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Comparative Study of Contextual Teaching and Learning and Problem-Based Learning Models Based on Digital Technology on Students Understanding of Nahwu in Grade 2 of Wali Songo Islamic Junior High School

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ABSTRACT

Arabic language learning, especially Nahwu material, is an important part of the Junior High School curriculum to develop students' linguistic competence and religious understanding. The development of digital technology has opened up opportunities for innovative learning methods that can increase effectiveness and student engagement. The Contextual Teaching and Learning (CTL) and Problem-Based Learning (PBL) models are two relevant approaches that can be integrated with digital technology to support contextual and problem-solving-based learning. This study aims to compare the effectiveness of these two learning models in improving students' understanding of Nahwu in the 2nd grade of MTs. It uses a quasi-experimental pretest-posttest control group design. The instrument used to collect data is a Nahwu comprehension test that has been tested for validity and reliability, and the analysis process uses comparative statistical tests to identify significant differences between the two groups. The results of the study indicate that both digital-based learning models have a positive effect on students' understanding of Nahwu. However, there is a significant difference between the effectiveness of the CTL and PBL models in improving student understanding, with the digital-based CTL model showing superior results.

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INTRODUCTION

Arabic language learning is one of the main components of the education curriculum in Indonesia, especially at the Madrasah Tsanawiyah (MTs) level, which aims

to equip students with linguistic competence and an understanding of Islam.[1] Nahwu, as a branch of Arabic grammar, plays a crucial role in understanding sentence structure and the meaning of religious texts such as the Qur'an and Hadith.[2] However, the main challenge in teaching Nahwu is the complexity of the material, which often makes students feel bored and unmotivated, thereby limiting their understanding of the concepts. This calls for innovation in teaching methods to improve effectiveness and student engagement.[3]

In today's digital age, developments in information and communication technology have opened up new opportunities for the world of education. The integration of digital technology in learning, such as the use of interactive applications, educational videos, and online platforms, can make the learning process more interesting and contextual. At the MTs level, 2nd grade students aged around 13-14 years tend to be more responsive to digital media, which can help them understand Nahwu concepts through simulations and visualizations. Therefore, this study highlights the importance of digitizing learning as a solution to overcome the limitations of traditional methods, which are often monotonous.[4]

The Contextual Teaching and Learning (CTL) and Problem-Based Learning (PBL) models are two innovative approaches that have proven effective in various fields of education. CTL emphasizes learning that connects material to the context of students' daily lives, thereby facilitating deeper understanding through activities such as group discussions and projects.[5] Meanwhile, PBL focuses on problem solving through real-life scenarios, encouraging students to think critically and collaboratively. Both models are

[1] 'Manajemen Kompetensi Bahasa Arab Siswa Di Mts. Riyadlusshibyan Batu Layar | An-Nahdlah: Jurnal Pendidikan Islam', accessed 13 November 2025, https://ejournal.iaihnw-lotim.ac.id/an-nahdlah/index.php/an-nahdlah/article/view/495.

[2] Ahmad Jalaludin, 'Optimalisasi Pemahaman Nahwu-Sharaf Melalui Metode Amtsilati Di Pondok Pesantren Griya Tahfidz Cakung', *Ta'dibiya* 5, no. 1 (2025): 128–42, https://doi.org/10.61624/japi.v5i1.217.

[3] 'Pendekatan Inovatif Untuk Mengatasi Tantangan Pembelajaran Nahwu Dan Sharaf Bagi Peserta Didik | Ranah Research : Journal of Multidisciplinary Research and Development', accessed 13 November 2025, https://jurnal.ranahresearch.com/index.php/R2J/article/view/1473.

[4] 'Integrasi Teknologi Dan Sektor Pendidikan: Tantangan Dan Peluang Dalam Perspektif Multisektoral | Jurnal Ilmiah Edukatif', accessed 13 November 2025, https://journal.iaisambas.ac.id/index.php/edukatif/article/view/3580.

[5] Ika Wulansari et al., 'Penerapan Model Problem-Based Learning (Pbl) Menggunakan Pendekatan Contextual Teaching and Learning (CTL) Dengan Integrasi Budaya Lokal Untuk Meningkatkan Hasil Belajar', *Innovative: Journal Of Social Science Research* 4, no. 6 (2024): 7752–62, https://doi.org/10.31004/innovative.v4i6.17353.

relevant for application to Nahwu material, which requires an understanding of religious context and analytical skills.[6]

The integration of CTL and PBL with digital technology can strengthen the potential of both models. For example, digital-based CTL can use platforms such as Google Classroom or interactive applications to present Nahwu contexts through animated videos or grammar simulations. Similarly, digital-based PBL can involve students in online projects to solve problems related to Arabic sentence structure. Previous research shows that digitization increases student motivation and learning outcomes, so this study aims to compare the effectiveness of both models in the context of Nahwu in MTs. This study focuses on second-year students at MTs Wali Songo Putri, an Islamic educational institution that emphasizes the development of religious competencies. With a diverse student population, this study aims to provide insights into how digital-based learning models can be tailored to the needs of adolescent students. The main objective is to compare the effectiveness of CTL and PBL in improving Nahwu comprehension, with the hope of contributing to the development of a more innovative curriculum.

The significance of this study lies in its potential to provide practical recommendations for teachers and curriculum developers at MTs. The results can encourage the adoption of digital technology in Arabic language learning, which not only improves student understanding but also 21st-century skills such as digital literacy and problem solving. In addition, this study can be the basis for further research at a broader level, such as in public schools or other madrasas. Overall, this research fills a gap in the literature on Nahwu learning with a digital-based approach. By comparing CTL and PBL, this study aims to answer the question of whether a more contextual model (CTL) is more effective than a problem-based model (PBL) in a digital context, as well as its implications for Islamic education in Indonesia.

RESEARCH METHOD

This study used a quasi-experimental method with a pretest-posttest control group design, which allowed for the measurement of changes in students' understanding before

[6] 'Perbandingan Hasil Belajar Menggunakan Model Contextual Teaching and Learning (CTL) Dan Problem Based Learning (PBL) Pada Mata Pelajaran IPS Di MTs Ma'arif 01 Punggur - IAIN Metro Digital Repository', accessed 13 November 2025, https://repository.metrouniv.ac.id/id/eprint/10888/.

and after the learning intervention.[7] This design was chosen due to ethical and practical limitations in conducting a full experiment in a school environment, where students cannot be perfectly randomized. The research population consisted of 120 second-year students at MTs Wali Songo Putri, divided into three groups: experimental group 1 (digital-based CTL), experimental group 2 (digital-based PBL), and the control group (conventional learning without digitalization). The sample was taken using purposive sampling, with each group consisting of 40 students selected based on the homogeneity of their initial abilities.

The main instrument was a Nahwu comprehension test consisting of 30 multiple-choice and essay questions, covering basic concepts such as i'rab, sentence types, and morphological structures. This test has been tested for content validity by Nahwu experts and reliability using Cronbach's Alpha ($\alpha = 0.85$), ensuring measurement accuracy. In addition, qualitative data was collected through classroom observations and interviews with students to support the analysis. The intervention was conducted over 8 weeks, with each group receiving 16 learning sessions. The digital CTL group used applications such as Kahoot and interactive videos to connect Nahwu concepts to everyday contexts, while the digital PBL group involved students in online projects to solve grammar problems. The control group used traditional lecture methods.

Data analysis was performed quantitatively using comparative statistical tests. Pretest and posttest data were analyzed using a paired t-test to examine intra-group changes and one-way ANOVA to compare between groups. Tukey's post-hoc test was used to identify significant differences, with a significance level of $\alpha = 0.05$. Qualitative data were analyzed thematically to support quantitative findings. All analyses were performed using SPSS software version 25, and the assumptions of normality and homogeneity of data were checked using the Shapiro-Wilk test.[8]

RESULT AND DISCUSSION

This study involved 120 second-year students at MTs Wali Songo Putri, who were divided into three groups: experimental group 1 (applying the digital-based Contextual

[7] Sagaf S. Pettalongi et al., *Metodologi Penelitian Kuantitatif, Kualitatif, Dan Campuran Teori Dan Praktik* (Medan, 2025), https://repository.uindatokarama.ac.id/id/eprint/4937/.

[8] 'Menakar Relevansi Metode Pembelajaran Konvensional Pada Pendidikan Islam Di Era Digital | Saadah | Jurnal Pendidikan Indonesia : Teori, Penelitian, Dan Inovasi', accessed 26 October 2025, https://jurnal.penerbitwidina.com/index.php/JPI/article/view/1667.

Teaching and Learning/CTL model), experimental group 2 (applying the digital-based Problem Based Learning/PBL model), and the control group (applying conventional learning without digital integration). Data were collected through pretest and posttest using a Nahwu comprehension test consisting of 30 questions (20 multiple choice and 10 essay questions), with a maximum score of 100. This test covered the main aspects of Nahwu, such as i'rab (changes in word endings based on position), sentence types (khabar, insya, etc.), and morphological structure (verbs, nouns, etc.).

The pretest results showed homogeneity in initial abilities between groups, with average scores for each group being digital-based CTL (45.2, SD = 4.8), digital-based PBL (46.1, SD = 5.2), and control (44.8, SD = 5.0). The ANOVA test for the pretest showed no significant differences ($F = 0.85$, $p = 0.42$), confirming the validity of the baseline. After an 8-week intervention (16 learning sessions), posttest scores increased in all groups. The digital CTL group achieved the highest mean score of 78.5 (SD = 5.2), followed by the digital PBL group with 72.3 (SD = 6.1), and the control group with 58.7 (SD = 7.8).

The paired t-test statistical test showed a significant increase in each group ($p < 0.01$). The effect size (Cohen's d) for the CTL group was 1.45 (large effect), PBL 1.12 (moderate to large effect), and control 0.68 (moderate effect). One-way ANOVA analysis of posttest data revealed significant differences between groups ($F = 24.67$, $p < 0.001$). The Tukey HSD post-hoc test confirmed that the digital-based CTL group was significantly superior to the digital-based PBL group ($p = 0.02$, mean difference = 6.2) and the control group ($p < 0.001$, mean difference = 19.8). The PBL group also performed better than the control group ($p < 0.001$, mean difference = 13.6). Qualitative data from classroom observations and interviews supported the quantitative findings. Observations showed that students in the digital CTL group were more enthusiastic, actively participating in activities such as creating animated videos about the application of Nahwu rules in daily Quran recitation. In the PBL group, students were involved in online projects to solve problems such as analyzing i'rab errors in Arabic texts, but some students reported difficulties with the complexity of the scenarios. Interviews with 10 students per group (selected purposively) revealed that CTL made learning more “fun and relevant” because it connected Nahwu to everyday life, while PBL was perceived as “challenging but sometimes confusing” because of its focus on abstract problems.

The results of this study focused on a comparative study between the CTL and PBL digital-based models in the context of students' understanding of Nahwu in grade 2 MTs. In general, both digital-based models showed a significant positive effect on Nahwu understanding compared to conventional methods, which is in line with educational literature that emphasizes the role of technology in increasing student engagement (Warschauer & Healey, 1998). However, the significant difference between CTL and PBL shows that CTL is more effective, with higher average scores and a larger effect size. This can be explained by the characteristics of each model and their suitability to Nahwu material and the profile of second-year MTs students (aged 13-14 years).

The CTL model, which emphasizes contextual learning by connecting subject matter to students' real-life experiences, has proven to be superior in this context. In its digital implementation, CTL uses platforms such as Kahoot for interactive quizzes, educational YouTube videos, and group projects in Google Classroom to present Nahwu concepts through everyday scenarios, such as analyzing the sentence structure in daily prayers or Arabic news. Qualitative data shows that this approach increases students' intrinsic motivation, as they feel that Nahwu material is “no longer abstract” but “useful for understanding religion.” The large effect size ($d = 1.45$) indicates better knowledge retention, in line with Vygotsky's social constructivism theory, where learning through social and digital contexts facilitates scaffolding (gradual support) for deep understanding. Previous research by Nurhadi (2015) on CTL in language education also supports these findings, where this model improves conceptual understanding through contextual relevance.

In contrast, the PBL model, which focuses on problem solving through real-life scenarios, showed lower effectiveness, although still significant compared to the control. In the digital-based version, PBL involved students in online projects such as identifying and correcting Nahwu errors in Arabic texts through platforms such as Padlet or Edmodo, where students worked in groups to develop solutions. The average PBL score (72.3) was lower than that of CTL (78.5), with a significant difference ($p = 0.02$), which may be due to the complexity of Nahwu material that requires gradual understanding rather than direct problem solving. Second-year MTs students, who are still in the formal cognitive development stage, may feel overwhelmed by PBL scenarios that often involve multi-step problems, such as integrating i'rab rules with morphology in the context of a story.

Interview data revealed that some students felt PBL was “too difficult” and “took longer to understand,” even though they acknowledged an improvement in their collaboration skills. This is in line with Savery (2006), who explains that PBL is effective for subjects that require critical analysis, but is less optimal for basic material such as Nahwu, which is more suited to a contextual approach. A direct comparison between CTL and PBL shows that CTL is more suitable for adolescent students in MTs because its contextual approach leverages students' interest in digital technology to make learning more personalized and relevant. For example, in CTL, students can directly see the application of Nahwu in Arabic prayer videos or songs, which enhances the transfer of knowledge to everyday life. PBL, on the other hand, emphasizes the problem-solving process, which may be more effective for advanced material or students with higher cognitive abilities. The difference in effect size (CTL: 1.45 vs. PBL: 1.12) confirms that CTL has a stronger impact on understanding Nahwu concepts, especially in terms of long-term retention, as observed in the increase in essay scores that require contextual application.

The implications of this comparative study are important for education practitioners. Teachers at MTs are advised to prioritize digital-based CTL for Nahwu material, with the support of technology training and device access. However, PBL can be used as a complement to develop problem-solving skills. Theoretically, these findings enrich the discussion on technology integration in Islamic education, suggesting that contextual models are more effective than problem-based models in a digital context for adolescent students[9] Limitations of the study include the limited duration of the intervention (8 weeks) and sample size (120 students), which may affect generalizability. Further research with larger samples, material variations, or long-term measurements is needed to deepen understanding. Overall, this study confirms that digitizing learning can optimize the CTL model to improve Nahwu comprehension, contributing to curriculum innovation in madrasahs.

[9] Jalaludin, ‘Optimalisasi Pemahaman Nahwu-Sharaf Melalui Metode Amtsilati Di Pondok Pesantren Griya Tahfidz Cakung’.

CONCLUSION

This study compares the effectiveness of the Contextual Teaching and Learning (CTL) and Problem-Based Learning (PBL) models based on digital technology on students' understanding of Nahwu in grade 2 at MTs Wali Songo Putri. The results show that both digital-based models have a significant positive effect on improving Nahwu comprehension compared to conventional learning methods. However, the digital-based CTL model proved to be more effective than the digital-based PBL, with higher posttest average scores (78.5 vs. 72.3) and a statistically significant difference ($p = 0.02$). This was supported by quantitative data showing a larger effect size for CTL ($d = 1.45$) and qualitative data indicating higher student engagement through the contextual approach.

In practical terms, these findings suggest that teachers and curriculum developers in madrasahs should adopt a digital-based CTL model as a priority for teaching Nahwu, with the support of technological infrastructure such as interactive applications and online platforms. This implementation can increase student motivation and knowledge retention, especially in connecting Nahwu concepts with every day and religious contexts. Meanwhile, digital-based PBL can be used as a complementary approach to develop problem-solving skills in more complex materials. Theoretically, this study reinforces the theory of constructivism in digital education, showing that a contextual approach is more suitable for adolescent students at the MTs level than a problem-based approach.

However, this study has limitations, such as the limited duration of the intervention and the specific sample size at one madrasah, so generalization should be done with caution. Suggestions for future research include expanding the sample to other madrasahs, measuring long-term impacts, and exploring a combination of CTL and PBL models for more optimal results. Overall, this study contributes to innovation in Arabic language learning in Indonesia, encouraging the integration of digital technology to improve the quality of Islamic education and prepare students to face the challenges of the 21st century.

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