

Multivariate Test of Multimedia Implementation Effects in Development of Chemical Concept Materials for Class X Students of SMK Private Satrya Budi I Perdagangan

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ABSTRACT

This study aims to improve student learning activities and achievement through the use of multimedia in the material development of chemical reaction concepts in the SMK Private Satrya Budi I Perdagangan. This research is a classroom action research study consisting of two cycles. Each cycle consists of action planning, action implementation, observation, and reflection. The subjects of the study were students of grade X in SMK Private Satrya Budi I Perdagangan in 2018/2019 Academic Year. Data sources come from teachers and students. Data obtained through interviews, observations, tests, and questionnaires. The data analysis technique used is multivariate analysis with SPSS software. The conclusion of this research is the use of multimedia can improve student learning activities and achievement on the material development of the concept of chemical reactions and chemical practice class X SMK Private Satrya Budi I Perdagangan.

Keywords: Multimedia learning, Class Research, Student Achievements

INTRODUCTION

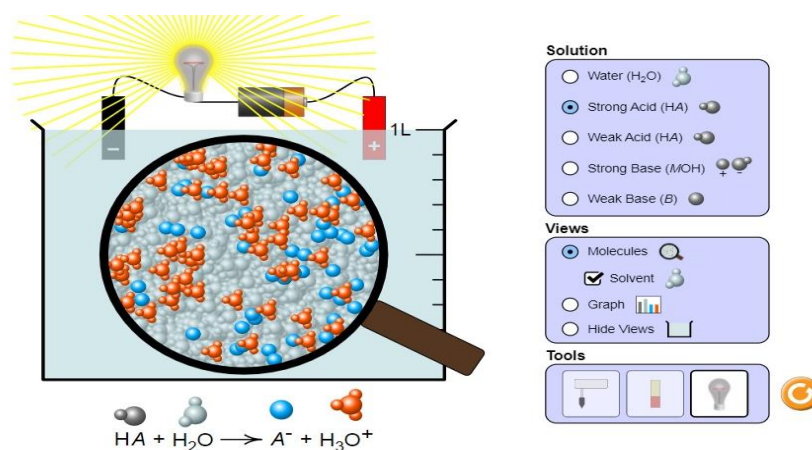
In the world of school education is a formal institution that functions to print students into intelligent and educated people. Efforts to improve the quality of teaching and learning processes and student learning outcomes, at every level of education need to be realized in order to obtain the quality of Indonesian human

resources that can support national development. Teaching and learning activities are the main activities in the educational process at school, therefore the success of achieving educational goals is highly dependent on the quality of the implementation of the teaching and learning process. One of the developments of human resources is through education in vocational schools as well as in Vocational High Schools (SMK). Based on the consideration that SMK graduates have top priority must have the competence to carry out certain jobs, so they can develop themselves both vertically and horizontally so able to compete in the era of globalization that has the ability to live life well based on scientific approaches. Learning needed at this time is innovative and creative learning, one of which is among others developing learning media in the classroom. Learning media must increase student innovation. Additionally, it stimulates students to remember what they have learned, in addition to providing new learning stimuli. Good media will enable students to provide responses, feedback, and encourage students to do the right practices.

Multimedia is an alternative that can be used as a learning media because it can give more insight to the material that will be delivered by the teacher to students. Aside from using manuals and modules, the

delivery of material using multimedia is felt to be more attractive to students. That way students are expected to better understand the material delivered by the teacher. Media education using multimedia is still rarely used by educators to assist in the teaching and learning process. This is because making multimedia as a learning medium is not as easy as making other media such as

power points. In addition, making multimedia also requires special programs or software, time is not short and adequate expertise. Learning media in the form of multimedia is useful in supporting teaching and learning activities, but not many multimedia are made for learning functions in schools.



Picture 2. Multimedia in Chemical Learning

Learning outcomes are very important in education because they are indicators of achieving planned targets. For teachers learning outcomes are not only an indicator of success in delivering material to students but the use of the methods used in the teaching and learning process and determine students who have achieved minimal completeness and are entitled to proceed to the next material. For students learning outcomes become a benchmark for mastery of the material delivered by the teacher. For schools good learning outcomes increase the credibility and reputation of the school both in the community and the world of education. For departments and other educational institutions learning outcomes are the material for evaluating curriculum implementation in schools.

MATERIALS & METHODS

Materials

The description of learning activities using multimedia carried out in class X Technical light vehicle is as follows; 1) Division of groups consisting of 4 people

and 5 people from 37 students namely 8 groups; 2) A brief description of the material; 3) Distribute paper to students in the form of short and interesting material; 4) Students have a discussion about the kinds of face shapes; 5) Each group presents the results of the group; 6) The teacher demonstrates tips on drawing faces; 7) Each group chooses one kind of face shape that is used; 8) Students collect and are given group assessments; 9) Announce the value obtained by each group; 10) Reviewing together between teacher and students about the material; 11) Question and answer and assignment. The instruments used were curriculum, lesson plans, syllabus, teaching materials / materials, instruments and observation sheets. About the assessment of attitudes, student activity in performance and student success / student mastery in drawing.

Research methods

Research procedures consist of: action planning, implementation, observation of actions and reflection. In the first to third learning is a meeting for

adaptation for students. Data collected by assignment techniques (drawing individuals), interviews, observations. About the attitudes, activities and activeness of students in learning. The assignment technique is to draw individuals and fill in the questionnaire sheets about students' attitudes to the subject.

Research Instruments

This class action assessment was carried out at SMK Private Satrya Budi 1 Perdagangan for chemical concept subjects, as subjects in this study were students of class X.

Data analysis technique

This study uses SPSS version 17.0 in data processing. The test that will be discussed to explain all the aims and objectives of the study is explained based on the results of testing by SPSS.

RESULT

This study aims to determine the effectiveness or influence of the Multimedia Implementation (X) on Improving the concept of chemical reactions(Y1) and Chemistry practice (Y2) Students Class X Class X and SMK Private Satrya Budi I Perdagangan.

a. Basic Chemistry Concept

The results of the pre-test analysis of basic Chemistry concept variables obtained the highest score of 130, the lowest score of 101, the average score of 119.1, the standard deviation of 8.55, the median of 121, mode 124. Many class intervals are 6 and the length of the class interval is 5. Frequency distribution of the data can be seen in table 1.

Table 1: Frequency Distribution of PreTest Scores for Basic Chemistry Concept Students Class X Class X and SMK Private Satrya Budi I Perdagangan.

Interval	Absolute Frequency (f)	Relative Frequency (%)
101 - 105	3	15
106 - 110	1	5
111 - 115	1	5
116 - 120	5	25
121 - 125	6	30
126 - 130	4	20
Total	20	100

The results of the posttest analysis of the basic Chemistry concept variables obtained the highest score of 142, the lowest score of 122, the average score of 133.55, the standard deviation of 5.86, the median of 135, mode 137. Many class intervals are 6 and the length of the class interval is 4. Frequency distribution of the data can be seen in table 2.

Table 2: Post Test Frequency Distribution Scores of Basic Chemistry Concept Students Class X Class X and SMK Private Satrya Budi I Perdagangan.

Interval	Absolute Frequency (f)	Relative Frequency (%)
122 - 125	2	10
126 - 129	3	15
130 - 133	4	20
134 - 137	7	35
138 - 141	2	10
142 - 145	2	10
Total	20	100

b. Chemistry practice

The results of the pre-test analysis of the Chemistry practice obtained the highest score of 265, the lowest score of 37, the average score of 132.8, the standard deviation of 61.31, the median of 139, the mode of 139. Many class intervals are 6 and the length of the interval class is 38. Frequency distribution from data these can be seen in table 3.

Table 3: Distribution of PreTest Frequency Score for Chemistry practice of Students Class X and SMK Private Satrya Budi I Perdagangan.

Interval	Absolute Frequency (f)	Relative Frequency (%)
37 - 75	3	15
76 - 114	6	30
115 - 153	2	10
154 - 192	7	35
193 - 231	1	5
232 - 270	1	5
Total	20	100

The results of the post test analysis of Chemistry practice obtained the highest score of 315, the lowest score of 195, the average score of 257.15, the standard deviation 32.66, the median 255, mode 252. Many class intervals are 6 and the length of the class interval is 20. Frequency distribution of data these can be seen in table 4.

Table 4: Post Test Frequency Distribution Scores on Chemistry practice of Students Class X and SMK Private Satria Budi I Perdagangan.

Interval	Absolute Frequency (f)	Relative Frequency (%)
195 - 215	2	10
216 - 236	3	15
237 - 257	5	25
258 - 278	5	25
279 - 299	3	15
300 - 320	2	10
Total	20	100

HYPOTHESIS TESTING

H0: There is no effect of the Multimedia Implementation (X) on the Improvement of Basic Chemistry Concept (Y1) and Chemistry practice (Y2) Students Class X for SMK Private Satria Budi I Perdagangan and Training.

H1: There is an influence of SMK Private Satria Budi I Perdagangan Center and (X)

Curriculum on Improving Chemistry Basic Technique (Y1) and Chemistry Result (Y2) Junior Athlete Class X for SMK Private Satria Budi I Perdagangan and Coaching

	Score	Mean	Std. Deviation	N
Score	less	96.50	3.416	4
	enough	101.83	5.913	6
	good	107.40	2.951	10
	Total	103.55	5.862	20
Score	less	250.25	26.196	4
	enough	245.00	32.354	6
	good	267.20	34.778	10
	Total	257.15	32.658	20

Table 5 above, shows the descriptive test results. The table above explains the average of each category in each of the basic techniques of chemistry and the results of chemistry in the post test.

Effect		Value	F	Hypothesis df	Error df	Sig.	Noncent. Parameter	Observed Power ^b
Intercept	Pillai's Trace	.999	5833.502 ^a	2.000	16.000	.000	11667.004	1.000
	Wilks' Lambda	.001	5833.502 ^a	2.000	16.000	.000	11667.004	1.000
	Hotelling's Trace	729.188	5833.502 ^a	2.000	16.000	.000	11667.004	1.000
	Roy's Largest Root	729.188	5833.502 ^a	2.000	16.000	.000	11667.004	1.000
Category	Pillai's Trace	.619	3.813	4.000	34.000	.012	15.251	.845
	Wilks' Lambda	.401	4.636 ^a	4.000	32.000	.005	18.543	.912
	Hotelling's Trace	1.444	5.417	4.000	30.000	.002	21.667	.949
	Roy's Largest Root	1.409	11.974 ^c	2.000	17.000	.001	23.949	.985
a. Exact statistic								
b. Computed using alpha = .05								
c. The statistic is an upper bound on F that yields a lower bound on the significance level.								
d. Design: Intercept + Category								

For the F test results, ignore the part labeled "Intercept." The row below in the table above shows 4 numbers giving the P value for four different multivariate tests.

These results explain that if there is a significant influence of the independent variables on all dependent variables. If asked "Overall, is there a significant influence of the independent variables on a set of dependent variable groups", "by looking at the results of this multivariate test, if 4 p-values indicate <0.05, then significantly at the 95 confidence level % it can be concluded that there is an influence of the SMK Private Satria Budi I Perdagangan (X) chemistry training and coaching curriculum center on Improving the concept of chemical reactions(Y1) and Chemistry practice (Y2) Students Class X at

the SMK Private Satria Budi I Perdagangan.

Table 7 shows the results of the homogeneity test that is the Levene test. It is said that all variables have the same variant if the sig value. > 0.05. This value will later affect what Post Hoc test choice is used. If Sig. > 0.05 then the Post Hoc test uses the Benferroni Test, whereas if <0.05 it uses Games-Howell. The results above indicate the dependent variable has a different variant because there is Sig. > 0.05 and Sig. <0.05 so the Post Hoc test used later is also different. Each row shows the results of the test of the influence of one independent variable, namely the category of each dependent variable. From the results above, see the value in the "Sig." Column. It said significant if the value of Sig. <0.05.

Table 7: Multiple Comparisons

Dependent Variable		(I) Score	(J) Score	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval		
							Lower Bound	Upper Bound	
Score	Bonferroni	less	enough	-5.33	2.658	.183	-12.39	1.72	
			good	-10.90*	2.436	.001	-17.37	-4.43	
		enough	less	5.33	2.658	.183	-1.72	12.39	
			good	-5.57	2.126	.054	-11.21	.08	
		good	less	10.90*	2.436	.001	4.43	17.37	
			enough	5.57	2.126	.054	-.08	11.21	
	Games-Howell	less	enough	-5.33	2.957	.229	-13.80	3.13	
			good	-10.90*	1.946	.006	-17.27	-4.53	
		enough	less	5.33	2.957	.229	-3.13	13.80	
			good	-5.57	2.588	.153	-13.33	2.19	
		good	less	10.90*	1.946	.006	4.53	17.27	
			enough	5.57	2.588	.153	-2.19	13.33	
	Score	Bonferroni	less	enough	5.25	21.108	1.000	-50.79	61.29
				good	-16.95	19.346	1.000	-68.31	34.41
enough			less	-5.25	21.108	1.000	-61.29	50.79	
			good	-22.20	16.886	.618	-67.03	22.63	
good			less	16.95	19.346	1.000	-34.41	68.31	
			enough	22.20	16.886	.618	-22.63	67.03	
Games-Howell		less	enough	5.25	18.602	.957	-48.61	59.11	
			good	-16.95	17.103	.604	-66.54	32.64	
		enough	less	-5.25	18.602	.957	-59.11	48.61	
			good	-22.20	17.188	.428	-68.43	24.03	
		good	less	16.95	17.103	.604	-32.64	66.54	
			enough	22.20	17.188	.428	-24.03	68.43	

Based on observed means.

The error term is Mean Square(Error) = 1069.315.

*. The mean difference is significant at the .05 level.

CONCLUSION

The conclusion and answer of the hypothesis is that the Multimedia Implementation significantly influences the improvement of chemistry basic techniques and Chemistry practice with Sig. <0.05 on all tests used (table 6 category rows) which means H0 Rejected or H1 Accepted.

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