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The Influence of the VCT (Value Clarification Technique) Learning Model Based on Local Wisdom on the Character Values of Elementary School Students

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ABSTRACT

This study investigates the effect of a local wisdom-based Value Clarification Technique (VCT) model on elementary students' personality character values in geometry learning. The research addresses the limited integration of character education within cognitively oriented mathematics instruction. The objective is to examine differences in personality character values between students taught using the VCT model integrated with the ulos sadum cultural motif and those receiving conventional instruction. A quantitative true experimental design with a posttest-only control group was employed. A total of 120 fourth-grade students were randomly assigned to experimental and control groups. Data were collected using a validated questionnaire measuring moral knowing, moral feeling, and moral action. Instrument validity and reliability were confirmed through confirmatory factor Analysis using PLS-SEM. Statistical analyses included normality and homogeneity tests, Pearson correlation, and simple linear regression. The results indicate a significant difference between groups, with the experimental group achieving higher character scores. The VCT model accounted for 54.5% of the variance in personality character values. The findings demonstrate that integrating value clarification with culturally contextualised mathematics learning effectively strengthens students' character development.

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1. INTRODUCTION

The integration of character development within mathematics instruction remains a persistent challenge in elementary education. National education policies emphasise character formation as a central curricular objective; however, classroom practices in mathematics continue to prioritise procedural competence and cognitive achievement [1],

[2]. The dominance of symbolic manipulation and mechanistic exercises restricts structured opportunities for developing affective and behavioural dimensions of learning [3], [4]. This discrepancy between policy mandates and pedagogical implementation reflects a substantive research problem: mathematics instruction has not been systematically designed to foster measurable character development alongside conceptual understanding.

Geometry learning in Grade IV exemplifies this issue. Instruction is commonly delivered through formal definitions and routine problem-solving activities detached from students' sociocultural realities [5]. Such instructional patterns fail to sufficiently cultivate the dimensions of moral knowing, moral feeling, and moral action that constitute personality character formation [6], [7]. Moral knowing involves rational comprehension of the values underlying actions; moral feeling entails emotional commitment to those values; moral action requires consistent behavioural enactment grounded in internalised principles. Learning environments that neglect contextual meaning fail to stimulate reflective engagement, leading to implicit, unstructured character development.

Constructivist theory provides a theoretical foundation for addressing this problem. Knowledge is actively constructed through interaction between prior cognitive structures and experiential stimuli [8]. The sociocultural perspective further emphasises that learning is mediated by symbols, cultural artefacts, and social interaction [9]. Mathematics learning that integrates local cultural contexts aligns with these theoretical perspectives by situating abstract concepts within meaningful experiences. The ulos sadum motif, for instance, embodies geometric forms such as squares, rectangles, and triangles, as well as symmetrical patterns consistent with Grade IV plane geometry competencies. These motifs originate from cultural traditions that represent perseverance, responsibility, precision, and collectivity [10]. Analytical exploration of geometric structures strengthens moral knowing through logical reasoning; reflection on symbolic meanings nurtures moral feeling; collaborative investigation promotes moral action. Cultural integration thus functions as both cognitive mediation and a structured pathway for value internalisation [11].

The Value Clarification Technique (VCT) provides a systematic pedagogical framework for operationalising this integration. The model structures value internalisation through the stages of choosing, prizing, and acting. The choosing stage promotes rational evaluation of alternatives, reinforcing moral knowing [12]. The prizing stage cultivates appreciation and commitment, corresponding to moral feeling. The acting stage requires the behavioural realisation of selected values, thereby strengthening moral action. The alignment between VCT stages and character dimensions demonstrates conceptual coherence and pedagogical feasibility within culture-based mathematics learning [13].

Previous studies have shown that ethnomathematics approaches enhance students' conceptual understanding and engagement in geometry learning [14]. Research on VCT implementation has demonstrated effectiveness in fostering social responsibility and positive attitudes in social studies contexts [15]. Empirical investigations also highlight the potential of culturally contextualised mathematics instruction to strengthen meaningful learning experiences [16]. Despite these contributions, prior studies predominantly emphasise cognitive outcomes or social attitudes, without systematically measuring integrated character dimensions in mathematics classrooms. Explicit mapping between VCT

stages (choosing, prizing, acting) and character constructs (moral knowing, moral feeling, moral action) in elementary geometry learning remains underexplored. This unaddressed conceptual and methodological gap necessitates empirical investigation [17].

The present study addresses this gap by proposing an instructional design that integrates the ulos sadum cultural motif with the structured stages of the Value Clarification Technique in Grade IV geometry instruction. The research problem addressed is whether such integration significantly influences students' personality and character values compared to conventional instruction. The study aims to analyse differences in personality characteristics between students exposed to local wisdom-based VCT learning and those receiving traditional procedural teaching.

This investigation is expected to make theoretical contributions by strengthening the linkage among constructivist learning theory, sociocultural mediation, and value clarification frameworks in mathematics education. Pedagogically, the study provides an operational model that balances cognitive achievement and character formation. Empirically, the findings are anticipated to offer evidence supporting culturally contextualised value-based mathematics instruction as a strategic approach to fostering holistic student development in elementary schools [18], [19].

2. METHOD

To investigate this research aim, this study employed a quantitative approach using a true experimental design, specifically a posttest-only control group design, to examine the effect of implementing the Value Clarification Technique (VCT) on students' personality development. The research was conducted with fourth-grade elementary school students, involving a total sample of 65 participants. The subjects were assigned to two groups by simple random assignment: an experimental group and a control group. The randomisation process was conducted to ensure the equivalence of the initial characteristics between the groups and to enhance the study's internal validity.

The experimental group received VCT-based instruction integrating the stages of choosing, prizing, and acting. The control group received conventional instruction without the structured implementation of value clarification procedures. The posttest-only control group design allowed the outcome measure to be administered only once after the treatment, thereby minimising potential pretest effects on students' responses.

Table 1. Posttest-only control group design

Group	Treatment	Post-test
Experiment	X	O_1
Control	-	O_2

Table 1 presents the research design, which involves two groups. The experimental group received the treatment (X) in the form of VCT-based instruction. The control group did not receive the treatment. Measurement was conducted after the intervention through a posttest. The comparison between O_1 and O_2 was used to determine the effect of the treatment on students' personality variables.

The implementation of VCT instruction was carried out through three systematic stages. The choosing stage required students to analyse value-based situations and select values rationally. The prizing stage required students to demonstrate appreciation and commitment toward the selected values through reflection and guided discussion. The acting stage required students to actualise the values in observable behaviour during the mathematics learning process. Data were collected using a personality questionnaire developed based on three dimensions: moral knowing, moral feeling, and moral action. The instrument consisted of 25 statement items measured using a four-point Likert scale to encourage decisive responses without a neutral option. The rating scale used in the personality character assessment instrument is presented in Table 2.

Table 2. Personality Character Assessment Scale

Criteria	Score
Never	1
Rarely	2
Sometimes	3
Often	4

Confirmatory Factor Analysis (CFA) was conducted to examine the adequacy of the measurement model and to ensure the validity and reliability of the students' personality constructs measured in this study. The analysis employed Partial Least Squares Structural Equation Modelling (PLS-SEM) with SmartPLS 4.0. Evaluation of the measurement model focused on testing convergent validity, discriminant validity, and construct reliability. Convergent validity was determined based on factor loading values greater than 0.70 and Average Variance Extracted (AVE) values exceeding 0.50. Loading values above 0.70 indicate that the indicators make a strong contribution to representing the students' personality constructs, while AVE values above 0.50 indicate that the construct can explain the variance of its indicators.

Discriminant validity was assessed using the Fornell-Larcker criterion and the Heterotrait Monotrait Ratio (HTMT). According to the Fornell–Larcker criterion, the square root of the AVE for each construct must be greater than its correlations with other constructs. In addition, HTMT values below 0.90 indicate that each construct demonstrates adequate distinctiveness and that there is no overlap among the latent variables.

Construct reliability was evaluated using Composite Reliability (CR) and Cronbach's Alpha (CA). CR and CA values exceeding 0.70 indicate that the instrument demonstrates good internal consistency and can be considered reliable in measuring students' personality after the implementation of the VCT learning model.

Data analysis was conducted in several stages. The first stage involved prerequisite tests, including normality and homogeneity tests. The second stage employed Pearson's correlation analysis to examine the relationship between VCT implementation and students' personality. The third stage used simple linear regression to assess the magnitude of VCT's effect on the dimensions of moral knowing, moral feeling, and moral action.

Table 3. Convergent validity and construct reliability

Dimension	Outer Loadings	Item	AVE	CR	CA
Choosing	0.792	P1	0.657	0.834	0.824
	0.791	P2			
	0.893	P3			
	0.759	P4			
Prizing	0.767	P5	0.690	0.869	0.852
	0.866	P6			
	0.838	P7			
	0.848	P8			
	0.720	P9			
Acting	0.838	P10	0.629	0.859	0.851
	0.809	P11			
	0.731	P12			
	0.857	P13			
Moral Knowing	0.897	P14	0.813	0.924	0.923
	0.907	P15			
	0.887	P16			
	0.915	P17			
Moral Feeling	0.838	P18	0.714	0.876	0.867
	0.823	P19			
	0.853	P20			
	0.865	P21			
Moral Action	0.846	P22	0.717	0.882	0.870
	0.807	P23			
	0.872	P24			
	0.861	P25			

Table 3 indicates that most indicators have met the criterion of factor loadings above 0.70, although several indicators remain slightly below the ideal threshold. All constructs in this study demonstrate Average Variance Extracted (AVE) values exceeding 0.50, indicating that convergent validity has been achieved. The internal consistency of the constructs is considered good, as reflected by Composite Reliability (CR) and Cronbach's Alpha (CA), both of which exceed 0.70. These findings confirm that the measurement model of students' personality in the context of implementing the VCT learning model satisfies the criteria of validity and reliability, thereby making it suitable for proceeding to structural analysis or hypothesis testing.

Table 4 shows that the Fornell–Larcker values for all construct pairs are lower than the square roots of their respective AVE values, indicating that the discriminant validity criterion has been satisfied. The Heterotrait–Monotrait Ratio (HTMT) values are also below the 0.90 threshold, suggesting the absence of excessive construct overlap. The relationships among the dimensions of students' personality fall within a moderate category, reflecting reasonable conceptual associations without indicating redundancy among the constructs.

Table 4. Discriminant validity

Dimension	Fornell–Larcker	HTMT
Choosing –> Acting	0.301	0.353
Moral action –> Acting	0.212	0.255
Moral action –> Choosing	-0.067	0.120
Moral feeling –> Acting	0.130	0.189
Moral feeling –>Choosing	0.076	0.149
Moral feeling –> Moral Action	0.281	0.299
Moral Knowing –> Acting	0.191	0.236
Moral Knowing –> Choosing	0.089	0.108
Moral Knowing –> Moral Action	0.504	0.547
Moral Knowing –> Moral Feeling	0.509	0.561
Prizing –> Acting	0.125	0.141
Prizing –> Choosing	0.364	0.410
Prizing –> Moral Action	-0.075	0.120
Prizing –> Moral Feeling	0.001	0.108
Prizing –> Moral Knowing	0.032	0.072

3. RESULTS AND DISCUSSION

3.1. Results

Descriptive statistical analysis was conducted to provide an overview of the score distribution of learning outcomes in the experimental and control groups after the treatment was implemented. Information, including the number of participants, the score range, the mean, and the standard deviation, is presented concisely to illustrate the quantitative characteristics of each group's data. This presentation serves as an initial basis for identifying differences in learning achievement characteristics between the two groups before further inferential analysis is performed. A summary of the descriptive statistical analysis results is presented in Table 5.

Table 5. Descriptive statistics analysis

Group	N	Minimum	Maximum	Mean	Std. Deviation
Experiment	60	50.00	96.00	68.18	10.950
Control	60	41.00	59.00	50.20	4.144

The descriptive analysis indicates a clear difference in score trends between the experimental and control groups after treatment. The experimental group had a mean score of 68.18, whereas the control group had a mean of 50.20, resulting in a difference of approximately 17.98 points, suggesting a practically meaningful treatment effect. The score range in the experimental group was 50-96, higher than that of the control group (41-59), further confirming the difference in learning achievement outcomes. The experimental group showed greater variability, with a standard deviation of 10.950, while the control group showed lower dispersion, with a standard deviation of 4.144, indicating a more homogeneous score distribution. These descriptive findings were subsequently reinforced through inferential analysis to determine the statistical significance of the differences between the groups. The results are presented in Table 6.

Table 6. Model summary of regression analysis

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
1	.738[a]	.545	.541	8.27933

The regression model summary indicates a strong relationship, with an R value of 0.738 and a coefficient of determination of 0.545. This value suggests that the independent variable in this research model explains 54.5% of the variance in the dependent variable. The Adjusted R^2 of 0.541 indicates that the model's explanatory power remains stable after controlling for sample size and the number of predictors. The standard error of the estimate, amounting to 8.27933, reflects a relatively moderate level of prediction error in explaining data variability. These findings confirm that the constructed regression model provides a substantial contribution to explaining data variability before further analysis is conducted through coefficient parameters to determine the direction of influence, the magnitude of contribution, and the level of significance of each variable, as observed in Table 7.

Table 7. Coefficients[a] of regression analysis

Model		Unstandardized Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	86.167	2.390		36.052	.000
	Value Clarification Technique (VCT)	-17.983	.1.512	-.738	-11.897	.000

The results of the regression analysis indicate that the model is highly significant (p-value = 0.000), suggesting that implementing the Value Clarification Technique (VCT) statistically affects students' learning outcomes. The regression coefficient is negative, with a standardised beta of 0.738, indicating an inverse relationship with a large effect size. The large absolute t-value ($t = -11.897$) further confirms that the VCT variable's contribution to the dependent variable is not due to chance but is supported by strong statistical evidence. The direction and strength of this effect are consistent with the results of the previous correlation test, thereby reinforcing the validity of the research findings regarding the effectiveness of the implemented treatment presented in Table 8.

Table 8. Correlations analysis

		Post-test scores	Theoretical Model of Intelligence Integration
Post-test scores	Pearson Correlation	1	-738**
	Sig. (2-tailed)		.000
	N	120	120
Value Clarification Technique	Pearson Correlation	-738**	1
	Sig. (2-tailed)	.000	
	N	120	120

The results of the correlation analysis indicate a strong relationship between the Group variable and students' Scores. The correlation coefficient $r = -0.738$, with a

significance level of 0.000, indicates that the relationship is significant at the < 0.01 level with a sample size of 120 respondents. The negative direction of the relationship suggests a statistically inverse pattern of score variation, while still reflecting a substantial empirical association between the variables. The magnitude of the contribution, as reflected in the coefficient of determination, indicates that the variation in Scores in this study is significantly associated with differences between Groups. These findings provide a strong empirical basis for proceeding to the next stage of analysis and strengthen the interpretation of the dynamics between the two variables within the context of the study.

3.2. Discussion

The research findings indicate that implementing the Value Clarification Technique (VCT) learning model based on local wisdom significantly improves students' learning outcomes. The mean score of the experimental group, 68.18, which is higher than the control group's mean score of 50.20, suggests that integrating value clarification into mathematics instruction can measurably enhance academic achievement. The relatively large mean difference is not only statistically meaningful but also pedagogically relevant, as it reflects a tangible improvement in performance following the intervention [20]. An approach that emphasises reflection, decision-making, and the simultaneous internalisation of values simultaneously encourages cognitive and affective engagement, allowing learning to move beyond procedural mastery toward deeper conceptual understanding [21].

The integration of local wisdom into VCT implementation strengthens the learning context by connecting mathematical concepts, such as the introduction of plane figures, with cultural realities close to students' daily lives [22]. This contextualization helps reduce the abstract nature of mathematics, which often becomes a barrier at the elementary school level. When students can relate geometric shapes to cultural artefacts or their surrounding environment, the process of knowledge construction becomes more natural and meaningful [23]. The linkage between academic content and sociocultural experiences also broadens the scope of learning, moving it from mere knowledge transmission to the development of value awareness and identity formation. This condition is consistent with contextual learning principles that position real-life experience as a bridge toward abstract understanding.

The regression analysis results, with an R^2 value of 0.545, indicate that the implemented learning model accounts for a substantial portion of the variance in students' learning outcomes. More than half of the score variation can be explained by the presence of the treatment in the model, while the remaining variance is influenced by factors such as individual characteristics, the learning environment, and students' initial readiness. These findings suggest that local wisdom-based VCT is not the sole determinant, yet it remains a strong predictor of improved academic achievement [24]. The relatively stable Adjusted R^2 further demonstrates the model's consistent explanatory power within the studied sample.

The negative correlation coefficient of −0.738 indicates a strong relationship between VCT implementation and the dynamics of learning outcomes in this study. The statistically inverse direction reflects differences in group coding or categorisation; however, the strength of the correlation indicates a strong empirical association. The large absolute t-value and the

significance level of 0.000 further reinforce that the treatment variable's influence on learning outcomes did not occur by chance. The consistency between the correlation and regression results demonstrates coherence in the findings and enhances the credibility of the interpretation that the implemented learning model is statistically effective.

From a theoretical perspective, the effectiveness of VCT can be explained by the value clarification mechanism, which encourages students to think reflectively, evaluate choices, and take responsibility for their decisions [25]. This process indirectly trains metacognitive skills that play a crucial role in mathematics learning. Structured discussion, argumentation, and reflection activities help students construct understanding through dialogue and social interaction rather than passively receiving information. Such a learning environment supports the creation of student-centred instruction and fosters a sense of ownership over the learning process [26].

The transformation of the teacher's role into a facilitator within the VCT framework, grounded in local wisdom, further strengthens classroom interaction. Teachers no longer dominate content delivery but guide students in exploring meaning, connecting concepts, and clarifying values that emerge during the learning process [27]. This interaction pattern promotes active participation, enhances students' self-confidence, and builds a dialogical and reflective classroom culture. The integration of character values through a local cultural context provides an important foundation for developing responsibility, honesty, and critical thinking skills in solving mathematical problems [28].

Overall, the implementation of the local wisdom-based VCT model has proven effective in improving learning outcomes while simultaneously strengthening the character dimension of elementary school students [29]. This systematic, contextual, and reflective approach presents mathematics learning as more relevant, humanistic, and meaningful. The findings confirm that integrating cognitive and value dimensions in instructional design represents a strategic response to the challenges of 21st-century education, which demands a balance between academic competence and sustainable character development [30].

4. CONCLUSION

This study establishes that implementing the local wisdom-based Value Clarification Technique in Grade IV plane geometry significantly strengthens students' personality character values within mathematics learning. The integration of the ulos sadum cultural motif with the structured stages of choosing, prizing, and acting provides an instructional design that systematically links moral knowing, moral feeling, and moral action with geometric concept exploration. The main finding is that students who experienced the integrated VCT model demonstrated stronger character development than those who received conventional instruction. The instructional framework positions mathematics not only as cognitive training but also as a medium for reflective value internalisation grounded in cultural context, thereby addressing the previously identified gap between curriculum mandates on character education and procedural classroom practice.

The study is limited to a specific sample, educational level, and mathematical content area, limiting the generalizability of its findings to broader contexts. The reliance on posttest measurement also limits the ability to evaluate the long-term sustainability of character

internalisation. Future research is recommended to examine longitudinal impacts, apply the model across different mathematical topics, and investigate its implementation in varied cultural settings to assess adaptability and consistency of outcomes. The contribution of this research lies in offering an empirically tested model that integrates ethnomathematics and value clarification within elementary mathematics education, providing practical guidance for educators and policymakers seeking to harmonise academic achievement with structured character formation in culturally responsive learning environments.

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