teaching

materials the teacher developed on the topic ecology using Curriculum 2013 at Surabaya is categorized as compatible with 70.8%. The compatibility of the completeness component of the lesson plan is categorized as compatible with 89.39%, the compatibility of the lesson plan content is categorized as compatible according to 78.8%, the match between the cognitive dimension indicator and the test item is categorized as less compatible by 44.36%. Teaching materials developed by researchers are feasible and compatible for the Curriculum 2013.

Suggestion

After the research that has been done, the suggestions are: teachers need to do lesson study with other teachers or educational experts in helping the preparation of the formulation of test items in accordance with indicators of achievement, but also to develop an authentic assessment in accordance with learners, teachers need to conduct other Lesson study activities or educational experts in helping to prepare Student Worksheets based on a scientific approach to support the learning of students, discussion activities with teachers in the field to find out what difficulties experienced in implementing compatible learning Curriculum 2013, educational authorities need to follow up and monitor the ability of teachers in generating items in accordance with the indicators that have been made, the educational authorities need to follow up and monitor the ability of teachers in conducting the compatible assessment with the Curriculum 2013 (Cognitive, affective and skill spheres), educational authorities need to evaluate and improve the effective of Curriculum 2013 training process related to the implementation of the Curriculum 2013, the educational authorities need to follow up and monitor the learning process as compatible Curriculum 2013 with successful students National Exam.

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