

# DEVELOPMENT OF INTERACTIVE MEDIA WITH CONTEXTUAL TEACHING LEARNING TO ENHANCE VOCATIONAL SCHOOLS STUDENT CREATIVITY IN MALANG

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## ABSTRACT

Basic Graphic Design is one of the compulsory subjects that must be taken by students of class X Multimedia Department at SMK Negeri 7 Malang. This research and development aim to produce products in the form of interactive media containing Contextual Teaching Learning (CTL) Basic Graphic Design subjects to foster creativity. This type of research and analysis is included in mixed or quantitative and qualitative research. The Research & Development model used is the ADDIE model. The development procedure is (1) Analyze; (2) Design; (3) Development; (4) Implementation; (5) Evaluation. The results of the validation by material experts were 88.75%, media experts 95%, small group trials 83.18%, large group trials 87.69%. Therefore, it can be concluded that the basic interactive media of Graphic Design with CTL is suitable for use as a student learning medium. Based on the results of the study as long as students used interactive media, it was found that 19 students (63%) had high creativity, 10 students (33%) had moderate creativity, and 1 student (3%) had low creativity. This indicates that the use of interactive media has been able to foster student learning creativity in general.

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## I. INTRODUCTION

Interactive learning media is a technology used to deliver teaching materials using mechanical and electronic machines to present audio and visual messages [1]. The use of technology-based interactive media in learning can be used as an alternative in optimizing the learning process [2], [3]. In addition, the use of interactive learning media is expected to foster student creativity in expanding learning [4]–[6].

Based on the results of observations made to students in class X MM 1, X MM 2, X MM 3, and teachers of Basic Graphic Design subjects, it was found that (1) The level of student understanding was low in Basic Graphic Design learning; (2) The media used by the teacher does not attract

students' attention; (3) The method of delivering material in the form of theory is not liked by students; (4) There is no recommendation of sources of teaching materials that can be used by students in the learning process; (5) Students tend to be passive during the implementation of the learning process.

The level of students' understanding is low in Basic Graphic Design learning. This is shown from the results of the UAS scores in the odd semester of class X Multimedia students at SMK Negeri 7 Malang, almost all of which are below the KKM, even based on the results of observations for students of class X MM 3, all of them have remedial. Most students only memorize what the teacher says, so students cannot develop their own understanding. This background strengthens

developers to choose basic graphic design subjects as media subjects that are developed.

The media used by the teacher did not attract the attention of students. Based on the results of observations and questionnaires given to students, students are less interested in Basic Graphic Design subjects because the media used by teachers is only a blackboard and not infrequently also uses full text PowerPoint media which makes students bored with learning, there is no media other methods used by teachers to attract students' attention. PowerPoint used by teachers is only limited to ordinary presentation media, there are no animations or images that support the material. This is the background behind the developer to create an interactive learning media, which later this media can be used by teachers and students in supporting the learning process. Students can study independently anytime and anywhere because they are flexible. This interactive media was developed using the PowerPoint application, where in the process the developer tried to optimize the features available in PowerPoint. By optimizing its features, media that are usually taken for granted, now the results can be equivalent to using other applications. Even PowerPoint media which is usually only for presentation media, can now be used as an independent learning medium.

The way of delivering material in the form of theory is not liked by students. Based on the results of observations and questionnaires given to students, students are more likely to like practical learning compared to theoretical learning, this is because the way the delivery of learning in the form of theory delivered by the teacher is still using the lecture method by utilizing full text PowerPoint media and whiteboard media. The media used by the teacher has not been able to provide a real visualization of the material presented. The material presented is only theoretical and does not represent the real situation in everyday life. There is nothing new that can attract students to be more active in studying the material presented. With these conditions, students sometimes feel bored with the appearance of the material presented and many students pay less attention to the teacher's explanation. So, from this background it can be concluded that students need a way of delivering material through a learning model that displays more real situations and is more liked by students.

The use of interactive media with the CTL presentation model is a learning concept that can help teachers relate the material being taught to students' real-world situations [7], [8]. It makes students become easier to understand the relationship between their knowledge and its application in life, especially in the world of graphic design.

There are no recommended sources of teaching materials that students can use in the learning process. Based on the results of interviews and observations made during KPL at

SMK Negeri 7 Malang, class X students, especially multimedia X, did not have a recommended source of reference for Basic Graphic Design subjects. In the learning process students only pay attention to explanations from the teacher with existing media and look for other reference sources on the internet. So from this problem, the interactive media created can be used as a learning reference source for students in the learning process. This interactive media was developed not as a substitute medium but as an additional medium (supplement).

Students tend to be passive during the implementation of the learning process. This is shown from the results of observations during KPL at SMK Negeri 7 Malang, especially in class X Multimedia students. In making a product design, students tend to be passive and less creative. Students only work on assignments according to the instructions given by the teacher without taking the initiative to develop the design creations made. From this problem, students need teaching materials in the form of interactive media that contains structured steps in making a design that can be used by students for independent study and able to foster student creativity.

Creativity is very important, especially in the education system. MPR RI Decree No. 11/MPR/1983 states that the education system is adapted to development needs that require different types of expertise and skills while increasing productivity, creativity, quality, and work efficiency. Creativity exists in everyone and needs to be cultivated as early as possible because it is important in life. Vocational High School students are required to be as creative as possible in learning because their task is related to making a certain product which will be useful after they graduate, as a portfolio in looking for work.

Given the importance of a technology-based learning media, especially interactive media, the developer develops interactive learning media containing CTL in the Basic Graphic Design subject. In this subject the teacher still conveys material theoretically both with lectures and with PowerPoint media and ordinary whiteboards, there is no use of other media in learning. The material presented includes the principles of layout, vector image processing software, and manipulation of vector images using the effects feature. The scope of the material in this subject is very complex, because knowledge of graphic design is needed in the industrial or business world. The combination of interactive media using the CTL (Contextual, Teaching, and Learning) presentation model is expected to help and facilitate students in participating in learning activities, and can foster student creativity. Based on some of the explanations above, the developer took the title "Development of Interactive Media Loaded with CTL Learning Basic Graphic Design to Grow Creativity in Class X Multimedia Students at SMK Negeri 7 Malang".

## II. METHODS

The development model that will be used in this research is the ADDIE model. The ADDIE development procedure has five stages, namely Analyze, Design, Development, Implementation, Evaluation [9].

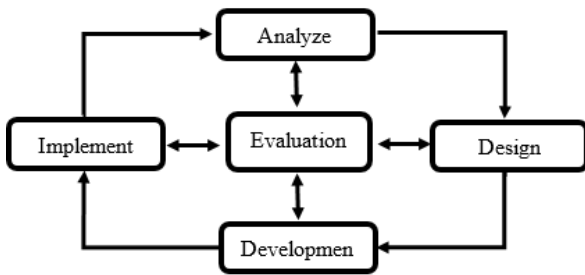


Fig. 1. ADDIE Development Model Flowchart

The ADDIE development model was chosen for several reasons. The first reason is that the steps that need to be carried out are simple and simplify the development process, with the results of the implementation process being systematic. The second reason is that there is an opportunity to evaluate and revise at each stage, so that the product developed is valid and can actually be used in the learning process. This is because the resulting product is reliable and proven feasible to use.

The analysis phase has 2 activities in it, which include: Problem analysis and needs analysis. Problem analysis is carried out to identify problems regarding learning in order to find out the necessary needs. Then after knowing the problem, a needs analysis is carried out which consists of analyzing the needs of students and teachers, analyzing the type of learning media to be developed, analyzing the basic material for Graphic Design. evaluation is carried out on input and suggestions from the supervisor. After conducting a problem and needs analysis and evaluation, the next stage will be carried out.

The design stage is carried out to prepare designs for interactive media to be made, namely in the form of sketches and interactive media displays. There are two activities at the design stage, including: creating a plot structure and storyboarding. The flow structure in this development is made to help design the path between the pages contained in the interactive media that will be developed. Storyboard is a rough outline of the display of interactive media products that will be developed so that you can find out the components or menus needed. Revisions are made based on consultation from the supervising lecturer. At this stage, a revision is carried out before moving to the next stage.

The development stage is carried out to build and develop media that has been designed or a follow-up to the creation of plot structures and storyboards from interactive media. Where

in the development of the program flow, it follows the flow of the structure that has been made. While the results of face-to-face interactive media refer to storyboards that have been made of teaching material products. The main development application uses the Microsoft PowerPoint application. The preparation of the material contained in the interactive media was assisted by material experts, namely the Basic Graphic Design subject teacher at SMK Negeri 7 Malang. Preparation of material according to KI and KD obtained from school. In the development of interactive media, it consists of displaying the main menu and sub menus (help, KI/KD, objectives, materials, evaluation, and bibliography). At the development stage there is validation from material and media experts. Validation is carried out to obtain criticism and suggestions that will be used to correct the shortcomings of the media, so that the media can be even better.

The implementation stage is a real step in testing the media that has been developed in such a way. Tests are divided into two, namely small group trials and large group trials. Small group trials of 10 students from class X Multimedia 1, while large groups will be tested on 30 students of class X Multimedia 2, in field trials using questionnaires as data collection to determine the level of media feasibility and direct observation to assess creativity. If there are deficiencies based on the results of the trials that have been carried out, it is necessary to make improvements or revisions to improve the media.

After carrying out the implementation stage, the next stage is the evaluation stage. There are two kinds of evaluation, namely formative evaluation and summative evaluation. This evaluation is carried out to test whether the product that has been developed has been successful and feasible to be used in the learning process. Formative evaluation includes validation of content or material by material experts and the use of interactive media as learning media by media experts. Summative evaluation is used because the measurement of creativity is carried out during the learning process, so that what is measured is their technique and way of doing the given task.

At this stage, it has basically been carried out throughout the implementation of the four steps in the ADDIE development model. At the analysis stage, the evaluation is carried out from the suggestions and inputs given by the supervisor and the Basic Graphic Design subject teacher for the development of teaching materials that will be made so that they can be continued to the next stage, namely the design stage. At the design stage, an evaluation is carried out based on consultation from the supervisor.

At the development stage, the evaluation was obtained from analyzing data in the form of a validation questionnaire conducted by material experts and media experts. The implementation stage of the evaluation was carried out after

testing the feasibility of interactive media products by analyzing the filling of feasibility questionnaires shown to class X students of SMK Negeri 7 Malang in small groups and large groups.

The types of data used in this study are quantitative data and qualitative data. Quantitative data were obtained from the results of filling out questionnaires during validation tests, product trials and usage trials. The results of filling out the questionnaire are in the form of a score calculated from the number of answered questions that have been filled in. Meanwhile, qualitative data were obtained from the results of tests conducted by media experts, material experts, and students of class X Multimedia at SMK Negeri 7 Malang. The test results are in the form of suggestions and criticisms of the interactive media that have been developed.

The data collection instrument in this study used a questionnaire determined through the Linkert scale to determine the percentage of the product. The Linkert scale indicators are shown in Table 1.

TABLE I. ASSESSMENT CRITERIA

Point	Description
4	Very good
3	Pretty good
2	Not good
1	Very Not Good

The data analysis technique was carried out after all the required data were obtained. The data analysis process is carried out by calculating the percentage of answers from the previously prepared questionnaire. To determine the feasibility of interactive media, namely matching the results of the questionnaire with the media validation criteria adapted from [10]. The validity criteria are shown in Table 2.

TABLE II. VALIDITY CRITERIA

Percentage (%)	Description	Follow-up
> 85	Very Valid	Can be used without revision
70,01 - 85,00	Quite Valid	Can be used with minor revisions
50,01 - 70,00	Less Valid	Not recommended, need major revision
< 50,01	Invalid	Cannot be used

To find out the level of student learning creativity, it is done by matching it with the ideal limit of the learning creativity category which was adapted from [11]. Determination of the ideal limit can be seen in Table 3. So that

the results of the ideal grouping of data are obtained in accordance with Table 4.

TABLE III. GROUP BOUNDARY DETERMINATION

Category	Description
High	All students who have an average score of +1 standard deviation and above ( $\geq M+SD$ )
Medium	All students who have a score between a mean of +1 standard deviation and a mean score of -1 standard deviation ( $M-SD > a < M+SD$ )
Low	All students who have a mean score of -1 standard deviation and less than that ( $\leq M - SD$ )

TABLE IV. CATEGORY CREATIVITY LEVEL

Interval	Category
$\geq 43$	High
41 - 42	Medium
$\leq 40$	Low

### III. RESULT AND DISCUSSION

The design used in the development of interactive media is made to produce interactive media that is attractive and easy to use where there are 8 main pages, namely: (1) the main menu page; (2) sub menus; (3) help page; (4) KI/KD page; (5) goals; (6) material pages; (7) evaluation page; (8) bibliography page.

The result of the product resulting from research and development is a teaching material in the form of interactive media that can be run using computers/PCs, laptops and smartphones that can be used by class X students of the Multimedia expertise program at SMK Negeri 7 Malang. In addition, in the development of material in interactive media, it is arranged according to KI and KD Basic Graphic Design subjects at SMK Negeri 7 Malang.

The main menu is the first part that is seen when opening interactive media. In this main menu there are 3 choices of sub menus which later if selected will move to another page, including: (1) KD menu 3.3 Principles of Layout; (2) menu KD 3.6 Vector Image Processing Software; and (3) KD menu 3.7 Vector Image Manipulation. The main menu also contains information about: (1) Malang State University logo; (2) the logo of SMK Negeri 7 Malang; (3) the name of the subject; (4) name of class, department and name of school; (5) Exit button to exit interactive media.



Fig. 2. Main Course Page

The sub menu is part of the main interactive media menu. The sub menu contains a list of menu options to move to another page, including: (1) help; (2) KI/KD; (3) Purpose; (4) Material; (5) Evaluation; (6) Bibliography. On this sub menu page there is also KD name information and also the home button to go to the main menu page.



Fig. 3. Submenu Page

Help contains an explanation of the use of the buttons on interactive media. Each button has a different function which will be used by students in learning activities using interactive media. In this help menu there are 3 buttons that can be selected by students, namely the home button to go to the main menu page, the sub menu button to go to the sub menu page, and a shortcut button to go to the help page, KI/KD, objectives, materials, evaluation, and bibliography.



Fig. 4. Help Page

KI/KD contains core competencies and basic competencies in Basic Graphic Design material. On the KI/KD menu, there are 3 buttons that students can choose from, including the home button to go to the main menu page, the sub menu button to go to the sub menu page, and shortcut buttons to go to the help page, KI/KD, destination, material, evaluation, and bibliography.



Fig. 5. KI/KD Menu Page

Learning Objectives contain the objectives that must be achieved by students in a lesson. In this destination menu there are 3 buttons that can be selected by students, including the home button to go to the main menu page, the sub menu button to go to the sub menu page, and shortcut keys to go to the help page, KI/KD, goals, materials, evaluation, and bibliography. The material contains the content of the subject of Basic Graphic Design subjects. The material presented has been compiled based on KI and KD in Basic Graphic Design subjects for the Multimedia expertise program at SMK Negeri 7 Malang. Evaluation contains questions related to the material presented. The evaluation is intended so that students can find out their abilities in understanding the material that has been studied.

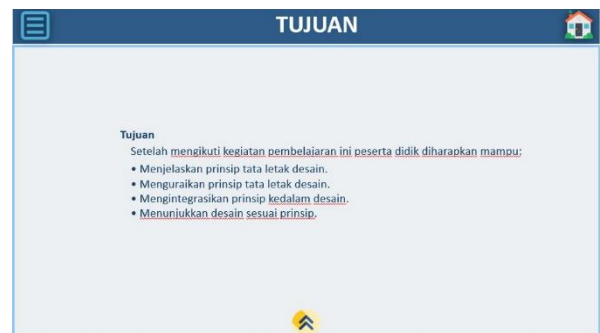


Fig. 6. learning Objectives Page



Fig. 7. Learning Materials Page

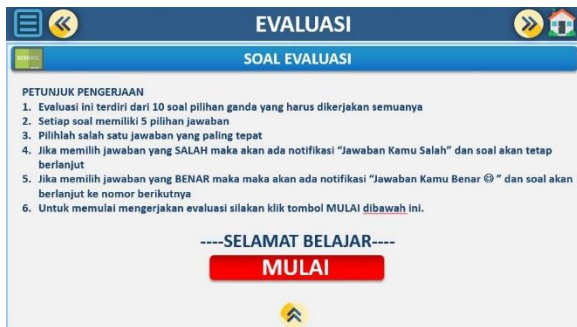


Fig. 8. Learning Evaluation Page

### Test Result Data

Based on the development method, the product that has been developed is validated by two validators, namely material experts and media experts. The next step, the product is tested on students with small groups and large groups.

Validation by material experts is used to determine the feasibility of the material contained in the Graphic Design Basic interactive media both in the percentage scale of validity, criticism and suggestions given by material experts. Based on the results of validation by material experts, the results obtained in the form of quantitative and qualitative data. The results of the validation by material experts are shown in Table 5.

TABLE V. VALIDITY CRITERIA

Aspect	T <sub>se</sub>	T <sub>sh</sub>	Validity	Category
Contents Eligibility	13	16	81,25%	Quite Valid
Contents Submission	30	32	93,75%	Very Valid
Characteristics of Media in Learning Language	21	24	87,5%	Very Valid
	7	8	87,5%	Very Valid
<b>Average</b>			<b>88,75%</b>	<b>Very Valid</b>

Based on the validation data above, in the aspect of the feasibility of the content of the material obtained a percentage of 81.25% of the total score and is included in the criteria quite valid. In the aspect of delivering material content, the percentage is 93.75%, meaning that this aspect is very valid. For aspects of the characteristics of the media in learning to obtain a percentage of 87.5% which is included in the very valid criteria. In the linguistic aspect, the percentage is 87.5%, which means it is included in the very valid criteria. Based on all these validations, an average value of 88.75% was obtained, which means that the material and content in interactive media is very valid to be used without revision, but it is necessary to pay attention to the advice given by material experts to improve the learning media products that have been developed.

Validation by media experts is used to determine the feasibility of the media contained in the Graphic Design Basic interactive media both in the percentage scale of validity, criticism and suggestions given by media experts. Based on the results of the validation by media experts, the results were in the form of quantitative and qualitative data. These results will be used as a reference to revise the products that have been produced. The results of the validation by media experts are shown in Table 6.

TABLE VI. MEDIA EXPERT VALIDATION RESULTS

Aspect	T <sub>se</sub>	T <sub>sh</sub>	Validity	Category
Display and Animation	27	28	96,43%	Very Valid
Audio	20	20	100%	Very Valid
Writing	14	16	87,5%	Very Valid
Navigation	12	12	100%	Very Valid
Convenience	12	12	100%	Very Valid
Communication	10	12	83,33%	Quite Valid
<b>Average</b>			<b>95%</b>	<b>Very Valid</b>

Based on the validation data above, in the aspect of display and animation, a percentage of 96.43% of the total score is obtained and is included in the very valid criteria. In the aspect of writing (text) a percentage of 100% is obtained, meaning that this aspect is very valid. For the audio aspect, the percentage is 87.5% which is included in the very valid criteria. In the aspect of navigation obtained a percentage of 100% which means it is included in the very valid criteria. In the aspect of ease of obtaining a percentage of 100% and included in the very valid criteria. The last communicative aspect gets a percentage of 83.33% which is included in the quite valid criteria. Based on all these validations, an average value of 95% was obtained, which means that the product is very valid for testing without revision but it is necessary to pay attention to the advice given by media experts to improve the learning media products that have been developed.



Small group trials were conducted on 10 students of class X Multimedia 1 at SMK Negeri 7 Malang who had taken Basic Graphic Design subjects. On the research sheet, the aspects assessed include: (1) attractiveness aspects; (2) aspects of convenience; (3) benefit aspect; (4) motivational aspects. The trial was carried out by giving a questionnaire instrument totaling 22 items in accordance with the assessment indicators. The small group trial was conducted on Tuesday, June 18, 2019. The results of the small group trial can be seen in Table 7.

TABLE VII. SMALL GROUP TRIAL RESULTS

Aspect	T <sub>se</sub>	T <sub>sh</sub>	Validity	Category
Attractiveness	172	200	86,2%	Very Valid
Convenience	164	200	82%	Quite Valid
Convenience	230	280	82,14%	Quite Valid
Language	166	200	83%	Quite Valid
<b>Average</b>			83,18%	Quite Valid

Based on the data from the small group trial above, in the attractiveness aspect, a percentage of 86% of the total score is obtained and is included in the very valid criteria. In the aspect of convenience, the percentage obtained is 82%, meaning that this aspect is quite valid. For the benefit aspect, the percentage is 82.14% which is included in the quite valid criteria. In the aspect of motivation, the percentage obtained is 83%, which means that it is included in the criteria quite valid. Based on all these validations, an average value of 83.18% was obtained, which means that the material and content in interactive media is valid enough to be used but needs minor revisions by taking into account comments, criticisms, and suggestions that have been given to improve the learning media products that have been developed.

Large group trials were conducted on 30 students of class X Multimedia 2 at SMK Negeri 7 Malang who had taken Basic Graphic Design subjects. On the research sheet, the aspects assessed include: (1) attractiveness aspects; (2) aspects of convenience; (3) benefit aspect; (4) motivational aspects. The trial was carried out by giving a questionnaire instrument totaling 22 items in accordance with the assessment indicators. The large group trial was conducted on Wednesday, June 19, 2019. The results of the large group trial can be seen in Table 8.

TABLE VIII. LARGE GROUP TRIAL RESULTS

Aspect	T <sub>se</sub>	T <sub>sh</sub>	Validity	Category
Attractiveness	548	200	91,33%	Very Valid
Convenience	529	200	88,17%	Very Valid
Convenience	718	280	85,48%	Very Valid
Language	520	200	86,6%	Very Valid
<b>Average</b>			87,69%	Very Valid

Based on the data from the large group trial above, in the attractiveness aspect, a percentage of 91.33% of the total score is obtained and is included in the very valid criteria. In the aspect of convenience, the percentage obtained is 88.17%, meaning that this aspect is very valid. For the benefit aspect, the percentage is 85.48% which is included in the very valid criteria. In the aspect of motivation, the percentage obtained is 86.67%, which means that it is included in the very valid criteria. Based on all these validations, an average value of 87.69% was obtained, which means that the material and content in interactive media is very valid to be used without revision, but it is necessary to pay attention to the suggestions given by the test subjects to improve the learning media products that have been developed.

This product usability trial was conducted to determine the effectiveness of the product made in fostering student creativity. This trial was carried out on Wednesday, June 19, 2019. In this trial, data were collected from Observers 1 and 2. The data used were observations from the two Observers. The results obtained were then calculated on the average of the processed frequencies using SPSS version 22. For the results of determining group data from observer results, it can be seen in Table 9.

TABLE IX. DETERMINATION OF CREATIVITY GROUP DATA RESULTS

Category	Interval	Frequency	Percentage
High	$\geq 40$	19	63%
Medium	36 – 39	10	33%
Low	$\leq 35$	1	3%

Based on the results of learning creativity in Table 4.6, there is a high group ( $\geq 40$ ) with a percentage of 63% with a total of 19 students, a medium group (36 – 39) with a percentage of 33%, namely 10 students, and a low group ( $\leq 35$ ) of 3% with the number of 1 student. It can be concluded that the level of creativity of students using the basic interactive media of Graphic Design is included in the category of high creativity. This is in line with previous studies [12], [13].

#### IV. CONCLUSION

Based on the results of research and development, it can be concluded that the final product produced is interactive media containing CTL for Basic Graphic Design subjects to foster student creativity, supported by the results of learning creativity trials, the results obtained are 19 students (63%) have high creativity, 10 students (33%) had moderate creativity, and 1 student (3%) had low creativity. This indicates that the use of interactive media has been able to foster student learning creativity. Interactive media are suitable for use in the learning process as well as for independent study. The feasibility of

interactive media is supported by the results of material expert validation, a percentage of 88.75% (very valid), the results of media expert validation obtained by a percentage of 95% (very valid), small group trials obtained a percentage of 83.18% (quite valid) , and the large group trial obtained a percentage of 87.69% (very valid).

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