Development Instructional Media On Static And Dynamic Electrical Based On Android As Student Center Learning Media

Mahesi Agni Zaus, Krismadinata, Nurhasan Syah, Nizwardi Jalinus, Rizky Ema Wulansari, Syaiful Islami

Abstract: This article discusses the development of instructional media on static and dynamic electrical studies that are abstract in nature by explaining the abstraction using animation supported by the android based operating system for smart phones, so it can be used anytime and anywhere to support the process of understanding of learning. The research method used is Research and Development (R & D) by using development model of Instructional Development Institute (IDI) which includes three stages: define: needs analysis, develop: product development, and evaluate: product test by doing validity test, and effectiveness test on instructional media. The results show that the developed instructional media is valid, practical, and effective, to be used as student centre learning media, and can improve student learning outcomes.

Index Terms: Instructional media, valid, practical, effective.

1. INTRODUCTION

Industry revolution 4.0 brings change in all aspects of life, change the way of life, how to relate man to man, man to machine [1], starting from transformed IT, mobile communications, and e-commerce, social media, internet in communicating, the basis of the progress of transformation there are nine basic are Big Data, Internet of Things (IOT), Cyber physical systems, collaboration systems, cloud computing, intelligent robots [2]. It creates a good influence for industry, government, and society, many advantages technology allows creating new products, business models and services that can benefit every industry [3] The development of the industrial revolution 4.0 that has occurred at this time of course will not be separated from the creator of labor that is the world of education, industrial revolution demands the world of education is able to innovate with existing changes, we need to adapt the challenges of the future that prepare students to be equal to the industrial revolution 4.0 [4]. To face the challenges of the industry revolution 4.0 The Ministry of Education has changed the education from teacher center learning to student center learning, where learning activities are centered on students, students are not only passive listening to teacher directions and lectures, in student-centered learning, teachers function as facilitators student [5].

In line with the industrial revolution and student centered learning, the learning process in the classroom will change[6]. The learning process of mutual influence between the objective components, teachers, students, materials, types of activities undertaken and the means of learning in an environmental system. Learning process will go well if communication between the components which are involved will go well too, so that can make students understand the material easily. The successful is determined by teacher’s success in election the learning process strategy. Learning process as an activity to make students learn. One of strategy that can be conducted by teacher to reach learning objectives that is choosing instructional media that match and according to the needs. In revolution industry 4.0, technology as one of basic of instructional media development that is expected to be correlation between teacher and students [7]. Instructional media that use technology gives the significant effect to learning [8]. One of subject that is difficult to be understood by students that is Static and Dynamic Electricity subject. Static and Dynamic Electricity is a subject with the abstract material that can not be seen by visible [9]. The abstract material makes students have each perception about the material in learning, so that teacher need instructional media that can combine the students’ perception. There are more developments of instructional media on Static and Dynamic Electric, are follows development of interactive CD on Static and Dynamic Electric, media that is developed in learning process at school.

But, this media just can be operated in PC or students’ laptop, so that this media is not fleksibel for independent learning process to students, the function of instructional media is to solve the limit of space, time and sense power. Development of electricity teaching material that is added with game twoplayer on android smartphone as learning aids, it can make more fleksibel wherever and whenever, there is no animation in presentation, utilization of language is less communicative, so that students can not understand about Static and Dynamic Electricity materia. Explains that utilization of instructional media like applications can improve students’ motivation and performance, because utilization of ICT which is quite rapid in education. But, media that is used by teacher just informative without care about students’ interesting, so that teacher need interesting instructional media of independent learning for students. Mobile learning media based on android is alternative instructional media that has unique characteristic that can be used whenever and wherever, it has interesting visualization. This is corresponding that students can learn indirectly, that is active to interact with media or other learning

References:

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resources, so that learning process can be happened wherever and whenever. Media is not seen as learning aids for teacher to learn, but media as conveyor message from teacher to students. Students can improve understanding about Static and Dynamic Electricity as learning fun through instructional media. Development of supporting media is expected can facilitate teacher and students’ needs to learn Static and Dynamic Electricity material every time without limitation of place and time. Mobile Learning is effectiveness cognitive learning [10]. Instructional media based on android is expected to be able to produce independent learning supporting media for students. Supporting media that produced is not monotonous with text only, but it has multimedia of audio/visual and animation that can make students understand the material easily. The best of instructional media based on android must has certain criteria that is rated by material expert and media expert on practicability test and validity test, which is rated by teacher and students. In this stage, the research conduct practicality test of instructional media based on android that has been developed, and then effectiveness test that is rated by students.

2 METHOD

The method used Research and Development/R&D. This electronic module development model uses IDI model (Instructional Development Institute). The IDI model establishes the principles of a system approach that includes three stages of define, develop, and evaluate. Data collection techniques in this study are questionnaires. The subjects were students grade X TKJ SMK N 1 Gunung Talang, taken random sampling or randomly as many as 31 people for the control class and 31 people for the experimental class. Data analysis techniques consist of validity analysis, practicality analysis and effectiveness analysis. Validity analysis is the result of validation through questionnaire to instructional media based on android from valuator to all aspect (content and design) assessed. Validity analysis using Aiken’s V statistic is formulated as

\[ V = \frac{\sum s_i}{n(c-1)} \]  

(1)

Practicability analysis is obtained from the results of the assessment through questionnaires to android-based learning media from teachers and students. The effectiveness analysis of android-based learning media was determined by looking at the achievement of the students’ learning achievement in the control and experimental class by using android-based learning media obtained during the study and to see the difference between the control and experimental class using T-test.

3 RESULT AND DISCUSSIONS

Define Stage (Definition)

In this define stage analysis needs analysis of android-based learning media consisting of student characteristics and concepts of static and dynamic electrical learning materials. Based on observation data and interview result of teacher and student, hence can be concluded that for study on physics subject of static and dynamic electricity needed source of learning in the form of android based learning media.

Develop Stage (Development)

Instructional media based on Android is designed by considering contents and designs contained therein. On the content, android-based learning media adapted to the curriculum and syllabus that exist in static electricity and dynamic subjects. While the design of Instructional media based on Android is considered on the display aspects of android-based learning media developed. After the android-based learning media is made then the next stage of validation of the expert who aims to determine whether or not appropriate android-based learning media.

Validation of instructional media based on Android

Validation of instructional media based on android is obtained from valuator responses about the validity of learning media developed. Valuator consists of two teachers of SMK N 1 Gunung Talang as a valuator of learning media materials with experience teaching physics courses in static and dynamic electricity and two people as design valuator of media based on android advocacy.

Table 1. Material Validity

<table>
<thead>
<tr>
<th>No</th>
<th>Valuator</th>
<th>Validity Results</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Valuator 1</td>
<td>0,92</td>
<td>Valid</td>
</tr>
<tr>
<td>2</td>
<td>Valuator 2</td>
<td>0,94</td>
<td>Valid</td>
</tr>
</tbody>
</table>

Table 2. Design Validity

<table>
<thead>
<tr>
<th>No</th>
<th>Valuator</th>
<th>Validity Results</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Valuator 1</td>
<td>0,86</td>
<td>Valid</td>
</tr>
<tr>
<td>2</td>
<td>Valuator 2</td>
<td>0,90</td>
<td>Valid</td>
</tr>
</tbody>
</table>

Evaluate Stage (Evaluation)

Practicality of instructional Media Based on Android

Practicality data of instructional media based on android is obtained through the limited test that is conducted at SMK N 1 Gunung Talang students Grade XI TKJ. This test aims to see implementation instructional media based on android in learning. In test processing, researcher is helped by 2 TKJ productive teachers. The assessment toward practicality of instructional media based on android is obtained from questionnaire that is filled by teacher/practitioner.

Table 3. Practicality Data of Instructional Media Based on Android According To Teacher’s Response

<table>
<thead>
<tr>
<th>No</th>
<th>Assessment Aspect</th>
<th>Assessment Presentation</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Technical</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>Content</td>
<td>96</td>
<td>96</td>
</tr>
<tr>
<td>3</td>
<td>Design</td>
<td>94</td>
<td>90</td>
</tr>
</tbody>
</table>

Average | 97 | Very Practice |

Table 4. Practicality Recapitulation Based on Students’ Response

<table>
<thead>
<tr>
<th>No</th>
<th>Assessment Aspect</th>
<th>Assessment Presentation</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Easiness</td>
<td>84,3</td>
<td>Very Practice</td>
</tr>
<tr>
<td>2</td>
<td>Motivation</td>
<td>84,5</td>
<td>Very Practice</td>
</tr>
<tr>
<td>3</td>
<td>Interesting</td>
<td>86,2</td>
<td>Very Practice</td>
</tr>
<tr>
<td>4</td>
<td>Usefully</td>
<td>88,5</td>
<td>Very Practice</td>
</tr>
</tbody>
</table>

Average | 85,88 | Very Practice |
Effectiveness of Instructional Media Based on Android

Effectiveness of instructional media based on android is seen from ability of instructional media based on android can make students understand learning material easily. Learning benefit with instructional media based on Android is focused on student individual ability, there is control toward learning outcomes through competency standard utilization which must be reached by students, curriculum relevance is showed with objective and the reached way, students can know correlation between learning and the result will be reached. Effectiveness of instructional media based on android development can be seen on Physics subject who is conducted with test of learning outcomes in the last meeting. Based on data, that is obtained from effectiveness test of instructional media based on android, so researcher can explain that there is significant difference between control class and experimental class.

4 CONCLUSION AND SUGGESTION

Based on explanation above, development of instructional media based on android that has been conducted, so it can be concluded that development mechanisms of instructional media based on android on Static and Dynamic Electricity as supporting learning for independent learning are need analysis that is needed by students and teacher, development stage, design and evaluation. Validity test of instructional media on Static and Dynamic Electricity based on Android as media supporting for independent learning, it explains that mobile learning is valid. Practicality test of instructional media on Static and Dynamic Electricity based on Android as media supporting for independent learning, it explains that mobile learning is practice. And effectiveness test of instructional media on Static and Dynamic Electricity based on Android as media supporting for independent learning, it explains that mobile learning is effective. It is proved by students outcomes have improved. Based on discussion, there are some things can be consideration to be followed up. Development of instructional media on Static and Dynamic Electricity based on Android is not just on 1 Basic Competence and utilization of math formulation is text and math symbol.

REFERENCES