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THE EFFECTIVENESS OF MACROS-BASED COGNITIVE DOMAIN EVALUATION MODEL IN SENIOR HIGH SCHOOL BASED ON THE CURRICULUM 2013

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Abstract

The particular objective of this study was to investigate the effectiveness of implementation of learning device in the form of macros-based cognitive domain evaluation model via E-learning applied at 10th grade of senior high school in the odd semester based on the curriculum 2013. The method of this study followed the procedures of R & D (Research & Development) developed by Borg and Gall. The results of the research and application development of macros-based evaluation model are effective which can be seen from (1) the results of students' mastery learning, (2) students' independence gives positive effect on learning outcomes, (3) the learning results of students who used macros-based learning evaluation model of cognitive domain are better rather than those in control class. Based on the above results, it can be concluded that macros-based learning evaluation model of cognitive domain tested has met the quality standards.

Keywords: Models, Evaluation Tool, Curriculum

Abstrak

Tujuan khusus penelitian ini adalah mengetahui efektifitas penerapan perangkat pembelajaran berbentuk model evaluasi pembelajaran ranah kognitif berbasis program macros melalui E-learning pada SMA Kelas X semester gasal berdasar kurikulum 2013. Metode penelitian yang digunakan dalam penelitian ini mengikuti prosedur R & D yang dikembangkan oleh Borg and Gall. Hasil penelitian dan pengembangan aplikasi model evaluasi berbasis program macros efektif, yang dapat dilihat dari (1) Hasil belajar mahasiswa tuntas, (2) Kemandirian mahasiswa berpengaruh positif terhadap hasil belajar, (3) hasil belajar mahasiswa menggunakan alat evaluasi ranah kognitif berbasis macros lebih baik daripada hasil belajar peserta didik kelas kontrol. Berdasarkan hasil diatas maka model evaluasi ranah kognitif berbasis program macros yang telah diujicobakan telah memenuhi standar kualitas.

Kata Kunci: Model, Alat Evaluasi, Kurikulum

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INTRODUCTION

Curriculum 2013 development is carried out on the basis of few key principles. *First*, competency standards are derived from necessity. *Second*, content standards are derived from competency standards through their free subjects-core competencies. *Third*, all subjects should contribute to the formation of attitudes, skills, and knowledge of learners. *Fourth*, subjects are derived from the competency that needs to be achieved. *Fifth*, all subjects are

bounded by core competencies. *Sixth*, there is conformity of demands graduates, content, learning processes, and assessment. Applications consistent on these principles become essential in realizing the successful implementation of Curriculum 2013.

Based on the curriculum of 2013, the main problem in teaching high school (SMA) students faced by the teachers is the change of students and teachers' mindset in implementing learning activities. The transformation of KTSP into Curriculum 2013 puts emphasize on development of the mindset improvement, reinforcement of curriculum management, deepening and expansion of the material, reinforcement of learning process, and adjustment of learning burden in order to ensure conformity between what is targeted and what is produced. Curriculum development becomes very important in line with the continuity of the progress of science, technology, and arts & culture as well as transformation of society at local, national, regional, and global level in the future. Various advances and changes lead to internal and external challenges in the field of education. Therefore, the implementation of Curriculum 2013 is a strategic step in dealing with globalization and the demands of Indonesian society in the future.

In line with transformation of curriculum 2013, then the learning process is more directed at active learning and teachers will be busy with the escort of the learning process, while conducting authentic assessments, both in the domain of cognitive, affective, and psychomotor. Implementation of the assessment in every learning process at any time or certain period leads to the increase of correction burden for teachers in line with their teaching load consisting of 6 classes, with enrollment of about $6 \times 30 = 180$ students. In one semester there are about 8 subject matters; if any of the materials have three times competency tests, it means that there are $8 \times 3 \times 180$ students = 4.320 students. In addition, teachers must also assess attitudes, performance, project, and portfolio.

Wood, Cobb, and Yackel (in Turmudi, 2008) stated that mathematics should not be regarded as objective knowledge, but rather it has to be seen as an individuals' active construction which is shared and understood by other people. So, in the learning process, there is the necessity of independence (self-regulated) to reconstruct knowledge and E-learning can be an alternative medium of learning to provide solutions to these problems. Based on this point of view, we can develop macros program-based evaluation model of cognitive domain. The program of macros can be made through the system of network / LAN in school laboratory or by preparing a CD / flash disk of evaluation that can be used by any student on a laptop/computer.

METHOD

The method used in this study followed the procedures of R & D developed by Borg and Gall. The population was students of mathematics education at college in Semarang. While the sample is students of sixth semester study program of mathematics education at the University of PGRI Semarang, Walisongo State Islamic University and the Islamic University of Sultan Agung. Data collection techniques used the method of documentation, test, of observation and questionnaire.

RESULTS AND DISCUSSION

The validation of construction of macros-based evaluation model of cognitive domain covers main field testing and operational product revision; i.e. a tryout in class whose main purpose is to test the feasibility of the implementation of the evaluation model (second prototype). Then, the third prototype is tested to the research subjects as a field test. The population in this tryout is the sixth semester students taking high school math courses. The sample was taken through purposive random sampling; namely, the class of mathematics education study program and the students from University of PGRI.



Figure 1. Photo of application of using macros program-based evaluation device

Mastery Learning Outcomes

Mastery learning test by using macros program-based evaluation device used one direction t-test, which is the right side. Hypothesis used are as follows.

$$H_0 : \mu \leq 65$$

$$H_a : \mu > 65$$

Criteria for hypothesis testing I, reject H0 if sig <0.05 (5%)

The calculations were performed using SPSS program and the results can be seen in Table 1 and Table 2

Table 1. One-Sample Statistics

	N	Mean	Std Dev	Std. Error Mean
eksperimen1	28	71.5263	19.50985	3.16492
eksperimen2	28	68.5789	15.19536	2.46501
kontrol	29	66.1026	18.97338	3.03817

Table 2. One-Sample Test

	t	df	Test Value = 65			
			Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
eksperiment1	2.062	27	.046	6.52632	.1136	12.9390
eksperiment2	1.452	27	.155	3.57895	-1.4156	8.5735
kontrol	-1.612	28	.115	-4.89744	-11.0479	1.2530

Based on Table 2, it was obtained that the value of sig. in class experimental 1 who used macros program-based evaluation device is 0.046. The value of Sig. in class experimental 1 was compared to the significant level of 5%. It was obtained that Sig value in class experimental 1 who used macros program-based evaluation device is less than 5%; it means that H₀ is rejected. Thus, the mean of the experimental class 1 who used macros program-based evaluation device is 71.53 and achieved mastery learning, more than 65. For the experimental class 2 who used macros program-based evaluation device, it was obtained that sig value is 0.155. Sig. value of experimental class 2 was compared to the significant level of 5%. It was obtained that Sig value in class experimental 1 who used macros program-based evaluation device is more than 5%; it means that H₀ is accepted, so there is no significant difference. However, based on the table 4.4, the mean of class experimental 2 is 68.58 or more than 65 which is the value of the minimum criteria of mastery learning.

As for the control class, it was obtained that the value of sig is 0,115. The value of Sig. in control class was compared to the value of the significant level of 5%. It was obtained that the value of sig control class was less than 5%; it means that H₀ is accepted, so there is no significant difference. Based on Table 1, the mean of control class is of 66.1026 or more than 65. So, the mean of class control is still above minimum criteria of mastery learning.

Effect of Independence on Learning Outcomes

To analyze the effect of evaluation model on learning outcomes, we can use linear regression and the results are shown in Table 3 below.

Table 3. ANNOVA^b

	Sum of Suares	df	Mean Square	F	Sig.
Between Groups	2673.650	1	1673.650	115.313	.000a
Within Groups	555.125	27	14.609		
Total	3228.775	28			

Predictors: (Constant), activity

From the results above, it was obtained that the value of F = 115.313 and sig = 0,000 = 0%, which means that H₀ is rejected which means linear regression equation. To measure the effect of independence on learning outcomes, we can be see Table 4 below.

Table 4. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.765a	.732	.702	1.827

a. Predictors: (Constant), activity

The amount of independence effect on learning outcomes can be seen from R square value in the table Model Summary which is $0.732 = 73.2\%$. This value indicates that macro-based evaluation device affects learning outcomes by 73.2%.

The Comparison of Learning Outcomes between Class Experiment and Control

By using analysis of variance (ANOVA), it was obtained that analysis of macros-based evaluation device is better than the students who did not use macros-based evaluation device. Hypotheses used are as follows:

$H_0 : \mu_1 = \mu_2 = \mu_3$

$H_a : \text{At least there is an equal sign in equation } H_0.$

Criteria for testing hypotheses II, reject H_0 if sig < 0.05 (5%)

Based on the calculations using SPSS, the output was obtained presented in Table 5.

Table 5. The Results of ANOVA SPSS output

	Sum of Sures	df	Mean Square	F	Sig.
Between Groups	2716.769	2	1358.385	4.190	.022
Within Groups	36306.327	83	324.164		
Total	39023.096	85			

Based on the Table 5, it was obtained that the value of sig is 0.022. The value of Sig was compared to the significant level of 5%. It was obtained that the value of Sig. in the three classes is less than 5% or H_0 rejected. Thus, there is a difference of mean between the learning applied to class experimental 1 subjected to macros-based evaluation model, class experimental 2 subjected to macros-based evaluation model and class control who is not subjected to macros-based evaluation model. Therefore, it was followed by a further test using LSD. Further test results can be seen from SPSS output in Table 6.

Table 6. Results of SPSS Output Post Hoc

(I) Kelas	(J) Kelas	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Eksperimen 1	Eksperimen 2	2.94737	4.13053	.477	-5.2367	11.1315
	Kontrol	11.42375*	4.10396	.006	3.2923	19.5552
Eksperimen 2	Eksperimen 1	-2.94737	4.13053	.477	-11.1315	5.2367
	Kontrol	8.47638*	4.10396	.041	.3449	16.6079
Kontrol	Eksperimen 1	-11.42375*	4.13053	.006	-19.5552	-3.2923
	Eksperimen 2	-8.47638*	4.10396	.041	-16.6079	-.3449

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

Based on the Table 6, it was obtained that the value of Sig. between the class experimental 1 subjected to macros-based evaluation device and class experimental 2 subjected to macros-based evaluation devices is 0.477. The value of Sig. was compared to the significant level of 5%. It was obtained that the value of Sig. between the two classes, namely the class experimental 1 subjected to macros-based evaluation device and class experimental 2 subjected to macros-based evaluation devices is more than 5%; it means that H_0 is accepted. So, there is no difference significant mean between the class experimental 1 subjected to macros-based evaluation device and class experimental 2 subjected to macros-based evaluation devices.

The value of Sig between class experimental 1 subjected to macros-based evaluation device and class control not subjected to macros-based evaluation device is 0.006. The value of Sig. between these two classes compared to the significant level of 5%. The value of Sig. that is obtained for the two classes, namely class experimental 1 subjected to macros-based evaluation device and class controls not subjected to macros-based evaluation device is less than 5% or H_0 is rejected. So, there is a significant different mean between class experimental 1 subjected to macros-based evaluation device and class controls not subjected to macros-based evaluation device.

The value of Sig. between the class experimental 2 subjected to macros-based evaluation device and class controls not subjected macros-based evaluation device is 0.041. The value of Sig. of both classes was compared to the significant level of 5%. The value of Sig obtained for the two classes, namely the experimental class 2 subjected to macros-based evaluation device and class controls not subjected to macros-based evaluation device is less than 5% or H_0 is rejected. So, there is a significant different mean between class experimental 2 subjected to macros-based evaluation device and class control classes not subjected to macros-based evaluation device.

CONCLUSION

Based on the development process of macros-based evaluation model of cognitive domain, it can be concluded that the process and result of development had reached validity in the first year. Then, in the second year, the effective application of macros-based evaluation device has been implemented, which can be seen from (1) The results of students mastery learning, (2) students' independence gives positive effect on learning outcomes, (3) the results of students learning using macros-based evaluation device of cognitive domain is better than the result in the class control students. Based on the above results, it can be concluded that macros-based learning evaluation model of cognitive domain tested has met the quality standards.

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