Journal of General Education and Humanities
Vol. 4, No. 4, November 2025, pp. 1589 – 1602, https://doi.org/10.58421/gehu.v4i4.710
ISSN 2963-7147

The Effect of Pair Check Learning on The Learning Outcomes of Grade X Students of State Vocational School 1 Panai Hulu

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Article Info

Article history:

Received 2025-08-14
Revised 2025-09-17
Accepted 2025-09-19

Keywords:

History
Learning Outcomes
Phair Check Learning

ABSTRACT

Students' academic performance at SMK N 1 Panai Hulu has not consistently met the expected minimum standards. A major contributing factor is the limited variety of teaching methods teachers use, which has resulted in low student engagement and passive learning. While previous studies have shown that cooperative learning models can improve student outcomes, many have not specifically examined their application in history learning within vocational school contexts. This study addresses that gap by applying the Pair Check learning model, which encourages students to take a more active role through independent and collaborative learning. A quantitative approach with a quasi-experimental design was employed. The population consisted of all tenth-grade students, and a sample of 70 students was selected, comprising 35 in Class A and 35 in Class B. Data were collected through pretests and posttests administered before and after the intervention, then analyzed using SPSS version 26. The results revealed a clear improvement in the experimental group: the average score increased from 69.71 (pretest) to 78.03 (posttest), surpassing the school's minimum criteria. In comparison, the control group improved only from 69.34 to 72.29. An independent samples t-test confirmed this difference was statistically significant (sig. 2-tailed = 0.000 < 0.05). These findings demonstrate that the Pair Check model positively impacts student achievement in history learning. Beyond this context, Pair Check can be integrated into other subjects to foster active participation, peer accountability, and deeper understanding, offering teachers a practical alternative to conventional, teacher-centered methods.

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1. INTRODUCTION

Education is a cornerstone for a nation's progress, shaping individual futures and the broader societal fabric. Individuals acquire the knowledge and skills necessary to engage with and contribute to their communities and the world through education. Education

https://doi.org/10.58421/gehu.v4i4.710

facilitates personal growth, cultivates critical thinking, and nurtures moral values essential for harmonious coexistence within a nation. It is widely acknowledged that secondary education is vital in enhancing these outcomes, serving as a key phase where students refine their knowledge and develop the skills necessary for personal fulfillment and societal contribution [1].

Within the realm of secondary education in Indonesia, Social Studies (IPS) holds a unique place as it integrates concepts from various social science disciplines, such as history, geography, sociology, and economics, to promote understanding of societal structures and human interactions [2], [3]. Unlike other academic subjects focusing on one specific field, Social Studies fosters interdisciplinary thinking, encouraging students to apply knowledge from diverse domains to comprehend social phenomena better. Focusing on these interconnected fields, Social Studies aims to create citizens who understand their historical and cultural contexts and actively contribute to national development and social cohesion.

In line with this educational vision, Law Number 20 of 2003 concerning the National Education System outlines the importance of education as a well-structured, intentional, and dynamic process. This law emphasizes the need for an educational environment where students actively engage in learning, intending to foster intellectual development and moral values, such as integrity, ethics, and responsibility. Education, as defined by the law, must focus on developing the full potential of the student, preparing them not just for academic success but for their roles as contributing members of the nation [2], [3], [4].

Despite these high aspirations, significant challenges remain in achieving desired educational outcomes, particularly in specific subjects like Indonesian history within the Social Studies curriculum at the vocational high school level (SMK). At SMK Negeri 1 Panai Hulu, a notable trend has emerged: students consistently struggle to meet the Minimum Competency Criteria (KKM) set by the school, with a large portion failing to achieve the benchmark score of 65. This indicates a broader issue within the classroom: low student achievement, particularly in subjects that require complex cognitive engagement, such as history.

The root causes of these low achievement levels are multifaceted. One of the most significant factors is the lack of diversity in teaching methods. Traditionally, Indonesian History lessons at SMK Negeri 1 Panai Hulu have relied heavily on lectures and rote memorization, which are not conducive to deep learning or student engagement. As an abstract and often complex subject, history requires methods that allow students to connect the content to their lives and the contemporary world. However, in the absence of such approaches, students often find it difficult to understand the relevance of historical events or to see how the material applies beyond the classroom [5], [6], [7].

Furthermore, the limited opportunities for collaborative learning and peer interaction exacerbate this issue. The absence of discussion, problem-solving, and critical thinking activities in the classroom means that students miss out on the benefits of interactive learning. When students do not have the chance to engage with the material or with one another actively, they are less likely to retain and apply what they have learned [8], [9], [10].

Given these challenges, there is a pressing need to explore and implement alternative teaching strategies to better engage students and improve learning outcomes. One such

method is the Pair Check learning strategy, which has shown promising results in various educational contexts. The Pair Check method involves students working in pairs to review and critique each other's work. This process helps reinforce the content by encouraging more profound understanding and fosters peer collaboration, where students can learn from one another. By actively engaging with the material and discussing their ideas, students are more likely to retain the information and develop critical thinking skills [11], [12], [13].

According to research by Windi Maiendra [14], the Pair Check method has been shown to enhance student understanding significantly, as students are required to engage deeply with the content to critique their partner's work. This method transforms passive learning into an active, collaborative process, providing a more interactive and stimulating learning environment. It encourages students to seek out information, solve problems, and refine their understanding in real-world applications [6], [15].

Furthermore, studies by Hanifah Awwalina et al. [16] support the efficacy of Pair Check in improving students' academic performance. Awwalina et al. [16] found that Pair Check significantly improved students' critical thinking abilities. These findings suggest that the method improves knowledge acquisition and enhances higher-order thinking skills, essential for success in subjects like history.

Despite these positive findings, there remains a gap in the literature regarding applying Pair Check to Indonesian History education, particularly in vocational high schools (SMK). Most studies on the method have focused on general education contexts or specific subjects such as Islamic Education. However, there is limited research exploring the impact of Pair Check on history learning outcomes, especially in vocational schools, where students face distinct challenges in engaging with the material [17], [18].

Thus, the main focus of this research is to examine the impact of the Pair Check method on student learning outcomes in Indonesian History at SMK Negeri 1 Panai Hulu. Specifically, this study aims to assess whether implementing Pair Check can improve students' academic performance and their ability to connect historical concepts with real-world applications. The research will also investigate whether this approach fosters greater student engagement and enhances critical thinking skills in the context of historical learning.

Research Problem

The primary research problem addressed in this study is the low student achievement in Indonesian History at SMK Negeri 1 Panai Hulu. This issue is compounded by the lack of varied teaching methods and student engagement, which hinders the students' ability to understand and retain complex historical concepts. The study explores whether the Pair Check method can effectively solve these challenges.

To evaluate the effect of the Pair Check learning method on students' learning outcomes in Indonesian history. To determine whether the Pair Check method increases student engagement and critical thinking in the context of historical content. This research is grounded in constructivist learning theory, which posits that learners construct knowledge actively through interaction with their environment and peers. The Pair Check method is aligned with this theory, encouraging students to engage actively with the content and collaborate to refine their understanding. By working in pairs, students can help each other

comprehend the material and develop essential skills in problem-solving, critical thinking, and communication.

This study is significant because it addresses a critical gap in the current educational practices at SMK Negeri 1 Panai Hulu. By exploring the effectiveness of the Pair Check method in enhancing Indonesian History learning outcomes, the research aims to offer practical solutions to improve student achievement and engagement. The findings may also provide valuable insights for educators seeking to adopt more interactive and student-centered approaches in vocational education, thereby contributing to the broader discourse on improving teaching and learning in Indonesia.

2. METHOD

This study adopts a quantitative methodology with an experimental design, specifically a quasi-experimental approach. The rationale for using a quasi-experimental design stems from the practical constraints inherent in the educational setting. In a typical randomized controlled experiment, participants are randomly assigned to experimental and control groups, allowing researchers to control for external variables. However, in this study, random assignment of students to groups was not feasible due to the nature of the classroom setting, where the school already forms classes. Instead, two pre-existing groups were utilized: one group received the Pair Check learning method (experimental group), and the other continued with traditional teaching methods (control group) [19], [20].

The quasi-experimental design is particularly suited for educational research like this, where controlling for all extraneous variables is not always possible. Using this design, the study aims to investigate the effect of the Pair Check method while acknowledging the practical constraints of working with existing classroom groups. The absence of complete control means the results will be interpreted within the context of the limitations, but the quasi-experimental design still allows for valid comparisons between the two teaching methods in a real-world classroom setting.

Participants and Setting

The research was conducted at SMK Negeri 1 Panai Hulu, a vocational school in Labuhan Batu Regency, North Sumatra. The study focused on tenth-grade students enrolled in various social science-related courses. The target population for this study was 106 students, distributed across three classes:

1. **Class A**: Experimental group (Pair Check method)
2. **Class B**: Control group (traditional teaching methods)
3. **Class C**: Pilot group (used for preliminary testing of instruments)

The three classes were selected through a random sampling process to ensure that each class had an equal chance of being assigned to one of the groups. Class A, with its designated experimental group, received instruction based on the Pair Check learning method, while Class B received conventional instruction using traditional lecture-based

methods. Class C was not part of the main experimental setup but was used solely for pretesting the data collection instruments.

Pair Check Method Implementation

The Pair Check learning method was implemented with specific structures and activities to foster interaction and peer learning. This method encourages students to work in pairs, where one student's work is reviewed and critiqued by their partner. This approach fosters active learning, as students must understand the material thoroughly to provide feedback on each other's work.

Implementation details:

1. Duration: The Pair Check method was applied over four weeks, with two sessions per week, each lasting approximately 80 minutes. This provided enough time for students to engage in pair activities, discuss historical concepts, and receive feedback on their understanding.
2. Frequency: The Pair Check method was integrated into weekly lesson plans for Indonesian history. Each session included time for students to work in pairs, review each other's work, and engage in discussions. Additionally, the teacher facilitated the process by circulating among pairs to provide guidance and support.
3. Teacher's Role: The teacher's role in the Pair Check method was to act as a facilitator, rather than the primary source of information. The teacher provided initial instructions on the historical content, set clear guidelines for peer reviewing, and monitored the pair interactions. However, the primary learning activity was led by students, fostering collaboration and deep engagement with the material.

Example of a Pair Check Activity:

1. At the beginning of a lesson on Indonesian history, students were given a reading assignment or a historical analysis task. Once completed, they paired up with another student and exchanged work.
2. The students were then asked to critique each other's work, offering constructive feedback, identifying errors, and discussing key concepts in the historical narrative. This peer review process was structured to ensure students corrected mistakes and deepened their understanding through dialogue.
3. After peer feedback, students would revise their work based on their partner's suggestions, encouraging further reflection and learning.

Pilot Class (Class C)

Class C, consisting of a separate group of students, was designated as a pilot class. The main purpose of this class was to pretest the research instruments, specifically the pretest and posttest questionnaires. By administering these tests to Class C before the study began, the researchers were able to validate the instruments' content and structure, ensuring that the questions accurately measured students' knowledge of Indonesian history.

https://doi.org/10.58421/gehu.v4i4.710

Class C was not involved in the main experiment. Its role was limited to providing feedback on the reliability and validity of the assessment tools. This process helped refine the tests and ensured that the final instruments used in the main experiment would effectively assess the students' learning outcomes.

Ethical Considerations

Ethical considerations were taken into account to ensure the study was conducted fairly and transparently:

1. Informed Consent: Prior to the commencement of the study, students and their parents were provided with an informed consent form. This document explained the purpose of the research, the procedures involved, and the voluntary nature of participation. Consent was obtained from both the students and their legal guardians before they were included in the study.
2. Fairness to Control Group: While the experimental group received instruction using the Pair Check method, the control group continued with traditional teaching practices. The control group was not disadvantaged, as it received the standard curriculum prescribed by the school. Additionally, both groups were subjected to the same pretest and posttest, ensuring that all students were assessed based on the same criteria.
3. Confidentiality: All personal data and test results were anonymized to maintain the participants' privacy. Identifiable information was kept confidential, and only aggregated results were reported in the study.
4. Voluntary Participation: Participation in the research was voluntary. Students were informed that they could withdraw from the study without any negative consequences to their academic standing.
5. Teacher's Role and Ethical Integrity: The teacher acted as a neutral facilitator and did not influence the students' responses or participation in the study. All participants, whether in the experimental or control group, were given equal learning opportunities, and their participation in the study did not impact their grades or academic standing.

Data Collection and Analysis

Data for this study were collected through pretest and posttest assessments, which consisted of 25 multiple-choice questions selected from a pool of 50 validated items. Based on the course's learning objectives, the questions were carefully chosen to measure students' knowledge and understanding of Indonesian history. The data analysis process involved the following steps:

1. Testing for Normality: The data were first tested using the Kolmogorov-Smirnov test to determine if the scores followed a normal distribution. This is important for choosing the appropriate statistical tests.
2. Testing for Homogeneity of Variance: Next, Levene's Test was applied to ensure that the variances of the two groups (experimental and control) were equal, which is a necessary assumption for conducting the Independent Samples T-test.
3. Hypothesis Testing: The research hypotheses were tested using the Independent Samples T-test. The null hypothesis (Ho) posits that there is no significant difference between the

learning outcomes of the two groups, while the alternative hypothesis (Ha) asserts that the Pair Check method significantly affects students' learning outcomes.

- **Ha**: The Pair Check learning method significantly affects the learning outcomes of Grade X students at SMK Negeri 1 Panai Hulu.
- **Ho**: The Pair Check learning method has no significant effect on the learning outcomes of Grade X students at SMK Negeri 1 Panai Hulu.

3. RESULTS AND DISCUSSION

RESULTS

3.1 Description of Student Learning Outcomes

Student learning outcome data are scores obtained from pretests and posttests completed by students. The treatment provided in this study was Phair Check learning for the experimental class and conventional learning for the control class, with the following data description:

Table 1. Data Description

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Pretest Experiment	35	61	78	69.71	3.092
Post-Test Experiment	35	69	84	78.03	3.157
Pretest Control	35	63	75	69.34	3.105
Post-Test Control	35	67	78	72.29	2.585
Valid N (listwise)	35				

Based on the data presented in Table 1, the experimental group obtained a highest pretest score of 78, a lowest score of 61, and an average score of 69.71. After the intervention, the highest score increased to 84, the lowest score rose to 69, and the average score improved to 78.03. In the control group, the pretest results showed a highest score of 75, a lowest score of 63, and an average of 69.34. The posttest results indicated a highest score of 78, a lowest score of 67, and an average of 72.29. These findings indicate that the experimental group achieved a higher average score than the control group. This suggests that the *Pair Check* learning strategy enables students to learn more effectively than conventional teaching methods. In traditional instruction, the teacher typically dominates the learning process, which may limit student engagement. In contrast, the *Pair Check* strategy encourages students to work collaboratively, check each other's understanding, and clarify concepts through discussion. Consequently, this approach fosters a more active and engaging learning environment and improves academic performance.

1. Pretest Learning Outcome Data

Pretest data were used for analysis prior to the research. The following table summarizes and describes the pretest scores for the experimental and control classes:

 https://doi.org/10.58421/gehu.v4i4.710

Table 2. Pretest Learning Outcome Data

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Variance
Pretest Experiment	35	61	78	69.71	3.092	9.563
Pretest Control	35	63	75	69.34	3.105	9.644
Valid N (listwise)	35					

Source: SPSS Descriptive Statistics Output

Based on the table above, it can be seen that the average student score from the experimental pretest was 69.71 with a standard deviation of 3.092. The minimum score in the pretest was 61, the maximum score was 78, and the variance was 9.563. Meanwhile, the average student score from the pretest in the control class was 69.34 with a standard deviation of 3.105. The minimum score in the pretest was 63, the maximum score was 75, and the variance was 9.644.

2. Post-Test Learning Outcomes Data

The following is a summary of the post-test learning outcomes data:

Table 3. Post-Test Learning Outcomes Data

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Variance
Post-Test Experiment	35	69	84	78.03	3.157	9.970
Post-Test Control	35	67	78	72.29	2.585	6.681
Valid N (listwise)	35					

Source: SPSS Descriptive Statistics Output

Upon examining the figures within the chart, the experimental group's final test scores demonstrated a mean student grade of 78.03, alongside a standard deviation of 3.157. The minimum grade recorded in the experimental group's post-assessment was 69, whereas the maximum grade reached 84, and the computed variance stood at 9.970. Conversely, the control group's final test results indicated an average student grade of 72.29, with a standard deviation of 2.585; the minimum grade obtained totaled 67, the maximum was 78, and the variance worked out came to 6.681.

3.2 Inferential Statistical Analysis

To examine the influence of the pair check learning approach on the scholastic performance of tenth-grade learners at SMK N 1 Panai Hulu throughout the 2024/2025 academic year, SPSS 26 software was utilized for the analysis. The arrangement of these evaluations was as follows:

1. Normality Test

A normality test was required to determine whether the two samples were normally distributed. The following table shows the results of the normality test:

Table 4. Normality Test

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Class	Statistic	Df	Sig.	Statistic	df	Sig.
Score	Pretest (Control)	.132	35	.130	.956	35	.168
	Posttest (Control)	.146	35	.055	.966	35	.354
	Pretest (Experiment)	.113	35	.200*	.958	35	.198
	Posttest (Experiment)	.115	35	.200*	.973	35	.521

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

SPSS 26 Output Source

The Kolmogorov-Smirnov method offers a way to assess the data's distribution for normality. The Kolmogorov-Smirnov approach is applicable when the significance level fails to satisfy the condition of being greater than 0.05. Consequently, we can infer that the pretest control group's value, at 0.130, surpasses 0.05. The posttest control group's value is 0.055, which is also higher than 0.05. The pretest experimental group's value registers at 0.200, exceeding 0.05. The posttest experimental group's value, recorded at 0.200, is likewise greater than 0.05.

2. Homogeneity Test

This test determines whether the experimental and control classes have the same variance. The homogeneity test table in this study is as follows.

Table 5. Homogeneity Test

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
Score	Based on Mean	.361	1	68	.550
	Based on Median	.365	1	68	.548
	Based on Median and with adjusted df	.365	1	61.750	.548
	Based on trimmed mean	.406	1	68	.526

Source: SPSS 26 Output

According to the computations shown in the homogeneity test chart, the significance level for the pretest and posttest mean scores was determined to be 0.550,

https://doi.org/10.58421/gehu.v4i4.710

which exceeds the threshold of 0.05. This suggests that the sample groups exhibit similar levels of variability, as a significance or probability value that surpasses 0.05 implies homogeneity between variances. Thus, considering these noteworthy outcomes, the inference is that the experimental and control groups possess equal and homogeneous variance.

3. Hypothesis Testing

The t-test is used to demonstrate the extent of the influence of each independent variable individually and to explain the variance of the dependent variable. Referring to the results shown in the Independent Samples Test table, the determined t value is 8.326, while the corresponding t table value is 1.1995. A comparison between the calculated t value and the t table value reveals that the calculated t value exceeds the t table value, specifically, 8.326 > 1.995. Consequently, we reject the null hypothesis (Ho) and accept the alternative hypothesis (Ha) at a significance level of α = 0.05, demonstrating that implementing Phair Check learning influences the academic performance of tenth-grade students attending SMK N 1 Panai Hulu.

Table 6. Hypothesis Testing (T-Test)

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Score	Equal variances assumed	.361	.550	8.326	68	.000	5.743	.690	4.367	7.119
	Equal variances not assumed			8.326	65.446	.000	5.743	.690	4.366	7.120

Source: SPSS 26 Output

DISCUSSION

The results of this study demonstrate that the application of the Phair Check learning model had a significant and positive impact on the academic achievement of tenth-grade students at SMK N 1 Panai Hulu. Students in the experimental group achieved an average

posttest score of 78.03, exceeding the school's Minimum Completion Criteria (KKM) of 70 and outperforming the control group's average of 72.29. The statistical analysis through the Independent Samples T-test further confirmed this improvement, showing that the calculated t-value (8.326) was substantially greater than the critical t-table value (1.995) at a 0.05 significance level. This indicates that the improvement in learning outcomes can be attributed to the instructional treatment, not random variation.

The success of the Phair Check learning model can be understood through the lens of active learning and social constructivist theory. Vygotsky's concept of the Zone of Proximal Development (ZPD) emphasizes that students can achieve higher levels of understanding when working collaboratively with peers than alone. Within the Phair Check framework, students were required to work in pairs, exchange answers, and justify their reasoning, which encouraged peer teaching and scaffolding. Such interactions enabled students to refine their understanding by identifying errors, clarifying misconceptions, and reinforcing correct knowledge.

This peer-checking process also aligns with Johnson and Johnson's theory of Cooperative Learning [21], which highlights positive interdependence and individual accountability as essential elements. The act of "checking" each other's work instilled responsibility and reduced passivity, ensuring that each student actively contributed to the learning process rather than relying solely on teacher input.

The findings of this study reinforce and extend the conclusions of prior research. Huda emphasized that cooperative learning strategies enhance higher-order thinking skills because students must negotiate, justify, and explain. Similarly, Sanjaya found that peer-based learning models encourage active participation and increase student confidence in expressing ideas. The present study supports these observations by showing that students in the experimental group were more engaged and displayed stronger comprehension, as reflected in their superior posttest scores [22], [23], [24].

In vocational education, Wahyuni reported that cooperative learning methods such as Think-Pair-Share and Peer Tutoring improved cognitive outcomes and helped students develop communication skills essential for workplace readiness. The findings of this study parallel those results, demonstrating that Phair Check fosters both academic mastery and social learning, skills highly relevant to vocational students [25], [26], [27].

Another relevant study by Tamimi et al. [28] concluded that students taught with cooperative strategies displayed greater knowledge retention than those taught through traditional lecture methods. This resonates with the current findings, as the experimental group's higher mean score indicates better retention and comprehension of the material [29], [30].

While the control group also achieved scores close to the KKM, their performance lagged behind that of the experimental group. This suggests that conventional teaching methods, often teacher-centered and lecture-based, provide limited opportunities for active involvement. In such environments, students may become passive recipients of information, which can hinder deep learning and critical thinking. The disparity between the two groups highlights the importance of shifting from purely didactic methods to approaches emphasizing collaboration and accountability.

The validity and reliability testing of the research instrument adds credibility to the findings. With a Cronbach's Alpha coefficient of 0.854, the instrument demonstrated high internal consistency, ensuring that the improvements measured in the posttest were accurate reflections of student learning. This strengthens the argument that the differences in outcomes were a direct result of the learning model employed rather than flaws in the assessment tool.

Beyond confirming the effectiveness of the Phair Check learning model, this study contributes to the broader discourse on improving learning quality in Indonesian vocational schools. Vocational education imparts theoretical knowledge and cultivates practical competencies, collaboration, and problem-solving abilities. The cooperative nature of Phair Check directly supports these goals by embedding communication, teamwork, and accountability into the learning process.

Furthermore, the results indicate that cooperative learning models like Phair Check can address one of the persistent challenges in vocational schools: low student motivation. When students see themselves as active participants in knowledge construction, their sense of ownership and responsibility toward learning increases. This motivation translates into higher achievement, as demonstrated in this study.

4. CONCLUSION

This study confirms that the Phair Check learning model significantly enhances students' history learning outcomes at SMK N 1 Panai Hulu. Compared to traditional methods, students taught with Phair Check showed higher achievement and greater engagement, indicating the model's effectiveness in fostering active participation and deeper comprehension.

The findings suggest that Phair Check can be a practical alternative for teachers seeking to move beyond teacher-centered instruction. Its emphasis on peer collaboration and accountability makes it suitable for history and other subjects where critical thinking and active learning are essential. Integrating cooperative models such as Phair Check at the curriculum level can contribute to more interactive and student-centered learning environments in vocational schools.

For future research, further studies could explore the application of Phair Check in different subject areas, its long-term effects on retention and critical thinking, and its scalability across larger student populations. Comparative studies with other cooperative learning models would also provide valuable insights into the most effective strategies for enhancing student achievement.

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