The Effect of TPACK on Students' Writing of Procedure Text

Artika Dwi Rahayu[1](✉), Meiga Ratih Tirtanawati[2], Chyntia Heru Woro Prastiwi[3]
[1,2,3]English Education Department, IKIP PGRI Bojonegoro, Indonesia
artikadwi2303@gmail.com
meiga_ratih@ikippgribojonegoro.ac.id
chyntia_heru@ikippgribojonegoro.ac.id

Abstrak — TPACK merupakan kerangka kerja yang menggabungkan unsur teknologi, pedagogi, dan pengetahuan konten untuk mendukung kegiatan pembelajaran yang lebih efektif. Penelitian ini bertujuan menganalisis pengaruh kerangka kerja TPACK yang dipadukan dengan strategi TPS terhadap kemampuan menulis teks prosedur siswa. Penelitian ini menerapkan pendekatan kuantitatif dengan desain kuasi-eksperimen. Partisipan dalam penelitian ini adalah 50 siswa kelas sepuluh di SMKN Ngasem, masing-masing terdiri dari 25 siswa di kelompok eksperimen (X KI 1) dan 25 siswa di kelompok kontrol (X KI 2). Pengumpulan data dilakukan melalui tes menulis teks prosedur. Hasil uji Mann-Whitney menunjukkan nilai Asymp. Sig. (2-tailed) sebesar 0.045, yang lebih kecil dari 0.05 (0.045 < 0.05). Hal ini berarti terdapat perbedaan signifikan secara statistik pada skor post-test antara kedua kelompok. Temuan ini mengindikasikan bahwa penerapan kerangka kerja TPACK yang diintegrasikan dengan strategi TPS dapat secara signifikan meningkatkan kemampuan menulis teks prosedur siswa.
Kata kunci — TPACK, menulis, teks prosedur

Abstract — TPACK serves as a framework that combines technology, pedagogy, and content knowledge to support more effective learning activities. The study aims to analyze the effect of applying the TPACK framework integrated with the TPS strategy on students' procedure text writing skills. A quasi-experimental design with a quantitative approach was employed in this study. The participants were tenth-grade students at SMKN Ngasem, totaling 50 students, with 25 students in X KI 1 (as the experimental group) and 25 students in X KI 2 (as the control group). The data were collected using a procedure text writing test. The results from the Mann-Whitney U test showed an Asymp. Sig. (2-tailed) value of 0.045, which is less than 0.05 (0.045 < 0.05), indicating a statistically significant difference in post-test scores between the two groups. These findings suggest that the application of the TPACK framework integrated with the TPS strategy can significantly improve students' procedure text writing skills.
Keywords — TPACK, writing, procedure text

INTRODUCTION

Technology has become an important part of education. Educators can improve the quality of learning and create more interactive experiences for students by integrating technology into the learning process. The integration of key components including technology, pedagogy, and content knowledge within the educational process is described as Technological Pedagogical Content Knowledge (TPACK). This

framework was first developed by Mishra & Koehler (2006). According to Herring et al. (2016) there are three core knowledge domains in this framework: Technological Knowledge (TK), which refers to the understanding of how to use various technologies such as computers, internet, and digital tools to support learning; Pedagogical Knowledge (PK), which involves teachers' knowledge of instructional methods, classroom organization, student assessment, and lesson planning; and Content Knowledge (CK), which refers to the mastery of the subject material being delivered. The three key intersections within the TPACK are: Technological Pedagogical Knowledge (TPK), which refers to the understanding of how to apply technology effectively in teaching regardless of the subject; Technological Content Knowledge (TCK) refers to an educator's understanding of how technology interacts with specific content, and Pedagogical Content Knowledge (PCK) is the teachers' knowledge of effective strategies to teach particular content areas. The TPACK represents the integration of all these components. The TPACK model offers information and knowledge on how educators should efficiently and proportionately use technology in the learning process (Handayani et al., 2023).

Additionally, the TPACK model can help educators in teaching English and other subjects to improve the academic performance of learners (Torregosa & Boloron, 2024). However, based on a preliminary survey at SMKN Ngasem, some problems were found in the classroom, including students' lack interest and motivation in English lessons, students also lack skills to organize their ideas into written form. The teacher still uses conventional methods, such as lectures and textbooks, without the integration of technology, resulting in less interaction and engagement in the classroom (Lubis et al., 2020).

To overcome these problems, the Think Pair Share (TPS) strategy is used as an alternative approach integrated with the TPACK framework in the learning process. The TPS strategy enables learners to think about a question, ideas, or issue and then share their thoughts together with a partner before presenting it to the whole class (Rahmawati, 2017). This aligns well with the pedagogical component of the TPACK framework, where educators are encouraged to apply teaching methods that promote active student participation. According to Farizi & Fauzyah (2019), there are three steps carried out in the TPS strategy. The first step is Think, where the teacher gives a question and asks students to think independently. The second step is Pair, where students discuss their opinions or thoughts in pairs. The third step is Share, where the students express their thoughts with the teacher and classmate. Furthermore, Kurjum et al. (2020) also state that in cooperative learning strategy, teachers are not seen as learning sources (teacher-oriented), but students are expected to understand and discover new concepts on their own (student-oriented).

This is relevant to writing, which is considered the most demanding of the four fundamental English skills since it requires a long process (Nurdianingsih et al., 2024). Students should be able to organize ideas and manage structure, so they can produce coherent and effective written communication. Therefore, it is necessary for students, as this skill is needed for both academic and career opportunities (Prastiwi & Pujiawati, 2019). A common text type students encounter in their lesson is procedure text, which explains how to do or create something and this text become guide for completing a task for readers (Sani & Asty, 2021). There are some generic structures

of procedure text that students have to know such as goal, materials or ingredients, and steps. By mastering this type of text, students are able to write an instruction text of how to make something in a sequence and properly.

Several previous studies have highlighted the beneficial impacts of the TPACK framework on students' writing development. Usman et al. (2024) revealed in their study that TPACK improves students' writing outcomes and makes them more engaged, active, and enthusiastic during the learning process. Similarly, Putri (2019) found that students taught using the TPACK framework demonstrated a better understanding in writing activities.

Some previous studies have explored the effect of the TPACK framework on various English skills, particularly in teaching writing. However, most studies still focus on general writing skills or other types of texts. There is still limited research that applies TPACK specifically in teaching procedure text. To address this gap, the study aims to analyze the effect of applying the TPACK framework integrated with the TPS strategy in teaching procedure text.

METHOD

The study employed a quasi-experimental design with a quantitative approach. The study conducted at SMKN Ngasem during the academic year 2024/2025. There were two groups in this study: the experimental group (X KI 1) and the control group (X KI 2), with 25 students in each group, making a total of 50 participants. The researcher used a purposive sampling technique to select the groups based on practical considerations, such as class availability, similar English proficiency levels, and having the same English teacher. Purposive sampling is a technique of deliberately choosing participants with specific characteristics that align with the needs of the study (Etikan et al., 2016).

The researcher administered a writing test to gather the data, which included a pre-test and a post-test for each group. The pre-test was carried out on February 5, 2025, before any treatment was given to experimental and control group. The treatment sessions were carried out four times on February 10-13 and February 17-19, 2025. The post-test was carried out in experimental and control groups simultaneously on February 26, 2025, to ensure data accuracy. The experimental group received treatment using the TPACK framework integrated with the TPS strategy, whereas the control group was taught using only the TPS strategy without the TPACK framework.

FINDINGS AND DISCUSSION

The study intends to assess whether the integration of TPACK framework with TPS strategy significantly influences students' performance in writing procedure text. This section presents the data in the following order: first, the descriptive statistics; second, the classification of pre-test scores of the two groups; third, the classification of post-test scores of the two groups; fourth, the normality test; fifth, the hypothesis testing of the post-test results. The primary data of this research were collected through a test from the two groups. The following table displays the students' scores.

Table 1. Descriptive Statistics Results

	N	Min	Max	Mean	Std. Deviation
Pre-test Experimental	25	30	75	54.60	10.697
Post-test Experimental	25	35	100	66.40	14.033
Pre-test Control	25	25	60	50.80	10.770
Post-test Control	25	25	80	56.80	16.000
Valid N (listwise)	25	-	-	-	-

Table 1 presents the descriptive statistics of students' writing scores in both the two groups. In the group that received the treatment, the mean score raised from 54.60 to 66.40, along with the standard deviation from 10.697 to 14.033. Meanwhile, the comparison group experienced a modest improvement, with the average score rising from 50.80 to 56.80. The maximum score in the experimental group rose significantly from 75 to 100, indicating that some students reached a perfect score. In contrast, the highest score in control group was 80 with the standard deviation from 10.770 to 16.000.
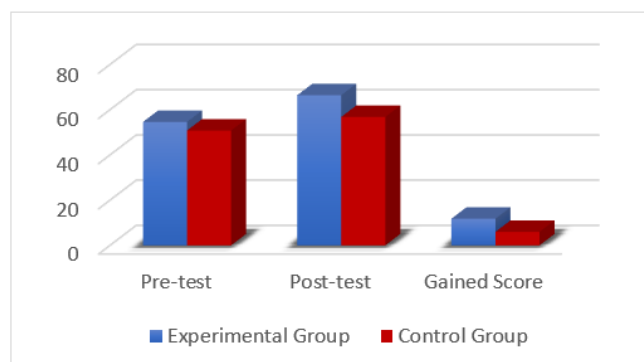
Figure 1. Overview of Mean Score

Figure 1 illustrates both groups started with a similar mean score in the pre-test, 54.60 for the experimental group and 50.80 for the control group. However, after treatment was given, the experimental group's post-test score showed a greater increase, which reached 66.40, compared to 56.80 in the control group. Furthermore, the treatment group achieved a higher gain score of 11.8, while the control group only reached 6. This indicates greater result of students' writing skills in the treatment group.

Table 2. Classification of Pre-test Scores

No	Classification	Range	Experimental Group		Control Group	
			Freq.	%	Freq.	%
1.	Very Poor	<50	7	28	7	28
2.	Poor	50-59	3	12	8	32
3.	Fair	60-69	13	52	10	40

No	Classification	Range				
4.	Good	70-79	2	8	-	-
5.	Very Good	80-89	-	-	-	-
6.	Excellent	90-100	-	-	-	-
	Total		25	100	25	100

The Table 2 displays the classification of students' writing scores based on the criteria adapted from Kadaruddin (2017). The total number of students who received score less than 50 in both the two groups were 7 students (28%). In the treatment group, 2 students (8%) achieved the highest score with the range 70 to 79. Then, 3 students (12%) in the 'Poor' category, and 13 students (52%) in the 'Fair' category. Meanwhile, in the control group, 10 students (40%) were classified in the 'Fair' category.

Table 3. Classification of Post-test Scores

No	Classification	Range	Experimental Group		Control Group	
			Freq.	%	Freq.	%
1.	Very Poor	<50	2	8	6	24
2.	Poor	50-59	5	20	4	16
3.	Fair	60-69	6	24	10	40
4.	Good	70-79	7	28	3	12
5.	Very Good	80-89	4	16	2	8
6.	Excellent	90-100	1	4	-	-
	Total		25	100	25	100

Table 3 provides the post-test score distribution of both classes. In the experimental group, students showed improvement, with 7 students (28%) categorized as 'Good', 4 students (16%) in the 'Very Good' level, and one student (4%) reaching the 'Excellent' level. However, the control group's score remained mostly in the 'Fair' category (40%), 3 students (12%) in the 'Good' level, 2 students (8%) in the 'Very Good' level, and the 'Excellent' level was not achieved by any students. Subsequently, a normality test was administered to analyze the data before determining the research hypothesis.

Table 4. Results of Normality Test

Class		Kolmogorov-Smirnov			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Students' Writing of Procedure Text	Pre-test Experimental	.293	25	<.001	.871	25	.004
	Post-test Experimental	.140	25	.200*	.980	25	.881
	Pre-test Control	.204	25	.009	.813	25	<.001
	Post-test Control	.179	25	.037	.910	25	.031

Table 4 presents the normality test results for both groups using IBM SPSS Statistics version 30. If the p-values obtained from both the pre-test and post-test exceed 0.05, the data can be considered to follow a normal distribution. The post-test

of experimental group showed a p-value of 0.200, which exceeds the 0.05 value, indicating normality. Meanwhile, the experimental group's pre-test, as well as both the pre-test and post-test results of the control group yielded significance values less than 0.05, signifying that these data do not meet the assumption of normal distribution.

Hypothesis Test

In this part, the researcher employed the Mann-Whitney U test as a substitute for the independent sample t-test since the data were not distributed normally. The hypothesis was formulated:

H_0 : There is no significant effect of the TPACK framework on students' writing of procedure text.

H_1 : There is a significant effect of the TPACK framework on students' writing of procedure text.

The post-test outcomes were analyzed to determine whether to accept or reject the null hypothesis (H_0). The following table presents the outcome of the statistical analysis.

Table 5. The Result of Mann-Whitney U Test

	Students' Writing of Procedure Text
Mann-Whitney U	210.000
Wilcoxon W	535.000
Z	-2.004
Asymp. Sig. (2-tailed)	.045

As illustrated in Table 5, the data reveal that the Mann-Whitney U test yielded a value of 210.000, with a Z score of -2.004 and an Asymp. Sig. (2-tailed) value of 0.045. Since the significance value is 0.045, which is less than 0.05 ($p < 0.05$), it shows that the post-test scores of the experimental and control groups differ statistically significantly. Thus, the null hypothesis (H_0) is rejected, leading to the acceptance of the alternative hypothesis (H_1). These findings indicate that the application of the TPACK framework had a significant effect on students' skills to write procedure text. By combining the TPACK learning framework with the TPS strategy, students' performance in writing procedure text improved.

In the same line with a previous study by Nurjanah & Nurbatra (2023), the incorporation of the TPACK framework was found to improve students' learning outcomes, as reflected by higher post-test scores compared to students who were not exposed to the TPACK framework. Moreover, the integration of technology facilitates the implementation of student-oriented learning by creating an interactive, meaningful, and motivating educational environment (Hajj & Harb, 2023).

Additionally, the implementation of the TPS strategy has been shown to enhance students' score, and students also demonstrate positive attitudes and responses throughout the teaching and learning process (Nadeem & Nadeem, 2019).

Furthermore, the TPS strategy is a successful technique for teaching writing because it enhances student engagement through peer collaboration (Santika et al., 2022).

CONCLUSION

The integration of the TPACK framework with the TPS strategy in the experimental group has demonstrated a significant positive effect on students' procedure text writing skills compared to the control group, which received only the TPS strategy. This is shown by the mean score that increased from 54.60 (pre-test) to 66.40 (post-test). Moreover, the result of significance p-value = 0.045, which is less than 0.05, indicating the null hypothesis was rejected, and confirming the alternative hypothesis. Therefore, this model can serve as a practical and effective alternative for English teachers aiming to improve students' writing skills. Future research should consider investigating the application of this framework to other types of texts and language skills, as well as to compare its effectiveness to other innovative teaching methods.

REFERENCES

Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of Convenience Sampling and Purposive Sampling. *American Journal of Theoretical and Applied Statistics*, *5*(1), 1–4. https://doi.org/10.11648/j.ajtas.20160501.11

Farizi, I., & Fauzyah, F. (2019). the Use of Think Pair Share in Teaching Writing Descriptive Text. *PROJECT (Professional Journal of English Education)*, *2*(5), 752–756.

Hajj, M. El, & Harb, H. (2023). Rethinking Education: An In-Depth Examination of Modern Technologies and Pedagogic Recommendations. *IAFOR Journal of Education: Technology in Education*, *11*(2), 97–113.

Handayani, S., Hussin, M., & Norman, H. (2023). Technological Pedagogical Content Knowledge (TPACK) Model in teaching: A Review and Bibliometric Analysis. *Pegem Journal of Education and Instruction*, *13*(3), 176–190. https://doi.org/10.47750/pegegog.13.03.19

Herring, M. C., Koehler, M. J., & Mishra, P. (2016). Handbook of technological pedagogical content knowledge (TPACK) for educators: Second edition. In *Handbook of Technological Pedagogical Content Knowledge (TPACK) for Educators: Second Edition*. https://doi.org/10.4324/9781315771328

Kadaruddin. (2017). The Effect of Learning Model Multimedia-Based toward The Students' English Ability at Senior High School Of Kolaka Regency. *Journal of Education, Teaching and Learning*, *2*(2), 249–252. https://doi.org/http://dx.doi.org/10.26737/jetl.v2i2.302

Kurjum, M., Muhid, A., & Thohir, M. (2020). Think-pair-share model as solution to develop students' critical thinking in islamic studies: Is it effective? *Cakrawala Pendidikan*, *39*(1), 144–155. https://doi.org/10.21831/cp.v39i1.28762

Lubis, R. F., Hasibuan, N. K., Islam, A., & Iain, N. (2020). *Students ' Writing Procedure Text Mastery*. *08*(02), 166–176.

Mishra, P., & Koehler, M. J. (2006). Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge. *Teachers College Record*, *108*(6), 1017–1054.

Nadeem, M. A., & Nadeem, T. (2019). Evaluating Effects of Think Pair Share

Technique on the Descriptive Writing Skill of Secondary School Learners. *Journal of Educational Research*, 22(2), 184–200.

Nurdianingsih, F., Fitriati, S. W., Astuti, P., & Rozi, F. (2024). Writing Difficulties Faced by EFL Writing Learners of English Education Study Program. *Proceedings of Fine Arts, Literature, Language, and Education*, 461–476.

Nurjanah, L., & Nurbatra, L. H. (2023). The Power of PBL and TPACK: Catalysts for Elevating Students' Writing Learning Outcomes. *Jo-ELT (Journal of English Language Teaching) Fakultas Pendidikan Bahasa & Seni Prodi Pendidikan Bahasa Inggris IKIP*, 10(2). https://doi.org/doi:10.33394/jo-elt.v10i2.8043

Prastiwi, C. H. W., & Pujiawati, N. (2019). Penggabungan Artificial Intelligence dan Kecerdasan Alami dalam Pembelajaran Keterampilan Menulis Bahasa Inggris. *Prosiding Seminar Nasional Pascasarjana (PROSNAMPAS)*, 1–7.

Putri, S. E. (2019). The implementation of TPACK in teaching writing recount text in a senior high school level. *Retain*, 7(2006), 156–163.

Rahmawati, O. I. (2017). Think-Pair-Share: a tecnique to enhance students' writing skill. *Jurnal Pendidikan Edutama*, 4(1), 49–57.

Sani, R. D., & Asty, H. (2021). Students' Writing Ability In Generic Structure Of Procedure Text In SMK Padang. *Jurnal Pendidikan Nasional*, 1(2), 40–45. https://doi.org/10.55249/jpn.v1i2.7

Santika, M. L., Kasim, U., & Burhansyah. (2022). Teaching Writing Skill by Using Think Pair Share Technique. *Research in English and Education (READ)*, 7(4), 135–145.

Torregosa, M. C., & Boloron, R. A. (2024). The TPACK Model, Students' Academic Performance in English, and Challenges of Its Use as Assessed by Teachers. *Psychology and Education: A Multidisciplinary Journal*, 24(6), 615–621. https://doi.org/10.5281/zenodo.13627152

Usman, S., Arafah, B., Marhum, M., Munir, S., Budi, & Tadeko, N. (2024). The Effect of Technological Pedagogical Content Knowledge (TPACK) on Rural Area Students' English Writing. *Journal of Language Teaching and Research*, 15(3), 884–892. https://doi.org/10.17507/jltr.1503.21