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The Effectiveness of Problem-Based Learning in Improving Students' Digital Tabayyun Attitudes: Evidence from Islamic Religious Education Classrooms

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Abstract
The rapid development of digital technology makes it easier to access and share information. However, this also brings various problems, such as the spread of hoaxes, cyberbullying, and online gossip, which often involve teenage students. Therefore, cultivating a digital tabayyun attitude needs to be instilled through Islamic Religious Education (PAI) lessons. This study aims to determine the effectiveness of the Problem-Based Learning (PBL) method in improving the digital tabayyun attitude of seventh-grade students. The study uses a quantitative approach and an experimental method, employing a One-Group Pretest-Posttest Design. Data were collected through a pre-test, implementation of PAI learning using the PBL method, and a post-test administered with a digital tabayyun attitude scale instrument. The results showed that the average digital tabayyun attitude score of students increased from 76.91 in the pre-test to 84.00 in the post-test. The paired sample t-test results showed a significance value of < 0.001, indicating a significant difference between the conditions before and after applying the PBL method. Meanwhile, the N-Gain test results had an average of 29.78%, which falls into the low category. These findings suggest that the Problem Based Learning method can have a positive and significant impact on improving students' digital tabayyun attitudes, even though the level of effectiveness is still considered low. Therefore, a more continuous implementation is needed so that the development of the digital tabayyun character can grow optimally.
Keywords: *Problem Based Learning; Islamic Religious Education; Digital Tabayyun*

Abstrak
Perkembangan teknologi digital yang semakin pesat memberikan kemudahan dalam memperoleh dan menyebarkan informasi. Namun, kondisi tersebut juga menimbulkan berbagai permasalahan, seperti penyebaran hoaks, cyber-bullying, dan cyber-ghibah yang banyak melibatkan siswa usia remaja. Oleh karena itu, sikap tabayyun digital perlu ditanamkan melalui pembelajaran Pendidikan Agama Islam (PAI). Penelitian ini bertujuan untuk mengetahui efektivitas metode Problem Based Learning (PBL) dalam meningkatkan sikap tabayyun digital siswa kelas VII. Penelitian menggunakan pendekatan kuantitatif dengan metode eksperimen melalui desain One-Group Pretest-Posttest Design. Pengumpulan data dilakukan melalui pemberian pre-test, pelaksanaan pembelajaran PAI menggunakan metode PBL, dan post-test menggunakan instrumen skala sikap tabayyun digital. Hasil penelitian menunjukkan bahwa rata-rata skor sikap tabayyun digital siswa meningkat dari 76,91 pada pre-test menjadi 84,00 pada post-test. Hasil uji paired sample t-test memperoleh nilai signifikansi < 0,001 yang menunjukkan adanya perbedaan yang signifikan antara kondisi sebelum dan sesudah penerapan metode PBL. Sementara itu, hasil uji N-Gain memperoleh rata-rata sebesar 29,78% yang termasuk dalam kategori rendah. Temuan ini menunjukkan bahwa metode Problem Based Learning mampu memberikan pengaruh positif dan signifikan terhadap peningkatan sikap

tabayyun digital siswa, meskipun tingkat efektivitas peningkatannya masih tergolong rendah. Dengan demikian, diperlukan penerapan yang lebih berkelanjutan agar pembentukan karakter tabayyun digital dapat berkembang secara optimal.
Kata kunci: *Problem Based Learning; Pendidikan Agama Islam; Tabayyun Digital.*

Introduction

The development of information and communication technology has changed the landscape of social interactions among teenagers, including seventh-grade middle school students who are in the transitional phase toward early adolescence (Ramdhani et al., 2026). Ideally, digital spaces and social media should serve as educational tools to broaden students' perspectives and improve their information literacy (Rizqiyah et al., 2025). However, in reality, this freedom of digital access is not matched by emotional maturity and the ability to filter information (Zulkifli et al., 2025). Students at this age are very vulnerable to getting caught up in the spread of false information (hoaxes), cyberbullying, and the habit of talking about others negatively in digital spaces (cyber-ghibah). The lack of awareness to verify information fills students' digital environment with assumptions and interpersonal conflicts that blur the values of noble character (Puspito et al., 2023). As a result, they tend to easily believe and spread information without checking it first. This situation shows that students' attitudes toward digital verification still need improvement so they can be critical and responsible when using digital media (Ilman & Kanus, 2026).

The phenomenon of digital vulnerability among seventh-grade students is supported by the fact on the ground showing their high dependence on instant messaging apps like WhatsApp and social media like TikTok and Instagram. Based on observations and preliminary research at school, conflicts between students are often triggered by screenshots of chats being spread without full context, as well as speculative comments that corner one party. Many students immediately believe, react emotionally, and share negative information about their friends or teachers before knowing the real truth. This copycat behavior, without confirmation, is clear evidence that students' skills in validating information remain at a worrying level.

To address the moral crisis in the digital space, instilling the attitude of tabayyun (clarification and verification) becomes an absolute necessity in Islamic religious education. In the modern era, this concept has transformed into digital tabayyun, which is the conscious behavior of checking the credibility of sources and the accuracy of

information before trusting or sharing it online (Herman & Makassar, 2025; Ramdani, 2026). One pedagogical approach that is theoretically considered capable of fostering this critical attitude is the Problem-Based Learning (PBL) method or Case-Based Learning. Through PBL, students do not merely memorize the principles of tabayyun, but are directly confronted with simulated contextual cases (such as hoax news scenarios or group chat gossip) (Fuadah, 2025), training them to think critically, analyze the impact, and independently formulate steps for clarification.

Several previous studies have extensively explored the implementation of the Problem Based Learning method in Islamic religious education, and it has been studied by academics with various focuses. In the context of social ethics material, research by Walahe (2022) at SMPN 4 Anggrek shows that applying the PBL model is proven effective in solving real problems related to gossip phenomena among Generation Alpha teenagers. Through problem stimuli in the form of everyday case illustrations, this model successfully shifted conventional learning patterns, boosting students' cognitive learning outcomes significantly from the pre-cycle to achieving 100% mastery in cycle II. In line with this, research by Najmuddin and Rizal (2023) at SMPN Satap 4 Sematu Jaya also confirmed that the PBL syntax, which emphasizes independent problem-solving techniques, can boost positive classroom interactions, with the average formative test scores consistently rising from 60 in cycle I to 80 in cycle II. In addition, another study by Prawira et al. (2025) expands the scope of PBL success by shifting the focus from merely cognitive mastery to the development of students' affective-social aspects from an early age. Through a literature study method, Prawira et al. emphasized that involving students in solving contextual problems related to diversity and socio-religious dilemmas can stimulate perspective-taking skills, which in turn effectively shapes empathetic reasoning and a moderate attitude. Although this model faces challenges in terms of long time management and high creative demands on teachers in designing modules, the findings confirm that the PBL syntax is operationally very relevant for transforming Islamic normative values into inclusive character awareness. Based on a review of several previous studies, it has indeed shown the success of the PBL model, but the focus has been limited to the cognitive realm, such as students' learning mastery and formative test scores in class through Classroom Action Research (PTK). On the other hand, the research still relies on library study designs, so the effectiveness of the instruments hasn't been tested empirically in the field. There hasn't been any study that specifically measures to what extent the PBL model can transform

the concept of traditional tabayyun morals into a practical competency, namely students' digital tabayyun attitude, measured using a rigid quantitative approach.

Based on mapping previous literature, most studies on the implementation of Problem Based Learning (PBL) in Islamic Education (PAI) are still stuck using Classroom Action Research (CAR), with their success outputs limited to the cognitive domain, such as learning achievement and formative test scores. On the other hand, studies discussing adolescent cyber morality generally still use library research designs, so the effectiveness of their instruments has not been empirically tested in the field. The clear research gap in this context is that there hasn't been a study specifically measuring how far the PBL model can transform the concept of theological-normative morality into practical-affective competence, namely students' digital tabayyun attitude, measured using a rigid quantitative experimental approach. This research comes to fill that gap by shifting the focus from cognitive-academic performance to changes in students' affective-psychomotor aspects in responding to the reality of cyber misinformation.

Based on this urgency, this study focuses on answering two main questions: (1) what the students' digital tabayyun attitude looks like before and after being given interventions based on real-world cyber problems, and (2) whether there is a difference and a significant improvement in students' digital tabayyun attitude after applying the PBL method based on the paired sample t-test. Through these answers, the effectiveness of this model in transforming students' moral-religious competence in the digital era can be proven empirically and validly.

Based on the research questions posed, this study aims to empirically test and prove the effectiveness of the Problem Based Learning (PBL) method in Islamic Education (PAI) learning for improving the digital tabayyun attitude of seventh-grade students. Specifically, this study is intended to describe the comparison of students' attitude profiles before and after the intervention, as well as to analyze the significance of the PBL model's influence on changes in students' digital behavior through a paired sample t-test.

Method

This study uses a quantitative approach with an experimental method through a One-Group Pretest-Posttest Design. The experiment was conducted on a single group without a control group for comparison. The research population includes all seventh-grade students at the school being studied, with the sampling technique using purposive

sampling (Creswell, 2015). The selected sample focuses on one class consisting of 32 students, who also act as the experimental group. The independent variable in this study is the intervention of the Problem Based Learning (PBL) method in PAI learning, while the dependent variable is the students' Digital Tabayyun Attitude.

The data collection process was carried out in three stages: giving a pre-test to measure the students' initial attitudes, implementing the treatment in the form of PAI learning based on PBL syntax that includes a cyber moral dilemma scenario, and ending with a post-test using the same attitude scale questionnaire instrument. The data analysis technique in this study used two main statistical tests with the help of SPSS software. First, a paired sample t-test was used to test the significance of changes or differences in students' attitude scores before and after the treatment, after ensuring the data met the normality test requirements. Second, the Normalized Gain (N-Gain) test was applied to measure the level of effectiveness and the amount of increase in students' digital tabayyun attitudes specifically. The N-Gain score obtained is then categorized based on the score index (high, medium, low) and the percentage of interpretation of effectiveness to understand the actual efficacy of the PBL method applied. But before moving on to the analysis, the researcher first determines the hypothesis.

Results and Discussion

The Context of Islamic Education Learning and the Digital Characteristics of 7th Grade Students

Before presenting the data analysis on the effectiveness of the Problem Based Learning method, it's important to first understand the students' contextual background and the learning process that has been carried out. Seventh-grade students at SMP Negeri 2 Cikajang are generally digital natives who have high access to gadgets and social media like TikTok, Instagram, or WhatsApp. However, this high level of digital interaction has not yet been matched with digital literacy based on Islamic values, especially the principle of tabayyun as mandated in QS. Al-Hujurat verse 6:

يٰٓاَيُّهَا الَّذِيْنَ اٰمَنُوْٓا اِنْ جَاۤءَكُمْ فَاسِقٌۢ بِنَبَاٍ فَتَبَيَّنُوْٓا اَنْ تُصِيْبُوْا قَوْمًاۢ بِجَهَالَةٍ فَتُصْبِحُوْا عَلٰى مَا فَعَلْتُمْ نٰدِمِيْنَ

It means: "O you who have believed, if a sinful person comes to you with important news, then verify its truth so that you do not harm a people out of ignorance, which would lead you to regret your actions." (Q.S. Al Hujurat:6)

As a result, students are vulnerable to becoming both consumers and spreaders of information whose truth is unclear. Conventional Islamic Education (PAI) learning, which tends to be theoretical, often struggles to touch the digital realities that students face daily. Therefore, the application of the Problem Based Learning (PBL) method in this study is presented as a bridge between the theological doctrine of tabayyun and contemporary reality. Through this method, PAI material is no longer just about memorization but transforms into a tool for students to critically analyze and solve problems in the online world.

Students' Digital Tabayyun Attitude Profile Before and After Implementing the PBL Model

Data refers to all kinds of information or details related to a situation, phenomenon, or event (Febriani et al., 2023). In this study, the type of data used is quantitative data, which is data in the form of numbers, where facts and phenomena are not presented in natural language but in numerical form (Fitri et al., 2023). The data used comes from students' exam scores before applying the PBL method and their scores after using the PBL method.

The first step in data analysis is to establish the research hypothesis. A hypothesis is a temporary statement whose truth still needs to be proven through testing (Anuraga et al., 2021). Thus, a hypothesis can be understood as an initial guess or a temporary answer that needs to be tested to verify its accuracy (Maskhuliah et al., 2025). In the context of statistics, a hypothesis is defined as a statement about the condition of a population (parameter) that will be tested based on data obtained from a research sample (statistic) (Wulansari, 2018). The hypothesis in this study is as follows:

a. H_0: There is no difference in the digital tabayyun attitude of 7th-grade students before and after applying the Problem Based Learning (PBL) method in PAI lessons.
b. H_1: There is a difference in the digital fact-checking attitude of seventh-grade students before and after applying the Problem Based Learning (PBL) method in Islamic Education lessons.

The second stage in data analysis in this study is carried out through descriptive statistics, which is a method used to process, summarize, and present data so that it is easier to understand, for example in the form of tables or charts (Martias, 2021); (Subhaktiyasa et al., 2025). By using numerical and visual data, descriptive statistics help

identify patterns in data sets, summarize existing information, and present it according to needs (Terimajaya et al., 2024). The results of the descriptive test are presented in the following table:

Tabel 1. Descriptive Statistics

	N	*Minimum*	*Maximum*	*Mean*	*Std. Deviation*
Before_PBL	*32*	*60,00*	*86,00*	*76,9063*	*5,66460*
After_PBL	*32*	*75,00*	*90,00*	*84,0000*	*3,86047*
Valid N (listwise)	*32*				

Based on the descriptive data presented in Table 1, there is a noticeable change in students' score indicators before (pre-test) and after (post-test) applying the Problem Based Learning (PBL) method. Before the PBL intervention, students had a minimum score of 60.00 and a maximum score of 86.00, with an average (mean) score of 76.91 and a standard deviation of 5.66. This relatively large standard deviation indicates that the initial variation in students' abilities related to tabayyun attitude was still quite high. However, after implementing the PBL method, the students' score profile showed a positive shift, with the minimum score rising to 75.00, the maximum score reaching 90.00, and the overall average increasing steadily to 84.00. In addition, the post-treatment standard deviation dropped to 3.86, which proves that the distribution of students' abilities after receiving the intervention became more even and didn't vary as much as before. It can be concluded that before applying the PBL method, the students' average score was 76.90 with a fairly large data spread of 5.66, indicating that the variation in students' scores was still quite high. The histogram results before applying the PBL method are presented in the following image:

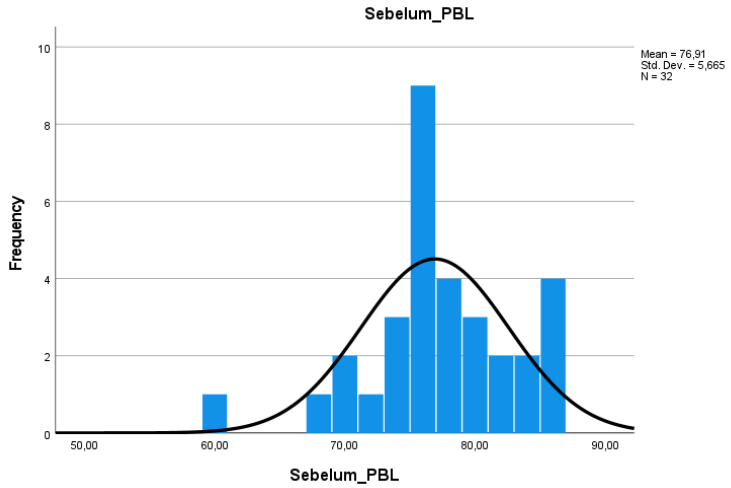

Figure 1. Histogram Before the Problem-Based Learning Method

After using the PBL method, the average student score increased to 84.0000. In addition, the standard deviation became smaller, namely 3.86, which means that the student scores became more even or not too varied. The histogram results after applying the PBL method are presented in the following image:

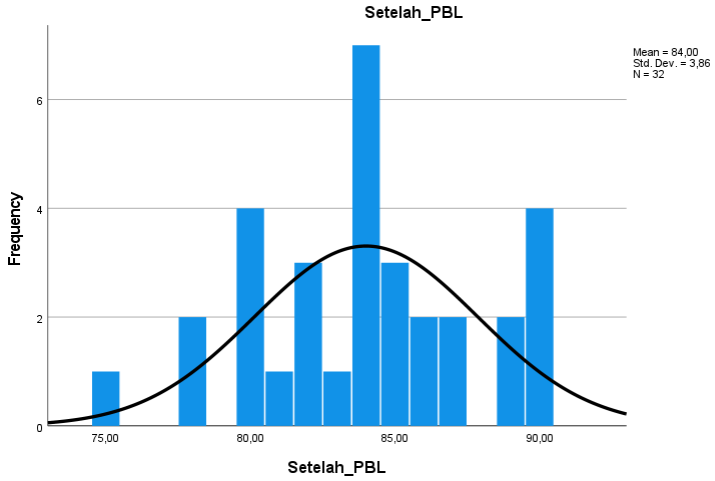

Figure 2. Histogram After the Problem-Based Learning Method

The third stage of data analysis is conducting a normality test. A normality test is a procedure to assess whether the collected data is normally distributed and therefore suitable for use in parametric (inferential) statistical analysis (Nasar dkk., 2024). In other words, this test aims to determine whether the empirical data from the field matches a certain theoretical distribution (Priati dkk., 2022). The results of the data Normality test are as follows:

Tabel 2. Data Normality Test

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Before_PBL	,118	32	,200*	,945	32	,105
After_PBL	,125	32	,200*	,960	32	,270
*. This is a lower bound of the true significane a. Lilliefors Significance Correction						

The results of the prerequisite analysis were carried out using the Kolmogorov-Smirnov and Shapiro-Wilk normality tests to ensure the distribution of student attitude scores. The analysis results showed a significance value (Sig.) before the PBL method intervention (pre-test) of 0.200 (Kolmogorov-Smirnov) and 0.105 (Shapiro-Wilk). Meanwhile, the significance values after the PBL intervention (post-test) were 0.200 (Kolmogorov-Smirnov) and 0.270 (Shapiro-Wilk). Since all significance values were consistently greater than 0.05 (Sig. > 0.05), it can be concluded that the digital tabayyun

attitude scores of students, both before and after the PBL method implementation, are normally distributed. This indicates that the data meet the normality requirements and are suitable for use in parametric statistical analysis, namely the paired t-test (Paired Samples Test). Here is also the distribution of the Normal Q-Q Plot data before and after applying the Problem Based Learning method in the following figure:

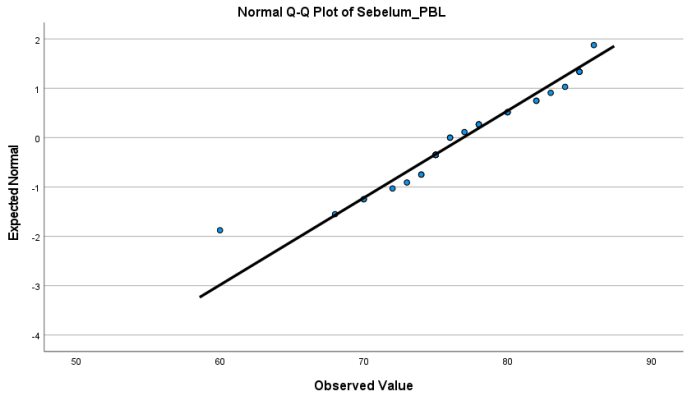

Figure 3. Normal Q-Q Plot Before Problem-Based Learning Method

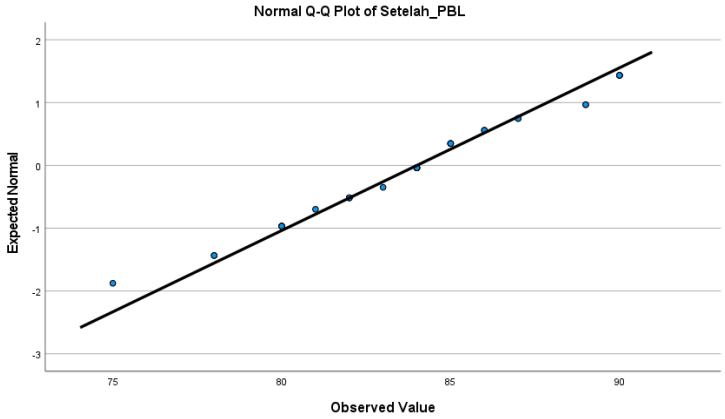

Figure 4. Normal Q-Q Plot After Problem Based Learning Method

Based on the comparison of the Normal Q-Q Plot graphs Before PBL and After PBL, both show a point pattern that tends to follow the diagonal line. This indicates that both the data before and after the PBL method are normally distributed. However, there are slight differences in their spread patterns. In the Before PBL data, there are minor deviations in some points, especially in the lower values, making the spread appear less close to the diagonal line. Meanwhile, in the After PBL data, the data points look closer and follow the diagonal line more consistently. This shows that after implementing the PBL method, the data distribution becomes more stable and closer to normal compared to before. Therefore, both datasets meet the normality criteria, but the data after treatment shows a better distribution pattern.

The fourth step in data analysis is performing parametric statistical tests, which are used because the data has been shown to follow a normal distribution. Parametric statistics are part of inferential statistical methods that focus on population parameters, like the mean (μ), standard deviation (σ), and so on. Generally, this approach uses interval or ratio scale data in numerical form (Wulansari, 2018).

Analysis of the Significance of Changes in Students' Digital Tabayyun Attitudes

In this study, the analysis technique used is the t-test, specifically the paired sample t-test. The t-test is a method used to test comparative hypotheses or see differences, especially in small sample sizes with unknown population variance (Waluyo et al., 2025); (Fitri et al., 2023). The paired sample t-test is a test conducted on two paired samples, meaning samples with the same subjects but undergoing two different treatments (Arman, 2019). Through this test, researchers can find out the average difference between two conditions, namely before and after the treatment (Wulansari, 2018). The results of the paired sample t-test are as follows:

Tabel 3. Paired Samples Test Results

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Before_PBL	76,9063	32	5,66460	1,00137
	After_PBL	84,0000	32	3,86047	,68244

The Paired Samples Statistics results show that the average score before applying the PBL method was 76.9063 and the average score after applying the PBL method was 84.0000. There was an increase in the average score after applying the PBL method, by 7.0937.

After applying the PBL method, students' scores increased by around 7.09 points. In addition, the standard deviation after using the PBL method became smaller, indicating that the score distribution became more uniform than before. Also, there is output data showing the relationship or correlation between the two variables, presented in the following table:

Tabel 4. Paired Samples Correlation Results of Students' Digital Tabayyun Attitude

Paired Samples Correlations				
		N	Correlation	Sig.
Pair 1	Before_PBL& After_PBL	32	,792	<,001

Based on the table of correlation results between the two variables above, it shows a Sig value of <,001, which means Sig < 0,05. This indicates that there is a significant relationship between the two variables.

To see the strength of this relationship, we can look at the correlation value, which is 0.792. This means the correlation value is in the range of 0.70-0.89, indicating that the correlation between the scores before and after the treatment applied is very strong and significantly related. Meanwhile, to see the difference in scores before and after the treatment was applied, you can see the following:

Tabel 5. Paired Samples T-Test Results of Students' Digital Tabayyun Attitude

Paired Samples Test									
Paired Differences									
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std.Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	Sebelum_PBL - Setelah_PBL	-7,09375	3,51365	,62113	-8,36056	-5,82694	-11,421	31	<,001

The next step is hypothesis testing. Based on the Paired Samples Test output, the significance value (Sig.) obtained is <.001. Since this value is smaller than 0.05 (Sig. < 0.05), H0 is rejected and H1 is accepted. Therefore, it can be concluded that there is a difference in the digital tabayyun attitude of seventh-grade students before and after applying the Problem Based Learning (PBL) method in PAI lessons.

After the results of the hypothesis testing showed a difference in students' tabayyun attitudes before and after the implementation of the PBL method, the final step in data analysis is to conduct the N-Gain test. This test aims to determine the level of improvement as well as the effectiveness of the PBL method. According to Edward Corcoran (2005: 4), the N-Gain test is used to measure the extent of students' understanding improvement after the learning process. The gain value is obtained from the difference between the posttest and pretest scores, so through this test, the amount of students' understanding improvement after learning can be known (Corcoran, 2005). The results of the N-Gain Test from this study are presented in the following table:

Tabel 6. N-Gain Calculation Value

Descriptives				
			Statistic	Std. Error
NGain_Persen	Mean		29,7799	2,19006
	95% Confidence Interval for Mean	Lower Bound	25,3133	
		Upper Bound	34,2466	
	5% Trimmed Mean		30,6655	
	Median		29,8148	
	Variance		153,483	

	Std. Deviation	12,38884	
	Minimum	-13,33	
	Maximum	53,13	
	Range	66,46	
	Interquartile Range	8,40	
	Skewness	-1,458	,414
	Kutosis	4,721	,809

The N-Gain calculation on student scores shows an average of 29.7799 or 0.297799, which falls into the category of low improvement in students' tabayyun attitudes. The determination of the effectiveness of implementing the PAI learning model using the PBL method in improving students' tabayyun attitudes can be seen from the N-Gain value. Based on the obtained percentage, which is 29.7799%, the result falls into the ineffective category. Based on the N-Gain calculation, the improvement in students' tabayyun attitudes varied across individuals. Of the 32 students, 17 students (53.125%) achieved a moderate level of improvement, while 13 students (40.625%) showed a low level of improvement. In addition, one student (3.125%) experienced no improvement, and one student (3.125%) showed a decline in score. These findings indicate that most students experienced positive changes in their tabayyun attitudes after participating in the learning process, although the magnitude of improvement differed among students.

The inferential statistical analysis results in this study show very interesting and dynamic findings. On one hand, the paired sample t-test empirically proves that the implementation of the Problem Based Learning (PBL) method has a very significant positive effect on changing students' digital tabayyun attitudes, as the Sig value is less than 0.05. The linear increase in the average score from 76.91 to 84.00, along with the strengthened correlation between variables at 0.792, indicates that this cyber problem-based learning model intervention can trigger students' critical awareness.

Procedurally, this improvement happens because the entire syntax of the PBL method forces students to shift their roles from passive information consumers to active cyber investigators. When students are faced with problem-oriented stimuli like hoax news, disinformation, and contemporary digital polarization cases, they are required to conduct independent investigations, engage in group discussions, and develop critical reasoning before drawing conclusions. This activity directly internalizes the theological spirit outlined in QS. Al-Hujurat verse 6, where the process of verifying the truth of news (cross-checking) is positioned as a key moral pillar to prevent reckless actions in digital public spaces.

The findings about this significant impact align with previous studies by Walahe (2022) and Najmuddin and Rizal (2023), which confirmed that context-based problem learning models have a comparative advantage in stimulating students' critical thinking in religious subjects. However, the new contribution of this study goes further by proving that the PBL model is not only effective in the cognitive domain but also capable of reducing reactive behavior in 7th-grade students (as a representation of Gen Z) who are prone to getting caught up in destructive cyber trends on social media like TikTok, Instagram, and WhatsApp.

However, a deeper analysis using N-Gain Score testing reveals a crucial paradox to unpack. The average N-Gain achievement, which only reached 29.78%, places the effectiveness of this PBL method in the 'Low' or 'Ineffective' category. Statistically, this happens because the students' initial scores (pre-test) were actually quite high (average 76.91). Due to this high starting understanding, the room for achieving maximum improvement scores is relatively narrow, which mathematically results in a low N-Gain value.

However, if viewed from the perspective of developmental psychology and digital sociology, this gap in outcomes reveals the objective reality in the field that changing affective-psychomotor aspects (Attitude and Character) digitally is much more resistant and complex than improving cognitive abilities. Referring to the conceptual study by Prawira et al. (2025), the main obstacle in implementing PBL is the limited time for experiments amid the strong gadget habitus in early teenage children. Seventh-grade students have already developed very intense daily social media habits, which psychologically condition them to act instantly, reactively, and crave cyber validation through clicks, likes, or shares.

Although the PBL syntax successfully opened their horizons and critical awareness in the classroom (as evidenced by significant t-test results), the relatively short duration of the experimental intervention wasn't enough to permanently break the impulsive cyber culture when students returned to real life. This fact is reinforced by the individual distribution data in the N-Gain test, where even though 53.13% of students managed to reach the 'Moderate' improvement category, there were still 40.63% of students stuck in the 'Low' category, and some even experienced stagnation or a drop in scores.

The fluctuations in individual data show that building a healthy and moderate digital tabayyun character can't be achieved instantly through short-term problem-

solving at school. This paradoxical finding has new theoretical implications for developing an adaptive Islamic Education curriculum: the PBL method has proven to be very effective as a trigger for moral religious awareness in cyberspace, but it requires a longer, continuous treatment period, along with support from a digital monitoring ecosystem outside of school, to be able to accelerate the effectiveness of student behavior changes on a larger scale.

Conclusion

Based on the results of the data analysis and discussion presented, it can be concluded that the implementation of the Problem Based Learning (PBL) method in PAI lessons has a very significant positive effect on improving the digital tabayyun attitude of 7th-grade students at SMP Negeri 2 Cikajang. This is empirically proven through a paired sample t-test showing a significance value of less than 0.05, where descriptively the students' average scores jumped from 76.91 to 84.00 with a much more even distribution of ability. Nevertheless, testing with the N-Gain Score revealed a paradoxical fact where the level of effectiveness of this improvement falls into the low category with a percentage of 29.78% (considered ineffective). This gap in results shows that even though the PBL syntax is really effective in sparking students' theological-critical awareness in class, this model faces high psychological and sociological resistance from the reactive social media habits in students' real lives. In other words, intervening in the affective domain, like digital character, requires a much more complex and continuous ecosystem process than just aiming for cognitive score improvements.

Referring to the findings and limitations of this study, several strategic suggestions are recommended for stakeholders. For educators, PAI teachers are expected not to use the PBL method just as a temporary classroom learning tool, but to integrate it regularly with real cyber project assignments so that the attitude of tabayyun can solidify into a lasting character. Schools also need to build a healthy digital ecosystem through integrated synergy between teachers, homeroom teachers, and parents in monitoring and providing ongoing Islamic digital literacy outside of school hours. Finally, for future researchers who are interested in developing this topic, it's recommended to extend the duration of the experimental intervention (for example, a full semester) and combine the PBL method with practical digital monitoring or field experiment techniques so that the acceleration of real student behavior changes can be measured more optimally on a higher N-Gain scale.

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