

The Influence of Problem-Based Learning (PBL) and Mind Mapping (MM) Models on English Learning Outcomes

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Abstract : The research aimed to determine whether problem-based learning and mind-mapping models could improve student learning outcomes for class VII.8 at SMPN 1 Srono. Variable X1 (problem-based learning) 5 indicators: 1). Problem orientation, 2) organizing, 3) guiding investigations 4) developing, 5) analyzing and evaluating. X2 (Model mind-mapping) 7 indicators: 1) planning, 2) communication skills, 3) creative, 4) solving problems, 5) focusing attention, compiling, explaining thoughts, 6) remembering, 7) practicing drawing. Variable Y (learning outcomes) 3 indicators: 1) skills, 2) knowledge, 3) attitudes. Causal quantitative research design. The method of determining the purposive sampling area. Population research technique population research. Data collection techniques: 1). observation, 2). interview, 3). document, 4) questionnaire, 5). test. Data analysis 1) instrument-test, 2) classic assumption test, 3) hypothesis test. The results of the t-test for the effect of problem-based learning on learning outcomes ($1.947 > 0.684$), the t-test for the effect of mind-mapping models on learning outcomes ($1.769 > 0.684$), the results of the F test for the effect of problem-based learning and mind-mapping models together on learning outcomes ($2.077 > 2.95$). So it can be concluded that problem-based learning and mind-mapping models jointly affect learning outcomes and H_0 is rejected.

Keywords: problem-based learning, mind-mapping models, learning outcomes

Introduction

The learning activities must emphasize the process and quality of learning within the classroom to achieve optimal learning outcomes as expected by the government and the international community¹. Teaching and learning activities and the grading or evaluation system are integral to the holistic learning process. The essence of the teaching and learning process fundamentally involves not only the act of teaching in a technical sense, but also an interactive,

¹ Michael Sailer, Florian Schultz-Pernice, and Frank Fischer, "Contextual Facilitators for Learning Activities Involving Technology in Higher Education: The Cb-Model," *Computers in Human Behavior* (2021); Maya R. Kalogirou et al., "Using an E-Learning Activity to Enhance Student Nurses' Understanding of Cognitive Impairment," *Nurse Education Today* (2022).

two-way communication, as humans inherently grow and develop through their relationships with others. Students' learning activities encompass all subjects, including English².

Language plays a central role in intellectual, social, and emotional development³. English serves as the medium of instruction in all levels of education, from primary to tertiary education. English language learning in middle school (SMP), high school (SMA), and Islamic high school (MA) is oriented towards enhancing students' ability to communicate effectively in both spoken and written English, while also cultivating an appreciation for Indonesian human achievements. English is a subject in the Indonesian education curriculum, offered at every educational level, including higher education⁴.

English language learning activities are facilitated by teachers. Learning can take place within the classroom or beyond, encompassing introductory, core, and concluding activities. Throughout the learning process, teachers ascertain students' learning outcomes. Students' learning outcomes can be understood as achievements attained through learning activities. These outcomes are inseparable from the learning process students engage in, as learning is a process, whereas achievement is the result of the teaching and learning process. Learning outcomes reflect the level of success in comprehending school subjects, quantified through scores obtained from assessments⁵.

Hamalik⁶ states, "Learning outcomes are patterns of behavior, values, understandings, attitudes, perception, and abilities." Learning outcomes denote tangible changes in students' behavior following a teaching and learning process aligned with instructional objectives. To gauge achieved learning outcomes, evaluation serves as a measuring tool. As per Sudjana (Dimiyati and Mudjiono, 2013:191), "Evaluation, in general terms, is a systematic process to determine the value of something (objectives, activities, decisions, performance, processes, individuals, objects, etc.) based on specific criteria through assessment."

Based on the researcher's observations of English language learning in seventh-grade classrooms during the 2022-2023 academic year, students' achievements have yet to reach their full potential. In the report on the observation results, many seventh-grade students received scores below the Minimum Competency Criteria (KKM). The implementation of the Problem-Based Learning model in English language instruction is anticipated to enhance students'

² Niroj Dahal et al., "ENHANCING STUDENT-TEACHERS ASSESSMENT SKILLS: A SELF-AND PEER-ASSESSMENT TOOL IN HIGHER EDUCATION," *International Journal of Education and Practice* (2022); Emiliano del Gobbo et al., "Automatic Evaluation of Open-Ended Questions for Online Learning. A Systematic Mapping," *Studies in Educational Evaluation*, 2023; Li Ruan, "Language Teaching from the View of Formative Assessment," *Theory and Practice in Language Studies* (2015).

³ Nyoman Suastika Suastika, "PROBLEMATIKA PEMBELAJARAN MEMBACA DAN MENULIS PERMULAAN DI SEKOLAH DASAR," *Adi Widya: Jurnal Pendidikan Dasar* (2019); Nyoman Suastika, "Problematika Pembelajaran Membaca Dan Menulis," *Jurnal Pendidikan Dasar* (2019).

⁴ Fauzatul Ma'rufah Rohmanurmeta and Candra Dewi, "Developing Digital Comics as Character Learning Media for Elementary School Students," *Jurnal Ilmu Pendidikan* (2020); Muh Barid Nizaruddin Wajdi, "Arabic Learning Skill," *AT-Tabdzjib: Jurnal Studi Islam dan Muamalah* 3, no. 2 (2016): 32-47.

⁵ Sri Ramadhani and Tengku Winona Emelia, "Pengaruh Model Pembelajaran Penemuan (Discovery Learning) Terhadap Kemampuan Menemukan Kalimat Perintah Dalam Teks Eksplanasi Oleh Siswa Kelas VIII SMP Gajah Mada Medan Tahun Pembelajaran 2020-2021," *Babterasia: Jurnal Ilmiah Pendidikan Bahasa dan Sastra Indonesia* 2, no. 1 (2021).

⁶ Oemar Hamalik, "Dasar-Dasar Pengembangan Kurikulum," *Bandung: PT. Remaja Rosdakarya* (2007).

potential and abilities, thereby manifesting learning outcomes. The learning outcomes related to skills and actions are called the psychomotor domain. According to Jihad and Haris ⁷, the psychomotor domain concerns the learning outcomes of skills and actions. There are five psychomotor domain levels: imitation, manipulation, precision, articulation, and naturalization. Considering the potential of both teaching models, the researcher is inclined to apply them in the instructional process. The hope is that through this implementation, the potential of each model will be revealed, providing educational practitioners/teachers with alternative references beyond conventional models.

Method

The type of research employed in this study is quantitative research. The research area was determined using the purposive sampling area technique, which is a method of selecting sample data sources based on specific considerations (Sugiono, 2015). In this research, the subjects or respondents are seventh-grade students. The data collection methods utilized by the author in this study are Observation, Interview, Questionnaire, Documentation, and Test.

In addition to data analysis, the researcher must also delve into literature to confirm theories. The analysis conducted in this research is as follows:

1. **Testing Assessment Instruments** a) **Validity Test:** The validity test determines if the instruments used are valid. This means that the instruments can measure what they are intended to measure. The instrument's results are valid if the collected data closely corresponds to actual occurrences in the researched subjects. A questionnaire is considered valid if the computed correlation coefficient (R) is greater than the critical value of R (Sugiyono, 2008:248). The instrument testing was conducted with a sample size of 31 individuals, ensuring that the questionnaire's questions had a reliable level of validity due to the chosen high critical R value.

The calculated R value is compared with the critical R value (R table), where the calculation of the R table involves determining the degrees of freedom ($df = n-2$) with a significance level of 5% and a confidence level of 98%, using a one-tailed test. Validity tests were conducted for each research variable. The formula to measure the variable is as follows:

$$r_{xy} = \frac{N\sum xy - (\sum x)(\sum y)}{\sqrt{(N\sum x^2 - (\sum x)^2)(N\sum y^2 - (\sum y)^2)}}$$

Notation:

- r : Pearson correlation coefficient of validity
- x : Respondents' scores for each question
- y : Respondents' scores for all questions
- n : Number of respondents

⁷ Abdul Haris and Asep Jihad, "Evaluasi Pembelajaran: Yogyakarta: Multi Pressindo," *Achmad Rifa'I dan Chatarina Tri Anni. 2009, Psikol* (2013).

Result and Discussion

Table 1. Table of Data from Reliability Testing of the Problem-Based Learning Questionnaire, Variable X1)

Reliability Statistics

Cronbach's Alpha	N of Items
0,999	20

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
V1	113,33	60864,033	0,999	0,999
V2	114,48	62095,162	0,999	0,999
V3	114,29	61888,614	0,999	0,999
V4	111,90	59337,990	1,000	0,999
V5	113,71	61272,414	1,000	0,999
V6	113,81	61375,062	1,000	0,999
V7	112,95	60452,348	0,999	0,999
V8	113,81	61375,062	1,000	0,999
V9	113,81	61375,062	1,000	0,999
V10	113,33	60860,333	0,998	0,999
V11	113,81	61375,062	1,000	0,999
V12	113,81	61375,062	1,000	0,999
V13	113,81	61375,062	1,000	0,999
V14	112,38	59842,948	1,000	0,999
V15	113,33	60864,033	0,999	0,999
V16	114,19	61785,462	1,000	0,999
V17	114,38	61993,848	0,999	0,999
V18	113,90	61477,590	1,000	0,999
V19	112,38	59842,948	1,000	0,999
V20	113,52	61067,862	0,999	0,999

Table 2. Results of Reliability Testing for the Mind-Mapping Questionnaire, Variable (X2)

Reliability Statistic

Cronbach's Alpha	N of Items
0,999	20

Table 3. Results of Reliability Testing for the Learning Outcome Questionnaire, Variable (Y)

Reliability Statistic

Cronbach's Alpha	N of Items
0,998	10

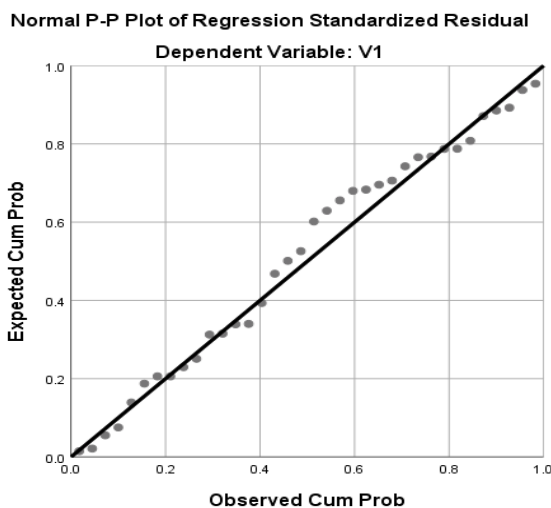


Figure 1. Normal P-P Normal Probability Plot

In Figure P-Plot 4.1, the distribution of points follows the diagonal line, indicating that the regression model adheres to the assumption of normality..

Homogeneity Test

Table 2. Homogeneity Test Results

Group	Data	Levene's Statistic	Sig	Description	Conclusion
Problem-Based Learning Model and Science Process Skills and Critical Thinking Skills		1.277	0,296	Sig>0,05	Homogen

In the table above, the homogeneity test indicates a significance value of 0.296, which means that $0.296 > 0.05$, thus the data can be considered homogenous. Since the significance level obtained from the homogeneity test is ≥ 0.05 , it can be concluded that the data has equal/varied variances (homogeneous).

Autocorrelation Test

Table 3. Results Table of Autocorrelation Test for Model Summary

Model Summary ^b					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.148 ^a	.022	-.038	2.471	2.675
a. Predictors: (Constant), V3, V2					
b. Dependent Variable: V1					

Using the Durbin-Watson test, the Autocorrelation Test results yielded a DW value of 2.675. Based on the Durbin-Watson value obtained, $2.675 > 1.6505$, which indicates that the regression model is free from autocorrelation issues.

Heteroskedasticity Test

The Heteroskedasticity Test examines whether there is uniform or non-uniform variance between observations in a regression model. Heteroskedasticity testing is conducted using a scatterplot.

Hypothesis Testing:

Table 4. Linear Regression of the Impact of Problem-Based Learning (X1) on Learning Outcomes (Y)

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	46.225	7.057		6.550	.000
	X1	.186	.105	.307	1.769	.001
a. Dependent Variable: Y						

Table 5. Linear Regression of the Impact of Mind-Mapping (X2) on Learning Outcomes (Y)

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	40.952	3.706		11.051	.000
	X2	.121	.062	.335	1.947	.001
a. Dependent Variable: Y						

Table 6. Results Table of F-Test

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.266	2	3.633	2.077	.000 ^b
	Residual	50.734	29	1.749		
	Total	58.000	31			
a. Dependent Variable: Y						
b. Predictors: (Constant), X2, X1						
Normality Test						

Based on the above data analysis and hypothesis testing, evidence is provided for the hypotheses presented in Chapter II. The obtained data indicates that H0 is rejected, and H1 is accepted, signifying an influence of the use of problem-based learning and mind-mapping on learning outcomes. Regarding the impact of problem-based learning on learning outcomes, the hypothesis testing demonstrates a significant result. The regression equation illustrates the relationship between the problem-based learning and learning outcomes variables. The significance value is less than 0.05 (sig 0.01 < 0.05), and the t-value is greater than the t-table value (1.769 > 0.684). Thus, the variable Y has a significant partial influence on X1.

Similarly, the regression equation indicates a relationship between the mind-mapping and learning outcomes variables. The significance value is less than 0.05 (sig 0.01 < 0.05), and the t-value is greater than the t-table value (1.947 > 0.684). Consequently, the variable X has a significant partial influence on Y2.

Based on the data presented in the tables above, it can be concluded that the significance level is 0.000, which is smaller than 0.05, and the computed F-value is greater than the F-table value (2.077 > 2.95). Following Mulyono's (2018:113) guidelines, H0 can be rejected, leading to the conclusion that independent variables significantly influence the dependent variable. This means that there is a combined impact of problem-based learning (variable X1) and mind-mapping (variable X2) on the learning outcomes (variable Y) of English for the seventh-grade students at SMPN 1 SRONO Banyuwangi in the even semester of the academic year 2022-2023.

Conclusion

There is an influence of the Problem-Based Learning (PBL) Model on English Learning Outcomes, an influence of the Mind Mapping (MM) Model on English Learning Outcomes, and a combined influence of the Problem-Based Learning (PBL) Model and the Mind Mapping (MM) Model on English Learning Outcomes.

It is hoped that I can apply and further develop the knowledge and insights gained during my graduate studies in the Faculty of Education's Instructional Technology program at PGRI Argopuro University (UNIPAR) Jember. It is also hoped that these findings can be valuable for teachers as a contribution of thoughts and inputs in their efforts to enhance more effective teaching and learning methods.

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