

Development of Information Technology (IT) Based Learning Model Using Flip Animation on Chemical Bonding Material Grade X in Yapalis Vocational High School Krian



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ABSTRACT: This research aims to develop a chemistry teaching material that takes into account the characteristics of the subject and the characteristics of the students. Teaching materials that are designed according to student needs can increase student interest, which, in turn, will increase their learning achievement. The development model chosen is the Dick and Carey model using flip media. The reason for choosing this model is that the Dick and Carey model uses a procedural-system approach in accordance with the characteristics of chemical subjects that are tiered and sequential.

The stages carried out in the development of these teaching materials are (1) identifying the objectives of chemistry learning, (2) conducting learning analysis, (3) identifying the initial abilities and characteristics of students, (4) formulating specific learning objectives, (5) preparing assessment instruments, (6) developing learning strategies, (7) developing and selecting learning materials, (8) designing and conducting formative evaluations, and (9) revising learning.

The results of field trials showed 84.90% of students and 80% of teachers that the flip learning media were qualified. The odd semester flip chemistry learning media can be used by students and chemistry teachers of class X SMK Yapalis Krian and can be used by teachers and vocational students by paying attention to product use suggestions, dissemination suggestions, and suggestions for further development.

KEYWORDS: Flip Animation, Chemistry, Vocational High School

I. INTRODUCTION

The implementation of the 2013 curriculum has consequences for teachers who have to be more qualified in carrying out learning activities. There must be literacy integration and character education strengthening (PPK) in the teaching and learning process (PBM). Learning also needs to be carried out contextually using models, strategies, and techniques according to the characteristics of Basic Competence (KD) so that learning objectives are achieved (Puspita, 2016) and (Khoirunnisa, Veri Firmansyah, & Friska Septiani Silitonga, 2019). 21st century learning is simply defined as learning that provides 21st century skills to students, namely the 4Cs, which include: (1) communication, (2) collaboration, (3) critical thinking and problem solving, and (4) creativity and innovation. Based on Bloom's Taxonomy, which has been revised by Krathwoll and Anderson, the abilities that students need to achieve are not only Lower Order Thinking Skills (LOTS), namely C1 (knowing) and C2 (understanding), and Middle Order Thinking Skills (MOTS), namely C3 (applying) and C4 (analyzing), but there must also be an increase in Higher Order Thinking Skills (HOTS), namely C5 (evaluating) and C6 (creating) (Elihami, 2019; Marwiyah, 2012; Rosmayadi, 2017).

For this reason, education is needed to form a creative, innovative, and competitive generation. One of these things can be achieved by optimizing the use of technology as an educational tool, which is expected to produce output that can follow or be better.

II. RESEARCH METHODS

This study uses research and development methods, which means that the results of this research can be used to assist the implementation so that the work becomes more effective and efficient (Sugiyono, 2017). This research method contains several points, namely (1) development model, (2) development procedure, and (3) product trial, wherein the third item contains several points, namely (a) trial design, (b) test subject, (c) types of data, (d) data collection instruments, and (e) data analysis techniques. Expert validation of devices and media. Flip media support device and Flip media were both assessed by experts, and the results were analyzed in a way that was easy to understand.

The assessment of supporting tools is in the form of compatibility between the tools, namely curriculum, concept analysis, and learning scenarios, while the assessment of the design is in the form of the suitability of supporting devices with the

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media that has been designed. Limited trial of Flip media: The data collected from the results of the limited trial in the form of questionnaires from both students and educators were analyzed descriptively with the percentage technique.

III. RESULTS AND DISCUSSION

This development research produced a Flip Animation learning medium that students can use both offline and online. All they need to do is simply download the file shared by the teacher and open it on their laptop, tablet, or smartphone. The interesting part about this medium is that students can flip the pages like a book instead of scrolling them down endlessly like a basic PDF eBook.



Image 1. Flip Animation Cover



Image 2. How Flip Animation looks on touch screen devices

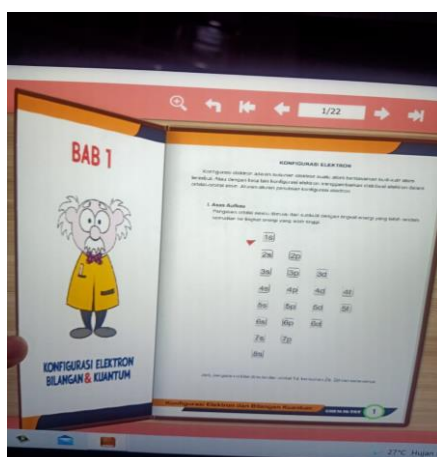


Image 3. Materials inside

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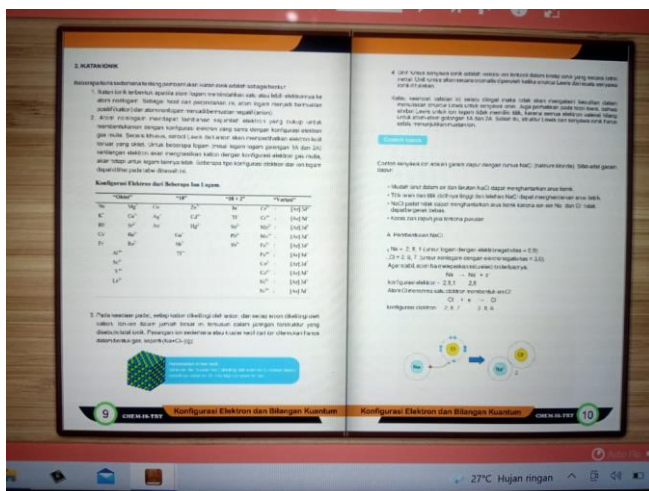


Image 4. Student's evaluation

The researcher also got valuable input from content experts for chemistry subjects, learning design experts, and learning media experts. Meanwhile, the input from students using the Flip Animation application media on the chemical bonding material was shown in the results of individual trials, small group trials, and field trials.

A. Feasibility Assessment by Content Expert

Table 1. Feasibility Test Result by Content Expert

No.	Indicator	Score (1-5)
1.	The design and layout images give a positive impression so that they are able to attract the interest of <i>Flip</i> and Animation application media users	5
2.	Ease of reading text/writing and symbols.	5
	Total	10

Comments and suggestions from subject matter experts on the Flip Animation application media product on Chemical Bonding Materials are as follows: (1) in the presentation section of the Chemical Bond Material concept map, the writing on the concept map should be written in a rather large font size so that students can more clearly read and understand each word that is there; (2) should be given a summary at the end of the chapter so that students can review the material they have read; (3) abstract concepts and learning topics are clarified again during direct learning, namely when face-to-face or Google Meet; and (4) in general, this Flip and Animation application media is good and worthy to be conveyed to students.

To determine the percentage of the results of the assessment of subject matter experts, a score calculation is used on the feasibility of material aspects, linguistic aspects, presentation aspects, aspects of the Flip and Animation application media effect on learning strategies and overall display aspects with two formulas sourced from (Luhulia, 2018) as follows:

$$P = (\frac{X}{X1} \times 100\%)$$

The explanation for the formula is:

- P = percentage (%) of answers
- X = total score of respondents' overall answers in one item
- X 1 = the maximum number of scores in one item

$$P = (\frac{\sum X}{\sum X1} \times 100\%)$$

The explanation for the formula is:

- P = Percentage (%) of answers
- X = total score of respondents' overall answers
- X 1 = the maximum number of answer scores

The percentage of the feasibility level of Flip and Animation application media on this Chemical Bond Material can be presented in the following table:

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Table 2. Content Feasibility Test Score in Percent by Content Expert

No.	Assessment Aspect	Total score	Percentage
1	Material aspect feasibility assessment	25	83.33
2	Assessment of the feasibility of the linguistic aspect	17	85.00
3	Presentation aspect feasibility assessment	9	90.00
4	Assessment of feasibility aspects of <i>Flip</i> and Animation application Media effects on learning strategies	21	84.00
5	Overall view aspect feasibility assessment	10	100.00
Average percentage			88.47

B. Feasibility Assesment by Design Expert

The second expert who provides input on the Flip and Animation application media is a learning design expert. The Flip and Animation application media on the Chemical Bond Material was submitted to the learning design expert on December 14, 2020. The design expert appointed by the developer to validate the learning design in this Flip and Animation application media was Dr. H. Ibu t Priono Leksono, M.Pd., one of the lecturers of the Learning Technology Study Program, Postgraduate Program, Universitas PGRI Adibuana Surabaya. The questionnaire was collected on January 4, 2020. The data was collected using the questionnaire method.

Table 3. Feasibility Test Result by Design Expert

No.	Indicator	Score (1-5)
1.	The design and layout images give a positive impression so that they are able to attract the interest of <i>Flip</i> and Animation application media users	4
2.	<i>Flip</i> app Media Design and Animation regular and consistent.	3
3.	The type and size of the selected font is correct and makes Media a <i>Flip</i> and Animated application become more interesting.	4
4.	Easy text/writing and symbols be read.	4
5.	The colors chosen and their combinations are appropriate and attractive .	3
6.	There is a suitability of the presentation of the image and the material under discussion.	4
7.	<i>Flip</i> and Animation app media packaged in the form of <i>Html5</i> for ONLINE learning	5
	Total	27

The assessment about flip and animation's media, linguistic, presentation, learning strategy, and overall display aspects are shown in the table below. The percentage of learning design expert assessments that were used to calculate the scores is shown in the next column.

Table 4. Design Feasibility Test Score in Percent by Design Expert

No.	Assessment Aspect	Total score	Percentage
1.	Assessment of the feasibility of the Media aspect of the <i>Flip</i> and Animation application	55	91.66
2.	Assessment of the feasibility of the linguistic aspect	20	80.00
3.	Presentation aspect feasibility assessment	14	93.33
4.	Assessment of the feasibility of aspects of Learning strategy	18	90.00
5.	Overall view aspect feasibility assessment	27	77.14
Average percentage			86.43

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Based on the table above, the average percentage of the design feasibility level of Flip and Animation application media is 86.43%. The qualifications are very good, and the feasibility level is very high. Therefore, Flip and Animation media do not need a revision.

C. FeasibilityAssesment by Media Expert

A draft of the Flip and Animation application on Chemical Bond Materials was validated by learning media experts on December 14, 2020, to obtain feedback and assessments. The learning media expert referred by the developer to validate the learning media in this Flip and Animation Media application is Dr. Ahmad Noor Fatirul, M.Pd., one of the Postgraduate Program lecturers at PGRI Adibuana University Surabaya.

Table 5. Feasibility Test Result by Media Expert

No.	Indicator	Score (1-5)
1.	The design and layout images give a positive impression so that they are able to attract the interest of <i>Flip</i> and Animation application media users	5
2.	<i>Flip</i> app Media Design and Animation regular and consistent.	4
3.	The type and size of the selected font is correct and makes Media a <i>Flip</i> and Animated application become more interesting.	4
4.	Easy text/writing and symbols be read.	5
5.	The colors chosen and their combinations are appropriate and attractive .	5
6.	There is a suitability of the presentation of the image and the material under discussion.	5
7.	<i>Flip</i> and Animation app media packaged in the form of <i>Html5</i> for ONLINE learning	5
	Total	33

The percentage results of media expert assessments used to calculate the score on the feasibility of the Flip and Animation application media aspects, linguistic aspects, presentation aspects, learning strategy aspects, and overall display aspects are presented in the following table:

Table 6. Media Feasibility Test Score in Percent by Media Expert

No.	Assessment Aspect	Total score	Percentage
1.	Media aspect feasibility assessment	55	91.66
2.	Material aspect feasibility assessment	29	96.66
3.	Assessment of the feasibility of the linguistic aspect	24	96.00
4.	Presentation aspect feasibility assessment	14	93.33
5.	Assessment of feasibility aspects of Learning strategy	19	95.00
6.	Overall view aspect feasibility assessment	33	94.28
	Average percentage		94.49

D. Individual Trial

After revising the first draft of Flip and Animation application media on Chemical Bonding Materials based on input from subject content experts, learning design experts, and learning media experts, the developer submitted draft II (revised draft I) Flip and Animation application media to 3 students as respondents in the individual test, namely 1 person each from class X MM4, X MM-5, and X MM-7. Individuals will be able to test the second draft of the Flip and Animation Media app on February 2, 2021. There are no additional comments on other things that need to be improved, so that this textbook in the form of Flip and Animation application media is suitable for use without revision.

The results of data analysis through questionnaires revealed that the average individual test reached 80.47%. This result is categorized as highly feasible. Therefore, the Flip and Animation applications do not require revision. There are also no further comments or suggestions from students.

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The results of the small group test analysis of teaching materials in the form of Flip and Animation application media showed the average percentage of textbook achievement was 92.69%, which was included in the very good category.

E. Field Trial

Field trial was carried out at the Yapalis Krian 1 Vocational School with 21 respondents from class X MM 4, as many as 7 students, X MM5, as many as 7 students, and also as many as 7 students from class X MM 6, on March 2, 2021. Hanit Styaningtyas, S.Pd., is a senior chemistry teacher at Yapalis Krian Vocational School who helped to run the field trial.

The result of student assessment questionnaires on the Flip and Animation application media during the field trial was 91.76%, which means that the Flip and Animation application media were in very good qualification. It also turns out that, from the point of view of the chemistry teacher who filled out a questionnaire, the development product in the form of Flip and Animation application media is very good at achieving goals with a 90% success rate.

The final result of the assessment from both students and teachers in the field test is $(91.76\% + 90\%)/2 = 90.88\%$. This average demonstrates that the Flip and Animation application media are of very high quality. The developer did not make any revisions, considering there were no suggestions from the subject teacher.

IV. CONCLUSIONS

Flip and Animation media for Chemical Bonds in Class X SMK Yapalis Krian has been developed. Flip and Animation Application Media Development using the Dick and Carey development model. The content or material in the Flip and Animation application media is adjusted to the curriculum that is currently being used. Inside Flip and Animation apps students are given access rights to access material that is packaged in an attractive manner by providing multimedia elements in it as well as competency test. Students can study independently anytime and anywhere, especially when learning is still being done ONLINE due to the COVID-19 outbreak.

The results of validity test for Flip and Animation application media on Class X Chemical Bond Materials at Yapalis Krian Vocational School for the 2020/2021 Academic Year, as follow: (1) according to content experts, the qualifications are very good, namely 88.47%, (2) according to learning design experts, they are in very good qualification 86.43%, (3) according to learning media experts, it is in very good qualification 94.49%, (4) based on individual trials is in very good qualification, namely 80.47%, (5) based on trials the small group has very good qualifications, namely 92, 69%, (6) based on field trials for students and chemistry teachers are in very good qualifications, namely 91.76% and 91.76%.

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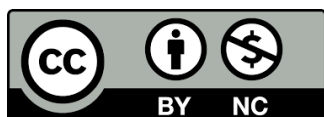
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