Journal of English Language and Education
ISSN 2597- 6850 (Online), 2502-4132 (Print)
Journal Homepage: https://jele.or.id/index.php/jele/index

OPEN ACCESS Article

PowerPoint-Based Inquiry Tool Development for Active Learning and Process Skills

https://doi.org/10.31004/jele.v10i5.1251

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A B S T R A C T

This study aims to: (1) produce a valid learning device with a PowerPoint-assisted inquiry approach to improve students' activeness and process skills; and (2) test the effectiveness of the device. This study is development research with a 4D model (Define, Design, Develop, Disseminate), but modified to 3D, only up to the development stage. The results of the study indicate that the developed device is valid and effective. The development achieved classical completeness with a score of 77 and an average of 96%. There is an influence of student activeness on learning completeness of 57.1%, and the influence of process skills of 70%. Simultaneously, activeness and process skills contribute 71% to learning completeness. Learning completeness in the trial class is higher than in the control class, and learning outcomes after learning are higher than before learning, indicating the effectiveness of the PowerPoint-assisted inquiry approach.

Keyword: *Development, Inquiry, Powerpoint, Activeness, Process Skills*

Article History:
Received 17th July 2025
Accepted 20th September 2025
Published 24th September 2025

INTRODUCTION

A teacher's ability to deliver Christian Religious Education (PAK) material significantly impacts the learning process and outcomes of students. PAK and Character Education should not merely transfer knowledge, but serve as a means of developing active, creative, and independent character. In ideal learning, students are trained to construct understanding independently, with the teacher acting as a facilitator who connects real-world phenomena around them with the light of God's Word. However, the reality on the ground shows that PAK lessons are not yet popular among some students because they are considered difficult and unenjoyable.

At SMP Negeri 1 Kairatu, particularly in eighth grade, several obstacles were identified that hampered the effectiveness of Christian Religious Education (PAK) learning. Students were less active because teachers tended to assign notes without providing space for critical thinking. Teachers were unfamiliar with the inquiry learning model, still used outdated worksheets that were not aligned with the curriculum, and had not utilized learning media optimally. This situation indicated the need for updated learning approaches and tools to make Christian Religious Education (PAK) learning more relevant and engaging. To address these issues, teachers needed to improve their classroom management skills and create a pleasant learning environment. Christian Religious Education (PAK) learning must actively engage students so they can explore the material independently. Learning media is an important tool in this process.

Therefore, the learning approach used must be appropriate to the characteristics of the material and students, and supported by comprehensive and contextual teaching tools.

The development of learning tools must include learning objectives, teaching materials, learning activities, methods, media, learning resources, and evaluation. The tools developed can include teacher's books, student books, student worksheets (LKPD), lesson plans (RPP), and evaluation tools. One effective approach to activating students is inquiry-based learning, which is student-centered and encourages collaboration, self-confidence, and critical thinking skills through group activities. PowerPoint is one medium that effectively supports inquiry-based learning. With its visual and interactive features, PowerPoint can present material in an engaging and systematic manner. Research shows that the use of interactive media such as simulations and multimedia can significantly increase student engagement and learning outcomes. Therefore, media integration in learning is a crucial element in creating meaningful learning experiences.

Implementing a PowerPoint-assisted inquiry learning model is a strategic solution to improve the quality of Catholic Religious Education (PAK) learning. Teachers need to be trained in using this model and encouraged to utilize digital learning media. Schools must also provide learning resources aligned with the latest curriculum. With these steps, Catholic Religious Education (PAK) learning can be more enjoyable, relevant, and positively impact students' spiritual and academic development.

METHOD

This research is a type of development research (Research and Development) that uses the 4D model (Four-D Model), but modified into 3D, which consists of the Define, Design, and Develop stages. This research does not include the Disseminate stage, because the development of learning tools is only carried out up to a limited trial. The learning tools developed include: Lesson Implementation Plans (RPP), student books, teacher books, student worksheets (LKPD), PowerPoint-based learning media stored on CD, and instruments in the form of questionnaires to measure student activity and process skills. The explanation of each stage in the 3D model is as follows:

Define Stage. At this stage, an initial analysis is conducted of learning needs, student characteristics, core competencies, and problems encountered in Christian Religious Education learning. Data is obtained through observation, interviews, and documentation studies. The results of the analysis are used to formulate learning objectives and determine the direction of tool development relevant to the context and needs of students.

Design Stage. This stage includes designing the structure of learning tools based on the analysis results from the Define stage. The tools designed include the syllabus, lesson plans, student books, teacher books, student worksheets (LKPD), PowerPoint media, and evaluation instruments. The learning design is structured using an inquiry approach, which emphasizes student activeness in building understanding through exploration and reflection. PowerPoint media is designed to support visual and interactive presentation of material.

Development Phase. At this stage, the designed learning tools are then developed and tested on a limited basis. Validation is carried out by material experts and media experts to ensure the suitability of the content, appearance, and effectiveness of the tools. A limited trial was conducted in class VIII of SMP Negeri 1 Kairatu to assess the impact of the tools on student engagement and process skills. The trial data is analyzed to assess the quality of the tools and provide input for improvement.

FINDINGS AND DISCUSSIONS

Results of Learning Device Development

In this section, the stages in developing PAK learning devices with an inquiry approach assisted by PowerPoint media will be explained to increase the activeness and process skills of students. The implementation of learning with an inquiry approach requires learning tools that are in accordance with the characteristics and principles of inquiry. Therefore, researchers feel the need to develop learning tools with an inquiry approach. The learning tools developed include a syllabus, Lesson Implementation Plan (RPP), Student Books, Student Worksheets (LKPD), and PowerPoint learning CDs. The purpose of the development stage is to produce a draft of the revised learning tools based on input from experts/validators, and data obtained from the trial results. Activities at this stage are expert assessment and limited trials.

Table 1.1. Overall Learning Device Validation Results

No	Device Name	Average Score	Category
1	Lesson Plan	3.56	Very Good and can be used with minor revisions
2	Student Book	3.69	
3	LKPD	3.62	
4	PowerPoint learning media	3.69	
Total Score		**14.56**	
Average Total Score		**3.64**	

The calculation of the validity of descriptive questions using the product moment correlation formula with n questions = 10 and α = 5% obtained the following results. Of the 10 descriptive questions tested, there were 7 questions with sufficient validity and 2 questions with high validity criteria. After all learning tools were validated and deemed suitable for testing, a trial of the learning tools was conducted in the trial classroom. During this trial, data collection included observations of the learning process, observations of student activity, and observations of student skills. At the end of the trial, a learning outcome completion test was conducted in the trial classroom. The complete data from this study can be found in the appendix.

Research data is used to determine the success rate of using the developed tools. The success rate is measured through three statistical tests: (a) Learning outcome completion test, (b) Influence test, and (c) Difference test (comparative test).

Learning Outcome Completion Test

Research data is used to determine the success rate of the developed tools. Success is measured through (1) a learning outcome completion test, (2) an impact test, and (3) a difference test. The results of these three stages can be seen in the following explanation:

Classical Completion Test of Learning Outcomes

The classical completeness test uses a mean difference test with the following statistical hypothesis.

Hypothesis:

Ho : μ = 70, the average completion of the test results is equal to 70

H1 : μ ≠ 70, the average completion rate of the test results is not equal to 70

With the rejection criterion of H0 if the significance value is ≤ 5%

Based on the classical completeness test using SPSS 24.00 (one sample t-test) it can be seen in the table below.

Table 2.1. One Sample Test

	Test Value = 209.8					
	T	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Learning outcomes	4,197	38	.000	8.52632	4.4098	12.6429

The results of the classical mastery test above, with each KKM (test value) listed in the table above, produced an average significant value of less than 5%, namely sig (2-

tailed) = 0.000 = 0.0%. Therefore, H0 is rejected and H1 is accepted. With an average value of 71.5263 as seen in the SPSS output below. This means that the average learning ability of students in the device trial class is more than 70 and achieved completion on the learning outcome test with a KKM of 70. These results can be seen in the table below.

Table. 2. 2. One-Sample Statistics

	N	Mean	Standard Deviation	Std. Error Mean
Learning outcomes	38	171.5263	212.52400	2.03166

Individual Student Completion Test

The individual completeness test used a two-way proportion test with the following hypothesis.

Hypothesis

Ho: μ = 75%, at least 75% of students achieve learning completion

H1 : μ ≠ 75, at least 75% of students do not achieve learning completion

The formula used to calculate individual learning completion is as follows:

$$z = \frac{\frac{x}{n} - \pi_0}{\sqrt{\frac{\pi_0(1 - \pi_0)}{n}}}$$

Information:

$$\bar{x} = \frac{x}{n} = nilai\ rata - rata$$

π0 = hypothesized mean value (KKM)

n = number of samples

The results are then compared with the Z table value using a significance level of α = 5%. H0 is accepted if the calculated z < Z 0.5 – α. The results obtained are that the number of students who completed the KKM of 70 was 29 out of 38 students with a hypothesized proportion value (π) = 75% = 0.75. The proportion calculation is as follows:

$$z = \frac{\frac{x}{n} - \pi_0}{\sqrt{\frac{\pi_0(1 - \pi_0)}{n}}}$$

$$z = \frac{\frac{29}{38} - 0{,}75}{\sqrt{\frac{0{,}75\ (1 - 0{,}75)}{38}}}$$

$$= 0.187$$

Using a significance level of 5%, Ztable = 1.685 is obtained, meaning H0 is accepted if -1.685 < Zcount < 1.685. Because the Zcount value is obtained = 0.187, H0 is accepted, meaning the proportion of individual student learning completion is 75%.

Student Activity Completion Test

The test of the completeness of the student activity variable used a mean difference test with the following statistical hypothesis:

Hypothesis

Ho: μ = 70, the average completion of student activity is equal to 70

H1 : μ ≠ 70, the average completion of student activity is not equal to 70

In this study, observation data on student activity was obtained, which can be seen in the appendix. From this data, a classical completion analysis was conducted using the One Sample Test.

The results obtained are as can be seen in Table 5.4 below.

Table 2.3. One Sample Test

Test Value = 209.8

	t	f	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Activity	2,860	38	.007	3.05263	.8899	5.2154

Since the sig value is 0.007 = 0.7% (below 5%), H0 is rejected. This means that the average completion value of the student activity variable (μ) ≠ 70. Furthermore, to find out that the average completion value of the student activity variable is more than 70, it can be seen in table 5.5.

Table. 2. 4. One-Sample Statistics

	N	Mean	Standard Deviation	Std. Error Mean
Activity	38	73.0526	6.57985	1.06739

Because the average value (mean) is 73.0526, the average value of the student activity variable completion is more than 70.

Student Process Skills Completion Test

To test the completeness of the Student Process Skills variable, a two-way average test was used with the following statistical hypothesis:

Hypothesis

Ho: μ = 70, the average completion of students' process skills is equal to 70

H1: μ ≠ 70, the average completion of students' process skills is not equal to 70

In this study, observational data on students' process skills were obtained, which can be seen in the appendix. From this data, a classical mastery analysis was then conducted using the One Sample Test, and the results are as shown in Table 2.5 below.

Table 2.5. One Sample Test

Test Value = 70

	t	f	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Process Skills	3,271	38	,002	2.78947	1.0617	4.5172

Since the sig value is 0.002 = 0.2% (below 5%), H0 is rejected. This means that the average completion value of the student process skill variable (μ) ≠ 70. Furthermore, to find out that the average completion value of the student process skill variable is more than 70, it can be seen in table 2.6.

Table. 2. 6. One-Sample Statistics

	N	Mean	Standard Deviation	Std. Error Mean
Process skills	38	72.7895	5.25644	85271

Because the average value (mean) is 72.7895, the average value of the students' process skills variable completion is more than 70.

Influence Test

For this influence test, multiple regression and linear regression tests were used. The multiple regression test has the following hypotheses:

Ho: β = 0, where there is no influence of student activity (X1) and student skills (X2) on learning completion. $\beta = \frac{b}{c}$

H1 : β ≠ 0, where there is an influence of student activity (X1) and student skills (X2) on learning completion $\beta = \frac{b}{c}$

In this study, the independent variables are student activity (X1) and skills (X2), while the dependent variable is learning completion. Data on activity and process skills were taken from observations recorded in the student activity observation sheet and the student process skills observation sheet. Meanwhile, learning completion data was taken through learning outcome tests conducted at the beginning and end of the meeting. Data

on the results of observations of student activity and process skills can be seen in the appendix.

The Influence of Student Activity on Learning Completion

To test the effect of student activity on student learning achievement, a simple regression test was used. The regression equations can be seen in the tables below:

Table 2.7.Coefficientsa

Model		Unstandardized Coefficients		Standardized Coefficients	Tt	SSig.
		B	Std. Error	Beta		
1	(Constant)	33,586	15,230		2,205	.034
	Activity (X1)	1,439	.208	.756	.6.929	000

a. Dependent Variable: Learning completion (Y)

From the SPSS output results above, the regression equation is Y = 33,586 + 1,439 X1. This equation describes the following scatterplot:

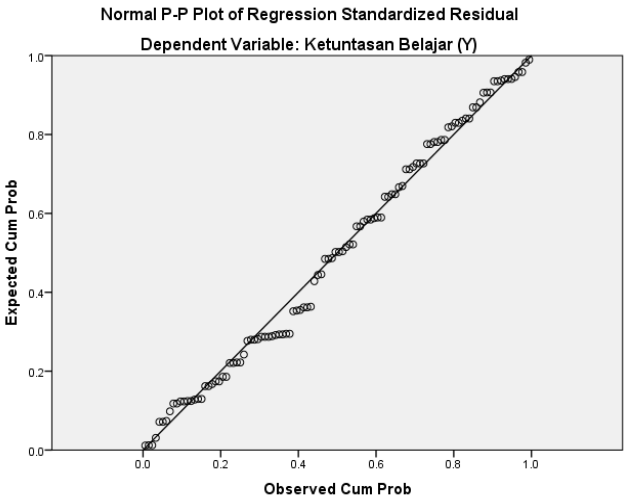

Figure 2.1. Simple Linear Regression Graph of the Effect of Student Activity on Learning Completion

The hypothesis used is as follows:

Hypothesis

H0: b = 0, there is no influence of activity on learning completion

H1: b ≠ 0, there is an influence of activity on learning completion

To analyze the influence of student activity on student learning completion, linear regression was used and the results obtained can be seen in the following table:

Table 2.8 ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	4275.180	2	2137,590	76,899	.000a
	Residual	2974.311	107	27,797		
	Total	7249.491	109			

a. Predictors: (Constant), activity (X1)

b. Dependent Variable: learning completion (Y)

From the data processing results above, the sign obtained = 0.000 = 0%, which means H0 is rejected, meaning the linear regression equation. To measure the magnitude of the influence of activeness on student learning completion, it can be seen in the table below:

Table 2.9. Model Summary

Model	R	R Square	Adjusted R Square	Standard Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig.F Change
1	.756a	.571	.560	8.31149	.467	94,814	1	108	.000

Predictors: (Constant), Activity (X1)

Dependent Variable: Learning outcomes (Y)

Based on table 2.9 above, it shows that the R square value = 0.571, which means that 57.1% of students' learning completion is influenced by student activity factors and 42.9% is influenced by other factors.

The Influence of Students' Process Skills on Learning Completion

To test the influence of student skills on learning completion, a simple regression test was used. This can be seen in the table below:

Table 2.10.Coefficientsa

Model		Unstandardized Coefficients		Standardized Coefficients	Tt	SSig.
		B	Std. Error	Beta		
1	(Constant)	73,186	15,975		4,580	.000
	Process skills (X2)	1,988	.219	.834	9,080	000

a. Dependent Variable: Learning completion (Y)

From the SPSS output results above, the regression equation is Y = 73.186 + 1.988 X2. This equation describes the following scatterplot:

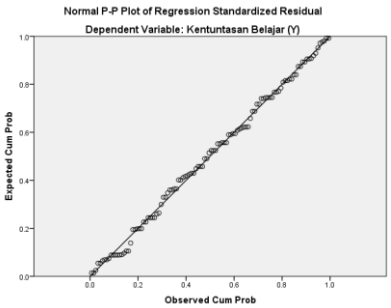

Figure 2.2. Simple Linear Regression Graph of the Influence of Student Process Skills on Learning Completion

The hypothesis used is as follows:

Hypothesis

H0: b = 0, there is no influence of process skills on learning completion

H1: b ≠ 0, there is an influence of process skills on learning completion

To analyze the influence of student activity on student learning completion, linear regression was used and the results obtained can be seen in the following table:

Table 2.11. ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4039.730	1	4039.730	82,455	.000a
	Residual	1763,744	36	48,993		
	Total	5803.474	37			

a. Predictors: (Constant), Process skills (X2)

b. Dependent Variable: learning completion (Y)

From the data processing results above, the sign obtained is = 0.000 = 0%, which means H0 is rejected, meaning the linear regression equation. To measure the magnitude of the influence of process skills on student learning completion, it can be seen in the table below:

Table 2.12.Model Summary

Model	R	R Square	Adjusted R Square	Standard Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig.F Change
1	.834a	.696	688	6.99949	.467	94,814	1	108	.000

a. Predictors: (Constant), Activity (X1)

b. Dependent Variable: Learning outcomes (Y)

Based on table 2.12 above, it shows that the R square value = 0.686, which means that 69.6% of students' learning completion is influenced by student activity factors and 30.1% is influenced by other factors.

The joint influence of student activity and process skills on learning completion

To test the effect of activeness and process skills simultaneously on student learning outcomes, a multiple regression test was used. The regression equation can be seen in the table below:

Table 2.13. Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	Tt	SSig.
		B	Std. Error	Beta		
1	(Constant)	72,421	15,799		4,584	.000
	Activity (X1)	.413	.303	.217	1,361	.182
	Process skills (X2)	1,563	.380	.656	4,119	000

a. Dependent Variable: Learning completion (Y)

From the SPSS output results, the multiple regression equation is Y = 72.421 + 0.413X1 + 1563X2, this shows that the influence of students' process skills on learning completeness is greater than students' activity.

The hypothesis used is as follows:

$H0 : \beta = 0$ *with* $\beta = =$ *there is no influence of variables X1 and X2 on* $Y\binom{b}{c}$

$H1 : \beta \neq 0$ *with* $\beta = =$ *there is no influence of variables X1 and X2 on* $Y\binom{b}{c}$

To test the hypothesis of activeness and process skills together with regard to learning completeness, an ANOVA table is used, as seen in the following table:

Table 2.14. ANOVA

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4128.433	2	2064.216	43,132	.000a
	Residual	1675,041	35	47,858		
	Total	5803.474	37			

a. Predictors: (Constant), Process skills (X2), Activeness (X1)

b. Dependent Variable: Learning outcomes (Y)

From the data processing results obtained sig = 0.000 = 0% which means H0 is rejected, meaning the linear regression equation. To determine the effect of activeness and process skills on learning completeness can be seen in the table below:

Meanwhile, to see how big the influence of Activeness and Process Skills is on learning outcomes, see the Model Summary table below:

Table 2.15.Model Summary

Model	R	R Square	Adjusted R Square	Standard Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig.F Change
1	.843a	.711	695	6.91797	.469	82,813	1	108	.000

a. Predictors: (Constant), Activity (X1)

b. Dependent Variable: Learning outcomes (Y)

The SPSS output results above produce R Square = 0.711, which means that 71.1% of student learning achievement is jointly influenced by student activity and skill factors, and 28.9% is influenced by other factors.

Comparative Test of Learning Completion

The comparative test was conducted to determine the learning completion of students in participating in PAK and Budi Pekerti learning with the Inquiry approach before and after learning and to compare the device trial class with the Control class.

Comparison test of the device trial class with the control class

The comparative test here is intended to compare the mean of a variable between samples from the device trial class and samples from the control class. The data used in the device trial class are the post-test scores at the end of the lesson. To test for equality of variance, the following hypothesis is used:

Ho: , there is no difference in variance between the device trial class and the control class (both classes are homogeneous) $\sigma_1^2 = \sigma_2^2$

Ho: , there is no difference in variance between the device trial class and the control class (both classes are homogeneous) $\sigma_1^2 \neq \sigma_2^2$

In this study, the comparative test data analysis used the Independent Sample Test and the results obtained can be seen in the following table:

Table 2.16. Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Standard Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Completeness	Equal variances assumed	.671	.415	.842	108	.000	12.4977	1.9791	2,804	11,132
	Equal variances			.311	108	.000	12.4977	1.9688	2,050	12,813

For equal variance, the Equal Variance Assumed column is selected, and the sig is 0.000 or 0% (less than 5%). This means H0 is rejected. This means that the two samples have different average completeness values. To determine which class has the higher average value, Group Statistics analysis is used, as shown in the following table.

Table 2.17. Group Statistics

	Group	N	Mean	Standard Deviation	Std. Error Mean
Completeness	1	38	129.33	6,316	.717
	2	36	128.16	5,095	.687

Based on table 2.17 above, it shows that the average completion value of the device trial class (Class 1) is higher than the average completion value of the control class (Class 2).

Comparison test of trial class devices before and after learning

The comparative test here is intended to compare the average of a sample variable from the device trial class before and after learning with an inquiry approach assisted by learning media with the PowerPoint application. The assessment of learning completion is based on the Minimum Competency (KKM) standards for Christian Religion and Character Education. The value data used in the device trial class is the value data before and after learning with the highest and lowest scores. This data can be seen in the following table:

Table 5.19. Summary of Learning Completion Scores Before and After Learning with the Inquiry Approach Assisted by PowerPoint Media

Pert	**Minimum Completion Criteria**	**Before Learning**		**After Learning**		**Increase (%)**
		Average Score Obtained	%	**Average Score Obtained**	%	
1	77	56	72	74	96	24
2	77	72	93	77	100	7
3	77	77	100	85	110	10

Table 5.19 above shows the scores obtained according to the minimum completion criteria before and after learning with the inquiry approach assisted by PowerPoint media. The increase column describes the increase in scores before and after learning in percentage (%). The highest increase in fulfillment of KKM occurred at the 3rd meeting at 85 (110%), while the lowest increase was at the 1st meeting at 74 (96%). The lowest score before the 1st meeting (learning) was 56 (72%) and the highest score before the 3rd meeting (learning) was 77 (100%).

Discussion

This study shows that the development of Christian Religious Education (PAK) learning tools based on an inquiry approach with the aid of PowerPoint media is proven valid and effective in improving student activity and process skills. All lesson plans, student books, student worksheets, and PowerPoint media received an average score of

3.64 from expert validation results, indicating excellent quality and are suitable for use with minimal revision.Besides thatThe results of statistical tests show that: (1) Classical learning completion reached 96%, and individual completion was 77%, (2) The average learning outcomes of students exceeded the KKM (≥70), both classically and individually, (3) There was a significant increase in learning outcomes after learning compared to before learning.

On the other handThe influence of variables shows that (1) Student activity contributes 57.1% to learning completion, (2) Process skills contribute a greater influence, namely 70%, (3) Simultaneously, both variables contribute 71%, indicating strong synergy in supporting learning outcomes. Meanwhile, the Class comparison shows that the trial class shows higher learning outcomes than the control class, strengthening evidence that the developed device has a positive impact on learning. The PowerPoint-assisted inquiry approach not only increases student active participation, but also strengthens critical and exploratory thinking skills. These results support the importance of contextual and interactive media-based teaching device innovation in transformative religious education.

CONCLUSION

This research successfully developed a learning tool for PAK and Budi Pekerti based on an inquiry approach with PowerPoint media through a 3D model (modified from 4-D). The tools, which included lesson plans, student books, student worksheets, learning outcome tests, and PowerPoint media, were declared valid in terms of content and construct by experts. The trial showed that learning with this approach effectively increased student activity and process skills, which had a direct impact on the completion of learning outcomes, both individually (77%) and classically (96%). Data analysis revealed that (1) Activeness contributed 57.1% to learning completion, (2) Process skills contributed higher, namely 70%, (3) Simultaneously, both had an influence of 71%, with skills as the dominant factor. Learning completion in the trial class was higher than in the control class, and learning outcomes after learning increased significantly compared to before. Thus, the implementation of learning was declared effective.

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