IJBMC
International Journal of Body, Mind and Culture

Volume 12, Issue 9, pp 169-180
DOI: 10.61838/ijbmc.v12i9.1257

Article type:
Original Research

Culture-Infused Blended Learning to Enhance Moral Responsibility, Empathy, and Discipline among Elementary Teacher Education Students: An Experimental Study

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Article history:

Received 21 Feb 2025
Revised 14 May 2025
Accepted 24 June 2025
Published online 01 Dec 2025

How to cite this article:
Susarno, L. H., Arifin, Z., & Kristanto, A. (2025). Culture-Infused Blended Learning to Enhance Moral Responsibility, Empathy, and Discipline among Elementary Teacher Education Students: An Experimental Study. International Journal of Body, Mind and Culture, 12(9), 169-180.

ABSTRACT

Objective: This study examined whether a Culture-Infused Blended Learning Approach (CIBLA) that integrates Madurese cultural values into technology-enhanced instruction improves moral responsibility, empathy, and discipline among elementary teacher education students.

Methods and Materials: A true-experimental posttest-only control group design was used. Fifty-four third-semester elementary teacher education students at STKIP PGRI Bangkalan (mean age 20.4 years) were matched and randomly assigned to an experimental (n=27) and a control group (n=27). The experimental group received 16 sessions of CIBLA combining face-to-face and online learning with local cultural values (work ethic, respect for elders and teachers, mutual cooperation, and traditional arts), while the control group received conventional blended instruction. Moral values were assessed using a validated 24-item scale (three 8-item subscales for responsibility, empathy, and discipline; 5-point Likert; Cronbach's alpha=0.96). Data were analyzed with independent-samples t tests, Cohen's d, and ANCOVA controlling for pretest scores.

Findings: Posttest scores were substantially higher in the experimental than control group for responsibility (34.07 vs. 17.59), empathy (35.33 vs. 17.37), discipline (35.70 vs. 17.33), and total moral values (105.11 vs. 52.30; all $p<0.001$). Effect sizes were large for the three subscales ($d=0.61–0.67$) and very large for the total score ($d=1.00$). ANCOVA confirmed significant treatment effects across all dimensions ($p<0.001$).

Conclusion: CIBLA produced strong gains in students' moral responsibility, empathy, and discipline beyond conventional blended learning. Embedding local cultural wisdom within digital and face-to-face instruction appears to be a promising strategy for character education in higher education.

Keywords: culture-infused blended learning, moral responsibility, empathy, discipline, character education, teacher education.

Introduction

Developing students' moral character, in the digital age, is one of the hardest task for higher education (Herak, 2025; Prabowo, 2024; Zvereva, 2023). The rapid social changes brought about by globalization, digitalization and the evolution of ICTs have given rise to new behaviours in students with a prevailing individualistic, pragmatic and lack of moral responsibility ethical values system that is lacking of social empathy (Narvaez, 2021; Sotelo, 2017; Wang & Li, 2024; Xu et al., 2025). This trend becomes possibly evident by the decreasing attention to academic values of integrity, lack of study ethic and decreased social respect for others on campus (Louw, 2024). If anything, these are conditions under which the moral frameworks that undergird academic achievement need shoring up.

Some moral values that lead to good academic achievement are responsibility, empathy and discipline (Nirmala et al., 2024). Moral values are associated with cultural psychology, a branch of psychology related to culture and human behavior (Parihar et al., 2018; Prabowo, 2024). This is how cultural psychology assists us in understanding that the students' moral development is a dialogue involving individual identity and cultural statuses that influence their moral perceptions about taking responsibility, empathy, discipline.

The deterioration of moral values can be seen especially with college students (Louw, 2024). The picture of decline in moral values is striking and very detrimental to the quality of future human resources (Hossain, 2023; Parihar et al., 2018). Students devoid moral responsibility and empathy will have the possibility to transform as professionals who are unethical prone, weak in self-restraint, cannot work together morally (Hidayah, 2021; Sosik et al., 2019). Furthermore, the erosion of learned discipline in blended-learning times which is rather unstructured and often requires higher level of self-regulation leads to a low task commitment and lower intrinsic motivation whereby at the end students are dependent on online learning systems (Dahri et al., 2024; Ibrahim & Nat, 2019; Vanslambrouck et al., 2018).

Character education is historically part of the Indonesian education policy in last two decades. Nevertheless, its implementation at higher education is still challenging since learning which is conducted on cognitive achievement compared to affective and morality's dimension inside of it often limited (Rifka & Quddus, 2024; Wiranata, 2024). Contrarily, in a Society 5.0 era it calls for a combination of technology, the human values, and local culture to educate students not only to have intellectual capability but also good morality (Fazira et al., 2024; Haikal et al., 2025). But its negative effects can be seen in the students' morality as well. Unlimited access to technology can encourage instant behavior, reduce learning discipline, trigger digital plagiarism, and reduce social sensitivity because interactions are increasingly virtual. Dependence on technology also has the potential to weaken responsibility, empathy, and academic ethics if not balanced with character building and digital literacy.

Several previous studies have shown that blended learning is effective in increasing learning motivation (Arifin & Abduh, 2021; Cahyaningsih et al., 2025; Fap & Hardini, 2021) and interest in learning (Zamhari et al., 2025). However, most of these studies emphasize cognitive and technopedagogical aspects rather than the development of moral values. Other studies on culture-based education prove that the integration of local cultural values can strengthen students' moral character and empathy (Atmaja, 2023; Miskiyyah et al., 2025; Patras et al., 2023). However, studies that explicitly combine blended learning with a culture-based approach to foster moral values in students are still very limited, especially in the context of higher education in Indonesia. Furthermore, controlled tests for responsibility, empathy, and discipline in the implementation of Culture-Infused Blended Learning have not yet been conducted. Therefore, this study will also validate the instruments used to measure responsibility, empathy, and discipline in students.

A preliminary study conducted by researchers at STKIP PGRI Bangkalan in the Elementary School Teacher Education Study Program in 2024 showed that more than 70% of students had difficulty managing their study time and responsibilities for group assignments during blended learning. In addition, 62% of respondents admitted that they were unable to understand the socio-cultural values contained in the learning materials, which resulted in low empathy towards their classmates. This information supports the development of a learning

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model that is not only technologically interactive, but has cultural context as well.

The research gap is found in the dearth of conceptual and empirical models that incorporate culture-based blended learning into students' moral character development, especially from a cultural psychology point of view. The cultural psychology approach emphasizes that morality, empathy, and discipline are the result of the internalization of social values formed through interactions between individuals and cultural contexts. However, the application of this perspective in the context of technology-based learning is still rare and has not been systematically tested.

The novelty of this research lies in the development and testing of a culture-infused blended learning approach, which explicitly integrates local cultural elements into digital and face-to-face learning designs to foster students' moral responsibility, empathy, and discipline. This approach is not only oriented towards academic achievement, but also towards the internalization of moral values relevant to the cultural context of students. Thus, this study is expected to contribute new insights to the literature on cultural psychology and technology-based character education in the digital age. Apart from that, there has been no study on Madura Culture-Infused Blended Learning on responsibility, empathy, and discipline in students. Therefore, this study aims to analyze the application of the culture-infused blended learning approach on responsibility, empathy, and discipline in students.

Methods and Materials

This study has obtained ethical approval from the STKIP PGRI Bangkalan Research Ethics Committee with number 035/C8/G/VII/2024, where all participants were given informed consent forms and respondent data was kept confidential for academic purposes only. This study used a true-experimental approach with a posttest-only control group design. This design was chosen because it allowed researchers to compare the differences in results between the experimental group, which received a combination of blended learning and culture-based learning, and the control group, which received conventional learning in the learning media course. The research population consisted of all students enrolled in the Elementary School Teacher Education Program at STKIP PGRI Bangkalan in the 2024/2025 academic year. The recruitment flow for determining the sample in this study was by determining inclusion and exclusion criteria, identifying candidates according to the criteria, contacting and inviting them, screening, informed consent, final recruitment, and replacement of participants (if necessary). Sampling was carried out using purposive sampling with the criteria of students who were actively studying in their 3rd semester, had taken character education and pedagogy courses, and were willing to attend lectures for a full semester. Exclusion criteria include unwillingness to provide consent, unable to participate in the entire series of activities or research schedule, incomplete or invalid data during the initial verification process. The sample size was set at 54 students, the group division used the matching technique so that it was divided into an experimental group (n=27) and a control group (n=27). The characteristics of the sample are described in Table1.

Table 1

Characteristics of the Sample of Elementary School Teacher Education Students at STKIP PGRI Bangkalan

Characteristics	Experimental Group (n=27)	Control Group (n=27)	Total (N=54)
Gender			
Man	10 (37.0%)	9 (33.3%)	19 (35.2%)
Woman	17 (63.0%)	18 (66.7%)	35 (64.8%)
Age (years)			
Average (Mean ± SD)	20.3 ± 1.1	20.5 ± 1.2	20.4 ± 1.2
Range	19–23	19–23	19–23
Semester			
Semester 3	27 (100%)	27 (100%)	54 (100%)

The independent variable in this study is a combination of blended learning and culture-based learning models, while the dependent variable is students' moral values, which include responsibility, empathy, and discipline. The instruments used in this study consist of three main measuring tools, namely the Moral Responsibility Scale (MRS) adapted from Narvaez & Rest, (1995) and developed by the researcher to measure ethical awareness and moral decision-making abilities; the Empathy Quotient (Andreevich et al.), adapted from Baron-Cohen & Wheelwright, (2004) in Smees et al., (2025) and developed by the researcher to assess the dimension of empathy; and Self Discipline, adapted from (Zimmerman & Kitsantas, 2014) and developed by the researcher to assess student discipline. These three instruments were used complementarily to obtain a comprehensive picture of moral value development through a culture-infused blended learning approach. The instruments used a 1–5 Likert scale consisting of 24 statements, with 8 statements each for responsibility, empathy, and discipline. The content validity of the instruments was tested through expert judgment by three character education experts. In addition, the validity of each item was also analyzed (Table 2).

Table 2

Validity Results for Moral Responsibility, Empathy, and Discipline

Item	Corrected Item–Total Correlation	Information
MR1	0.813	Valid
MR2	0.800	Valid
MR3	0.590	Valid
MR4	0.533	Valid
MR5	0.752	Valid
MR6	0.533	Valid
MR7	0.800	Valid
R8	0.800	Valid
E1	0.800	Valid
E2	0.800	Valid
E3	0.590	Valid
E4	0.800	Valid
E5	0.549	Valid
E6	0.752	Valid
E7	0.770	Valid
E8	0.813	Valid
D1	0.752	Valid
D2	0.673	Valid
D3	0.770	Valid
D4	0.758	Valid
D5	0.714	Valid
D6	0.693	Valid
D7	0.759	Valid
D8	0.770	Valid

The instrument from the previous study was modified by the researcher, resulting in 24 items for three indicators being declared valid with P> R (0.4821 from N 20). Reliability testing will then be conducted (Table 3).

Table 3

Reliability Results for Moral Responsibility, Empathy, and Discipline

Indicator	Items Total	Cronbach's Alpha	Interpretation
Responsibility,	8		
Empathy	8	0.956	Reliable
Discipline	8		
Total	24		

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The reliability test results obtained a value above 0.70, thus declaring it reliable. In conclusion, the instrument in this study was declared valid and reliable. Therefore, it is suitable for use in research.

The research procedure was carried out in several stages, namely preparation in the form of developing learning tools, validating instruments, and orienting lecturers, followed by a pretest to measure the baseline moral values of both groups. Next, the treatment was administered, in which the experimental group participated in blended learning-based lectures (50% face-to-face and 50% online) integrated with culture-based learning, namely integrating digital technology with Madurese cultural values. This learning combined online learning and face-to-face learning with elements such as the work ethic (tangghâ, bhângkit, etembhang), respect (buppa', babbu', guru, rato'), and mutual cooperation (kerapan barisan), as well as local traditions such as karapan sapi and macapat Madura as contextual media to foster moral values, empathy, and discipline. Meanwhile, the control group followed conventional learning through lectures and discussions. The treatment lasted for 16 meetings (one semester).

The syllabus for this course is designed in 16 sessions with a blended learning format that combines face-to-face and online activities, each lasting 100 minutes and focusing on the development of learning media based on Madurese cultural values. Each session includes contextual learning through the work ethic of tangghâ, bhângkit, etembhang, the values of respect for buppa', babbu', guru, rato', mutual cooperation (karapan baris), as well as exploration of local traditions such as karapan sapi and macapat as sources of moral values, empathy, and discipline. Activities per session include mini-lectures, cultural video analysis, value role-plays, media production practices, online collaboration, and project presentations. Each activity is organized per minute to maintain integration, with platform analytics support (LMS, Google Classroom, Google Docs, activity logs, automatic quizzes) to monitor participation, progress, and internalization of values. Lecturers receive instructional training on cultural integration in media, LMS use, character assessment, and blended classroom management. Fidelity checks were conducted through implementation checklists, classroom observations, lesson plan compliance, and content audits in the LMS to ensure consistent model implementation. Intergroup contamination was controlled by limiting access to materials between classes in the LMS, separating discussion forums, using different schedules for project presentations, and ensuring each group worked on different cultural media to prevent the exchange of strategies or content that could impact the validity of the learning process.

For the control group, the course was structured similarly in duration and structure to the experimental group, but without the Madurese cultural elements or emphasis on character values. Over 16 sessions, students received conventional instruction on learning media theory, media classification, basic content production, and media evaluation. Online activities in the LMS included only general material, standard quizzes, and technical discussions. Platform analytics were still used to monitor activity without character assessments. Control instructors received only training in LMS management and regular teaching methods. Fidelity checks were conducted through syllabus audits, random observations, and reviews of LMS materials to ensure there was no cultural integration. Contamination was prevented by separating classes in the LMS, scheduling different meetings, limiting the exchange of materials, and assigning non-cultural projects to prevent transfer of concepts from the experimental group.

After the treatment, both groups were given a posttest with the same instrument to determine changes in moral values. Data analysis was performed using SPSS 25 software with stages including descriptive analysis, prerequisite tests in the form of Shapiro-wilk normality and Levene's Test homogeneity, and hypothesis testing using the Independent Samples t-test. Furthermore, effect size calculations were performed using Cohen's d, and further analysis was conducted using ANCOVA.

Findings and Results

This section of the research presents a series of statistical analyses conducted to answer the research objectives. The analysis begins with descriptive statistics to describe the characteristics of each research variable. Next, classical assumption tests are conducted, including the Kolmogorov–Smirnov normality test and Levene's Test of homogeneity of variance to ensure the suitability of the data for parametric analysis. Once the assumptions were met, hypothesis testing using the Independent

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Samples t-test was applied to determine whether there were significant differences between the experimental and control groups. In addition, effect size calculations using Cohen's d were used to assess the strength of the learning model applied. The analysis was continued with a covariance test (ANCOVA) to control for the influence of the initial score (pretest) and obtain more accurate results regarding the effectiveness of the treatment given.

Table 4

Descriptive Statistics of Students' Moral Values (Posttest)

Variables	Group	N	Mean±SD
Responsibility	Experiment	27	34.07±2.67
	Control	27	17.59±2.50
Empathy	Experiment	27	35.33±2.75
	Control	27	17.37±2.47
Discipline	Experiment	27	35.70±2.89
	Control	27	17.33±2.35
Total	Experiment	27	105.11±4.82
	Control	27	52.30±5.28

Table 4 show the sample consisted of 54 students (n=27 experimental group; n=27 control group). The average posttest score of the combined moral value (average of all aspects) in the experimental group was M = 105.11 (SD = 4.82), while in the control group M = 52.30 (SD = 5.28). For each dimension measured, a similar pattern was observed: the average posttest score in the experimental group was higher than in the control group Responsibility : 34.07 vs 17.59 ; Empathy : 35.33 vs 17.37; Discipline : 35.70 vs 17.33 presented in Figure 1.

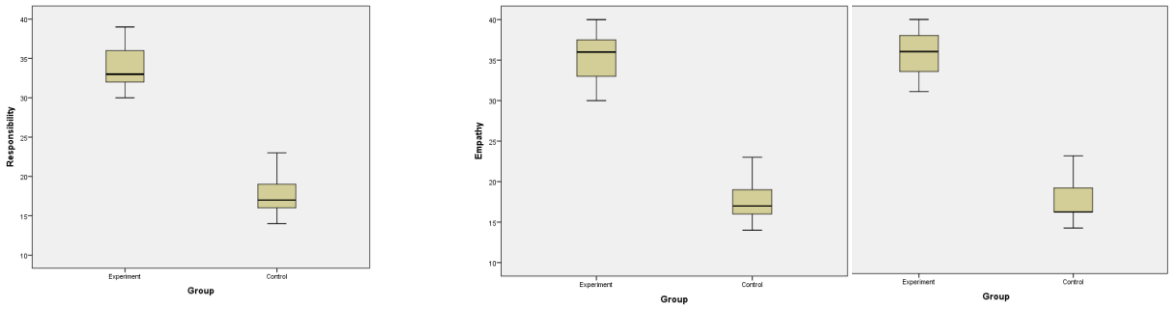

Figure 1

Mean difference in experimental and control groups

Table 5

Normality Test Shapiro Wilk and Levene's homogeneity

Variables	Group	Normality Sig	Homogeneity Sig.
Responsibility	Experiment	0.086*	0.789*
	Control	0.088*	
Empathy	Experiment	0.390*	0.453*
	Control	0.155*	
Discipline	Experiment	0.114*	0.183*
	Control	0.051*	
Total	Experiment	0.446*	0.474*
	Control	0.087*	

Table 5 Normality test the Shapiro Wilk test showed a significance value > 0.05, so the posttest data in each group can be considered normally distributed. Levene's homogeneity of variance test produced p>0.05, indicating that the assumption of homogeneity of variance was met. Thus, the requirements for implementing the independent t-test were met.

Table 6

Results of the Independent Samples t- test

Variables	t	df	Sig . (2-tailed)	Mean Difference	95% CI Lower	95% CI Upper
Responsibility	23.396	52	0.000	16.481	15.068	17.895
Empathy	25.285	52	0.000	17.963	16.537	19.389
Discipline	25.595	52	0.000	18.370	16.930	19.811
Total	38.366	52	0.000	52.815	50.052	55.577

The results of Independent Samples t- test showed statistically significant differences (Table 6). Responsibility: t= 23.396, p<0.05 significant difference; experimental group is higher. Empathy: t = 25.285, p< 0.05 significant difference; experimental group higher. Discipline: t= 25.595, p<0.05 significant difference; experimental group is higher. When viewed from the combined test (overall average), t= 38.366, p< 0.05, indicating that in general the experimental group had a significantly higher moral value posttest score than the control group.

Table 7

Effect Size (Cohen's d)

Variables	SD Pooled	Cohen's d	Interpretation
Responsibility	2.59	0.61	Large Effect
Empathy	2.61	0.66	Large Effect
Discipline	2.63	0.67	Large Effect
Total	5.06	1.00	Very Large Effect

The effect sizes in Table 7 for each dimension indicate large effects for responsibility empathy, and discipline. For the combined analysis, Cohen's d=1.00 is interpreted as a very large effect with SD pooled 5.06. These values indicate that the combined effect of the blended learning and culture-based learning towards improving students' moral values is substantive, not just statistically meaningful.

Table 8

Homogeneity of Regression Slopes Test

Variables	Sig.	Interpretation
Responsibility	0.789	Assumptions met
Empathy	0.453	Assumptions met
Discipline	0.183	Assumptions met
Total	0.474	Assumptions met

The results of Table 8 indicates that the Homogeneity of Regression Slopes Test stated that the assumptions were met so that the ANCOVA analysis could be continued validly. To ensure that posttest differences between groups were not solely due to initial (pretest) differences, an ANCOVA with pretest as a covariate was conducted (Table 9).

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Table 9

ANCOVA Results (Controlling for Pretest Values)

Variables	F	Sig .	Interpretation
Responsibility	547.379	0.000*	Significant effect
Empathy	639.332	0.000*	Significant effect
Discipline	655.102	0.000*	Significant effect

The ANCOVA results per dimension showed that Responsibility: F=547.379, p<0.05) (group has a significant effect), Empathy F =639.332, p<0.05, and Discipline F = 655.102, p < 0.005. These results show that the Culture-Infused Blended Learning treatment has a significant influence on increasing Responsibility, empathy, and discipline.

Discussion and Conclusion

The results of the study show that Culture-Based Blended Learning is significant influence in improving students' moral values, particularly responsibility, empathy, and discipline. Previous studies emphasize that culture-based education does not only serve as a supplement to the learning process, but as a fundamental foundation for developing character, strengthening personal and collective identity, and preserving cultural continuity (Cahyaningsih et al., 2025). Blended learning has also been acknowledged as an academic process which can effectively foster moral values among students (Kim, 2014). The use of blended learning to enhance character values in 21st century digital based education (Wahab & Adawiyah, 2025). The results of the study showed that modern educational technologies and culture-building approaches can strongly influence students' character formation in the digital era.

The progress on the dimension of responsibility indicates that students could not only constantly fulfill academic tasks, but they also have more developed moral and social responsibilities. This is consistent with the previous findings that culture-based learning can internalize the values of responsibility for a social context which is closer to students' lives (Rosala, 2016). Responsibility is a concept in psychology that means the ability to make decisions consciously and take responsibility for action. In students, responsibility has been associated with self-regulation when dealing with academic work and social commitments (Fishman, 2014; Pasha-Zaidi et al., 2019). Responsibility in Kohlberg's moral development theory Responsibility is an expression of conventional stage as elucidated by kohlberg, referring that man does not only follows rules from an external source rather knows the reason behind social norms and duty towards other (Hanafiah, 2024). In education, responsibility reflects moral maturity the ability to act independently, reliably and to take charge of one's academic as well as ethical choices (Krettenauer, 2022).

Empathy also saw a big jump. With cultural-based learning as the approach, students were more close to local wisdom, social norms and human values that being taught in real contexts. It is also supported by evidence arguing that culture-based education can promote social sensitivity and tolerance to differences through dynamic interaction and critique of difference (Rosala, 2016). According to psychology, empathy is an ability to understand and experience the feelings of others be it at a cognitive level (perspective-taking) or affective one (compassion) (Nurdin & Fakhri, 2020). Empathy is also relevant for morality, as it promotes prosocial behaviors such as helping, caring and respecting differences (Fonseca et al., 2024; Masto, 2015). Empathy is an important element in the development of positive social relationships, tolerance and awareness of social issues for learners (Hidayati et al., 2024; Wilson, 2011). In theory, empathy correlates with emotional intelligence (Fernández-Abascal & Martín-Díaz, 2019; Hajibabaee et al., 2018; Ioannidou & Konstantikaki, 2008), and the ability to empathize other's feelings contributes to raising moral attention and ethical decision-making.

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Regarding education, empathy is a cognitive and not only affective process that promotes sensitivity toward cultural diversity and human values.

Moreover, the enhancement in classroom discipline indicates that content enhanced with blended learning with a culture element yield more orderly study habits. The digital environment provides flexibility, while the cultural context provides a framework of values that shapes behavioral regularity. These findings are in line with the literature which states that hybrid learning models can improve students' self-regulation when combined with relevant cultural values (Rizkiyah et al., 2023). Discipline in moral psychology is related to self-control and behavioral regulation in order to align with norms, rules, and long-term goals (Baumeister & Juola Exline, 1999; Hofmann et al., 2018). In students, discipline reflects the ability to manage time, consistency in learning, and compliance with academic rules (Laadi & Asmar, 2025). According to self-determination theory, discipline does not only arise from external control (punishment or reward), but is stronger when it stems from internal motivation that is in line with personal values (Nyuhuan, 2024). Discipline based on moral values reflects integrity, because students behave in an orderly manner not only when they are being supervised, but also when they are in autonomous situations (Putra et al., 2025).

The aspects of responsibility, empathy, and discipline are important components in the formation of students' moral values (Nirmala et al., 2024). Duty engenders a sense of responsibility, sympathy creates care for the community and self control guides internal regulation toward collaboration. In this way, those three areas of character building support each other as the basis for morality that from an educational psychology perspective will educate students not only become academic intelligent persons but emulate emotionally, socially and also ethical mature person. In theory, these findings support the idea that character as a component of education cannot be isolated from their cultural and technological environment. Visibily, this research proved that learning models like tecno-pedagogical and culturological one have strategic value for higher education in Indonesia particularly to produce the graduates as honesty.Redponsibility.And social concern. Thus, this research helps to enrich the understanding that student character education is more effective not just in a blatant moral lesson, but rather when we were teaching it through innovative learning approaches combined between technological and cultural.

There are several limitations of our study: small sample size and the fact that we examined only a selected group of students from one university. This restricts the degree to which the findings can be generalized, as these are unlikely to reflect the characteristics of students more generally. Further research is advised to include larger and more heterogeneous samples in order to present a more global picture that can generalize the findings.

Conclusion

CIBLA promotes the integral development of students' moral responsibility, empathy and discipline by combining technological-enhanced-learning with cultural values. This model, when seen through the lens of cultural psychology, underscores that ethical and character development take place not only through cognitive learning but also via the internalisation of community wisdom and traditional customs. Incorporating traditions including collaboration, respect for authority, and collective responsibility into digital learning spaces as well as partnerships to watch promotes genuine learning experiences that develop ethical orientation and social empathy. Ultimately, this cultural blended learning model is a forward-looking educational mode which integrates moral education and technical innovation, enabling students to play the global role while keeping their morality and culture.

Acknowledgments

The authors express their gratitude and appreciation to all participants.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants. Ethical considerations in this study were that participation was entirely optional.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

Funding

This research was carried out independently with personal funding and without the financial support of any governmental or private institution or organization.

Authors' Contributions

All authors equally contribute to this study.

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