INTERNATIONAL JOURNAL OF SOCIETY, CULTURE & LANGUAGE

English Language Teaching as a Cultural Practice in Community Contexts: The Mediating Role of Technology Engagement

Agus Hasbi Noor[1*], Ansori Ansori[1]
[1]*Institut Keguruan dan Ilmu Pendidikan Siliwangi (IKIP Siliwangi), Indonesia*

Abstract Community-based English Language Teaching (ELT-C) depends on pedagogical innovation and digital technology to meet the practical needs of micro, small, and medium enterprises (MSME) and tourism actors. However, limited empirical evidence explains how learning models and technology adoption translate into effective community learning outcomes beyond statistical significance. This study addresses this gap by examining the effects of Model-Based Learning (MBL) and Technology Innovation Adoption (TIA) on ELT-C, with Community Technology Engagement (CTE) as a mediating mechanism. ELT-C effectiveness is operationalized through instructional relevance, learner engagement, and perceived improvement in communicative competence. Using a quantitative survey design, data were collected from 150 MSME and tourism participants involved in technology-supported community English training in Cimahi City. Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4.0. The results indicate that MBL and TIA significantly influence both CTE and ELT-C. CTE also shows a strong direct effect on ELT-C and significantly mediates the relationships between MBL and ELT-C as well as TIA and ELT-C. These findings highlight the critical role of community technology engagement in transforming pedagogical and technological inputs into effective community-based English learning outcomes.

Keywords: *Model-based learning, Technology innovation adoption, Community technology engagement, English language teaching, Community education*

[*]**Corresponding Author:**
Agus Hasbi Noor
agushasbinoor.ikip@gmail.com

Received: October 20, 2025
Revised: December 24, 2025
Accepted: January 14, 2026
First Published: January 31, 2026

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1. Introduction

Community-based education has increasingly been discussed as a critical site where pedagogical innovation and social development intersect, particularly within culturally embedded non-formal learning environments, serving economic actors such as micro, small, and medium enterprises (MSMEs) and tourism communities (Erfiani et al., 2025; Kanoksilapatham & Channuan, 2018; Koerniawaty & Koeswiryono, 2017; Laba et al., 2025; Meunchong & Tachom, 2023). Prior studies highlight that effective community learning is shaped not only by instructional design but

https://doi.org/10.22034/ijscl.2026.2079978.4302

also by how learners interact with learning systems and technologies embedded in their local cultural and social context (Addae, 2016; Buckley, 2000; Pramudia et al., 2017). Within this landscape, English Language Teaching for Community (ELT-C) has attracted growing scholarly attention as a means of enhancing employability, service quality, and cross-cultural communication capacities among community learners. These learners' engagement with English learning is strongly influenced by shared norms, values, communication styles, and collective identities that characterize their cultural context (Clifford & Reisinger, 2018; Hosseinzadeh et al., 2022; Syafii et al., 2022). Consequently, recent research has shifted from asking whether English matters for community development to examining how pedagogical and technological arrangements can render community-based English instruction substantively effective, meaningful, and culturally responsive in diverse community settings (Abrahams, 2010; Granić, 2022; Lei & Morrow, 2010).

Empirical studies increasingly emphasize Model-Based Learning (MBL) and Technology Innovation Adoption (TIA) as key drivers of learner-centered and flexible education. MBL has been shown to enhance understanding and motivation through structured and contextualized learning processes that resonate with community learning traditions, shared practices, and culturally grounded ways of meaning-making (Cisterna et al., 2019; Hamzah et al., 2022; Ley et al., 2023; Ogwu et al., 2023). Similarly, TIA expands access and collaboration through digital tools that mediate social interaction and collective participation, with technology use being shaped by culturally embedded communication norms and community values (Oduro, 2020; Peng & Chen, 2023; Taherdoost, 2018). However, most existing research examines these constructs independently and predominantly within formal school or organizational settings, where cultural variability and community dynamics are often minimized (Turan & Akdag-Cimen, 2020; Yusri et al., 2018). Studies addressing community education tend to prioritize issues of access, infrastructure, or technological availability, paying limited attention to the culturally situated processes through which learners actively engage with technology and instructional models in everyday community life (Lam et al., 2021; Sun et al., 2020). Although community participation and engagement are frequently acknowledged at a conceptual level (Basri et al., 2023; Childrey, 2025; Ho, 2020; Rusmawan et al., 2025; Swenson-Lepper, 2012; Zamiri & Esmaeili, 2024), empirical models that explicitly position Community Technology Engagement (CTE) as a mediating mechanism, remain scarce. This gap is particularly evident in ELT-C research conducted within specific cultural contexts, where learning effectiveness is deeply influenced by local norms, values, and collective practices.

In response to this gap, this study aims to examine the influence of MBL and TIA on ELT-C, with CTE serving as a mediating variable. By empirically situating engagement as a central mechanism, this study contributes to a more nuanced understanding of how pedagogical and technological innovations translate into effective community-based English learning outcomes. Specifically, the study seeks to:

(1) analyze the effect of MBL on ELT-C,
(2) examine the effect of TIA on ELT-C,
(3) assess the mediating role of CTE in the relationship between MBL and ELT-C, and
(4) assess the mediating role of CTE in the relationship between TIA and ELT-C.

2. Theoretical Framework

2.1. Model-Based Learning (MBL) and English Language Teaching for Community (ELT-C)

MBL is grounded in constructivist learning theory, emphasizing the use of conceptual models, simulations, and structured representations to support learners in understanding complex phenomena through active exploration rather than passive reception (Cisterna et al., 2019; Martinez-Lopez et al., 2017). Within this framework, knowledge construction is not value-neutral but is shaped by learners' prior experiences, social practices, and cultural backgrounds. In MBL, learning effectiveness is achieved when learners interact with models that guide reasoning, problem-solving, and contextual application in ways that resonate with their sociocultural realities, rather than through surface-level study behaviors. Accordingly, established MBL indicators focus on learners' engagement with simulations, scenario-based tasks, structured modeling activities, and reflective interpretation of outcomes, all of which allow cultural meanings and norms to be embedded within the learning process (Peel et al., 2019).

In community-based education, MBL offers particular relevance because learners often possess heterogeneous educational backgrounds, linguistic repertoires, and culturally situated communication practices that require contextualized instructional scaffolding (Yusri et al., 2018). In ELT-C, MBL enables participants to practice language use through role-play simulations, community-based scenarios, and task-oriented communication models that reflect not only real-life functional needs but also local cultural norms, values, and interaction patterns, such as politeness strategies, service etiquette, and community identity in tourism services or MSME interactions (Erfiani et al., 2025; Laba et al., 2025; Syatriana & Sakkir, 2020). Prior research demonstrates that model-based approaches in language education improve learner participation, contextual relevance, and communicative competence when instruction is anchored in practical and culturally meaningful models rather than rote memorization (Cisterna et al., 2019; Peel et al., 2019). Therefore, MBL is theoretically expected to enhance the effectiveness of ELT-C by aligning instructional design with community-based communicative contexts that are socially and culturally grounded.

2.2. Technology Innovation Adoption (TIA) and English Language Teaching for Community (ELT-C)

TIA refers to the degree to which individuals or communities accept, integrate, and routinely use technological tools to support learning processes (Taherdoost, 2018). Drawing on diffusion of innovation theory, TIA is not limited to technology availability but encompasses perceived usefulness, ease of use, and contextual compatibility within a social system (Sasaki, 2018). Importantly, this compatibility is shaped by cultural norms, values, and shared practices that influence how technology is perceived, trusted, and appropriated within a community. In educational settings, technology adoption facilitates flexible access to learning resources, interactive communication, and exposure to authentic language materials, provided that technological practices align with learners' cultural expectations and communication habits (Oduro, 2020).

In the context of ELT-C, technological innovations such as mobile applications, digital learning platforms, and online communication tools enable community learners to engage with English beyond formal classroom boundaries in ways that reflect their everyday social and cultural environments (Turan & Akdag-Cimen, 2020). Empirical studies indicate that effective technology adoption enhances learning interactivity, collaboration, and instructional relevance, particularly in non-formal and community-based environments where learning is embedded in local social relations and cultural routines (Lam et al., 2021; Ly et al., 2021). However, adoption outcomes vary depending on infrastructure readiness, digital literacy, institutional support, and culturally embedded attitudes toward technology use and authority in learning contexts (Sasaki, 2018; Taherdoost, 2018). When successfully adopted, technology strengthens ELT-C by supporting continuous practice, peer interaction, and culturally situated, contextualized language exposure.

2.3. Community Technology Engagement (CTE) and English Language Teaching for Community (ELT-C)

CTE refers to the collective and sustained participation of community members in technology-supported learning activities, including shared use, collaborative content creation, and mutual support in learning processes (De Barba et al., 2016). Unlike technology adoption, which emphasizes acceptance and usage decisions, CTE highlights the depth of involvement, social interaction, and sense of ownership embedded in technology-mediated learning environments (Sun et al., 2020).

This collective engagement is inherently shaped by cultural norms, social values, and community traditions that influence patterns of cooperation, mutual assistance, and shared responsibility within learning communities. In ELT-C contexts, CTE manifests through activities such as joint participation in digital language training, collaborative task completion, peer-assisted learning, and co-development of locally relevant learning content that reflects community identity and culturally grounded communication practices (Syatriana & Sakkir, 2020; Vyatkina, 2016). Research consistently shows that higher levels of community engagement enhance motivation, learning sustainability, and instructional effectiveness by reinforcing culturally embedded social support structures, trust, and shared responsibility for learning outcomes (Lam et al., 2021; Turan & Akdag-Cimen, 2020). Thus, CTE is

theoretically positioned as a direct determinant of ELT-C effectiveness, as it integrates technological participation with culturally grounded community interaction.

2.4. Mediating Role of Community Technology Engagement (CTE)

Although MBL and TIA contribute to improved instructional design and access, their effectiveness in community-based settings depends on how actively learners engage with these pedagogical and technological resources. Prior studies indicate that instructional innovations yield stronger outcomes when learners participate collaboratively and meaningfully in learning activities (Cisterna et al., 2019; Peel et al., 2019). In this process, engagement is not merely individual but socially and culturally situated, reflecting shared norms of participation, cooperation, and collective learning. CTE serves as a mechanism through which structured learning models and technological tools are transformed into shared learning practices that are culturally embedded within the community.

Similarly, research on educational technology emphasizes that adoption alone does not guarantee learning success; active engagement mediates the relationship between technology use and learning outcomes by fostering motivation, sustained usage, and social learning dynamics (Lam et al., 2021; Sun et al., 2020; Taherdoost, 2018). In ELT-C, community engagement through digital platforms enables learners to internalize instructional models, practice language collaboratively, and contextualize learning in ways that align with local cultural values, interaction patterns, and communicative norms. Therefore, CTE functions as a critical mediating variable that links MBL and TIA with ELT-C effectiveness by integrating pedagogical design and technological access into culturally grounded community learning processes.

While the proposed framework adopts a directional structure grounded in theory, this study acknowledges that the relationships are examined using cross-sectional data and therefore interpreted as associative rather than strictly causal. Alternative reciprocal relationships, such as effective ELT-C reinforcing engagement, are theoretically plausible and suggested for future longitudinal research.

Figure 1

Conceptual Framework of MBL and TIA on ELT-C with CTE as a Mediating Variable

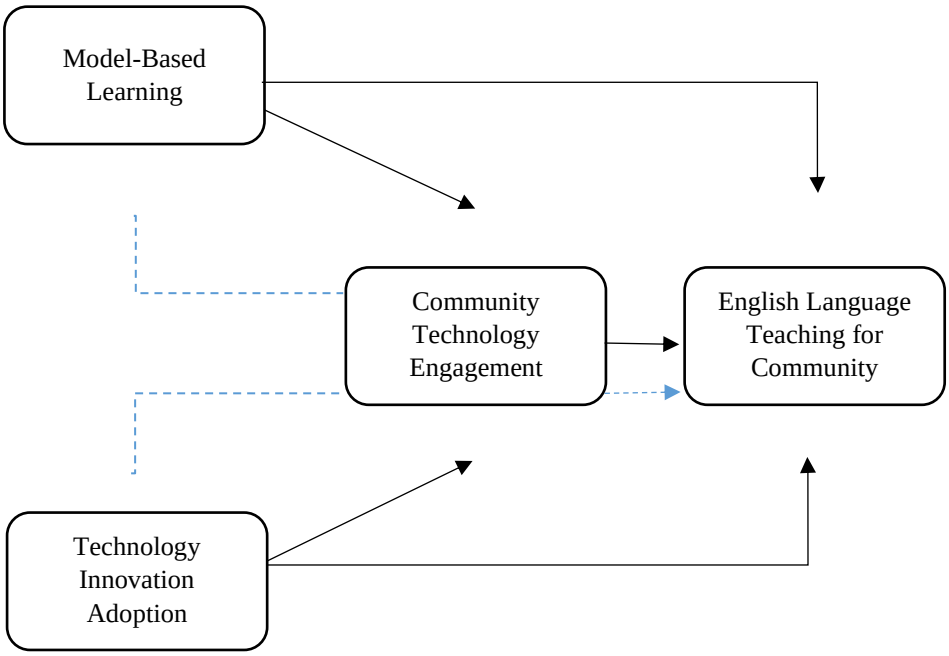

Figure 1 presents a theoretically grounded conceptual framework illustrating the relationships among MBL, TIA, CTE, and ELT-C. The directional paths are derived from educational innovation theory and technology adoption literature, which posit that instructional design and technology adoption influence

learning outcomes both directly and indirectly through learner and community engagement. CTE is positioned as a mediating construct to explain how and under what conditions MBL and TIA contribute to ELT-C effectiveness.

3. Methodology

3.1. Participants

The 150 participants were community-based English learning stakeholders in Cimahi City who were actively involved in technology-supported English training programs between September and November 2024. These stakeholders consisted of MSME owners and tourism-sector managers in their capacity as program participants, organizers, or facilitators, rather than as business actors per se. This type of community-based English learning context has also been examined in previous studies (Meunchong & Tachom, 2023; Nomnian et al., 2020; Peng & Chen, 2023; Phaiboonnugulkij, 2023; Prihandoko et al., 2019). They were selected because, in community-based education settings, such actors often simultaneously assume roles as learners, program initiators, and technology users.

In terms of demographic characteristics, the participants ranged in age from 20 to 55 years, reflecting a broad representation of working-age adults involved in community education initiatives. Regarding gender distribution, 86 participants (57.3%) were male and 64 participants (42.7%) were female, indicating a relatively balanced gender composition among respondents.

Given the absence of a fixed sampling frame, purposive sampling was applied with the following criteria: (1) participation in or organization of community-based English training, (2) exposure to or use of digital technology in the training process, and (3) active engagement throughout the program period. A total of 150 valid responses were collected.

Regarding sample size adequacy, this study follows Hair et al. (2019) by applying the 10-times rule based on the maximum number of structural paths pointing at a latent variable, not the number of indicators. In this model, the endogenous construct with the highest number of predictors is ELT-C, which has three incoming paths (MBL, TIA, and CTE), resulting in a minimum requirement of 30 respondents. The final sample of 150 therefore exceeds the recommended threshold and enhances model stability and statistical power.

3.2. Instrument

Data were collected using a structured questionnaire with a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). All constructs were measured reflectively using five indicators each. MBL indicators were adapted from Martinez-Lopez et al. (2017) and Peng and Chen (2023) and capture structured learning preparation, participation, and engagement in model-based activities. TIA indicators, adapted from Oduro (2020), reflect perceived usefulness, adaptability, and functional adoption of technological innovations in community learning contexts. CTE indicators, adapted from Lam et al. (2021), measure collaborative engagement, confidence, and sustained technology use within the community. ELT-C indicators, adapted from Vyatkina (2016), operationalize teaching effectiveness in terms of instructional relevance, learner participation, and perceived communicative usefulness, rather than abstract outcome claims. The full list of indicators is presented in Appendix 1.

3.3. Procedure

Questionnaires were distributed both in printed form during in-person training sessions and online via Google Forms to increase accessibility. Prior to data collection, respondents were informed about the study's purpose and anonymity was assured. In addition, brief informal interviews were conducted to contextualize responses and support interpretive validity, though these qualitative inputs were not included in the statistical analysis.

Data analysis was conducted using SmartPLS 4.0. The analysis consisted of (1) outer model evaluation (convergent validity, discriminant validity, and construct reliability), (2) inner model evaluation (R^2, Q^2, and path coefficients), and (3) mediation analysis using bootstrapping to assess the role of CTE in linking MBL and TIA with ELT-C.

4. Results

Table 1 shows the results of the outer model evaluation, confirming convergent validity and construct reliability. All indicators have loading factors above 0.78, indicating a strong contribution to each construct. Average variance extracted (AVE) values for all variables are above 0.67, meeting the requirements for convergent validity. Construct reliability (CR) ranges from 0.902 to 0.913, and Cronbach's Alpha between 0.874 and 0.886, both exceeding the minimum threshold of 0.70. These results demonstrate that MBL, TIA, CTE, and ELT-C have good internal consistency and are worthy of further analysis.

Table 1
Outer Model Evaluation Results

Construct	Indicator	Loading Factor	AVE	CR	Cronbach's α
MBL	MBL1	0.781	0.672	0.902	0.874
	MBL2	0.823			
	MBL3	0.856			
	MBL4	0.803			
	MBL5	0.844			
TIA	TIA1	0.814	0.698	0.913	0.886
	TIA2	0.867			
	TIA3	0.853			
	TIA4	0.819			
	TIA5	0.835			
CTE	CTE1	0.822	0.681	0.908	0.879
	CTE2	0.833			
	CTE3	0.846			
	CTE4	0.791			
	CTE5	0.842			
ELT-C	ELT1	0.825	0.695	0.912	0.885
	ELT2	0.859			
	ELT3	0.838			
	ELT4	0.812			
	ELT5	0.841			

Given that all data were collected using a self-reported questionnaire, potential common method bias (CMB) was assessed. First, Harman's (1976) single-factor test was conducted, showing that the largest factor accounted for less than 50% of the total variance, indicating that CMB is unlikely to be a serious concern. Second, full collinearity variance inflation factor (VIF) values were examined following Kock (2015). All inner VIF values were below the conservative threshold of 3.3, suggesting the absence of common method bias. These results indicate that the high indicator loadings reflect true construct relationships rather than methodological artifacts.

Table 2 shows that all constructs meet the Fornell–Larcker criteria. The √AVE value (0.820–0.835) is greater than the correlation between constructs, confirming that discriminant validity has been achieved. This proves that MBL, TIA, CTE, and ELT-C have clear and measurable conceptual differences.

Tabel 2
Fornell–Larcker Criterion

Construct	MBL	TIA	CTE	ELT-C
MBL	0.820			
TIA	0.612	0.835		
CTE	0.598	0.645	0.826	
ELT-C	0.571	0.623	0.659	0.834

Table 3 presents the results of the Heterotrait-Monotrait Ratio (HTMT), used to test discriminant validity between constructs. All HTMT values range from 0.668 to 0.769, lower than the conservative limit of 0.85. This indicates that each construct is empirically distinct and does not experience problematic overlap. For example, the HTMT value between MBL and TIA is 0.734, while the highest value is found for CTE and ELT-C at 0.769, which remains within safe limits. Thus, all constructs have been proven to meet the discriminant validity criteria well.

Table 3
HTMT Results

Construct Pair	HTMT Value	Status
MBL – TIA	0.734	Valid
MBL – CTE	0.701	Valid
MBL – ELT-C	0.668	Valid
TIA – CTE	0.752	Valid
TIA – ELT-C	0.713	Valid
CTE – ELT-C	0.769	Valid

Furthermore, Table 4 presents the coefficients of determination (R^2), predictive relevance (Q^2), and effect sizes (f^2) for the mediator and dependent constructs. CTE achieved an R^2 value of 0.521 and a Q^2 value of 0.372, indicating moderate explanatory power and satisfactory predictive relevance. ELT-C obtained an R^2 of 0.574 and a Q^2 of 0.401, reflecting good predictive relevance and strong explanatory support for the structural model.

To further assess the substantive contribution of each exogenous construct and to address potential overfitting concerns, effect size (f^2) values were examined following Cohen's (1988) criteria. The results show that MBL and TIA exert medium effects on CTE, while CTE demonstrates a large effect on ELT-C. In contrast, the direct effects of MBL and TIA on ELT-C are within the small-to-medium range, indicating balanced contributions.

Table 4
Coefficient of Determination (R^2) and Predictive Relevance (Q^2)

Endogenous Construct	Predictor	R^2	Q^2	f^2	Effect Size Interpretation
CTE (Mediator)	MBL	0.521	0.372	0.21	Medium
	TIA			0.29	Medium
ELT-C (Dependent)	CTE	0.574	0.401	0.38	Large
	MBL			0.09	Small
	TIA			0.12	Small–Medium

The first objective examined the effect of MBL on CTE. The analysis results show a β value of 0.384, t = 5.912, and p = 0.000, indicating a significant effect (Figure 2; Table 5). This finding suggests that more intensive implementation of MBL is associated with higher levels of community involvement in technology use. In community-based learning settings, this relationship reflects the role of culturally familiar models and structured learning representations in encouraging collective participation, shared problem-solving, and socially grounded engagement with technology.

The second objective examined the effect of TIA on CTE. Bootstrapping results show a β value of 0.461, t = 7.025, and p = 0.000, confirming a significant effect. This indicates that higher levels of technological innovation adoption correspond to greater community involvement in technology use. In culturally embedded community contexts, this result implies that successful technology adoption extends beyond access and functionality, requiring alignment with local values, norms, and collective readiness for active participation in technology-supported learning activities.

The third objective examined the effect of CTE on ELT-C. The results show a β value of 0.497, t = 8.211, and p = 0.000, indicating a significant effect. These findings demonstrate that higher levels of community engagement with technology enhance the effectiveness of community-based English

language teaching. This result highlights the role of culturally grounded engagement in enabling technology to function as a bridge between English learning and the real communicative, economic, and social needs of the community.

The fourth objective examined the effect of MBL on ELT-C. The statistical results yield β = 0.212, t = 2.881, and p = 0.004, indicating a significant effect. This finding indicates that model-based learning strategies directly strengthen the effectiveness of English language teaching in community settings. From a cultural perspective, systematic and contextualized learning models support meaningful learning by aligning instructional design with community learning traditions and shared ways of understanding.

The fifth objective examined the effect of TIA on ELT-C. Bootstrapping results yielded β = 0.275, t = 3.412, and p = 0.001, confirming a significant effect. These results demonstrate that the adoption of technological innovation directly improves the quality of English language learning in the community. Accordingly, the development of English language programs should integrate innovative technologies that are not only functional but also culturally appropriate, ensuring broader and more sustainable benefits for community learners.

Figure 2
Bootstrapping Analysis

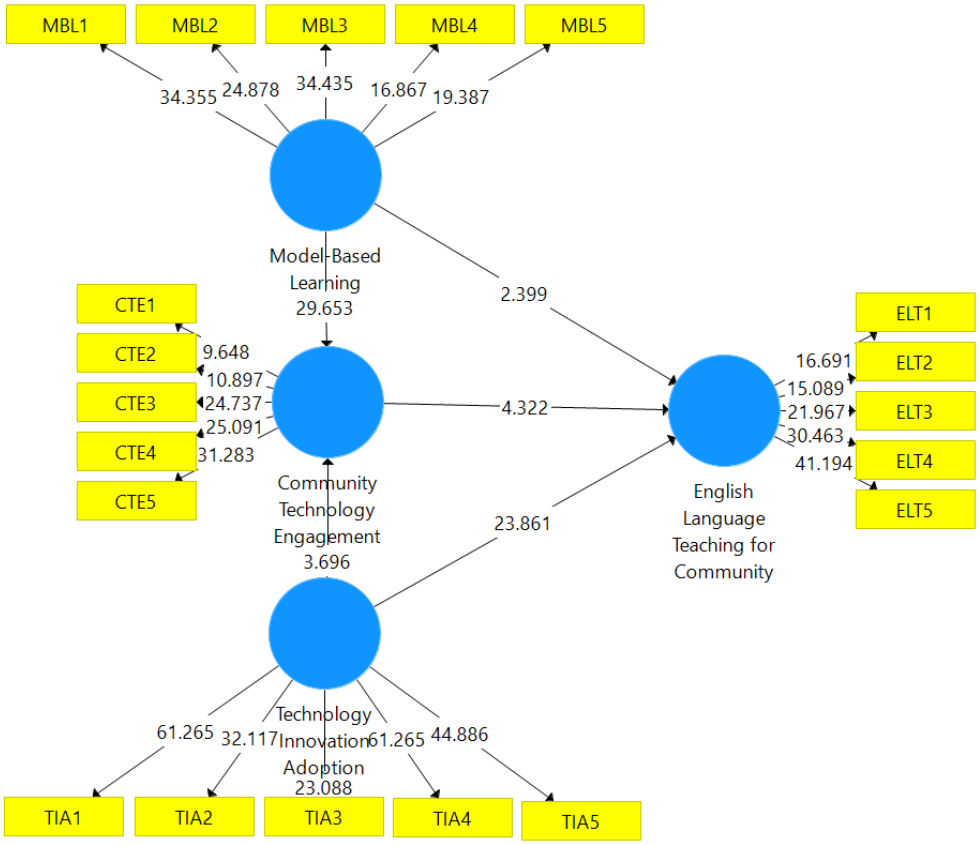

Table 5
Path Coefficient & Direct Effect (Bootstrapping)

Relationship	Original Sample (β)	t-value	p-value	Result
MBL → CTE	0.384	5.912	0.000	Significant
TIA → CTE	0.461	7.025	0.000	Significant
CTE → ELT-C	0.497	8.211	0.000	Significant
MBL → ELT-C	0.212	2.881	0.004	Significant
TIA → ELT-C	0.275	3.412	0.001	Significant

The results of the indirect path analysis indicate that both exogenous variables significantly influence ELT-C through CTE. First, the MBL → CTE → ELT-C path obtained a coefficient of β = 0.191 with a t-value of 4.622 and a p-value of 0.000 (Table 6), confirming a significant mediation effect. Second, the TIA → CTE → ELT-C path showed a coefficient of β = 0.229 with a t-value of 5.213 and a p-value of 0.000, thus also significant. Thus, the hypothesis stating an indirect effect through CTE is accepted. These findings confirm that CTE plays an important mediator in strengthening the relationship between MBL and TIA with ELT-C.

Table 6
Indirect Effects (Bootstrapping)

Indirect Path	β	t-value	p-value	Result
MBL → CTE → ELT-C	0.191	4.622	0.000	Significant
TIA → CTE → ELT-C	0.229	5.213	0.000	Significant

5. Discussion

This study aimed to examine the effects of MBL and TIA on the effectiveness of ELT-C, with CTE serving as a mediating mechanism. Situated within community-based education in Indonesia, the study responds to the need for culturally grounded learning models that integrate structured instructional design, technological innovation, and collective participation in non-formal educational settings (Buckley, 2000; Cisterna et al., 2019; Peel et al., 2019; Pramudia et al., 2017; Syafii et al., 2022). The findings indicate that both MBL and TIA significantly enhance CTE, demonstrating that well-defined instructional models and accessible digital technologies encourage active community participation. These results underscore the central role of culture in shaping learning engagement, particularly in collectivist learning cultures such as Indonesia, where learning is socially situated and reinforced through interaction, coordination, and shared responsibility rather than individual performance alone (Hamzah et al., 2022; Turan & Akdag-Cimen, 2020; Yusri et al., 2018). Within this cultural context, model-based instructional approaches provide structured learning scripts that support collective activities and shared meaning-making, while technology adoption facilitates communication, access to shared resources, and collaborative learning environments that align with community values and social practices (Addae, 2016; Lam et al., 2021; Ogwu et al., 2023; Syatriana & Sakkir, 2020). Moreover, the mediating role of CTE highlights that pedagogical and technological innovations become effective in ELT-C only when they are enacted through culturally embedded patterns of engagement. These findings are consistent with prior studies showing that media-supported instruction enhances interaction quality and coordinated problem-solving in learning communities, particularly when learning processes reflect shared norms and collective orientations (Abrahams, 2010; Lei & Morrow, 2010). Overall, the study affirms that the effectiveness of ELT-C in community-based settings is not determined solely by instructional models or technology adoption, but by their integration into culturally grounded modes of participation and engagement.

CTE was found to exert the strongest influence on ELT-C and to mediate the effects of both MBL and TIA. This finding indicates that instructional models and technological innovation improve community-based English learning outcomes only when they are accompanied by active and sustained community engagement. In culturally embedded learning environments, engagement reflects shared norms of participation, mutual support, and collective responsibility that shape how learning resources are used and valued. Prior research similarly emphasizes that engagement and participation function as key mechanisms linking learning design to motivation and instructional effectiveness (De Barba et al., 2016; Martinez-Lopez et al., 2017; Mighani & Moghadam, 2019; Salih & Omar, 2022; Vyatkina, 2016). In community-oriented contexts, technology operates less as an individual cognitive aid and more as a social connector that facilitates trust, collaboration, and sustained participation through culturally grounded interaction patterns (Sun et al., 2020; Swenson-Lepper, 2012). These findings affirm that the effectiveness of ELT-C depends on integrating pedagogical and technological innovations into culturally aligned modes of community engagement.

Theoretically, this study refines community education and engagement models by positioning collective technology engagement, rather than individual cognitive ability, as the central explanatory mechanism linking pedagogy and learning outcomes. This culturally informed perspective recognizes learning as a socially situated process shaped by shared norms, values, and interaction patterns, and aligns with community-based learning and student-centered education frameworks that emphasize interaction, media use, and shared learning processes as determinants of educational success (Childrey, 2025; Clifford & Reisinger, 2018; Zamiri & Esmaeili, 2024). Practically, the findings suggest that ELT programs should prioritize participatory technology use, culturally relevant instructional models, and collaborative learning activities that resonate with local community practices and collective learning traditions (Ley et al., 2023; Peng & Chen, 2023). Future research may extend this model to other cultural or vocational learning contexts to test its broader applicability. Longitudinal and mixed-method approaches could further examine how community engagement evolves over time and how instructional models and technology adoption jointly shape learning sustainability. Additionally, refining context-sensitive indicators of community engagement would enhance construct validity and deepen understanding of culturally embedded educational innovation (Sasaki, 2018; Siala et al., 2019; Taherdoost, 2018).

Acknowledgements

The authors used an AI-based tool solely for linguistic polishing and/or for generating figures or tables. The ideas, interpretations, and analyses presented in this paper are entirely original and the sole responsibility of the authors.

Disclosure Statement

The authors claim no conflict of interest.

Funding

The research did not receive any specific grants from funding agencies.

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Appendix 1

Measurement Indicators for the Variables

Variable	Indicator	Statement	Sources
Model-Based Learning (MBL)	MBL1	Structured learning activities are systematically planned in the training program	Peng & Chen, 2023; Martinez-Lopez et al., 2017
	MBL2	Instructional models are clearly communicated to community participants	
	MBL3	Learning sessions encourage guided problem analysis and discussion	
	MBL4	Training activities include iterative practice based on instructional models	
	MBL5	Model-based approaches are consistently applied throughout the program	
Technology Innovation Adoption (TIA)	TIA1	Digital technologies are adopted to improve training effectiveness	Peng & Chen, 2023; Oduro, 2020
	TIA2	Technology is used to facilitate access to external knowledge and expertise	
	TIA3	Digital innovation supports efficiency in training implementation	
	TIA4	Technology compensates for limited physical or instructional resources	
	TIA5	Digital tools enable program scalability and broader community reach	
Community Technology Engagement (CTE)	CTE1	Community members actively collaborate using digital platforms	Lam et al., 2021 (adapted)
	CTE2	Technology facilitates cross-group participation and coordination	
	CTE3	Participants demonstrate confidence in using training-related technologies	
	CTE4	Digital interaction fosters mutual trust and shared learning goals	
	CTE5	Community members are encouraged to sustain engagement through technology	
English Language Teaching for Community (ELT-C)	ELT1	English teaching methods are contextually appropriate for community needs	Vyatkina, 2016
	ELT2	Learning materials are relevant to community-based communication contexts	
	ELT3	Technology-supported activities enhance instructional delivery	
	ELT4	English instruction aligns with practical community applications	
	ELT5	Learning activities promote collaborative language use within the community	