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# Development of Web-Based Science Teaching Materials in Dick and Carey Model School in SMP Al-Falah Surabaya

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ABSTRACT

The purpose of this development is to produce a WEB-Based Science Teaching Material at SMP Al-Falah Surabaya. The development model used is Dick & Carey. The stages of development research on the Dick & Carey model consist of ten steps. The development process involves subject matter experts, instructional design experts and learning media experts to provide feedback and suggestions for improvement. In addition, the science subject teacher of SMP Al-Falah Surabaya as a user of WEB-Based Science Teaching Materials at this school also provided feedback and input. The use of WEB-Based Science Teaching Material Development Dick & Carey School Model for Science Subjects can effectively increase active learning interactions. The results of this development research are (1) School WEB-Based Science Teaching Materials are able to increase students' motivation in science lessons which were initially considered boring to be fun, and (2) Student responses and responses to WEB School-Based Science Teaching Materials are very good so that the material It is faster to understand and after validation from material experts, design experts and media experts, it is hoped that this school's WEB-Based Science Teaching Materials will be better.



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## 1. INTRODUCTION

In the current era of globalization, the development of technology is increasingly rapid so that it is gradually changing all aspects of life. Changes in technological developments change the fields of business, economy, government and education. Changes in the field of education change the point of view of the learning system that used to be conventional into a modern learning system. Teacher-centered learning has turned into student-centered learning. Students are also free to obtain sources of information or teaching materials about the material they are studying. Teaching materials can be in the form of print, audio, video, television, multimedia, and web teaching materials (Astawa & Utami, 2020; Reksamunandar, 2020; Wahyuni et al., 2021).

Web-based learning is a teaching and learning process that is carried out by utilizing the internet network, so it is often referred to as e-learning. The development of web-based teaching materials in the world of education is expected to increase effectiveness and

interest in learning. The use of web-based teaching materials is very necessary in developing the education sector in Indonesia, especially with regard to the problem of access to education. There are three main characteristics that constitute the great potential of web-based teaching materials, namely: presenting multimedia, processing, and presenting information (Abror, 2021; Marlina et al., 2021; Widya et al., 2021).

Based on the results of a survey with biology teachers, it shows that the Energy and Heat material in the Living system does not get maximum results this is because there is too much material, often the concepts understood by students overlap between the Energy and Heat material in the Living system so that students are often confused and experience problems. difficulty to learn. In addition, according to students in the material on Energy and Heat in the system of Life, there are many foreign terms for students, so students find it difficult to understand these terms. This results in students not being interested in learning it. Therefore we need a media that can attract students' interest to study the material that can improve student learning outcomes.

Besides, it is known that schools already have WIFI facilities to access the internet. These facilities have not been optimized as a support in the learning process, so an example is needed for teachers to be able to make the best use of the facilities for learning. In this case the author presents the material Energy and Heat in the system of Life on a web-based e-learning.

Materials of Energy and Heat in the student's life system In order to understand the material well, supporting teaching materials are needed. Web-based teaching materials can be an alternative teaching material in understanding the concept of the material. This is because the advantage of the web is that it has applications that can be used to increase user participation.

## 2. RESEARCH METHOD

The development research that the researcher develops is included in the type of development research and the types of data are quantitative and qualitative data. This research is in the form of a Development of Web-Based Science Teaching Materials for the Dick and Carey School Model at Al-Falah Junior High School Surabaya in which there are Energy and Heat materials in the Life system and student worksheets as well as practice questions for class VII at Al-Falah Junior High School Surabaya.

This research uses the Research & Development (R&D) development model, Dick and Carey. The Dick and Carey model (Sugiyono, 2017) emphasizes at each stage, namely an overall improvement in the procedural learning system design model. The researcher chose the Dick and Carey development model because it was in accordance with the title of the researcher, namely developing School Web-Based Science Teaching Materials as revealed by (Sugiyono, 2017) the Dick and Carey model with this stage of the textbook development process including the model most used by most learning designers.

The flow of the process of developing School Web-Based Science Teaching Materials according to Dick and Carey, (2009) with the following chart:

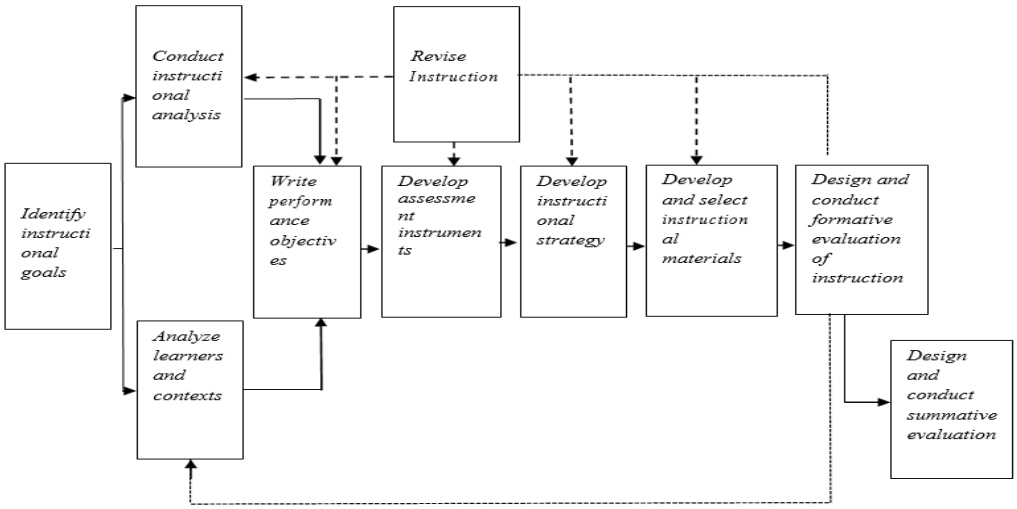


Figure 1. Research and Development Model (Dick & Carey, 2015)

## 3. RESULTS AND DISCUSSIONS

Trial data excavation was carried out by distributing questionnaires to respondents as well as conducting interviews. The following will present data from the results of the questionnaire in the form of validation results from experts, namely material experts, media experts and assessments and responses from individual or individual respondents.

In carrying out product trials, the first step is the validation results of media expert lecturers in the form of School WEB-Based Science Teaching Materials

Table 1. Data on Media Expert Evaluation

| No | Indikator | Skor |
|---|---|---|
| 1 | The accuracy of the illustrations used in the cover of the textbook | 5 |
| 2 | The suitability of the material with the media used | 5 |
| 3 | Quality of paper used | 4 |
| 4 | Font size accuracy | 5 |
| 5 | Image placement accuracy | 5 |
| 6 | Text quality | 4 |
| 7 | Organizing learning message design | 4 |
| | Total | 32 |

The result of calculating the percentage level of achievement of Media expert data is data generated from media expert validation that has been received by researchers and calculated through percentages so that the results can be known. Based on the results of data analysis from media expert questionnaires and it has been calculated that the total results reach 91.43% with the criteria for WEB School-Based Science Teaching Materials is very good.

Further validation is carried out by content experts or material experts for WEB School-Based Science Teaching Materials

Table 2. Data from the Validation of Content Experts / Material Experts

| No | Indikator | Skor |
|---|---|---|
| 1 | The level of relevance of textbooks with the curriculum..... | 4 |
| 2 | The accuracy of the unit title with the material description in each unit | 5 |

| | | |
|---|---|---|
| 3 | Introductory clarity on each theme | 5 |
| 4 | Clarity of content outline (epitome) | 5 |
| 5 | Appropriateness of indicators and basic competencies | 4 |
| 6 | Conformity of indicators with material description | 5 |
| 7 | Conformity between basic competencies, indicators and material descriptions | 5 |
| 8 | Clarity of description | 5 |
| 9 | The suitability of the examples presented with the learning material | 5 |
| 10 | Clarity of completion of sample questions on the sidelines of the material description | 5 |
| 11 | Clarity of the contents of the summary | 4 |
| 12 | Conformity between competency test and indicators | 5 |
| 13 | The attractiveness of the components in the textbook | 5 |
| 14 | Interesting learning content | 4 |
| 15 | The attractiveness of organizing Digital Books using the Borg & Gall model | 5 |
| | Total | 71 |

Result from efforts to validate content or material experts to find out the continuity of the material and the suitability of the material using video media. Based on the results of the analysis carried out on the material/content expert questionnaire, the media created can be said to be good and fit the criteria for use because it reaches 94.67%. With the criteria for WEB-Based Science Teaching Materials, the school is very good. Further validation is carried out by an expert in WEB School-Based Science Teaching Material Design.

Table 3. Data from Design Expert Validation get a total result of 91.43% with the criteria for WEB School-Based Science Teaching Materials is very good.

| No | Indicator | Skor |
|---|---|---|
| 1 | Binding quality | 5 |
| 2 | Attractive cover design | 5 |
| 3 | Typing layout accuracy | 5 |
| 4 | Consistent use of title space, sub and typing material | 5 |
| 5 | Clarity of writing/typing | 4 |
| 6 | Completeness of the components in each chapter of the textbook | 4 |
| 7 | The accuracy of the presentation of the material | 5 |
| | Total | 33 |

Based on the results of the Individual Trial questionnaire, it can be seen that in general the results of the questionnaire are 3 students for the Small Group Trial of 9 students, the questionnaire for the Field Trial is 21 students and the results can be seen that the average is in the very good category so that Teaching Materials WEB-Based Science This school is considered appropriate to be used as a School WEB-Based Science Teaching Material after being revised by experts, both media experts, design experts and material experts.

Table 4. Individual Trial Data (3 Students)

| Aspect | Respondent Score | | | Amount | Prosentase (%) |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | | |
| 1 | 4 | 5 | 5 | 14 | 93% |
| 2 | 4 | 5 | 5 | 14 | 93% |
| 3 | 5 | 5 | 4 | 14 | 93% |
| 4 | 5 | 5 | 5 | 15 | 100% |
| 5 | 5 | 5 | 4 | 14 | 93% |
| 6 | 5 | 4 | 5 | 14 | 93% |
| 7 | 4 | 5 | 4 | 13 | 87% |
| 8 | 5 | 5 | 4 | 14 | 93% |
| 9 | 5 | 5 | 4 | 14 | 93% |
| 10 | 4 | 4 | 5 | 13 | 87% |
| 11 | 5 | 4 | 5 | 14 | 93% |
| 12 | 4 | 5 | 5 | 14 | 93% |

| | | | | | |
|---|---|---|---|---|---|
| 13 | 4 | 5 | 5 | 14 | 93% |
| 14 | 4 | 5 | 4 | 13 | 87% |
| 15 | 5 | 4 | 4 | 13 | 87% |
| 16 | 4 | 5 | 5 | 14 | 93% |
| Amount | 72 | 76 | 73 | 221 | 92% |

Is data taken through a questionnaire answered by 3 students as an Individual Trial to find out individually how the media made is appropriate or not with the percentage results reaching 90% with the criteria for WEB School-Based Science Teaching Materials is very good.

Table 5. Small Group Test Data (9 Students)

| Aspect | Small Group Respondent Score | | | | | | | | | Amount | Prosentase (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | |
| 1 | 5 | 5 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 40 | 88,89% |
| 2 | 5 | 4 | 5 | 4 | 5 | 5 | 5 | 5 | 5 | 43 | 95,56% |
| 3 | 4 | 5 | 4 | 4 | 5 | 4 | 5 | 5 | 5 | 41 | 91,11% |
| 4 | 4 | 5 | 4 | 5 | 4 | 5 | 4 | 5 | 4 | 40 | 88,89% |
| 5 | 4 | 5 | 4 | 5 | 4 | 5 | 5 | 4 | 4 | 40 | 88,89% |
| 6 | 4 | 5 | 4 | 4 | 5 | 4 | 4 | 5 | 5 | 40 | 88,89% |
| 7 | 5 | 4 | 5 | 5 | 5 | 4 | 5 | 4 | 5 | 42 | 93,33% |
| 8 | 4 | 4 | 5 | 5 | 4 | 5 | 4 | 4 | 4 | 39 | 86,67% |
| 9 | 4 | 5 | 4 | 5 | 5 | 5 | 5 | 5 | 4 | 42 | 93,33% |
| 10 | 5 | 5 | 4 | 4 | 5 | 5 | 5 | 4 | 5 | 42 | 93,33% |
| 11 | 5 | 4 | 5 | 4 | 5 | 4 | 5 | 5 | 5 | 42 | 93,33% |
| 12 | 4 | 5 | 4 | 4 | 5 | 4 | 5 | 5 | 4 | 40 | 88,89% |
| 15 | 5 | 4 | 4 | 4 | 5 | 5 | 4 | 5 | 4 | 40 | 88,89% |
| 14 | 4 | 5 | 4 | 5 | 4 | 5 | 5 | 4 | 5 | 41 | 91,11% |
| 15 | 4 | 4 | 4 | 5 | 4 | 4 | 5 | 4 | 5 | 39 | 86,67% |
| 16 | 4 | 4 | 5 | 4 | 5 | 4 | 4 | 4 | 4 | 38 | 84,44% |
| Jumlah | 70 | 73 | 69 | 72 | 74 | 72 | 74 | 73 | 72 | 649 | 90,14% |

This is data taken from a questionnaire with a total of 9 respondents as a form and procedure for using the Small Group Trial data. This is a series of data on the development of this media with a percentage of 90.14% with the criteria for WEB School-Based Science Teaching Materials is very good.

Table 6. Field Test Data (21 Students)

| Aspek | Skor Responden Lapangan | | | | | | | | | | | | | | | | | | | | | Jumlah | Prosentase (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | | |
| **1** | 5 | 5 | 4 | 4 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 4 | 5 | 4 | 5 | 5 | 4 | 4 | 4 | 5 | 4 | 96 | 91,43% |
| **2** | 5 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 4 | 4 | 5 | 5 | 5 | 4 | 95 | 90,48% |
| **3** | 5 | 5 | 4 | 5 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 100 | 95,24% |
| **4** | 4 | 5 | 4 | 5 | 5 | 5 | 4 | 5 | 5 | 4 | 4 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 98 | 93,33% |
| **5** | 5 | 5 | 4 | 4 | 4 | 5 | 5 | 4 | 5 | 4 | 5 | 4 | 4 | 5 | 4 | 5 | 4 | 5 | 5 | 4 | 5 | 95 | 90,48% |
| **6** | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 4 | 4 | 5 | 4 | 4 | 5 | 5 | 4 | 5 | 4 | 5 | 4 | 92 | 87,62% |
| **7** | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 5 | 5 | 4 | 5 | 4 | 4 | 4 | 5 | 5 | 5 | 4 | 5 | 98 | 93,33% |
| **8** | 5 | 5 | 4 | 4 | 4 | 5 | 5 | 4 | 4 | 5 | 4 | 5 | 5 | 5 | 4 | 4 | 4 | 5 | 5 | 4 | 5 | 95 | 90,48% |
| **9** | 4 | 5 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 5 | 5 | 4 | 5 | 4 | 5 | 5 | 5 | 5 | 4 | 97 | 92,38% |
| **10** | 5 | 5 | 4 | 4 | 5 | 4 | 5 | 4 | 5 | 5 | 5 | 5 | 4 | 5 | 4 | 4 | 5 | 4 | 5 | 4 | 5 | 96 | 91,43% |
| **11** | 5 | 4 | 5 | 5 | 5 | 4 | 5 | 5 | 4 | 4 | 4 | 5 | 4 | 5 | 5 | 4 | 5 | 4 | 5 | 5 | 4 | 96 | 91,43% |
| **12** | 4 | 5 | 4 | 4 | 5 | 4 | 4 | 5 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 5 | 4 | 4 | 5 | 4 | 95 | 90,48% |
| **15** | 5 | 4 | 5 | 4 | 4 | 4 | 4 | 5 | 5 | 4 | 5 | 4 | 5 | 4 | 5 | 5 | 5 | 5 | 4 | 5 | 4 | 95 | 90,48% |
| **14** | 5 | 5 | 4 | 5 | 4 | 5 | 5 | 4 | 5 | 4 | 4 | 5 | 4 | 5 | 5 | 5 | 4 | 5 | 5 | 4 | 4 | 96 | 91,43% |
| **15** | 4 | 5 | 5 | 4 | 4 | 4 | 5 | 5 | 5 | 4 | 4 | 5 | 4 | 4 | 5 | 5 | 4 | 4 | 5 | 5 | 5 | 95 | 90,48% |
| **16** | 4 | 5 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 5 | 4 | 4 | 5 | 5 | 5 | 4 | 5 | 4 | 4 | 95 | 90,48% |
| **Jumlah** | 75 | 76 | 68 | 69 | 73 | 74 | 74 | 75 | 76 | 69 | 70 | 76 | 72 | 71 | 76 | 74 | 73 | 74 | 75 | 74 | 70 | 1534 | 91,31% |

It is data taken from a questionnaire with a total of 21 respondents as a form and procedure for using data. This Field Trial Data is a series of data on the development of this media with the acquisition of a percentage of 91.31% with the criteria for WEB School-Based Science Teaching Materials is very good.

## 4. CONCLUSION

Based on the data and questionnaires of content experts/material experts, design experts, media experts which have been discussed in the previous chapter, namely chapter IV, it can be concluded that the product development of WEB-Based Science Teaching Materials at SMP Al-Falah Surabaya is: (a) WEB-Based Science Teaching Materials Schools are able to increase student motivation in science lessons which were initially considered boring to be fun, and (b) Student responses and responses to WEB-based Science Teaching Materials This school is very good so that the material is understood more quickly. validation from material experts, design experts and media experts, it is hoped that this school's WEB-Based Science Teaching Materials will be better even though the developers are aware of the weaknesses and strengths of this School's WEB-Based Science Teaching Materials.

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