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T-Test Analysis of Learning Achievement of Bilingual Students and Regular Students

Safri Ardiyanto[1], Charlotta Svonni[2], Nabiswa Martin Wasike[3]
[1]History Education Study Program, Semarang State University, Indonesia
[2]Educational History, Umeå University, Swedia
[3]History of Education, University of Nairobi, Kenya

Article Info

ABSTRACT

Purpose of the study: The purpose of this study was to investigate differences in learning achievement between bilingual students and regular students.

Methodology: This research methodology uses a quantitative approach with the type of Ex-Postfacto research. Data collection techniques were carried out through documents and interviews. The collected data were then analyzed using conditional tests, such as the normality test and homogeneity test, as well as hypothesis testing with the T test.

Main Findings: The findings of this study are that the average Grade Point Average (GPA) of bilingual students is 3.50, with a minimum GPA of 3.36 and a maximum GPA of 3.75. While the average GPA of regular students is 3.41, with a minimum GPA of 3.28 and a maximum GPA of 3.65. Based on the results of the t test calculation, with a 90% confidence level, a significance value (sig) of 0.005 is obtained with a calculated t value of 2.954 which is greater than t table of 1.675. The alternative hypothesis (Ha) is accepted, indicating that there is a significant difference between the GPA of bilingual students and regular students.

Novelty/Originality of this study: The novelty of this research lies in the research contribution to the understanding of differences in learning achievement between bilingual students and regular students. These findings can provide new insights in the context of education and show the importance of bilingualism in achieving academic achievement.

Corresponding Author:
Safri Ardiyanto,
History Education Study Program, Semarang State University, Indonesia
Email: safriardiyan07@gmail.com

1. INTRODUCTION

The development of the world today has created a global market that has eliminated the boundaries between nations. Globalization has grown rapidly and affected all aspects of life [1]-[3]. The flow of information and technology is a force and power that can determine the dynamics of life today. Changes and dynamics of life in modern society require nations to master information, science and technology [4], [5]. Nations that do not master it will be eroded by changes in modern civilization. Indonesia as one of the developing world countries certainly requires the readiness and ability of its community members in the form of adaptation with new values, competitiveness and skills to face challenges in the current era [6], [7].

Education becomes a teaching and learning system [8]. Education is a means for carrying out transformation in preparing intelligent, dynamic, progressive, innovative, creative human resources and of course having a spiritual basis and noble character [9]-[11]. Education has the main mission to produce quality

human resources. Educational institutions, both formal and informal, compete to offer excellent programs aimed at producing graduates with added value. Foreign educational institutions have even set up foreign educational institutions independently or in collaboration with local educational institutions to organize education in Indonesia by offering graduates the advantages of mastering foreign languages [12], [13]. As an illustration, the quality of education in Indonesia is considered by many to be low. This can be seen from various indicators. First, graduates from schools or colleges who are not ready to enter the world of work due to their lack of competence.

Indonesia still needs to improve the quality of education in its efforts to be on par with other developed countries. The Ministry of Education and Culture in this case as the party authorized to administer education in Indonesia has long launched excellent programs, either through a new curriculum or attitude building through character education. One of the programs of the Ministry of Education and Culture is rolling out a superior learning model that allows foreign languages to be used as the language of instruction in certain educational units to support students' foreign language skills [14], [15].

Educational institutions, namely schools, take the initiative to make improvements to the learning system, among others by competing to implement a two-language (bilingual) learning system. The government then encouraged the establishment of a bilingual class program by the government in educational institutions that have the potential to develop it. Bilingual classes in the implementation of academic learning have at least two advantages for students, namely mastery of science and literacy in two languages. Therefore, since 2004 the bilingual class has become the superior learning model rolled out by the Ministry of Education and Culture. Bilingual class is the implementation of Law no. 20 of 2003 concerning the National Education system article 33 paragraph (3), which states that a foreign language can be used as the language of instruction in certain educational units to support students' foreign language skills.

The purpose of this study is the difference in learning achievement between bilingual students and regular students of history education study program majoring in history, faculty of social sciences, Semarang State University.

2.   RESEARCH METHOD

The approach used in this study is a quantitative approach to ex-post facto research. The sample is part or representative of the population to be studied [16]. The sampling technique in this study is using random sampling technique. The random sampling technique is sampling, the researcher mixes the subjects in the population so that all subjects are considered the same [17]-[19]. Based on this technique, the samples in this study were divided into two groups. The first group was bilingual class students, which consisted of 25 students. The second group is regular class students consisting of 25 students. The sample of regular students was taken randomly from a total of 123 regular students. The sampling of 25 regular students was intended so that the comparisons with bilingual students were the same. Data collection techniques in this study are using document analysis and interview instruments. This study uses guided interviews, where the researcher has prepared a series of complete and detailed questions. The details of this interview sheet can be seen in the following table.

Table 1. Interview sheet grid

Indicator	Number	Question
Interest	1	Why did you enter the history department?
	2	What is interesting about history
	3	What do you think about the history major?
Foreign Language Ability	4	Have you ever taken a course or additional study of English?
	5	Have you ever participated in a competition in the field of English?
General perspectives	6	What do you think about the RSBI school
	7	Do you agree with the establishment of a Bilangual class in college?
	8	Are you one of those interested in entering a verbal class, state the reasons
	9	In your opinion, what are the advantages of the numeracy class?
Learning process	10	What do you think about the lecture process in the Department of History?
	11	How was the condition of your class during the lecture process?
	12	What do you think about history professors?
	13	What do you think about the lecturers' mastery of English in

		the Department of History in the lecture process?
	14	What do you think about the facilities in the Department of History?
Literature	15	What do you think about the library major in History?
	16	Have you ever made use of foreign literature?
	17	Mention foreign literature or journals that you have read?
	18	What are the obstacles in utilizing foreign literature?
	19	Where do you get information about foreign literature that you know?
	20	How about your academic achievements so far?
	21	Where do you get information about foreign literature that you know?
	22	How about your academic achievements so far?
Suggestion	23	What are your suggestions for the implementation of the bilingual class program?
	24	What abilities did you get after taking a verbal class or regular class?
	25	How is the implementation of the multicultural class program in your opinion?

In the research conducted, data analysis was divided into two stages, namely the initial stage and the final stage.

1. Preliminary Data Analysis

The initial stage of analysis is carried out before the research begins or before the researcher collects data after the treatment occurs. This analysis was conducted to determine the initial condition of the population. The data used in this analysis is data from the selection results for entering the bilingual class in 2012.

2. Final Data Analysis

In the final data analysis, prerequisite tests were carried out, namely the normality test and homogeneous test. The normality test is used to determine whether the data being analyzed is normally distributed or not [20], [21]. Meanwhile, the homogeneity test is used to determine whether the variance of samples taken from the same population is uniform or not. Furthermore, a hypothesis test is used to prove the truth of the hypothesis proposed. Hypothesis testing in this study was carried out using a two-party test. This two-party test uses the t test using normally distributed data. To test the hypothesis, using a two-sided test. The two-sided test was used to prove the hypothesis that there was a difference in learning achievement between the experimental group and the control group.

3. RESULTS AND DISCUSSION
3.1. Results
Early Stage Analysis

This initial analysis was conducted to find a group of bilingual students. In the first stage, the participants will be given questions in the form of 50 questions in the form of general English material. The assessment for this selection uses 2 indicators, namely test scores from bilingual selection questions and high school English National Examination scores. In the assessment of bilingual class selection, the score obtained by the participants will be given a weight of two. After multiplying by two, then multiplying by 8. The National Examination score is given a weight of 2. Then the two are added up and divided by 10. The following is the formula used in this assessment. After calculating the final score obtained by history education students in the selection to enter the bilingual class. The following is a tabulation of the final grades for acceptance of bilingual class selection.

Table 2. Results of Phase I Bilingual Selection for Majors

No.	Final Score	Number of Students
1.	1-10	0
2.	11-20	10
3.	21-30	19
4.	31-40	70
5.	41-50	35
6.	51-60	13
7.	61-70	1

8.	71-80	0
9.	81-90	0
10.	91-100	0

From the results of this selection, the final scores obtained by history education students will be narrowed down to the top 50. Students who pass are those who have the highest score to meet the top 50 quota. For students who pass, they will take part in the second stage of selection in the form of direct interviews with lecturers in the department. This interview contains readiness, ability and willingness to learn and develop themselves in a bilingual class. After considering the ability, willingness and readiness to take bilingual classes, the Department of History finally assigned 25 people to enter bilingual classes. These students will be given special treatment whereby a separate class is created which is numerically different from other classes. In learning, this class is also given different treatment, they will be accustomed to using two languages. This use is applied both in communication between fellow students, students and lecturers and when providing responses and objections in discussion forums.

Final Stage Analysis

The final analysis aims to answer the hypotheses that have been stated previously. The data used in this study were the GPA of students of History Education Study Program, Department of History, Faculty of Social Sciences, Semarang State University. The student learning achievement data is as follows.

Table 3. Overview of History Education Students' GPA data

Source of Variation	Bilingual	Reguler
Number of Students	25	25
Average value	3,50	3,41
Baku Devi	0,099	0,101
The highest score	3,75	3,65
Lowest Value	3,36	3,28

From the table above, it is obtained that the average GPA of bilingual students is 3.50, a minimum of 3.36 and a maximum GPA of 3.75. Regular class students get an average GPA of 3.41, a minimum of 3.28 and a maximum GPA of 3.65. The normality test is used to determine whether the data being analyzed is normally distributed or not. The normality test results can be seen in the following table.

Table 4. Calculation results of the normality test for student GPA data

Student GPA	Sig.	Criteria
	0,200	Normal

Based on the calculation of the normality test for student GPA scores, it was obtained sig = 0.239 > 0.05, thus it can be said that GPA values are normally distributed. The results of this analysis are used as a consideration in the next analysis using parametric statistics.

Homogeneity Test

Homogeneity test is used to determine whether the data taken is homogeneous or not. The data referred to here is the GPA. Is the GPA range in one group homogeneous or not? The results of calculating the homogeneity of the GPA scores of History Department students between the bilingual class and the regular class are presented in table 5.

Table 5. Calculation results of the Two Variance Equality Test of Student GPA Data

Learning achievement	Sig.	Criteria
	0,693	Homogen

Based on the calculation results obtained sig = 0.693 > 0.05, it can be concluded that the two groups have the same variance.

Test the difference between the average GPA of bilingual students and regular class students

The difference test of the two means (two-party test) is a test to determine whether there is a significant difference in the mean between groups. The results of the calculation of the two-way difference test on the average of the two sides of student GPA data are presented in the following table.

Table 6. Calculation results of the two-way difference test on the average of the two parties on student GPA data

Learning achievement	Levene's test		t-test for equality of means				95% Confidance Interval of the Difference	
	F	Sig.	t	Sig.(2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
	0,157	0,693	2,954	0,005	0,08360	0,02830	0,02670	0,14050
			2,954	0,00	0,08360	0,02830	0,02670	0,14050

Test the difference between the two averages between the GPA of bilingual students and the GPA of regular class students using the following hypothesis. With a confidence level = 95% or ( ) = 0.05. The number of bilingual class students = 25 and the number of regular class students = 25 obtained = 1.675. Based on the results of the calculation of the t test, the value of sig = 0.005 is obtained with = 2.954 > 1.675. According to the results of the analysis, Ha is accepted and there is a difference in GPA between bilingual students and regular students.

3.2. Discussion

Based on the results of research on the effect of bilingual class students on student achievement in the Department of History, Faculty of Social Sciences, Semarang State University, a surprising statement was obtained where learning achievement as measured by the GPA of bilingual students up to semester 4 obtained a higher score than regular student learning achievement. Analysis of the final data on student achievement between bilingual students and regular students was obtained from students' GPA up to the fourth semester. Based on the description and analysis of student learning achievement data above, it is obtained that the average score of bilingual students is 3.50 with the lowest score being 3.36 and the highest score being 3.75. Regular students get an average score of 3.41 with the lowest score being 3.28 and the highest score being 3.65.
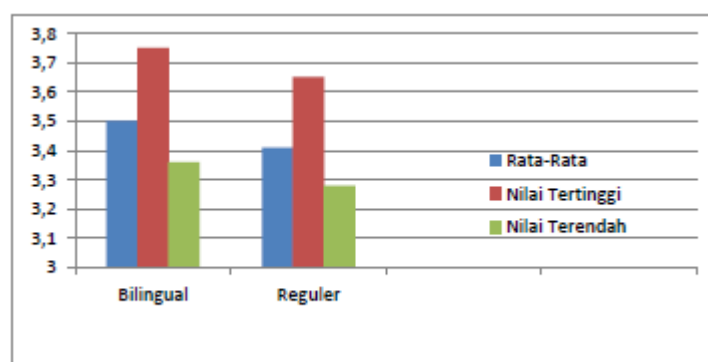

Figure 1. Description of student achievement data

Based on the results of the homogeneity test, the significance value > significance level (0.693 > 0.05) is obtained, which means that in general they have the same abilities. Without the same initial conditions, in this case the ability of the students who are the sample, measuring the effect of a treatment cannot be carried out, because the research results prove that the average student before the study is the same, the research can be carried out. To determine whether the data used is normally distributed or not, the Kolgomorov Smirnov formula is used. The normality test obtained a significant value of 0.239 > 0.05 = significant level, so it can be ascertained that the distribution of student GPA is normally distributed.

With a confidence level of 95%, the number of bilingual students = 25 and the number of regular class students = 25 is obtained = 1.675. In this study Ha was rejected if (tcount ≤ ttable), while Ha was accepted if (tcount ≥ ttable). Based on the results of the calculation of the t test, the value of sig = 0.005 is obtained with = 2.954 > 1.675. According to the acceptance criteria, Ha is accepted and there is a difference in GPA between bilingual students and regular students.

Bilingual class is a class in educational study programs at Semarang State University where learning prioritizes English as the language of instruction with international standard curriculum content, namely a curriculum that refers to the curriculum of one of the OECD member countries and/or other developed countries, the rest of which includes an adaptation curriculum and an adoption curriculum. Bilingual class is a class that uses two languages, namely Indonesian and English. In addition to the use of Indonesian in learning, the portion of the use of English is also prioritized. The use of English certainly provides a different experience.

History is a science that describes the development of society, a long process. History is a human story with a struggle known as culture. Understanding the origin of their culture means understanding their own reality

and the present. Understanding the essence of the present means being able to take lessons to face the future (Faizah, 2020). History as defined above is a scientific discipline that requires memory, insight and a high sense of curiosity. Interest in this science will provide many benefits. As Ulil Fahrudin said, "I have been interested since I was in high school. In History I find events whose truth is uncertain. That's what got me interested in history." Boediono said differently, "I am interested because I want to understand history, especially Indonesian history."

Without great interest accompanied by high curiosity, it is difficult if you only rely on sources from local books to understand and interpret history lessons. History is a scientific discipline that has many sources and various versions in the description of events. Historical events in Indonesia have also attracted the attention of many foreign writers. They also participated in writing Indonesian history with their own version and according to the point of view that they believed was the truth. Furthermore, bilingual students with mastery of foreign languages (English) certainly find it easier to obtain information from various sources, both from the internet media, national literature and even international literature.

Referring to the opinion of Slamet Wakhidin, "students are bilingual without receiving instructions from lecturers, most of them have used international books and journals". The existence of foreign literature studies conducted by bilingual students provides distinct advantages for students to study, interpret and understand history lessons objectively, bilingual students have a more critical tendency, when obtaining something controversial in nature, the curiosity of bilingual students encourages them to dig deeper into the problem by studying various literature in order to obtain facts that are closest to the truth. It is undeniable that history is a scientific discipline that is subject to controversy. Various sources from one history book compared to historical stories contained in different history books, it will be very easy to find various kinds of different stories, opinions and even characterizations that are sometimes different. This is reasonable considering that history books circulating throughout the country are not books that have been guaranteed the truth, there are always pros and cons in history lessons. This is what bilingual students usually eat daily, so it's not the confusion that bilingual students feel when given material full of controversy, but instead the challenges that bilingual students get.

Much of the material in History is subject to controversy and has not even been tested for truth. One of the controversies in history is in the pre-literate period. "Yes, we have studied the Neadhertal Age book, this is useful for testing the truth and existence of humans who are still believed to be manipulation," said Arum Sekar Kemuning. By continuing to dig up information about the material, of course, the historical knowledge possessed by bilingual students is higher than that of regular students, who incidentally do not dig up a lot of literature. Without reducing the credibility of regular students, who rely on locally published history books, a learning system like this is tantamount to shutting itself off from the outside world which is constantly making noise, questioning and debating about the truth and authenticity of various things contained in history. Various kinds of off-campus activities are usually additional activities for bilingual students. These activities include general discussions and even follow additional activities that are useful for practicing English skills. Some of them even filled their semester break time to visit the English Village in Pare Kediri.

Being a bilingual student makes interactions with the use of foreign languages more honed. Even though they are still not fluent in pronunciation and sometimes lack confidence, this makes students have certain advantages. The ability to master foreign languages possessed by bilingual students tends to be better than students who always use Indonesian every day. "From the start, most lecturers used English in delivering material. There are several lecturers who use English 50:50, in fact there are those who actually use English 100% full. Because we have to get used to English and we are in an environment where people use English, so they are starting to feel comfortable and confident," said Taufik Harpan Ardila. The number of students who are only 25 people makes the learning process in bilingual classes more effective and efficient.

Psychologically, this makes it easier to coordinate classes, especially in the division of groups in realizing active learning. "Of course it's different, in a bilingual class the distribution of groups is good, if one group consists of 5 students, of course there are only five groups. It makes the execution of assignments and presentations effective in terms of the number of members and efficient in execution of time. In contrast to the regular class which has nearly 50 students, the division of groups creates many groups and requires more time. In his presentation during the presentation, it made him less effective, "said Pak Tsabit. The existence of a smaller number of students also creates a healthy competition between students. This usually unconsciously spurs bilingual students to show themselves in the teaching and learning process. "I am sometimes shy when I am passive in learning, because my friends are all active. Therefore, I dared to actively participate and be involved in the discussion, both giving opinions and objections," said Syamsul Arifin. This makes the bilingual class active in learning.

According to Slamet Wakhidin, "there are several lecturers who are interested in teaching in our class, according to the lecturers when teaching in our class the lectures go in two directions and students are active in giving opinions and objections". On the lecturer side, there are several conveniences in teaching bilingual classes. First, lecturers feel more conducive to learning because it is easier to control the class. Second, in terms of lecturer interactions, it is faster to memorize student names because there are fewer of them than regular

classes. Third, it is easier to observe individual student abilities. The things mentioned above are the added value obtained by activist students, which directly or indirectly affect grades, or we often call it the Grade Point Average (GPA). So that being a bilingual student will not complicate the lecture process, in fact it can improve abilities when used properly.

This opinion was reinforced by Rizki Amaliyah's statement, "yes, I'm not interested in going to bilingual classes, my GPA is only 3.00. I used to think that being bilingual was difficult because the learning process used English. But I can't help but have to admit that they have more advantages than me." Different but similar to Fadzhilatul, "My GPA is pretty good, but I admit that I haven't been able to explore and study foreign literature. I thought bilingual students would find it difficult to study because of their use of English, in fact many had higher GPA than me, call me Slamet Wakhidin, Taufiq and Yoel. Of course they also have an advantage over me." Indeed, there are many regular class students who have not low GPA, for example Exsan and Reny. However, like the statements of the two colleagues above, that the personal abilities they have are not as many as those of bilingual students. In terms of using literature, regular students only use local books.

As Nurul Istiqomah stated, "I have never used foreign literature because I am constrained by mastering English." This statement was reinforced by the responses of several lecturers, such as Mr. Tsabit Azinar Ahmad, who stated that "bilingual students have the will and motivation to learn English so they are superior. These children who have great motivation then become capital not only in English skills, but then they have a great desire to develop their language skills. Another with Mr. Mukhammad Sokheh, he mentioned the advantages of bilingual students, especially in the use of foreign literature. Bilingual students are already inclined to take advantage of foreign literature, especially English. Even though they are still not dominant, bilingual students have great enthusiasm and potential to be even better. For learning achievement, of course, it still depends on each individual student. At least if we master a foreign language we will add personal skills. Being able to study foreign literature is one of the benefits. Furthermore, making students more prepared and confident to face the competition in the world of work in the global era.

4. CONCLUSION

Based on the results of the research and discussion, it is concluded that there are differences in learning achievement between bilingual students and regular students. Student achievement is measured by the Grade Point Average (GPA), where bilingual students have an average GPA of 3.50 and regular students of 3.41. The results of the study show that the achievement of bilingual students has a higher average GPA when compared to regular students. The difference in learning achievement is more or less influenced by the benefits obtained from entering a bilingual class. The real difference is in the mastery of English where bilinguals are superior. Bilingual students also have advantages in utilizing and studying foreign literature. The difference in the number of students which is smaller than the regular class has made the learning process different. Bilingual classes become more active and responsive so that learning goes in two directions.

REFERENCES

[1] F. T. Aldila and E. F. S. Rini, "Teacher's Strategy in Developing Practical Values of the 5th Pancasila Preepts in Thematic Learning in Elementary School," *Journal of Basic Education Research*, vol. 4, no. 1, 2023.

[2] F. T. Aldila, E. F. S. Rini, S. W. Oktavia, N. N. Khaidah, F. P. Sinaga, and N. Sinaga, "The Relationship of Teacher Teaching Skills and Learning Interests of Physics Students of Senior High School," *EduFisika: Jurnal Pendidikan Fisika*, vol. 8, no. 1, 2023.

[3] F. T. Aldila, R. P. W. Yuda, M. Wulandari, and A. P. Ningsi, "Deskripsi Keterampilan Proses Sains Siswa SMAN 10 Muaro Jambi pada Materi Kesetimbangan pada Tali," *Jurnal Pendidikan Fisika*, vol. 9, no. 2, pp. 112-119, 2021.

[4] D. Astalini, Darmaji, D. A. Kurniawan, R. P. Wirayuda, W. A. Putri, E. F. S. Rini, A. A. B. Ginting, and T. Ratnawati, "Impact of Science Process Skills on Thinking Skills in Rural and Urban Schools," *International Journal Instruction*, vol. 16, no. 2, pp. 803-822, 2023.

[5] D. Darmaji, A. Astalini, D. A. Kurniawan, and F. T. Aldila, "Gender and Perception: Implementation of Web-based Character Assessment in Science Learning," *International Journal of Instruction*, vol. 15, no. 4, pp. 311-338, 2022. [Online]. Available: https://doi.org/10.23887/jere.v6i1.37737.

[6] D. Defina, "Model Penelitian dan Pengembangan Materi Ajar BIPA (Bahasa Indonesia bagi Penutur Asing)," *Indonesian Language Education and Literature*, vol. 4, no. 1, pp. 36-51, 2018. [Online]. Available: https://doi.org/10.24235/ileal.v4i1.3012.

[7] U. Faizah, "Etika Lingkungan dan Aplikasinya dalam Pendidikan Menurut Perspektif Aksiologi," *Filsafat Indonesia*, vol. 3, no. 1, pp. 14-22, 2020.

[8] Y. Fitriani, Yani, and I. A. Azis, *Literasi Era Revolusi Industi 4.0*, 2019, pp.100.

[9] D. A. Kurniawan, N. N. Qoidah, M. Zannah, and E. Triani, "Character Values of Tenth-Grade Students during Learning Physics in Vector Material," *JPI (Jurnal Pendidikan Indonesia)*, vol. 12, no. 1, 2023.

[10] A. Hudaya, "Pengaruh Gadget Terhadap Sikap Disiplin Dan Minat Belajar Peserta Didik," *Research and Development Journal of Education*, vol. 4, no. 2, pp. 86-97, 2018. [Online]. Available: https://doi.org/10.30998/rdje.v4i2.3380.

[11] N. W. Idris, "Pengaruh Model Pembelajaran Berbasis Masalah Terhadap Kemampuan Berpikir Kritis Peserta Didik," *Jurnal Sains Dan Pendidikan Fisika*, vol. 16, no. 1, 2020.

[12] Kemendikbud, *Panduan Pengembangan Proyek Penguatan Profil Pelajar Pancasila*, Kementerian Pendidikan dan Kebudayaan, 2021.

[13] Kemendikbud, *Capaian Pembelajaran Pada Pendidikan Anak Usia Dini, Jenjang Pendidikan Dasar, dan Jenjang Menengah Pada Kurikulum Merdeka*, Kementrian Pendidikan Kebudayaan Riset dan Teknologi, 2022.

[14] Priyono, *Metode Penelitian Kuantitatif*, Zifatama Publishing, 2008.

[15] F. Rahmawati and I. R. W. Atmojo, "Analisis Media Digital Video Pembelajaran Abad 21 Menggunakan Aplikasi Canva pada Pembelajaran IPA," *Jurnal Basicedu*, vol. 5, no. 6, pp. 6271-6279, 2021. [Online]. Available: https://doi.org/10.31004/basicedu.v5i6.1717.

[16] Sugiyono, *Metode Penelitian dan Pengembangan*, Alfabeta, 2015.

[17] S. Sulfasyah and J. Arifin, "Implikasi Pendidikan Nonformal Pada Remaja," *Equilibrium: Jurnal Pendidikan*, vol. 4, no. 2, pp. 1-8, 2016. [Online]. Available: https://doi.org/10.26618/equilibrium.v4i2.506.

[18] S. Syahrial, D. A. Kurniawan, A. Asrial, H. Sabil, S. Maryani, and E. F. S. Rini, "Professional teachers: Study of ICT capabilities and research competencies in urban and rural?" *Cypriot Journal of Educational Sciences*, vol. 17, no. 7, pp. 2247-2261, 2022. [Online]. Available: https://doi.org/10.18844/cjes.v17i7.7590.

[19] U. Umar, "Filsafat Ilmu: Suatu Tinjauan Pengertian Dan Objek Dalam Filsafat Pengetahuan," *EL-Muhbib: Jurnal Pemikiran Dan Penelitian Pendidikan Dasar*, vol. 2, no. 2, pp. 160-170, 2018. [Online]. Available: https://doi.org/10.52266/el-muhbib.v2i2.392.

[20] Kamid, K., Iriani, D., & Nawahdani, A. M., "Scientific Learning and Process Skills Mathematics: Comparison and Relationship," *JPI (Jurnal Pendidikan Indonesia)*, vol. 11, no. 2, pp. 228-239, 2022, https://doi.org/10.23887/jpiundiksha.v11i2.37158

[21] Kurniawan, D. A., & Nawahdani, A. M, "Scientific Learning Model: Analytical Thinking and Process Skills in Mathematics," *Journal of Education Research and Evaluation*, vol. 6, no. 3, pp. 538-549, 2022. https://doi.org/10.23887/jere.v6i3.49159