

# Implementation CTL and CPS Model with Assist of Interaction Media Against HOTS Abilities

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## Article Info

### Article history:

Received: Jan 28, 2022

Revised: Feb 10, 2022

Accepted: Feb 25, 2022

### Keyword:

Contextual Teaching and Learning, Creative Problem Solving, Media Pembelajaran Interaktif, Higher Order Thinking Skills

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## ABSTRACT

The purpose of this research is to know the ability of HOTS the realm of knowledge of basic graphic design students grade X Multimedia SMKN 1 Pogalan because the application of CTL and CPS models are assisted by interactive media. This research uses the quasi-experiment design with pretest-posttest design and the research design is a population study consisting of all students of Class X Multimedia SMKN 1 Pogalan. The results of this study showed N-Gain experimental Class 1 and Experiment 2 in the medium category. The results of the hypothesis test show a significant value of 0.000. The conclusion is (1) an influence on the implementation of the CTL model assisted by interactive media against the ability of HOTS in experimental classroom knowledge 1; (2) There is an influence on the implementation of a CPS model with interactive media assistance to HOTS capabilities of experimental class knowledge 2 and; (3) There is a significant difference in the implementation of the CTL-assisted interactive media model with an interactive CPS model for the ability of HOTS of knowledge basic graphic design in students of Class X Multimedia at SMKN 1 Pogalan Trenggalek.

## I. INTRODUCTION

The design of learning activities is something that is familiar to an educator. Learning activities arranged in such a way require special accuracy and knowledge from an educator. Learning is a process of effort that is carried out by a person to obtain a new change in behavior as a whole, because of his own experience in interaction with his environment to fulfill his life needs [1]. Vocational High School (SMK) is a formal educational institution with unique and diverse characters of students. In the learning process in the classroom, the teacher is not sufficiently armed with knowledge alone, but must pay attention to other aspects that support the realization of potential development students, both in terms of spiritual, moral, attitude and Skills.

The application of a model that is in accordance with the characteristics of the subjects and students expected by the 2013 curriculum is learning that can improve abilities Higher Order Thinking Skills (HOTS). Learning that takes place can improve students' higher-order thinking skills, so that learning will achieve competency goals with the maximum and can be achieved to strengthen student character. Research results from Widyanastiti, show that the use of learning models that are

appropriate to student learning motivation is an important component that determines the maximum achievement of student learning outcomes [2].

Teachers are expected to be able to use a variety of learning models and media, leading to communicative, collaborative, cooperative, creative, innovative learning, and building students to think critically, creatively, communicatively, and be able to solve problems. Various learning models that must be sorted according to the characteristics of learning activities that can increase HOTS, become a separate obstacle for a teacher. Learning activities are designed to be challenging and interesting to achieve higher-order thinking. The realization of HOTS-based learning activities in the current era is not something new, but there are still many vocational schools that have not implemented this system. Limitations from various aspects are still a barrier to the realization of this unique and challenging new learning system.

BAVA reset result (British Audio-Visual Aids) describes learning outcomes that do not use media only 13% of the total material that has been given. Using learning media, the acquisition of absorbed teaching materials can be increased by up to 86% [3]. Learning media have different characteristics.

The lightest learning media made at this time is media in the form of slides, so that the majority of teachers use this media to support learning. Interactive media can help users in independent learning, besides that attractive displays and facilities can increase user attractiveness for learning [4].

Facilities in the field of technology that are currently rife in all circles including upper middle school students. This can be used by teachers to create digital fluency learning, so that it can increase student activity and initiative. This is in accordance with research conducted by Putro regarding the characteristics of students with a high level of initiative who can solve problems because they will participate more in learning activities [5].

Improving HOTS abilities in students can be realized using learning design by applying contextual learning models, namely learning models that aim to motivate students to understand subject matter by associating the material with the context of everyday life so that students have skills in solving one problem and continue with other problems. Research conducted by Hakiki, et al., which states that learning uses models Contextual Teaching and Learning (CTL) can increase student activity, creativity and motivation [6].

Contextual learning is learning that presents the real world in the classroom to connect existing knowledge to be applied in students' lives [7]. According to Muhlisin, the essence of contextual learning is meaning, meaning, and meaning [8]. According to Kurniati, et al, "The principle of contextual learning that can enhance mathematical critical thinking skills is questionable. Activities undertaken by educators ask is to encourage, guide and assess the thinking skills of learners" [9]. The principle of contextual learning that can improve critical thinking skills is asking. Asking is a process to encourage, guide and assess students' thinking skills.

According to Fallis, CTL is a learning concept that helps teachers make connections between learning materials with real-world situations, and encourages students to make connections between knowledge and application in everyday life [10]. Contextual learning is a learning concept that can be used to assist teachers in associating learning material with real-world conditions of students and encourage students to make connections between the real world and the material that has been studied, students get the process of constructing in solving problems [11].

Contextual learning has characteristics, according to Chamalah et al. there are seven characteristics of CTL, namely: (a) learning in real life settings, learning is carried out in an authentic context, namely directed at achieving skills in a real life context for learning carried out in a natural environment; (b) meaningful learning, learning provides opportunities for students to do meaningful tasks; (c) learning by doing, learning is carried out by providing meaningful experiences to students; (d) learning in group, learning is carried out through group work, discussing, correcting each other between friends; (e) learning to know each other deeply, learning provides an opportunity to create a sense of togetherness, cooperation, and mutual understanding between one another in depth; (f) learning to ask, to inquire, to work together, learning is carried out actively, creatively, productively, and emphasizes cooperation and; (g)

learning as an enjoy activity, learning is carried out in pleasant situations [7].

Another design is using a problem-based learning model, which is a learning model designed by the teacher by giving challenges to students through assignments. This model is very suitable for improving problem solving skills. Creative thinking has no universal antidote Which can cure all problems, but with this can offer a way to examine problems that force us to question underlying issues [12].

Model Creative Problem Solving(CPS) was coined for the first time by Alex Osborn and Sidney Parnes in 1940. Osborn emphasized that creativity is a talent that must be developed deliberately, not just as an inborn talent, according to which everyone can be creative through a teaching and learning process. According to Ariandari, the model formulated by Parnes Osborn uses the concept of brainstorming which emphasizes divergent-convergent cycles [13]. CPS learning, the teacher's role is as a facilitator. The learning process is widely given to students to learn independently through this model.

The application of learning models combined with interactive media is an option that can be applied to overcome this problem. This is supported by the suitability of subjects, existing facilities and the characteristics of students at SMKN 1 Pogalan who tend to like things that are not boring. The subjects that will be studied are Basic Graphic Design, where in this learning requires learning media that can create an active role for students so that they can improve HOTS abilities, namely critical thinking, collaboration, creativity and communication.

All learning media assist teachers in carrying out several functions in learning [14]. If seen from the observations at SMKN 1 Pogalan, interactive media is the right learning media to use because the infrastructure is adequate and to increase student participation in learning activities. According to [15], the procedure for developing multimedia has six steps, namely: (1) analyzing the characteristics of students and the needs needed; (2) formulate specific instructional objectives; (3) formulate detailed material items to support the achievement of goals; (4) is used. developing a measure of success; (5) media manufacture and; (6) conducting tests and revisions. Interactive media can be used in the learning process in class and to improve student learning outcomes [16].

This research has some objective, including: (1) to describe the level of HOTS ability in the realm of knowledge due to the influence of the application of the CTL model assisted by interactive media in the Basic Graphic Design subject in class X Multimedia SMKN 1 Pogalan; (2) to describe the level of HOTS ability in the realm of knowledge due to the influence of the application of the CPS model assisted by interactive media in Basic Graphic Design subjects in class X Multimedia SMKN 1 Pogalan, and; (3) to find out the significance of differences in HOTS abilities in the realm of knowledge due to the application of the CTL model assisted by interactive media compared to the application of the CPS model assisted by interactive media in the Basic Graphic Design subject in class X Multimedia SMKN 1 Pogalan.

## II. METHOD

Form pseudo experiment (quasi-experimental design) with pretest posttest design and descriptive research design. This study consists of independent variables, dependent variables, and control variables. There are two independent variables in this study, namely the CTL model as X1 which will be applied to the experimental class 1 and the CPS model as X2 which will be applied to the experimental class 2. The dependent variable from this study is the ability study Which is used in the HOTS domain of knowledge as Y. This research there are two control variables, namely learning materials and teachers or teachers.

### A. Treatment measurement

The treatment instrument is an instrument in the form of a learning device, used during research to treat students during learning activities. The treatment instruments in this study consisted of syllabus, Learning Implementation Plans (RPP), job sheets, and learning media.

The Learning Implementation Plan (RPP) is a plan developed from the syllabus and aims to direct student learning activities to achieve competency (Permendikbud, 2018). There are two types of learning implementation plans used in this study, the first is lesson plan I for experimental class 1 which applies the CTL model, assisted by interactive learning media that has been prepared. The results of the content validity of the CTL model lesson plan obtained an average of 95.32 so that it can be categorized as having very good validity and is suitable for use.

RPP II for experimental class 2 that applies the CPS model, assisted by interactive learning media. The learning steps used are problem classification, opinion expression, evaluation, and implementation. The results of the content validity of the CPS model lesson plan obtained an average of 95.32 so that it can be categorized as having very good and feasible validity.

Learning media is something that becomes a container in presenting material to students as a support or introduction to learning. The learning media used in this research is interactive learning media created in the Adobe Photoshop application with the .exe extension. Games contained in this learning media can be used for evaluation and are able to increase the attractiveness of students in carrying out learning activities. Based on the results of the validity of this media, it obtained an average of 92.97% and obtained a very high category so it was feasible to use.

Job sheets is a worksheet that will be used as a guide in conducting practicum. Practicum steps that can be used as a reference by students, and there are also problems that students must solve on the worksheet that will be used in this study. Based on the results of the validity of this media obtained an average of 92.85%. Very high category and feasible to use.

### B. Measuring Instruments

The measurement instruments used are in the form of questions and observation sheets of the implementation of learning. In this study, what was measured was students' higher-order thinking skills which could be done by evaluating the cognitive domain. Based on indicators from the HOTS aspect, namely communication, collaboration, critical and creative

thinking, the criteria used to measure HOTS in students according to [17] are as in Table 1.

The measurement instrument is in the form of questions, which consist of 12 numbers to be tested. The results of the 12 number trials produced 10 valid questions and were suitable for use in research. The reliability test results for the 10 questions were 0.637 so that they could be categorized as reliable. This category is in accordance with the reliability criteria according to Arikunto [18] in Table 2.

The item difficulty index is between 0.00 and 1.00. Questions with a difficulty index of 0.00 indicate that the item is too difficult, conversely if the item difficulty index is 1.00 it indicates that the item is too easy. The comparison between easy-to-difficult questions that will be used in this study is 3-4-3, meaning 30% of the questions are in the easy category, 40% are in the medium category, and 30% are in the difficult category. The difficulty index according to Arikunto [19] is classified as follows in Table 3.

### C. Data Collection Technique

The first stage is the preparation stage. The activity carried out in the preparatory stage was to study material in the Basic Graphic Design subject for class X Multimedia odd semester students at SMKN 1 Pogalan. Second, make initial observations at SMKN 1 Pogalan class X Multimedia in Basic Graphic Design subjects by conducting interviews with teachers, and observing when teachers carry out learning activities in class to obtain the necessary information. Third, compiling research instruments in the form of lesson plans, materials, pretest-posttest questions, and interactive learning media to be used during research. Fourth, validation of instruments that have been prepared as an evaluation tool for material experts.

TABLE 1. HOTS INDICATORS

HOTS Indicator	Sub-Indicators
Communication	Make decision
Solution to problem	Identification of problems
	Analysis
	Propose solution
Critical Thinking	Conclusion
	Evaluate
	Predict
Creative Thinking	Deductive thinking
	Inductive thinking
	Creative thinking

TABLE 2. RELIABILITY CRITERIA

Value Criteria	Category
0.81 - 1.00	Very reliable
0.61 - 0.80	Reliable
0.41 - 0.60	Reliable enough
0.21 - 0.40	Somewhat reliable
0.00 - 0.20	Very not reliable

TABLE 3. QUESTION DIFFICULTY LEVEL CRITERIA

Difficulty Level	Question Criteria
P 0.00 - P 0.30	Hard
P 0.31 - P 0.70	Medium
P 0.71 - P 1.00	Easy

The next stage is the implementation stage. The activities carried out in the first implementation stage were giving pretest questions to students in class X MM 1 as an experimental class 1, students in class X MM 2 as an experimental class 2 to find out students' initial abilities. Second, giving treatment by applying the CTL model to experimental class 1 and applying the CPS model to experimental class 2. Third, giving posttest questions to both experimental classes to determine students' final abilities after being given treatment.

The last stage is the data collection stage. The activities carried out at the first data collection stage were collecting data from the pretest-posttest results in the two experimental classes, and the data contained on the observation sheets. Second, analyze all the data obtained through statistical tests. Third, comparing the results of the pretest-posttest for each class to find out the increase in learning after implementing the CTL model and the interactive media-assisted CPS model. The fourth is to compare the posttest results of the two experimental classes to find out whether or not there is a difference between the two treatments given.

#### D. Data Analysis

The data analysis technique used in this study is quantitative analysis. The analysis was carried out in the form of calculations, namely comparing the test results of the experimental class 1 which applied the CTL model assisted by interactive media with the experimental class 2 which applied the CPS model assisted by interactive media. The data that has been collected is processed and analyzed to answer the problems and hypotheses.

The analysis used is descriptive analysis used to determine whether the HOTS ability in the realm of student knowledge is in the low, medium, or high category. Analysis prerequisite test is used to determine hypothesis testing. Analysis prerequisite tests carried out included normality tests and homogeneity tests.

Data on the implementation of the CTL model assisted by interactive learning media and the CPS model assisted by interactive learning media were measured using observation sheets of the implementation of learning. The assessment of this learning observation sheet is measured according to the observation indicators. Learning implementation score can be seen in Table 4. The step for determining the applicability of learning is done by adding up the scores obtained by each activity, then calculating the total number of each observer value and determining the average value. The final score is obtained by adding up the average score of each activity divided by the total score that should be obtained then multiplied by 100% [18].

Test score gain is a test used to determine the increase in learning outcomes. Following are the criteria gain percentage in Table 4.

TABLE 4. CRITERIA GAIN PERCENTAGES

Percentage	Interpretation
< 40	Ineffective
40 - 55	Less Effective
56 - 75	Effective enough
> 76	Effective

TABLE 5. PRETEST AND POSTTEST SCORE DATA OF X MM 1

	X MM 1 Grade			
		Pre 1	Post 1	Gain Score
N	Valid	35	35	69,84%
	Missing	0	0	
Mean		47.77	84.46	
Median		48.00	86.00	
Std. D		11.374	8.129	
Min		30	60	
Max		68	96	
Completeness		5.71%	97.14%	
Enhancement		91.43%		

### III. RESULT AND DISCUSSION

Data acquisition after students received treatment with the CTL and CPS models, both of which were assisted by interactive media, was used as a benchmark for achievement and a comparison of the two experimental classes.

#### A. Interactive Media Assisted CTL Model

Data pretest and posttest in class X MM 1 as experimental class 1 can be seen in Table 5.

Completeness of learning outcomes HOTS abilities in the realm of basic knowledge of graphic design in class X MM 1 as experimental class 1 before being given treatment and after being given treatment with the CTL model assisted by interactive media by 5.71% and 97.14% so that the experimental class 1 experienced an increase of 91.43%.

Objective from this research is for describing High Order Thinking Skills ability in the realm of knowledge due to the influence of the CTL model treatment assisted by interactive media in the basic subject of graphic design in class X MM 1 students who became the experimental class 1. CTL is learning that creates reinforcement, expansion, application of students' academic knowledge and skills in order to solve problems. How with associating learning material with real-world conditions of students and encouraging students to make connections between the real world and the material that has been studied, making it easier for students to understand related material. Interactive media as a support in learning is used by students as a guide to make it easier to access material, so that students can become more explorative.

The material discussed is raster image manipulation using effect features in Basic Competency (KD) 3.10 Applying raster image manipulation using effect features, and KD 4.10 Manipulating raster images using effect features. Before receiving treatment, students were given a pretest in the form of 10 essay questions in which the questions were integrated with HOTS indicators, so that students' initial HOTS abilities could be known in raster image manipulation material using effect features. After being given treatment, students were given

questions posttest, which is the same as the pretest questions that students have worked on but with random number questions. The purpose of posttest to measure the HOTS ability of raster image manipulation material using effect features on students after being treated with interactive media-assisted CTL models.

Average results ability of HOTS in the realm of knowledge obtained by students before being treated with the CTL model assisted by interactive media was classified as moderate. After obtaining data on students' initial abilities, they were then given treatment using the CTL model assisted by interactive media, which were then given to students posttest as the final ability data of students. Both of these data are used to determine the completeness of HOTS ability learning outcomes in the realm of basic knowledge of graphic design in X MM 1 students.

The result of the average value posttest students as the final data the HOTS ability of students obtained is very high, this is because during learning students are more active and explorative in using interactive media that can be accessed by each student on their computer. This is in line with the results of research conducted by Sinaga which states that learning must involve many student activities so that they can be more active [20]. The enthusiasm of students in solving problems found in interactive media arouses their curiosity so that discussions with interesting topics occur when learning takes place.

Results obtained from pretest and posttest there was an increase in HOTS ability in the realm of basic knowledge of graphic design after being given treatment using the CTL model assisted by interactive media. The increase in HOTS ability in the realm of basic graphic design knowledge in class X MM 1 students can be seen from Gain Score student scores before and after receiving treatment. Increasing HOTS ability in the field of knowledge of class X MM 1 is included in the medium category with an interpretation of its effectiveness being quite effective.

The results of observations of the implementation of learning carried out by three observers showed that each stage was at the first meeting and the second meeting both worked out well. The constructivism stages in the first and second meetings create exploratory activities, where students use the time to explore interactive media and jobsheets that has been shared. This stage was carried out well, but at the first meeting there were a few technical problems, namely when the interactive media was distributed, many laptops failed to access because the .exe virus detected by windows defender. This obstacle can be solved without spending a long time, so that learning activities can be continued as the CTL stage.

The inquiry stage, where at this stage students can find problems which students will then ask the teacher about the problems found. When working on pretest questions, students ask a lot of questions to the teacher to get reinforcement for the answers they have thought of. The next stage is the learning community where students are directed by the teacher to work with groups. When in groups, each student is active in solving the problems given. Some students who were less active received special treatment from the teacher so that they could participate in discussion activities properly.

TABLE 6. HOTS INDICATOR DATA DESCRIPTION OF X MM 1

	N	Range	Min	Max	Mean
Communication	35	70	30	100	88
Problem Solving	140	100	0	100	79.43
Thinking Hard	140	100	0	100	88.57
Thinking Creative	35	100	0	100	84.57

The modeling stage, at this stage the concepts obtained by students get a reinforcement from the model examples presented by the teacher. The teacher shows several examples of student work and from the teacher's own work. So that students can see directly the implementation of concepts that have been learned from interactive media, discussed in groups, and practiced with jobsheet guidance. The stage is reflection, where at this stage students reflect on the results of the work that has been done, so that together students can see what is lacking in their respective work.

HOTS capability improvement can be seen from the achievement of scores posttest each HOTS indicator used as standardization. This indicator is the result of adaptation from Ardiana [17], namely Communication (Communications), Solution to problem (Problem Solving), Critical thinking (Critical Thinking), and Creative Thinking (Creative).

The average value of communication indicators is 88, problem solving indicators are 79.43, critical thinking indicators are 88.57, and creative thinking indicators are 84.57. These results can be sorted by average value starting from the lowest to the highest value, in the lowest average value is an indicator of problem solving, then an indicator of creative thinking, an indicator of communication, and the highest is an indicator of critical thinking.

The achievement of communication indicators for the basic subject of graphic design with a focus on raster image manipulation material using effects features, in class X MM 1 students due to the treatment of the CTL model assisted by interactive media obtained an average of 88. This can be seen from the acquisition of student scores in answering questions which already integrated with indicator communication where the sub-indicator is making decisions. On average, students can communicate and answer questions correctly related to making decisions from the problems provided in the questions.

The achievement of problem-solving indicators in the basic subject of graphic design with a focus on raster image manipulation material using effect features, in class X MM 1 students due to the treatment of the CTL model assisted by interactive media obtained an average of 79.43. This can be seen from the acquisition of student scores in answering questions which have been integrated with problem solving indicators where the sub-indicators are problem identification, analysis, proposing solutions, and conclusions. On average, students can find solutions to problems and answer questions correctly related to the problem solving provided in the questions.

The achievement of indicators of critical thinking in basic graphic design subjects with a focus on raster image manipulation using effect features, in class X MM 1 students due to the treatment of the CTL model assisted by interactive

media obtained an average of 88.57. This can be seen from the acquisition of student scores in answering questions that have been integrated with critical thinking indicators where the sub-indicators are evaluating, predicting, deductive thinking, and inductive thinking. On average, students can think critically in answering questions correctly related to the critical thinking provided in the questions.

The achievement of creative thinking indicators in the basic subject of graphic design with a focus on raster image manipulation material using effect features, in class X MM 1 students due to the treatment of the CTL model assisted by interactive media obtained an average of 84.57. This can be seen from the acquisition of student scores in answering questions that have been integrated with creative indicators where the sub-indicators are creative thinking. On average, students can think creatively and answer questions correctly related to the creativity provided in the questions.

Based on the results of the average and standard deviation of the four basic HOTS graphic design ability indicators due to the influence of the application of the CTL model assisted by interactive media, it can be sorted starting from the highest average, namely critical thinking indicators, the second order is communication indicators, followed by creative thinking indicators, and the lowest order is problem solving. The highest average gain on this critical thinking indicator was developed through learning using the CTL model. This is in line with research conducted by Shanti, et al. which states that the CTL approach or model is very supportive for cultivating critical thinking skills through the stages of learning [21].

#### B. Interactive Media Assisted CPS Model

The purpose of this study is to describe the Higher Order Thinking Skills (HOTS) ability in the realm of knowledge due to the influence of the CPS model treatment assisted by interactive media in the basic subjects of graphic design in class X MM 2 students as an experimental class 2. CPS is a learning model that provides opportunities for students widely for independent study. Interactive media as a support in learning is used by students as a guide to make it easier to access material, so that students can get an overview of the material being studied. Data pretest and posttest in class X MM 2 as experimental class 2 can be seen in Table 7.

TABLE 7. PRETEST AND POSTTEST SCORE DATA OF X MM 2

		X MM 2 Grade		
		Pre 1	Post 1	Gain Score
N	Valid	35	35	40,81%
	Missing	0	0	
Mean		50.37	71.80	
Median		53.00	70.00	
Std. D		12.971	10.627	
Min		31	60	
Max		71	96	
Completeness		22.86%	62.86%	
Enhancement		40%		

The mastery of learning outcomes for HOTS abilities in the realm of basic knowledge of graphic design in class X MM 2 as the experimental class 2 before and after being treated with the CPS model assisted by interactive media was 22.86% and 62.86% so that the experimental class 2 experienced an increase of 40%.

The purpose of this study is to describe the Higher Order Thinking Skills (HOTS) ability in the realm of knowledge due to the influence of the CPS model treatment assisted by interactive media in the basic subjects of graphic design in class X MM 2 students as an experimental class 2. CPS is a learning model that provides opportunities for students to area for independent study. Interactive media as a support in learning is used by students as a guide to make it easier to access material, so that students can get an overview of the material being studied.

The material discussed is raster image manipulation using effect features in Basic Competency (KD) 3.10 Applying raster image manipulation using effect features, and KD 4.10 Manipulating raster images using effect features. Before receiving treatment, students in class X MM 2 were given a pretest in the form of 10 description questions in which the questions were integrated with HOTS indicators, so that it can be seen that students' initial HOTS abilities in raster image manipulation material using effect features. After being given treatment, students were given questions posttest, which is the same as the pretest questions that students have worked on but with random number questions. The purpose of posttest to measure the HOTS ability of raster image manipulation material using effect features on class X MM 2 students after being treated with interactive media-assisted CPS models.

Average ability result HOTS of realm the knowledge obtained by students before being treated with the CPS model assisted by interactive media is classified as moderate. After obtaining data on students' initial abilities, then students are given treatment using the CPS model assisted by interactive media, which at the end of learning students are given posttest to determine the final ability of students. Pretest and posttest value data which used to completeness of learning results of HOTS at basic knowledge of graphic design for X MM 2 students.

The result of the average value posttest after being treated with the CPS model assisted by interactive media, class X MM 2 students obtained a high category, this data was used as the final data on students' abilities. When learning takes place, there are many roles of students in learning activities so that students look more active. This is in line with research conducted by Huda which states that the application of the CPS model is very well applied to increase student learning activity [22].

The results of observations of the implementation of learning conducted by three observers showed that each stage at the first meeting and the second meeting was carried out well. The stage of problem classification at the first meeting is to introduce students to the problems that must be solved, in this case students are given a pretest to direct the realm of students' initial thoughts. The stage of expressing opinions, in which students are directed to develop on their own with the help of worksheets and interactive media, so that students' opinions

emerge because they read and understand the learning resources that are distributed.

The evaluation stage is carried out in large discussions, both evaluating learning activities and evaluating student work. The implementation stage is used as a joint correction of the work that has been done by students. In contrast to other learning models, in this CPS model the teacher provides the widest opportunity for students to learn independently and the teacher acts as a facilitator. Learning activities using this model show more active students so that the class looks more alive.

Results data pretest and posttest there was an increase in HOTS ability in the realm of basic graphic design knowledge after being treated with the CPS model assisted by interactive media. Improved HOTS capabilities in the basic knowledge of graphic design class X MM 2 can be seen from Gain Score student scores before and after being treated with the CPS model assisted by interactive media, which is in the moderate category with a less effective interpretation of effectiveness.

The average value of communication indicators is 66.29, problem solving indicators are 68.93, critical thinking indicators are 75.57, and creative thinking indicators are 73.71. These results can be sorted based on the average value starting from the lowest to the highest value, that is, the lowest average value is an indicator of communication, then problem solving, creative thinking, and the highest is an indicator of critical thinking.

The achievement of communication indicators for the basic subject of graphic design in class X MM 2 students due to the treatment of the CPS model assisted by interactive media obtained an average of 66.29. This can be seen from the acquisition of student scores in answering questions that have been integrated with indicators communication where the sub-indicator is making a decision. The average student has not been able to answer correctly, but some students have been able to communicate their answers textually. This shows that students do not convey information from the theory that has been obtained.

The achievement of problem-solving indicators for the basic subject of graphic design in class X MM 2 students due to the treatment of the CPS model assisted by interactive media obtained an average of 68.93. This can be seen from the acquisition of student scores in answering questions which have been integrated with problem solving indicators where the sub-indicators are problem identification, analysis, proposing solutions, and conclusions. On average students can solve problems regarding problem identification and analysis, but students are less able to solve questions about proposing solutions and concluding.

TABLE 8. HOTS INDICATOR DATA DESCRIPTION OF X MM 2

	<b>N</b>	<b>Range</b>	<b>Min</b>	<b>Max</b>	<b>Mean</b>
Communication	35	100	0	100	66.29
Problem Solving	140	100	0	100	68.93
Thinking Hard	140	100	0	100	75.57
Thinking Creative	35	100	0	100	73.71

The achievement of indicators of critical thinking in basic graphic design subjects with a focus on raster image manipulation using effect features, in class X MM 2 students due to the treatment of the CPS model assisted by interactive media obtained an average of 75.57. This can be seen from the acquisition of student scores in answering questions that have been integrated with critical thinking indicators where the sub-indicators are evaluating, predicting, deductive thinking, and inductive thinking. On average, students can think critically in answering related questions correctly critical thinking provided in the questions, but some students answered doubtfully, so the scores obtained were not complete.

Achievement of indicators of creative thinking in basic graphic design subjects with a focus on raster image manipulation using the effect feature, on students of class X MM 2 because of the treatment of the CPS model assisted by interactive media obtained an average of 73.71. This can be seen from the acquisition of student scores in answering questions that have been integrated with creative indicators where the sub-indicators are creative thinking. On average, students can think creatively and answer related questions correctly creativity provided in the questions, but when viewed from the answers some students actually know how to answer but are unable to write textually about how to create the steps that must be taken.

*C. Prerequisite Analysis Test*

Prerequisite analysis test is a test that must be passed first before testing the hypothesis. The prerequisite tests that must be carried out are the normality test and homogeneity test. The normality test is a test used to determine whether the data obtained is normally distributed or not. The data to be tested were obtained from the posttest HOTS ability in the realm of basic knowledge of graphic design in class X MM 1 and X MM 2. The posttest value of HOTS ability in the realm of basic graphic design knowledge in class X MM 1 which was treated using the CTL model assisted by interactive media has significance 0.200. Class X MM 2, which received treatment using the CPS model assisted by interactive media has a significance of 0.080. So that from the two significant values it can be stated that it is normally distributed.

Homogeneity test is used to determine whether the two groups are homogeneous or not. The results of the posttest data homogeneity test for HOTS ability in the domain of basic graphic design knowledge obtained a significance value of 0.127. Based on these results it can be concluded that the value posttest both classes have homogeneous data variants. The data can be said to be homogeneous because the significance value is greater than 0.05 (0.127 > 0.05).

*D. HOTS Ability Difference*

The significance of the difference between the class that was treated using the interactive media-assisted CTL model and the class that was treated with the interactive media-assisted CPS model. The average value of HOTS abilities in the realm of knowledge obtained by experimental class 1 with the CTL model assisted by interactive media is superior to the experimental class 2 by the CPS model assisted by interactive media. HOTS ability in the realm of knowledge of the experimental class 1 is included in the very high category.

While the HOTS ability in the realm of knowledge of the experimental class 2 is in the high category.

The material discussed is raster image manipulation using effect features, namely KD 3.10 Applying raster image manipulation using effect features, and KD 4.10 Manipulating raster images using effect features. Before given the treatment, students were given a pretest in the form of 10 numbers of description questions that had been integrated with the HOTS indicator to determine students' initial abilities. After being given treatment students will be given questions posttest to measure HOTS ability in the realm of knowledge after the two experimental classes were given treatment.

Average ability score of HOTS at realm the knowledge obtained by the experimental class 1 with the interactive media-assisted CTL model was superior to that of the 2nd experimental class with the interactive media-assisted CPS model. HOTS ability in the realm of knowledge of the experimental class 1 is included in the very high category. While the HOTS ability in the realm of knowledge of the experimental class 2 is in the high category.

The CTL model provides concrete examples to students, so that students can better understand the material presented. When learning students are more explorative in using interactive media that can be accessed by each student on his computer. This is in line with the results of research which states that learning using the CTL model can increase activity, creativity and learning motivation [23].

Students are very enthusiastic in solving problems contained in interactive media, arousing their curiosity so that interesting discussions occur. This statement is in accordance with research conducted by Kurniati, et al which shows that the use of the CTL model in learning can improve higher-order thinking skills such as problem solving, reasoning, and communication [9]. Therefore, the average HOTS ability in the knowledge domain of the experimental class 2 is superior because in learning activities students get analogies with real life so that it makes it easier to understand the material.

Average ability score the basic knowledge of graphic design obtained by experimental class 1 was higher than that of experimental class 2. The HOTS ability results for experimental class 1 included very high criteria with an average result of 84.46. While the results of HOTS ability in the domain of basic graphic design knowledge obtained by experimental class 2 are included in the high criteria with an average result of 71.8. The conclusion from the results of this study is that the application of the CTL model assisted by interactive media is superior to the CPS model assisted by interactive media.

#### IV. CONCLUSIONS

Based on the research results, data calculation, hypothesis testing, it can be concluded as follows: The value of HOTS ability in the realm of knowledge before being given treatment obtained the moderate category, then after being treated with the CTL model assisted by interactive media the average value increased so that it obtained a very high category. The value of HOTS ability in the realm of knowledge before being given treatment is in the moderate category, then after being treated

with the CPS model assisted by interactive media the average value increased so that it obtained a high category. There is a significant difference in HOTS ability in the basic knowledge of graphic design with the CTL model assisted by interactive media compared to the CPS model assisted by interactive media. The application of the CTL model assisted by interactive media is superior to the CPS model assisted by interactive media.

#### V. SUGGESTION

The suggestions from the results of this study include: For Basic Graphic Design subject teachers, applying the CTL model assisted by interactive learning media can be applied in learning activities, especially to improve students' understanding of the material. The CTL model is very suitable for improving students' critical thinking skills. For future researchers, the application of the CTL model assisted by interactive media can be used to improve HOTS capabilities in the realm of basic graphic design knowledge. The application of the CPS model should be combined with other creative learning media that are more based problem based. This is to increase ability problem solving and communication student.

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