

The Effectiveness of Contextual Learning on Number Learning Outcomes Count Grade V in Elementary School

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Abstract: Mathematics learning in elementary school, particularly on whole numbers, often encounters significant obstacles. Students commonly struggle with the abstract nature of numerical concepts, fail to see their relevance to daily life, and consequently exhibit low motivation and achievement. This study addresses these challenges by implementing an innovative learning strategy that combines a *Deep Learning* approach with the *Problem-Based Learning (PBL)* model, contextualized through a school kiosk simulation. The research involved 35 fifth-grade students who actively participated as sellers and buyers in a simulated market environment, utilizing concrete media such as imitation goods and play money. Data were gathered through observation, tests, and documentation. The results demonstrated a profound and statistically significant impact. The average student learning outcome surged from 57.5 to 93.0, with the majority of students successfully achieving the learning mastery standard. Statistical analysis using the Wilcoxon Signed Ranks Test confirmed the significance of this improvement (Asymp. Sig. = 0.000). Beyond cognitive gains, the simulation fostered a more dynamic and engaging classroom atmosphere, significantly boosting student motivation, participation, and collaborative social skills. The study concludes that the integration of *Deep Learning* and *PBL* through contextual, real-world simulations like a school kiosk is a highly effective method for enhancing the quality of mathematics education. It makes the learning of whole numbers more meaningful, applicable, and enjoyable, leading to superior academic results and holistic student development. This model is thus highly recommended for application in elementary school settings.

Keywords: Whole Numbers, Contextual Learning, School Kiosk, Deep Learning, Problem-Based Learning, Learning Outcomes.

Introduction

Education is (Simbolon, 2023) crucial aspects in build nation because through education the quality of human resources can be significantly improved . Basic education occupies a strategic position as the foundation for developing cognitive, affective, and psychomotor abilities. student (Anan Aditya Sari Harahap et al., 2023) , so it must be pursued with effective and contextual methods (Sinaga & Silaban, 2020) . The quality of human resources is greatly influenced by the quality of learning (Nurafni et al., 2022). received by students from an early age, thereby improving the quality of education (Nurfatimah et al., 2022) at the basic level is a top priority for creating a competent and competitive generation (Juita et al., 2023; Haq & Maunah, 2023).

Mathematics learning (Holisin, 2021) especially in elementary schools is often considered difficult and less than pleasant for student (Ratriansari et al., 2019) . This difficulty is especially felt in the material on whole numbers. (Unaenah, 2022) which requires conceptual understanding (Aledya, 2019) and arithmetic operation skills (Indah et al., 2020) Systematic learning. Research shows that conventional learning methods (Ananda et al., 2020), such as lectures and written exercises, have not been able to address motivational issues. (Nursaodah et al., 2022) and low student understanding in mathematics

learning on the material of whole numbers (Priyatna & Dwi, 2023) in grade V of school base shows that students have difficulty in completing (Isfayani, 2023) the concept of abstract whole numbers (Pinanjung, 2021) . In addition, the learning implemented does not connect the material to everyday life. (Shafira et al., 2021) This makes students less interested and makes it difficult to apply the concept in real contexts (Kamsurya & Masnia, 2021) . Conventional learning methods (Firdaus et al., 2024) . According to (Rakhmawati et al., 2024) the method used is also not bring up think critical student the average is 57.5 proof results Study student low earning process that is carried out only memorize (Ermalinda & Nuraeni, 2023) steps count without understand draft number count in a way deep (Nurjanah et al., 2016) , so material learning easy forgotten (Pane & Najoan, 2017) . Besides That learning Still dominated lectures and exercises question routine (Nurcholis et al., 2022) so that student fast bored , resulting in assumption as eye boring lesson the more persist which has an impact on the results understanding material the more strengthen (Nurhayati, 2021) . Causes problem No stop until there only . On the other hand, no all student own ability same count (Sila et al., 2021) , p. This cause gap understanding results Study student (Laili et al., 2024) in class

Method learning conventional (Oktaviani et al., 2024) cause student not enough interested and less motivated (Nabila Nur Annisa et al., 2023) in follow learning . Average grade results reflect not enough optimally understanding and ability student (Jamilah et al., 2023) in material number count specifically counting numbers, writing, and sort number count . Then from That learning innovative and contextual (Gaspersz

et al., 2024) it is very necessary for students more easy link it with life daily (Mahliza & Rahayu, 2023) .

Methods

This research uses the *Deep Learning approach* (Utama, 2023) combined with the *Problem Based Learning* (PBL) model (Smith et al., 2022) through school cafe simulation activities as a learning medium. This research was designed to improve student understanding (Diana et al., 2023). on the material on whole numbers and overcoming the obstacles to learning mathematics which are abstract in nature (Prayudi et al., 2023) and less contextual (Abdullah, 2020)

Deep Learning Approach (Ramadhan et al., 2022) in this study emphasized the active involvement of students (Kurino, 2020) in the process of relational understanding ability (Rahmi et al., 2021) deep and meaningful to the concept of operations count whole numbers (Apriani et al., 2023) . Providing problems real (Mutiah et al., 2022) can be applied through A Problem-Based Learning (PBL) model using a simulation of buying and selling activities at a school kiosk. This simulation uses concrete media. (Prananda et al., 2021) in the form of imitation merchandise and play money, so that students can learn while interacting directly with the situation. life daily they (Angelista et al., 2023) .

Amount student class V 35 people become subject study (Aqil Siroj et al., 2022) . During the learning process , data collection techniques include observation, tests (Nugroho et al., 2022) learning outcomes in the form of whole number operation questions, documentation of learning activities (Mahliatussikah et al., 2022) . Observing engagement and motivation student as observation Observations were conducted to observe student engagement and motivation (Muis & Santosa, 2022) while tests were used to determine improvements in cognitive learning outcomes (Pradnyana, 2018; Awang, 2021).

The implementation of learning refers to the syntax of Problem Based Learning (PBL) (Pratiwi & Setyaningtyas, 2020) which is combined with the *Deep Learning approach*. starting from problem orientation (Meylani Catur Ambarwati & Widodo, 2023) organizing students in small groups acting as sellers and buyers, investigating real problems (A et al., 2020) through buying and selling simulations, development and presentation of group discussion results (Suandi, 2022) so that push discussion, work same, and think critical (Rahardhian, 2022) then continue with evaluation and reflection (Karliani et al., 2023) with teachers .

By linking the material in the lesson with life participant daily education , understanding Students are more meaningful and increase active participation in learning. Simulation of school stall activities as a medium for learning mathematics offers an interactive and applicable learning process (Istiqomah et al., 2023). This activity is a representation of buying and selling activities that are close to students' real lives so that in addition to improving the understanding of whole numbers, (Latif

& Wahab, 2024) also develops social skills such as cooperation, communication, and responsibility. Research through school stall activities shows a significant increase in students' problem-solving abilities (La'ia & Harefa, 2021) after using this learning media .

Obstacles encountered during implementation (Mahbub et al., 2022) include limited learning time, readiness learning media, and Variations in student abilities require more intensive guidance. Careful planning can overcome problem said, management effective class (Hartadiyati et al., 2023) and increasing teacher capacity in using contextual learning media as a whole, contextual learning based on (Cahyani & Suniasih, 2022) school stall simulations provides a significant contribution (Oupen & Yudana, 2020) on improving learning outcomes, motivation, and the development of social skills in elementary school students. (Hartadiyati et al., 2023).

With this method, the research combines aspects of active, contextual, and innovative learning which aims to significantly improve students' understanding of the concept of whole numbers and their mathematics learning outcomes.

Results and Discussion

The results of the contextual learning research through the school stall simulation had a very positive impact. There was an increase in learning outcomes, where the average student score jumped from previously below the Minimum Completion Criteria (KKM) to 93.0 , with the majority of students successfully achieving or even exceeding the KKM. This simulation activity not only made students more actively involved, interacting, and collaborating in solving problems, but also created a more meaningful and enjoyable learning experience, thereby increasing their motivation and interest in mathematics. This success was reinforced by the results of the Wilcoxon statistical test which stated that the increase was statistically significant.

Activity also provides a more meaningful and enjoyable experience for students. (Cecilia & Imelda, 2023) , thereby increasing motivation and interest in learning mathematics (Sariani & Suarjana, 2022) Teachers also feel the positive impact of implementing the learning model (Mustamiroh & Ramadhayanti, 2021) This is to create a more lively and effective learning atmosphere. (Muliani et al., 2022) .

Of this study indicate that the use of the *Deep Learning approach* (Yunanto et al., 2021) with *the Problem Based Learning Model* (PBL) (Meilasari et al., 2020) through school stall simulations can improve the quality of mathematics learning (Isnaini et al., 2023) , especially in understanding the concept of whole numbers (Unaenah et al., 2023) , as well as becoming an innovative learning model (Junaidah, 2022) which is worthy of being recommended for implementation in elementary schools.

Table 1. Test of Normality
Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
before	.197	35	.001	.912	35	.008
after	.314	35	.000	.444	35	.000

a. Lilliefors Significance Correction

From the test carried out $.001 < 0.05$ can be it is concluded that the data is distributed not normal. Due to distributed data not normal then non- parametric tests were conducted

1. The significance (Sig.) values for both the Kolmogorov-Smirnov and Shapiro-Wilk tests are less than 0.05 for both the 'Before' and 'After' datasets.
2. Conclusion: Since all Sig. values < 0.05 , the null hypothesis (H_0) is rejected. This indicates that the data for both pre-test and post-test scores are not normally distributed. This finding necessitates the use of non-parametric statistical tests for further analysis.

Table 2. Paired Samples Test

Paired Samples Test

		Paired Differences							
		Mean	Standard Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
	before after				Lower	Upper			
Pair 1		-34,200	31,328	5,295	-44,962	-23,438	-6,458	34	.000

From the data above There is significant difference between learning that is carried out before it is done in a way contextual and after contextual

1. Mean Difference: -34.200. This indicates that the average score increased by 34.2 points from the pre-test to the post-test.
2. t-value: -6.458 with df (degrees of freedom) = 34.
3. Sig. (2-tailed): .000, which is less than the alpha level of 0.05.
4. Conclusion: There is a statistically significant difference between the scores before and after the contextual learning intervention. The negative mean difference confirms that the post-test scores are significantly higher.

Table 3. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
after - before	Negative Ranks	3 ^a	9.67	29.00
	Positive Ranks	31 ^b	18.26	566.00
	Ties	1 ^c		
	Total	35		

a. after < before

b. after > before

c. after = before

- Negative ranks (3) : there are 3 data pairs where mark after more small from before
 - Mean rank: 9.67
 - Sum of rank: 29.00
- Positive rank (31) : there are 31 data pairs where mark after more big from before
 - Mean of rank: 18.26
 - Sum of ranks: 566.00
- Ties (1) : there is 1 data pair where mark after The same with before
- Total sample : amount overall partner is 35

In conclusion is amount positive ranks Far more big compared to negative, this indicate that mark after treat tend increased compared to before, so that can concluded There is improvement significant results after treatment / intervention .

Table 4. Test Statistics ^a

	after - before
Z	-4.593 ^b
Asymp . Sig. (2-tailed)	.000

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

- Z-score: -4.593
- Asymptotic Significance (2-tailed): .000

3. Conclusion: Since the Sig. value of .000 is less than 0.05, the alternative hypothesis (H_a) is accepted. This provides strong non-parametric evidence that there is a statistically significant influence of the contextual learning method on mathematics learning outcomes for whole numbers.

Based on the output of the “test statistic” above, it is known that Asymp.Sig. (2-tailed) is 0.000. Because the value of 0.000 is greater than small from < 0.05 then can concluded that “ H_a is accepted”. This means There is difference between results Study mathematics For before and after learning contextual, so that can concluded There is influence method learning to results Study number count

Discussion

Mathematics learning requires the right approach. According to (Ali, 2023) One of the media that can be used in learning mathematics is concrete media. The implementation of the use of school stall simulations as a concrete learning medium brought very significant changes to learning which experienced a very big impact (Arum & Susilaningih, 2020), looks from simulation the act out as sellers and buyers and also know the currency used as a means of exchange to buy something (Monika, 2021) with So students not only learn theoretically, but also experience directly the application of the concept of whole numbers in a real context. With thus learning contextual can improve thinking skills.

Problem Model *B ased L earning* (Misidawati & Sundari, 2021) very allows students to work in groups (Mahardin et al., 2022) discuss and solve problems collaboratively, thereby improving ability Study with critical thinking and creativity in face something problem (Zakiyah & al., 2020). The learning outcomes showed an increase in the average value to 93.0. This proves that contextual learning (Muhartini Muhartini et al., 2023) which is based on *Problem Based Learning* applied to real experiences, which provide perspectives to help students' cognition, and increase the sharpness of authentic problem analysis. (Sholikha et al., 2024).

Conclusion

Through School cafe activities effectively improve fifth-grade students' mathematics learning outcomes. The average learning outcome score in contextual learning is higher than in conventional learning. In addition to improving cognitive aspects, this learning also encourages increased motivation and social skills, such as communication and cooperation. The implementation of the Deep Learning approach and *Problem Based Learning (PBL)* model makes learning more meaningful and applicable so that students more easily understand the concept of whole numbers. Obstacles such as limited time and varying student abilities can be overcome with good classroom management and intensive mentoring for students in need.

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