

Validity and Effectiveness of the Historical Electronics Module for Senior High School

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Validity and Effectiveness of the Historical Electronics Module for Senior High School

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Abstract: This study examines the content validity and presentation of historical electronics modules (HEM) based on higher-order thinking skills developed with the ADDIE model for class XII high school students in Indonesia. In addition, the assessment of the effectiveness of the module on improving critical and analytical thinking skills through a competency test. The research method used is a mixed-method with research and development and experimental designs, starting from the development of the electronic history module and starting from Analysis, Design, Development, Implementation, and Evaluation. The results showed that the validity of the content and presentation from the experts and the users, in this case, students were very valid, so HEM was very suitable. The effectiveness test results showed increased students' ability to think critically and analytically as an indicator of higher-order thinking. The electronic developed with a higher-order thinking approach can improve students' ability to think critically and analytically in learning history independently.

Abstrak: Penelitian ini mengkaji validitas isi dan penyajian modul elektronika sejarah (HEM) berbasis kemampuan berpikir tingkat tinggi yang dikembangkan dengan model ADDIE untuk siswa kelas XII SMA di Indonesia. Selain itu, penilaian keefektifan modul terhadap peningkatan kemampuan berpikir kritis dan analitis melalui uji kompetensi. Metode penelitian yang digunakan adalah metode campuran dengan desain penelitian dan pengembangan dan eksperimen, dimulai dari pengembangan modul sejarah elektronika) mulai dari Analisis, Perancangan, Pengembangan, Implementasi, dan Evaluasi. Hasil penelitian menunjukkan bahwa validitas isi dan penyajian dari ahli dan pengguna dalam hal ini siswa sangat valid, sehingga HEM sangat sesuai. Hasil uji efektivitas menunjukkan peningkatan kemampuan berpikir kritis dan analitis siswa sebagai indikator berpikir tingkat tinggi. Elektronik yang dikembangkan dengan pendekatan berpikir tingkat tinggi dapat meningkatkan kemampuan siswa untuk berpikir kritis dan analitis dalam pembelajaran sejarah secara mandiri.

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INTRODUCTION

Improving the quality of education is very dependent on the learning process in educational institutions such as schools. Several factors affect the learning process in schools, namely facilities and infrastructure, school management, teachers, students, the selection of learning methods and models, the availability of learning media, and learning resources. These factors have interrelated with one another. Higher education institutions, as providers of higher education, are responsible for contributing to the quality of education, including by improving the quality of education in schools—for example, research activities to produce innovative learning products at universities.

Innovative learning products must use in the world of education in the industrial era 4.0. In the era of the industrial revolution 4.0, technological progress and the development of science are increasing rapidly from time to time, so the world of education is required to address the challenges of technological advances in im-



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proving the quality of education (Che et al., 2020). Many teachers still do not take advantage of technological developments in learning. Because the teaching paradigm in school in carrying out the learning process is still A lot conventional and less innovative, this is contrary to the current 2013 curriculum.

The Student-Centered Learning approach is a must. The implementation of the 2013 curriculum is very demanding for student-centered learning and requires educators to have the ability to develop learning materials that are structured based on student characteristics and needs, one of which is by developing learning modules. The use of modules in learning follows the approach used in the 2013 curriculum. ICT's rapid development causes modules to be developed electronically and follow the material or learning, referred to as electronic modules. Furthermore, following the material or learning is called electronic modules. Electronic modules are digital learning resources (Yulando & Chi, 2019). Electronic modules with a student-centered learning approach are needed because it follows the applicable curriculum and the needs of today's students, including in history learning. However, electronic modules that follow the 2013 curriculum have not been widely developed (Sunarya Herawati & Muhtadi, 2018).

The Indonesian Journal of Learning Technology wrote in their research that they still use conventional printed teaching materials or student worksheets in historical subjects. The learning process only uses books from school as the only source of learning; this causes the history learning process less effective and varied. The material presented is still abstract and challenging for students to understand. Such teaching materials certainly cannot attract students' interest in learning (Udayanie et al., 2017). Electronic modules can overcome these problems by using electronic modules as innovative learning products. Learning today must use electronic-based teaching materials such as videos, computer-books, and electronic modules that can use in face-to-face meetings and online learning.

Electronic modules learning are very effective in helping students in the learning process (Shobri et al., 2021), (Handayani et al., 2021). In contrast, not many practitioners in the world of education have developed portals as online learning resources for students throughout Indonesia.

Electronic modules for history learning study several aspects of historical material. Such as Materials for the National Movement (Dewi Af-

yanti, 2016), Appreciation of Historical Heritage in the Local Environment (Akhmadi et al., 2021), Megalithic Heritage in Pasemah (Susanti, 2020), Cultural History of Lumajang (F S Azizha, N Umamah, 2020), and the local site of Situbondo (F S Azizha, N Umamah, 2020). From these studies, electronic modules can be used in historical subjects and effectively improve learning outcomes. In these studies, electronic modules are only packaged in one material aspect, not at one semester or year level, and product effectiveness is carried out only by involving students in one school without testing it in other schools. It does not provide a broader picture of the effects of electronic modules on history learning. So it is necessary to develop an electronic history module whose material coverage covers the need for one year of grade level and has a good effect on students from various regions in Indonesia.

Based on these problems, the authors are interested in presenting the research results on The Development of historical electronics for class XII senior high school so that there will be learning innovation products the community can use.

METHOD

According to Sugiyono (2017). Research and development is a method used to produce specific products and test their effectiveness of these products. The research method used in this research is the research and development methodology. The research was conducted in several high schools in Indonesia, namely SMAN 111 Jakarta, SMAK 1 BPK Penabur Jakarta, Muhammadiyah 11 High School Jakarta, SMAN 1 Gunung Sindur Bogor West Java, SMAN 2 Pagasen Subang West Java, SMAN 11 Bandung West Java, SMAN 2 Slawi Central Java, SMAK Petra 5, Surabaya, East Java, SMAN 21 Bandung, MAN 1 Padang Sidempuan, North Sumatra, SMAN 1 Dolok Sanggul, North Sumatra, SMAN 2 Buton Selatan with a population of class XII high school students with a sample of 389 students drawn from each school.

The development model used in the Development of the Historical Electronics Module (HEM) in this study is the ADDIE model, which is a systematic learning design (Robert Maribe Branch, 2009), (Serhart, 2018). ADDIE stands for Analysis, Design, Development, Implementation, and Evaluation. ADDIE result from the paradigm that can describe a systematic approach to instructional development. The educational philosophy emphasized by this model is also in line with the

| | <i>Analyze</i> | <i>Design</i> | <i>Develop</i> | <i>Implement</i> | <i>Evaluate</i> |
|--------------------------|--|--|---|--|---|
| Concept | Identify the probable causes for a performance gap | Verify the desired performances and appropriate testing methods | Generate and validate the learning resources | Prepare the learning environment and engage the students | Assess the quality of the instructional products and processes, both before and after implementation |
| Common Procedures | <ol style="list-style-type: none"> 1. Validate the performance gap 2. Determine instructional goals 3. Confirm the intended audience 4. Identify required resources 5. Determine potential delivery systems (including cost estimate) 6. Compose a project management plan | <ol style="list-style-type: none"> 7. Conduct a task inventory 8. Compose performance objectives 9. Generate testing strategies 10. Calculate return on investment | <ol style="list-style-type: none"> 11. Generate content 12. Select or develop supporting media 13. Develop guidance for the student 14. Develop guidance for the teacher 15. Conduct formative revisions 16. Conduct a Pilot Test | <ol style="list-style-type: none"> 17. Prepare the teacher 18. Prepare the student | <ol style="list-style-type: none"> 19. Determine evaluation criteria 20. Select evaluation tools 21. Conduct evaluations |
| | <i>Analysis Summary</i> | <i>Design Brief</i> | <i>Learning Resources</i> | <i>Implementation Strategy</i> | <i>Evaluation Plan</i> |

Figure 1. The procedure with The ADDIE Model (Robert Maribe Branch, 2009).

necessities required in developing the 2013 curriculum, especially in history learning, which is student-centered, innovative, authentic, and inspirational. The stages of the development of the historical electronics modules can be as follows: (1) Analysis stage. Researchers conducted a preliminary study through interviews and literature study to find problems. The results of problem reflection found that there was a need to develop learning aids that can be used offline and online in electronic modules on historical subjects. Next, the researcher determines the learning objectives of these subjects, confirms potential users, and identifies the necessary resources. (2) Design stage. Researchers analyze and determine core indicators, Basic Competitions, and indicators, create material flowcharts, collect materials and pictures, choose testing strategies, arrange tests, and design learning products according to the curriculum analysis results. (3) Development stage. Researchers developed it based on the 2013 curriculum for history subjects compiled by the Ministry of Education and Culture of the Republic of Indonesia. The initial results of this development by experts and the results of the validation of the experts are revised. Furthermore, small and field groups conduct product trials for the entire series in person and online. (4) Implementation stage. Products declared feasible are then used in the history learning process by

making prior preparations for the teacher and students as users and the observed variables. At this stage, the researcher data collection from students. (5) Evaluation stage. The evaluation effectiveness of the module to see its quality.

Data used in this development research is qualitative and quantitative. Data will then be analyzed descriptively and concluded to improve the products—the qualitative data on suggestions and input from experts and product users. Meanwhile, quantitative data was obtained based on scores from the validation results of material experts, media experts, teachers, and students using a Likert scale with four value ranges, namely: 4 in the excellent category, 3 in the excellent category, 2 in the fair category, and 1 in the inferior category. Good. Data collection techniques used in this study were observation and questionnaires. Observation aims to determine how the description of history learning activities using HEM.

In contrast, collects data through questionnaires when media and material experts validate it and in field trials that teachers and students fill out. The research instruments used in data collection were HEM assessment sheets for media and material experts and response questions for students. After presenting it, This research will be successful if the questionnaire is in the proper and feasible criteria, namely in the range 70.0% -

100%. It means the percentage obtained is suitable for use as an interactive historical electronic module. The researcher compared the outcomes of the pretest and posttest to see their effectiveness. It is said to be effective if there is an increase in student learning outcomes before and after using the product.

PRODUCT DESCRIPTION

A development model is needed to develop the historical electronic module (HEM). The choice of the model for a systematic sequence of activities on the applicable theory. A development model that follows the theory will guarantee the quality of the Electronic History Module. These development models include ASSURE, ADDIE, Dick and Carey, Gagne and Briggs, and Hannafin and Peck (Sugiyono, 2017). Some of these development models certainly have characteristics that need to be understood more deeply. The development model used in the Development of the Electronic History Module in this study is the ADDIE Model.

Historical learning in the current era should encourage teachers to design and implement technology for learning. Students need the availability of learning aids that are more effective and efficient. The electronic modules are according to the development and needs of students. Learning using modules can help students learn to be more independent. However, not many historical electronic modules contain material on a one-semester scale for students.

Various teaching materials that have been available containing material for one semester and one year are published by the ministry of education and distributed both free and paid, packaged in the form of textbooks. It consists of various information packaged in the form of text, and images, the concept of learning media in the visual media category. Providing various voice and video recordings of an event in learning, in addition to the information in the form of the text, provides a deeper understanding and covers a variety of student learning styles. Audio-visuales that are informative and follow the spirit of the students' times are very suitable for students' memories.

The development historical electronics module for class XII senior high school is needed. Current learning, especially during the pandemic, really needs learning aids that are student-oriented. Electronic modules also aid in effective learning in helping students learn independently during the online learning process. However, modules like this are not widely available, especially for Indonesian

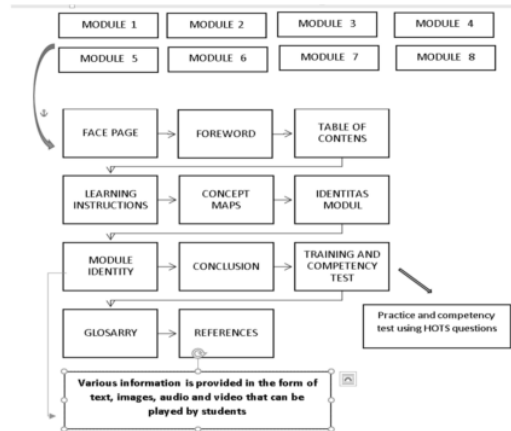


Figure 2. Blueprint of product

History subjects. Next is to determine the objectives of the learning to be achieved. The selected subject matter is all Indonesian history material for two semesters in a year. The learning objective's specification adjusts to the subject's essential competencies.

The historical electronic module was developed and contains learning materials for two semesters consisting of 8 materials or chapters based on adaptations to existing competencies for Indonesian history subjects in the 2013 revised edition of the curriculum for class XII SMA. There are eight essential competencies in cognitive and psychomotor aspects, so HEM was developed based on these competencies with a total of 8. Students can choose various electronic devices owned by students, namely computer traps, tablets, laptops, androids, and smartphones. Students can also download products as applications or files to reuse without connecting to the internet for further use. The final product exported using fliphhtml5 with an enterprise subscription has advantages compared to other subscriptions, namely the ability to adopt lightweight materials; the number of pages, images, and videos is also unlimited, so the product packaging by utilizing audio-visual. The electronics module description is in the following product blueprint in figure 2.

The format for the preparation of the historical electronics module is according to the needs at the planning stage. The design stage consists of several stages, starting with collecting reference sources to develop modules in the form of student handbooks that have been published and widely distributed. Then, drafting the material is based on the applicable curriculum, so eight drafts of the material are obtained, followed by analyzing



Figure 3. The covers page of the HEM

the content to make the material even more interesting, namely by changing the form of text material in the form of sound, image or video, determining the various applications needed in the next stage and drafting the historical electronic module. The media used to convey historical material during the learning process are the electronic history module and printed textbooks, and students use worksheets as supporting media in the learning process. The researcher produced the HEM design as a product of the historical electronic module's development, according to the subject matter for the selected essential competencies. The covers page of this product can see in the following figure 3.

The contents of the electronic history module consist of a table of contents, a list of pictures, a list of videos, audio, a study guide, a description of the material based on learning activities, a summary of the material, a competency test exercise based on higher order thinking skills, answer keys, a bibliography, and a glossary. Each material with pictures and videos with complete data sources. The content is modified in an attractive so that students can be more active in the learning process. The addition of designed images, videos, and audio makes this historical electronic module able to attract students' reading interest. For more details on HEM content

Table 1. HEM Validity by Material Experts

| Module Type | Aspect | | | Score | Criteria |
|-------------|----------|----------|----------|-------|---------------|
| | Learning | Material | Language | | |
| HEM XII.1 | 100 | 93 | 76 | 89,6 | Very feasible |
| HEM XII.2 | 100 | 100 | 97 | 99 | Very feasible |
| HEM XII.3 | 100 | 95 | 84 | 93 | Very feasible |
| HEM XII.4 | 100 | 100 | 97 | 99 | Very feasible |
| HEM XII.5 | 100 | 95 | 95 | 97 | Very feasible |
| HEM XII.6 | 100 | 100 | 97 | 99 | Very feasible |
| HEM XII.7 | 100 | 100 | 97 | 99 | Very feasible |
| HEM XII.8 | 100 | 100 | 97 | 99 | Very feasible |

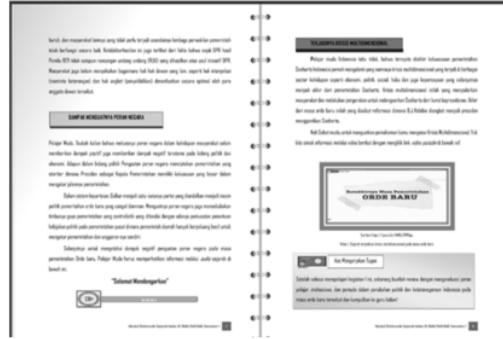


Figure 4. Design of the contents of the HEM

design, see Figure 4.

The next stage of development is product design. After packaging the historical electronic module, the next step is to conduct testing from material experts to validate and test the historical electronic module based on the characteristics of the MES. Researchers used valid research instruments to assess the product. Subjects provide an assessment using a questionnaire containing statements supporting product quality assessment indicators. In this study, the validity of the historical electronic module divides into expert and user validity.

EXPERT VALIDITY OF THE HISTORICAL MATERIALS

In the material expert trial, the test subject chosen was Eko Ribawati, M.Pd, who assessed the development product from the aspects of historical content and material through closed and open questionnaires. The researcher divides the assessment of the historical electronic module on material experts into three indicators: learning, material, and language. The three indicators are into statement items. The learning aspect is into eight statements, the material into 24 statements, and language into nine statements. The results of the assessment by material experts are as follows:

Table 2. Expert Validity of Learning Media

| Module type | Aspect | | | | Score | Criteria |
|-------------|------------|-----|-------------|---------|-------|---------------|
| | Appearance | Use | Consistency | Graphic | | |
| HEM XII.1 | 88 | 100 | 95 | 92 | 94 | Very feasible |
| HEM XII.2 | 88 | 94 | 95 | 92 | 92 | Very feasible |
| HEM XII.3 | 94 | 100 | 85 | 92 | 93 | Very feasible |
| HEM XII.4 | 88 | 100 | 90 | 88 | 92 | Very feasible |
| HEM XII.5 | 88 | 100 | 95 | 92 | 94 | Very feasible |
| HEM XII.6 | 88 | 100 | 100 | 92 | 95 | Very feasible |
| HEM XII.7 | 94 | 100 | 100 | 96 | 98 | Very feasible |
| HEM XII.8 | 88 | 100 | 100 | 96 | 96 | Very feasible |

(a) the learning indicators obtained a percentage of 100%, (b) the material obtained a percentage of 98%, and (c) language obtained a percentage of 92,5%. Based on the description above, clarify the understanding of the feasibility level of the historical electronic module according to material experts can be seen in Table 5

Of the three aspects of the material expert's assessment, the learning aspect received the highest percentage, 100%. The media created is based on systematic learning analysis, so the acquisition value is very high. From the three aspects of the criteria, the mean of the evaluation criteria from material experts on the historical electronic module is 96,83% which is in the "very feasible" category. It means that the HEM tested on material experts and teaching teachers meets the criteria for historical learning, which is "very feasible" and suitable for use as a tool in student-centered learning processes and high-order thinking skills for class XII SMA students.

EXPERT VALIDITY OF LEARNING MEDIA

Validation is also carried out by learning media experts because the product is a module using the sophistication of media technology, so that expertise by learning media experts, namely Dr. Nurdisnyah M.Pd. The researcher conducted a validation test by media experts to determine the percentage of the module's feasibility by reviewing the media presented. There are three aspects tested by media experts: appearance, use, and truth or consistency. This aspect into 30 statement items. The division is the display aspect into 4 statement items, the usage aspect into 15 statement items, the consistency aspect into 5 statement items, and the visual aspect into 6 statement items. The results of

validation by instructional media experts are as follows: (a) the display aspect obtained a percentage of 89,5%, (b) the usage aspect obtained a percentage of 99,25%, and the consistency aspect obtained a percentage of 95%, the visual aspect obtained a percentage of 92,5%. Based on this explanation, more details can see in table 2.

Of the three aspects of the assessment of the learning media expert's subject test, the highest percentage gain lies in the usage aspect, with a gain of around 100%. It means that the media created has a very high level of usage, and the results of the analysis about the use and ease of the product are very high. It means that the historical electronic module tested by instructional media experts meets the criteria of good history learning and "very feasible" in student-centered learning and higher-order thinking skills for class XII high school students. From the three aspects of the criteria, the average score criteria for learning media experts on the HEM) is 94,5% or is in the "very feasible" category.

THE EFFECTIVENESS OF THE HISTORICAL ELECTRONIC MODULE

Determine the effectiveness of the historical electronic module. It is done by analyzing and comparing the pretest and posttest results. Figure 1 shows a significant difference between pretest and posttest scores for each module.

The effectiveness test results showed that using the historical electronic module positively affected student learning outcomes, as evidenced by the significant increase in scores before and after using the product. The module's effectiveness shows different levels before and after using this history module. The difference in value occurs in all mod-

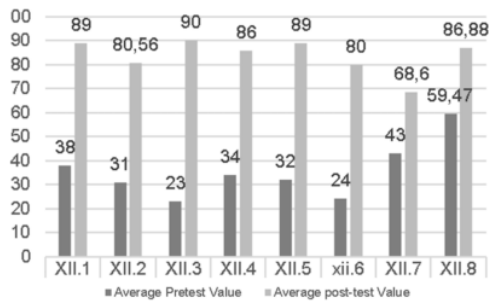


Figure 5. Differences in pretest and posttest scores

ules.

STUDENT’S PERCEPTION OF HISTORICAL ELECTRONIC MODULES

At the time of product implementation, students ask to answer several questions about how they felt after using the historical electronic modules at the end of the lesson. Responses from students were collected, analyzed, and grouped into four main themes, namely (1) ease of use, (2) Ease of learning,

(3) having fun, (4) interest, (5) willingness to learn history with HEM and (6) Difficulties faced. The following is a table of student opinions regarding historical electronic modules.

The data showed that students who learn by using HEM gave various opinions. Then after recapitulation based on the aspects indicated that the attractiveness aspect received a positive response of 31%, and for the difficulties faced aspect, the lowest result was only 1%. It showed that HEM is said to be very interesting and easy to use in history learning. Although it is very feasible to use, there are perceived obstacles such as a poor signal that can hinder access to the module because the module has a good and stable internet network, and some parts have small writing, so they must be zoomed in when reading it.

The Historical electronic module (HEM) equipped with catching pictures, audio, and videos is said to be very effective for use in learning and can improve student learning outcomes. The composition of the module content “higher order thinking skills” (Watson, 2019) gives students the

Table 3. Student’s Perception of Historical Electronic Modules

| Aspect | Example of Quote | Frequency |
|---------------------------------------|---|-----------|
| Easy to use | <ul style="list-style-type: none"> The module is easy to access This electronic module is easy to use by students and provides videos to clarify the material discussed Students can easily use | 25% |
| Easy to learn | <ul style="list-style-type: none"> The material provided is easy to understand and understand, making it easier to understand the lessons explained. HEM is very helpful in the learning process at home The module can make it easier for students so that there is a sense of enthusiasm for learning The material is easy to understand Students think the module is helpful for students in knowing history lessons because, with explanations or material accompanied by pictures, students do not get bored easily The module is soo interesting and easy to understand. Modules make interested in learning and make it easier to learn | 15% |
| Having fun | <ul style="list-style-type: none"> Learning like this is quite fun Learning to use HEM is fun It Great for self-study and fun | 10% |
| Interest | <ul style="list-style-type: none"> Modules are very interesting for learning The module is bully, students can learn independently, and the way of presentation is beautiful It is efficient and attractive to learn The module is beautiful and easy to understand | 31% |
| Willingness to learn history with hem | <ul style="list-style-type: none"> Students want to study this module in the future It makes learning history exciting Students hope a module like this for much historical material | 18% |
| Difficulties faced | <ul style="list-style-type: none"> HEM is very well, and only the signal is unsuitable depending on the area. The writing is small, so students have to zoom in when reading it | 1% |

ability to think critically and analytically to have higher-order thinking skills.

DISCUSSION

Thus, using the electronic history module as a history learning resource is very important to improve students' higher-order thinking skills because it contains material with fascinating and accessible text, images, audio, and video. This HEM makes it easier for teachers to teach, especially for online learning; especially during the Covid-19 pandemic, learning requires the help of digital products. Digitizing history learning resources is "more accessible" for students (Lee, 2002) because they can access them anytime and anywhere as long as they use digital devices (Widiadi et al., 2022). In addition, it can also encourage the improvement of students' critical thinking skills through searching for much information from HEM. "search and browse" printed and electronic study materials (Pálsdóttir, 2019). HEM makes the process of searching and searching for information easier because it contains a direct source of life if students want to trace it. By doing searches and watching videos, students' thinking ability also increases. Although (Brame, 2016) argues "student engagement" that students who do not watch videos will not be able to know the contents of the video, the results of this study indicate that students who do not like watching videos can still learn with this electronic. A historical module via text and audio is available in the module. The way students learn differs from "multiple intelligences" in Gardner's theory (Kornhaber, 2019) because students can experience extraordinary success if learning tasks are directly related to their advanced intelligence. HEM supports helping students learn with various kinds of superior intelligence because it presents the material in text, images, audio, and video.

The advantage of HEM with other similar products is that the file size is small because the development uses the Enterprise version of the Fliphtml5 application, which can produce products that can convert large files into lightweight so that students with electronic devices can easily access them. However, researchers have the challenge of paying a subscription fee so that the product can still be helpful for learning. Although students think HEM is very interesting, easy to use, easy to learn, and fun, HEM also has limited product appearance, namely small size, even though students can enlarge it by moving the cursor or finger. Electronic modules must also pay attention to the physical symptoms of students reading from the "Physics

Reason" screen because it limits students' ability to focus on the subject matter and interferes with their learning (Baron et al., 2017). Another limitation is that HEM requires an internet network to be able to use; students experience problems in the network, especially students from areas with limited internet networks, in this case, students from North Sumatra, Padang Sidempuan district.

CONCLUSION

This study examines the validity and effectiveness of the Historical Electronic Module (HEM). The product development result is in the form of an Electronic History Module for Class XII SMA. HEM contains history course material for one year and consists of 2 semesters divided into eight titles based on essential competencies adapted in the 2013 revised curriculum of Indonesian history for class XII SMA. The product can interact with computers, mobile phones, android, smartphones, and compact disks. The results obtained indicate that the results of the product validity test are very valid, namely from material experts and media experts. The effectiveness test results on students from various regions in Indonesia showed increased students' critical and analytical thinking skills, from pretest to posttest scores. So based on these results, HEM can be concluded that this module is very suitable to be used in learning history in schools because it is very valid and effective in improving learning outcomes, especially for digital-based learning. Sponsors are needed to support financing so that this product can continue to use

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