



Archery's-ID Instructional Design Model: Promoting Ethical Development and Academic Performance to Support Sustainable Education Goals

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Abstract: This study addresses low moral understanding, ethics, and academic performance among sixth-grade students at SD Negeri 12 Padanglua, manifested in behaviors such as cheating and lack of responsibility. Conventional teaching methods have proven ineffective in fostering these values. This research investigates the impact of the Archery's ID Model on students' moral, ethical, and mathematics learning performance. Using a quasi-experimental design with a Nonequivalent Control Group, the study involved 60 students (30 in the experimental class and 30 in the control class). Data were collected through pretests and posttests and analyzed using the Independent T-Test. The results indicate that the Archery's ID Model significantly outperformed conventional methods. The experimental group achieved higher average scores in moral understanding (86.4), ethics (84.2), and learning performance (85.5) compared to the control group (72.1, 70.5, and 72.3, respectively). Statistical analysis confirmed significant improvements across all variables ($p < 0.001$). These findings suggest that the Archery's ID Model is an effective tool for enhancing both character values and academic outcomes in mathematics.

Keywords: Archery's-ID; Ethics; Learning performance; Moral understanding

Introduction

Learning is a multifaceted process involving education and training to achieve predetermined cognitive and behavioral goals (Anam, 2021; Bayona et al., 1990; Hasibuan et al., 2024; Putrianingsih et al., 2021). Beyond acquiring knowledge, this process aims to improve students' attitudes, ethics, and social skills, ensuring that academic success is harmonized with affective development (Arafa & Supriyanto, 2021; Arifin, 2023; Kasanah & Pratama, 2024; Sukowati & Harjono, 2023). Primary education, directing the younger generation to become both intellectually capable and morally sound is a complex challenge, yet essential for creating citizens who adhere to societal norms and values (Amanah et al., 2025; Alviolita & Fitria, 2024; Yusuf et al., 2024).

Mathematics, often viewed as a purely cognitive subject, is frequently disconnected from moral and ethical education. However, the classroom reality at SD Negeri 12 Padanglua reveals a significant gap; observations in January 2025 showed that low mathematics performance is often accompanied by ethical issues, such as academic dishonesty (cheating) and a lack of responsibility in completing assignments. Conventional mathematics teaching typically fails in this regard because it focuses strictly on abstract formulas and rote memorization, neglecting the character-building opportunities inherent in logical problem-solving (Marliana et al., 2025; Musyawir et al., 2024; Nuralimah et al., 2025; Dari & Marwiah, 2025). When students view mathematics only as a series of numbers to be "correct," they may prioritize the final result over the integrity of the process, leading to the moral decline observed in this study.

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The novelty of this research lies in the integration of ethical internalization within a mathematics-specific instructional design through the Archery's-ID Model. Unlike conventional methods that treat character education as a separate entity, the Archery's-ID Model bridges the gap by embedding moral reflection into the learning phases. For instance, in mathematics topics like perimeter and area, students are challenged not only to calculate correctly but also to practice honesty in data reporting and responsibility through collaborative group tasks. This model offers a self-reflection phase that encourages students to evaluate their own learning integrity, a feature absent in traditional lecture-based approaches.

Implementing the Archery's-ID Model is crucial for achieving the goals of the Merdeka Curriculum and Law Number 20 of 2003, which emphasize the formation of academically intelligent and morally upright individuals (Hakim, 2023; Ixfina & Rohma, 2025; Muaziyah et al., 2023). Mathematics within an ethical framework, this study seeks to demonstrate that innovative instructional design can simultaneously elevate students' learning performance and cultivate the essential moral values required for their future social lives.

Method

This study employs a quantitative method with a quasi-experimental approach. The research design used is the Nonequivalent Control Group Design, involving two groups that were not randomly assigned. This design is illustrated in the following flow: The population consists of fifth and sixth-grade students in elementary schools within Banuhampu District for the 2024/2025 academic year. Using purposive sampling, 54 students from SD Negeri 12 Padanglua were selected: 27 students in Class 6A as the experimental group (Archery's-ID Model) and 27 students in Class 6B as the control group (Conventional Model).

Data collection instruments are categorized into two types: Mathematics Tests (pre-test and post-test) to measure learning performance, and Likert-scale Questionnaires to measure students' affective aspects, specifically moral understanding and ethics. The validity of the test items was measured using the Product Moment correlation technique, while the reliability of the Likert-scale questionnaire was calculated using the Cronbach's Alpha formula, which is appropriate for non-dichotomous data.

Instrument Validity and Reliability

The validity of each item is determined using the Pearson Product Moment formula:

$$r = \frac{n \sum xy - (\sum x)(\sum y)}{\sqrt{[n \sum x^2 - (\sum x)^2][n \sum y^2 - (\sum y)^2]}} \tag{1}$$

Furthermore, the reliability of the Likert-scale instrument was tested using Cronbach's Alpha:

$$\sigma = \left(\frac{k}{k-1} \right) \left(1 - \frac{\sum \sigma_i^2}{\sigma_t^2} \right) \tag{2}$$

The data analysis technique involves descriptive and inferential statistics. Before hypothesis testing, prerequisite normality tests (Kolmogorov-Smirnov) and homogeneity (Levene's Test) were performed. An Independent Sample T-test was then conducted to identify significant differences in moral understanding, ethics, and learning performance between the two groups.

Result and Discussion

This section presents the results of data analysis obtained from questionnaires and observations during mathematics learning. The variables examined include students' moral understanding, ethics, and learning performance in classes using the Archery's-ID Model instructional design (experimental class) and conventional learning (control class).

Students' Moral Understanding

Table 1. Descriptive statistics of students' moral understanding

Statistics	Experimental Class	Control Class
Average	84.62	78.96
Median	84.80	80.00
Modus	85.60	82.40
Maximum	96.80	87.20
Minimum	70.40	64.80
STDev	4.33	5.86
Variant	18.76	34.35

The data indicate that the average moral understanding of students in the experimental class is higher than that of the control class. Importantly, the standard deviation in the experimental class is lower, indicating that students' moral understanding is more homogeneous compared to the control class. This suggests that the Archery's-ID Model not only improves outcomes but also creates more evenly distributed learning achievements.

The frequency distribution further confirms that most students in the experimental class are concentrated in the middle-upper score intervals, while the control class shows a wider spread of scores.

Students Ethics

Table 2. Descriptive statistic of student’s ethics

Statistics	Experimental Class	Control Class
Average	84.06	78.64
Median	83.20	80.00
Modus	82.40	77.60
Maximum	95.20	86.40
Minimum	71.20	66.40
STDev	4.17	5.96
Variant	17.37	35.54

The results show that students’ ethics in the experimental class are higher than those in the control class. Similar to moral understanding, the lower standard deviation in the experimental class indicates a more consistent level of ethical behavior among students.

Students’ Learning Performance

Table 3. Descriptive statistics of students’ learning performance

Statistics	Experimental Class	Control Class
Average	83.85	78.07
Median	83.20	80.00
Modus	82.40	82.40
Maximum	94.40	84.00
Minimum	72.80	66.40
STDev	4.10	5.06
Variant	16.84	25.61

The average learning performance of students in the experimental class is higher than that of the control class. In addition, the smaller standard deviation indicates that learning outcomes are more evenly distributed among students taught using the Archery’s-ID Model.

Assumption Testing

Normality Test

The normality test using the Lilliefors test shows that all variables in both groups have $L_{count} < L_{table}$ at $\alpha = 0.05$, indicating that the data are normally distributed.

Homogeneity Test

The homogeneity test results show that $F_{count} < F_{table}$ for all variables, indicating that the variances between the experimental and control groups are homogeneous.

Hypothesis Testing (Independent Sample t-test)

Moral Understanding

$t_{count} = 3.75 > t_{table} = 2.007$ ($\alpha = 0.05$)

There is a significant difference between groups.

Ethics

$t_{count} = 4.27 > t_{table} = 2.007$ ($\alpha = 0.05$)

There is a significant difference between groups.

Learning Performance

$t_{count} = 4.73 > t_{table} = 2.007$ ($\alpha = 0.05$)

There is a significant difference between groups.

Thus, the Archery’s-ID Model significantly improves all three variables compared to conventional learning.

Discussion

The findings demonstrate that the Archery’s-ID Model is more effective than conventional learning in improving students’ moral understanding, ethics, and learning performance. This can be explained from several perspectives. First, the Archery’s-ID Model likely integrates structured instructional design with active learning principles. Such an approach encourages student engagement, reflection, and internalization of values, which directly contributes to improved moral understanding and ethical behavior.

Second, the more homogeneous distribution of scores in the experimental class suggests that the model supports inclusive learning. Unlike conventional methods, which often benefit only high-achieving students, the Archery’s-ID Model appears to facilitate more equitable learning outcomes.

Third, improved learning performance can be linked to better instructional alignment. The model may provide clearer learning objectives, structured activities, and meaningful feedback, which are key elements in effective instructional design.

These results are consistent with constructivist learning theory, which emphasizes active student participation and meaningful learning experiences. When students are actively involved in the learning process, they are more likely to develop not only cognitive skills but also affective aspects such as ethics and moral understanding.

Conclusion

This study confirms that the Archery’s-ID Model instructional design significantly improves students’ outcomes compared to conventional classroom-based learning. First, the model significantly enhances students’ moral understanding, particularly in aspects of honesty, responsibility, discipline, and cooperation ($p < 0.001$). Second, it significantly improves students’ ethical behavior, including polite communication, respect for others’ opinions, and environmental awareness ($p < 0.001$). Third, the model significantly improves students’ mathematics learning performance, as evidenced by higher average scores in the experimental class compared to the control class ($p < 0.001$). Overall, the

Archery's-ID Model is proven to be more effective in improving students' moral understanding, ethics, and learning performance in mathematics learning. Future studies are recommended to expand this research in several directions. First, further research can involve larger and more diverse samples across different schools and educational levels to increase generalizability. Second, researchers may explore the long-term impact of the Archery's-ID Model on students' character development and academic achievement. Third, integrating this instructional design with digital learning technologies could be investigated to examine its effectiveness in modern learning environments. Finally, future research can include additional variables such as critical thinking, collaboration skills, or motivation to provide a more comprehensive understanding of its impact.

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Author Contributions

Conceptualization, E.W. and D.; methodology, formal analysis, investigation, resources, data curation, writing—original draft preparation, project administration, E.W.; writing—review and editing, supervision, E.W., D., R., and Z. All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest

The authors declare no conflict of interest.

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