Earthcomm-based Electronic Module: The Learning Material of Natural Resource Management Wisdom

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Abstract. The study aims to identify: 1) The need of Earthcomm-based electronic module in the learning material of wisdom in natural resource management, 2) The stages of Earthcomm-based electronic module development, and 3) The feasibility of Earthcomm-based electronic module in the learning material of wisdom in natural resource management. This study is a Research and Development (R&D) research with ADDIE (Analysis, Design, Development, Implementation, and Evaluation). Conclusions of the study are that: 1) the students need the Earthcomm-based electronic module, 2) the Earthcomm-based electronic module is adapted with curriculum 2013 and developed by using Flipbook maker application and is packaged in the form of compact disk (CD), 3) the feasibility of Earthcomm-based electronic module according to the experts' team consisting of media experts, material experts and linguists is 84% and according to the students' response is 84%, therefore, it can be said that it is worth to be used.

1. Introduction

As the rapid development of technology, there are many learning media being developed to improve the quality of education. The use of media for learning can foster the students' interest, motivation, and stimulation in the process of the learning itself [1].

Geography is one of subject matters in Senior High School (SMA). Geography is important subject to be learnt since human need to be aware of the environment where they live in [2]. However, geography is still considered as challenging subject. Some students view geography as the monotonous subject. The lesson tends to be boring class. The lack of variety of learning media leads to the students' low interest to learn. In addition, the focus of the learning still lays on the result without integrating learning to the real problems existing in the surrounding.

From the result of interview with the geography teacher in SMA MTA Surakarta, it is known that the learning media used by the teacher to deliver the lesson is less varied. The most frequent media used by the teacher is power point slideshow. Moreover, the existing textbook and the printed module emphasize more on the result rather than on the process of the learning. The existing module has not been able to answer the problems that occur in the environment the students. This particular case causes students to be less aware to the surrounding environment.

Based on the above description, it can be said that the effective, attractive, innovative, and supportive media is needed to facilitate students in learning geography. The electronic module can create independent learners who do not merely depend on the teacher as the source of information.

The students can be the autonomous learners in during the learning process, so there will be student-centered learning as mandated in the Curriculum 2013. In addition, the use of electronic module is more economical since it uses less paper. This concept is in line with the environmental care movement with the tag line Go Green. Go Green refers to a movement to manage human activities effectively and efficiently to reduce global warming and environmental damage.

Reference [3] shows, learning module is the smallest unit in the teaching and learning program, which can be studied by the students individually or taught by the students to themselves (self-instructional). The electronic module is an example of modified learning media. It is originated from the printed module which is integrated to the use of Information and Communication Technology. This developed product can be accessed through personal computer or gadgets. The electronic module poses some advantages for instructional setting, mainly because it is accessible by the students anytime and anywhere. This feature can overcome the shortcoming of the existing module.

Earthcomm-based electronic module is an electronic module integrated with Earthcomm model of learning. Earthcomm learning model is a model of learning which provides students with insight into where, when, and how some phenomena happen. It helps students to understand which policies should be implemented by focusing on the community. In addition, this model incorporates the more holistic system approach into where there is interaction between subsystems and the other subsystems on this earth. Earthcomm-based learning is designed for the real discovery that focuses on the questions or issues which the students have to answer by various types of activities, thus it can improve the thinking skill of the students as in [4]. Earthcomm is packaged in the form of thematic module containing with reading material and some activities that stimulate discovery/ inquiry [5]. Earthcomm can be used to develop students' comprehension on the earth system and train students' critical thinking and thoughtful thinking in making decisions [6]. During the lesson, Earthcomm prioritizes the learning process rather than the result or achievement, so that the students do not only become knowledge receivers but also become the knowledge seekers. The students are encouraged to build their own knowledge by finding and applying their ideas [7].

The problem formulations of this research are as follow: 1) how is the need of Earthcomm-based electronic module on for learning material of wisdom in the utilization of natural resources; 2) how to develop Earthcomm-based electronic module on learning materials of wisdom in the utilization of natural resources? 3) how is the feasibility of Earthcomm-based electronic module On learning materials of wisdom in the utilization of natural resources?

The purposes of this research are to: 1) identify the need of Earthcomm-based electronic module on learning materials of wisdom in the utilization of natural resources, 2) identify the procedure of developing Earthcomm-based electronics module, and 3) determine the feasibility of Earthcomm-based electronic module on learning materials of wisdom in the utilization of natural resources.

There are some significances of this research, as the following: 1) generating students' autonomy in understanding and mastering the learning material about wisdom in utilization of natural resources as well as creating meaningful learning experiences for the students, and 2) providing a real picture to the teacher about the importance of using various learning resources, for example electronic module which can be developed independently by the teacher later on.

2. Research methodology

This research is designed under the platform of Research and Development (R&D). The research focuses on the development of electronic module as the learning sources. Research development conducted by the researchers refers to the procedure of ADDIE model (Analysis Design Development Implementation Evaluation). ADDIE model consists of five stages, namely analysis, design, development, Implementation, and evaluation [8]. The ADDIE model is a recurrent instructional design process, whereas the outcome of formative evaluation of each of its stages can lead to a return to previous stages [9]. However, in this study only done until the stage of Development. Earthcomm-based electronic module test was conducted on 6 students of XI IIS SMA MTA Surakarta.

This research is undertaken from December 2016 until April 2017 in SMA MTA Surakarta which is addressed at Kyai Mojo Street, Semanggi, Pasar Kliwon (7˚35'11,72 "S and 110˚50'10,62" T). Map of Research Location can be seen in Figure 1.
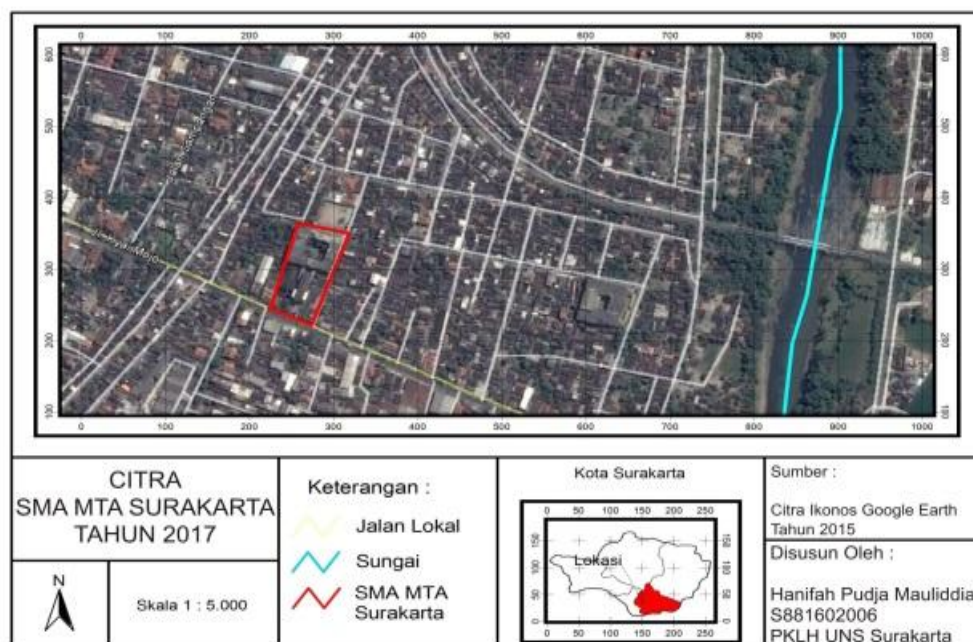

Figure 1. Map of Research Location

3. Research findings
The results of this study are:

3.1. The need for earthcomm-based electronic modules
From the results of the study, it can be seen that students who are always happy with geography subjects are 4 students (15%), often feel happy 9 students (33%), sometimes feel happy 11 students (41%), and not happy 2 students (7.4%). In the second point of the statement, which is a detail media and can be used as a self-learning source, students who are always interested in 4 students (15%), are often interested in 8 learners (30%), sometimes interested 14 learners 52%). The third item is teaching materials that provide information in the surrounding environment, there are 13 students (48%) who answered always happy, 5 students (19%) answered often happy, and 9 students (33%) sometimes happy.

Statement item 4 is a teaching material that is visualized or displayed in electronic media. 18 students answer that they are always happy (67%), often happy by 4 students (15%), and 5 students who answered sometimes feel happy (19%). In the fifth point on the need of electronic teaching materials, there are 19 students (70%) who always need electronic teaching materials, 4 students (15%) often need, 2 students (3.7%) who sometimes and do not need electronic teaching materials.

The statement on the sixth point is about the diversity of learning resources used in learning. Students who answered always happy 13 students (48%), often happy 11 students (41%), 2 students (7.4%) sometimes happy and 1 (3.7%) of students who answered not happy. In the seventh statement is a learning medium that shows the workings, pictures, or more detailed or real material. Students who answered always interested are 18 students (67%), 5 students (19%) who answered often interested, and 4 students answer sometimes interested (15%).

3.2. Development of earthcomm-based electronic modules

The electronic module was developed by applying ADDIE model of development. It consists of several steps, including Analysis, Design, Development, Implementation, and Evaluation. However, this research is mainly done until the developmental stage.

The first stage of this research is analysis. Analysis is done by analysing the need of the students and reviewing the literature. The literature review is intended to collect a theoretical foundation relating to the focus of research on the development of Earthcomm-based electronic learning module. Needs analysis is conducted to identify the needs of students to the learning resources that will be used in learning process. The needs of student are obtained from the questionnaire of needs analysis with 7 items of statement. From the questionnaire distributed to 27 students, it is known that as many as 19 students (70%) answered that they refer to require electronic teaching material rather than the printed materials.

The second stage is the design. The design is done based on needs analysis and interviews conducted with geography teachers. In the initial product design stage, Flipbook Maker application is applied to create the Earthcomm-based electronic module design with learning materials wisdom in the utilization of natural resources. The final result of this product design activity is in the form of learning media. The learning media is Earthcomm-based electronic module which will be packed in the form of compact disk (CD). The initial design of Earthcomm-based electronic module can be illustrated as in Figure 2:

Figure 2. Initial Design of Earthcomm-based Electronics Module

After determining the initial design or prototype, the next step to do is to determine the core competencies, basic competencies, indicators, and learning objectives. The electronic module being developed is integrated with the Curriculum 2013 and the Earthcomm learning model so that the learning emphasizes more on the process of the learning and meaningful process for the students. The following is the table design of Earthcomm-based electronic modules as seen in Figure 3:

Display

(a) Cover page   (b) Learning material

(c) Challenge   (d) Quiz
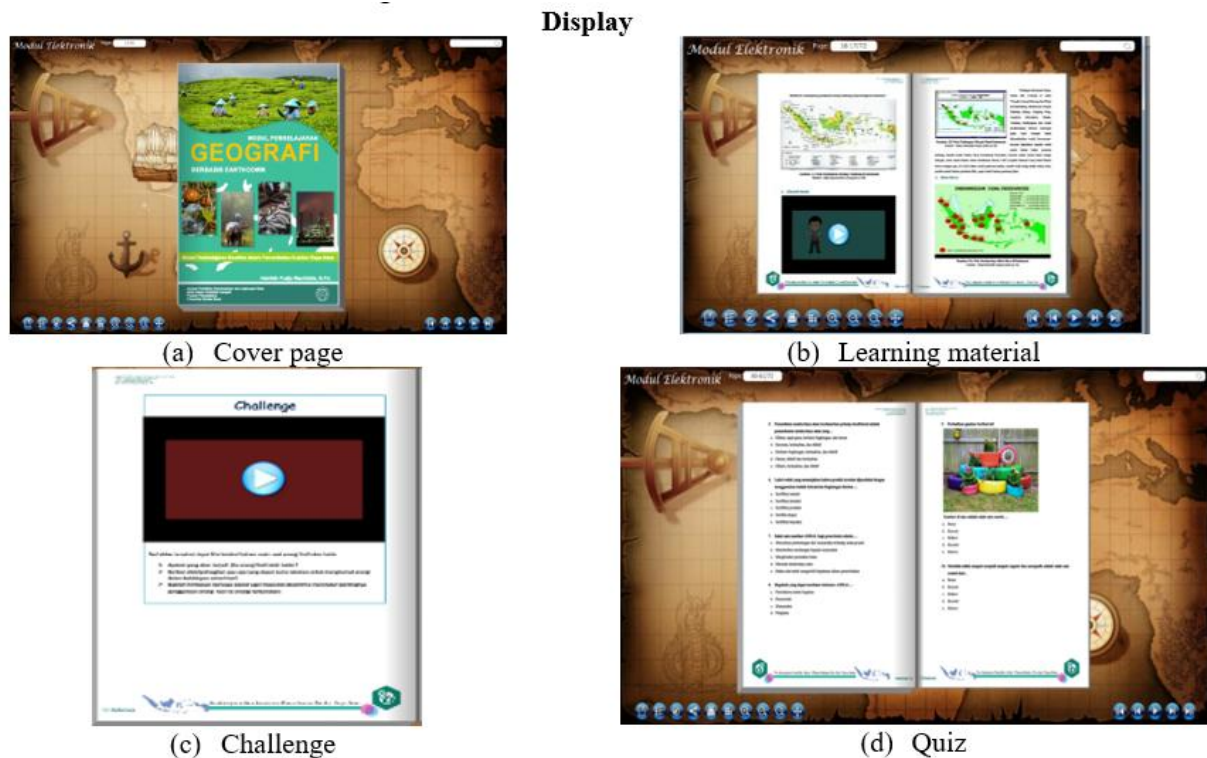
Figure 3. The Design of Earthcomm-based Electronic Module
Source: The analysis data of the research, 2017

After the design stage is done, the next stage is the validation stage. At this stage, validation is done by expert team and product trial is undertaken. Validator consists of media experts, material experts, and linguists. Media experts are lecturers of geography education, material experts and linguists are geography teachers and Indonesian language teachers. Validation results can be seen in Table 1:

Table 1. Result of validation on earthcomm-based electronic module

Validators	(%)	Criteria
media expert	80	feasible
material expert	83	feasible
linguist	89	feasible
mean	84	feasible

Source: The analysis data of the research, 2017

From Table 1, it can be seen that validation of Earthcomm-based electronic module is 84% so it is feasible to be used in Geography lesson.

After being validated, the electronic module is tested to 6 students of IIS class XI in SMA MTA Surakarta. Furthermore, in order to determine the students' response, the closed questionnaire containing 10 items is used. After that, the students' responses are analyzed. It can be seen that the mean score of students' response towards items 1 to 10 in the questionnaire is 84%.

From the results of the validation analysis of the expert team and the students' responses, the Earthcomm-based electronic module can be considered as feasible.

4. Discussion

Earthcomm-based electronic module is developed through research development stages, mainly referring to the ADDIE model. The first stage is the analysis phase. In this stage, the researchers conducted literature analysis, field analysis, and the needs of students. The needs of students are

identified through a questionnaire consisting 7 items about the learning needs. Questionnaire is made using Linkert scale. From the analysis, it is known that students need electronic teaching materials.

The second stage is the design stage. Earthcomm-based electronic modules are designed using flipbook maker application since this application is relatively easy to operate. The end product of electronic module is in the form of compact disk (CD) which is so easy to carry. Earthcomm-based electronic module is equipped with title page, introduction, core competence, basic competencies, indicators, learning objectives, table of contents, concept maps, and material about wisdom in utilization natural resources, images, schemes, maps, video, challenge, quiz, answer key, discussion, and author's identity. This developed electronic module has been integrated with the 2013 curriculum.

The third step is development. At this stage, validation is done by the expert team and product is tested to a small group of students. Earthcomm-based electronic modules are validated by media experts, material experts and linguists. Furthermore, Earthcomm-based electronic module is tested to small group consisting of 6 students. From the validation and trial results, Earthcomm-based electronic modules are considered as feasible for the use in the learning process.

5. Conclusions
Based on the results of the research, it can be concluded that: 1) students need an Earthcomm-based electronic module, 2) Earthcomm-based electronic module is developed using Flipbook maker application and packaged in compact disk (CD), 3) the feasibility of Earthcomm-based electronics module according to the expert team is 84% and learners' responses show 84% so that it can be said to be feasible in the geography learning process.

The suggestion that can be given for further research is Earthcomm-based electronic modules can be developed with more creative and attractive appearance for students. Furthermore, the electronic module is expected to be used with other gadgets such as smart phones or tablets.

References
[1] Falahudin Iwan 2014 Pemanfaatan Media dalam Pembelajaran *Jurnal Lingkar Widyaiswara* **I**
[2] Maryani E 2007 *Ilmu dan Aplikasi Pendidikan* Imperial Bakti Utama
[3] Winkel W S 2009 *Psikologi Pengajaran* Yogyakarta: Media Abadi
[4] Sumarmi 2012 *Model-Model Pembelajaran Geografi* Malang: Adtya Media Publishing
[5] Lewis E B 2008 Content is Not Enough: A Historical of Secondary Earth Science Teacher Preparation with Recommendations for Today *Faculty Publication: Department of Teaching, Learning and Teacher Education* University of Nebraska-Lincoln 449
[6] Jenkins E W 2003 *Innovation in Science and Technology education Vol III* United Nations Educational Scientific and Cultural Organization 83
[7] Suherdianto 2014 Upaya Peningkatan Hasil Belajar Siswa Melalui Pembelajaran *Earth Science Community (Earthcomm)* *Jurnal Edukasi* 113 **I**
[8] Ghaliyah S, Bakri F, Siswoyo 2015 Pengembangan Modul Elektronik Berbasis Model *Learning cycle 7e* Pada Pokok Bahasan Fluida Dinamik Untuk Siswa SMA Kelas XI *Proseding Seminar Nasional Fisika (E-Journal) SNF2015* **IV** 149
[9] McGriff, and Steven J 2000 Instructional System Design (ISD): Using the ADDIE Model *Journal of Collage of Education* Penn: Penn State University 1