Salus Publica: Journal of Community Service
Vol 4, Issue 3, December 2026, Pages 452-463
ISSN: 2987-9299 (Media Online)
DOI: https://doi.org/10.58905/saluspublica.v4i3.660

Higher Education as a Catalyst for Sustainable Development: A Unified Perspective on Service-Learning, Entrepreneurship, and Community Empowerment

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Abstract. Community service in higher education has evolved into a central pedagogical strategy that integrates academic learning with societal engagement, fostering innovation, cultural preservation, and economic resilience. This study of three student groups, focused on MSME development, entrepreneurial education, and service-learning in higher education, illustrates how universities act as catalysts for sustainable community transformation. Guided by experiential learning theory and service-learning pedagogy, student-led projects addressed challenges in MSME competitiveness, entrepreneurial innovation, and cultural heritage preservation. Faculty mentorship by Dr. Samuel PD Anantadjaya, Abdul Haris Lahuddin, MT, and Dr. Amelia Naim Indrajaya ensured academic rigor and societal relevance, transforming classroom exercises into impactful initiatives. Outcomes highlight enhanced student competencies in critical thinking, empathy, and problem-solving; strengthened community ties through culturally sensitive and economically viable interventions; and institutional advancement in embedding social innovation and sustainability into curricula. Collectively, these findings underscore that higher education, when integrating service-learning, social entrepreneurship, and experiential education, not only prepares graduates for global citizenship but also empowers communities through inclusive development, digital expansion, and cultural revitalization.

Keywords: service-learning; experiential learning; social entrepreneurship; MSME development; community empowerment

1 Introduction

1.1 Higher Education and the Evolution of Community Service

Community service has increasingly become a cornerstone of higher education, not as a peripheral activity but as a central pedagogical strategy that integrates academic learning with societal engagement. Universities worldwide are being reimagined as agents of social change, tasked with preparing graduates who are not only skilled professionals but also socially responsible citizens [1]. This shift reflects broader global imperatives: the need for sustainable development, inclusive growth, and cultural preservation in the face of rapid modernization. Service-learning, experiential education, and social entrepreneurship have emerged as key modalities through which higher education institutions (HEIs) fulfill this mission. These approaches emphasize reciprocal benefits: students gain experiential knowledge while communities receive tangible support [2]. In the Indonesian context, where micro, small, and medium enterprises (MSMEs) form the backbone of the economy, community service projects have proven particularly impactful. They not only strengthen local businesses but also cultivate civic responsibility and intercultural competence among students.

1.2 Service-Learning as a Transformative Pedagogy

Service-learning is widely acknowledged as a transformative educational practice that combines structured academic instruction with community engagement. Rooted in Kolb's experiential learning theory [3], [4], service-learning embodies the cycle of concrete experience, reflective observation, abstract conceptualization, and active experimentation. Embedding service-learning into curricula fosters critical thinking, civic responsibility, and applied problem-solving skills [5]. In Indonesia, service-learning has been applied to diverse

contexts, ranging from MSME development to cultural preservation initiatives. For example, student-led projects have documented traditional food practices, revitalized community spaces, and designed branding strategies for local enterprises. These interventions illustrate how service-learning can simultaneously preserve cultural heritage and empower local economies. Faculty mentorship plays a crucial role in scaffolding these experiences, ensuring that projects are academically rigorous and socially impactful [5].

1.3 Social Entrepreneurship and Community Empowerment

Entrepreneurial education has undergone a paradigm shift, moving beyond profit generation to emphasize social innovation and community empowerment. Social entrepreneurship is defined as the pursuit of innovative solutions to social problems through entrepreneurial means, blending business acumen with a social mission [6]. In educational contexts, social entrepreneurship fosters capacity building, inclusivity, and sustainable development. The case of TruCafé exemplifies this ethos (see the Conflict of Interest statement). By transforming an unused family pool into a community café, students reclaimed resources to create a hub for social interaction, cultural exchange, and youth empowerment. Such initiatives demonstrate how entrepreneurship can be reframed as community service, positioning students as agents of societal upliftment [7]. Classroom roleplay exercises, such as simulating customer scenarios, further illustrate how experiential learning cultivates empathy, adaptability, and opportunity recognition [8].

1.4 MSME Development and Economic Resilience

MSMEs represent a critical sector for Indonesia's economic resilience, contributing significantly to GDP and employment. Yet they face persistent challenges in branding, customer loyalty, and sustainability. Service-learning projects have been employed to strengthen MSMEs by providing consultancy, marketing strategies, and operational improvements [9]. Recent scholarship highlights the integration of green marketing and AI-driven tools as emerging strategies for MSMEs to enhance sustainability and competitiveness [10]. These approaches align with global trends in sustainable business innovation, offering pathways for MSMEs to differentiate themselves in saturated markets. Student-led interventions, such as loyalty programs, seasonal menu innovation, and brand storytelling, illustrate how academic–community collaboration can directly contribute to MSME resilience.

1.5 Faculty Mentorship and Institutional Advancement

Faculty involvement is indispensable in bridging academic theory with community practice. Mentors such as Dr. Amelia Naim Indrajaya, Abdul Haris Lahuddin, MT, and Dr. Samuel PD Anantadjaya exemplify this role by guiding students through projects that merge innovation with cultural sensitivity. Their mentorship transforms classroom exercises into community service initiatives with tangible societal impact. By facilitating projects such as food heritage preservation and café-based innovation, they ensure that students develop both scholarly competence and civic responsibility. Institutionally, these projects reinforce higher education's role as a catalyst for social innovation and sustainable development. Embedding service-learning into curricula institutionalizes community service as a mainstream pedagogy, ensuring that universities remain responsive to societal needs while preparing students for global citizenship [11].

1.6 Toward a Unified Framework

Taken together, MSME development, entrepreneurial education, and service-learning illustrate a unified framework for community service in higher education. This framework integrates economic empowerment through MSME resilience and innovation, social entrepreneurship as a vehicle for community upliftment, cultural preservation as a safeguard of intangible heritage, and experiential learning as the pedagogical foundation for student development [12]. The outcomes are multifaceted: enhanced student competencies, strengthened community ties, and institutional advancement. Collectively, these findings underscore that higher education, when integrating service-learning, social entrepreneurship, and experiential education, not only prepares graduates for global citizenship but also empowers communities through inclusive development, digital expansion, and cultural revitalization.

2 Literature Review

2.1 Community Service in Higher Education: A Pedagogical Transformation

Community service has evolved from a peripheral activity in higher education into a central pedagogical strategy that integrates academic learning with societal engagement. Scholars increasingly recognize universities

as agents of social change, tasked with preparing graduates who are not only technically competent but also socially responsible citizens [1]. Service-learning, experiential education, and social entrepreneurship have emerged as key modalities through which higher education institutions fulfill this mission. The literature consistently highlights service-learning as a transformative practice. Salam et al. [2] demonstrate that service-learning enhances critical thinking, civic responsibility, and applied problem-solving. Tijsma et al. [5] emphasize that embedding service-learning into curricula requires faculty mentorship and institutional commitment, ensuring that projects are both academically rigorous and socially impactful. This pedagogical foundation provides the backdrop for the three strands of research examined here: MSME development, entrepreneurial education, and broader community service in higher education.

2.2 Service-Learning and MSME Development

MSMEs represent a critical sector for Indonesia's economic resilience, contributing significantly to GDP and employment. Yet they face persistent challenges in branding, customer loyalty, and sustainability. Service-learning projects have been employed to strengthen MSMEs by providing consultancy, marketing strategies, and operational improvements [9]. Ananingsih et al. [13] highlight the role of socio-cultural service-learning in enhancing MSME competitiveness. Student-led interventions, such as loyalty programs, seasonal menu innovation, and brand storytelling, illustrate how academic–community collaboration can directly contribute to MSME resilience. Recent scholarship also points to the integration of green marketing and AI-driven tools as emerging strategies for MSMEs [10]. These approaches align with global trends in sustainable business innovation, offering pathways for MSMEs to differentiate themselves in saturated markets.

Critically, while traditional service-learning projects have focused on immediate operational improvements, emerging literature emphasizes the importance of integrating digital and sustainable strategies. This shift reflects broader global imperatives, positioning MSMEs not only as economic actors but also as agents of sustainability.

2.3 Entrepreneurial Education and Social Responsibility

Entrepreneurial education has undergone a paradigm shift, moving beyond profit generation to emphasize social innovation and community empowerment. Social entrepreneurship is defined as the pursuit of innovative solutions to social problems through entrepreneurial means, blending business acumen with a social mission [6]. Pache and Chowdhury [14] argue that social entrepreneurship education should prepare students to bridge the social-welfare and commercial logics in which social entrepreneurs are embedded, enabling them to address societal needs while cultivating entrepreneurial skills.

Experiential learning theory (ELT), pioneered by Kolb [3], [4], [15], provides the theoretical foundation for entrepreneurship education. Gemmell and Kolb [16] highlight that entrepreneurial creativity emerges from iterative cycles of experience, reflection, and experimentation. Corbett [8] emphasizes that experiential learning fosters opportunity recognition, a critical entrepreneurial skill. Classroom roleplay exercises, such as simulating customer scenarios, illustrate how experiential learning cultivates empathy, adaptability, and problem-solving.

Service-learning pedagogy further situates students in community contexts, allowing them to apply entrepreneurial skills to local challenges. Hockerts [17] shows that experiential social entrepreneurship education strengthens students' intention to pursue social entrepreneurship, which can increase their societal impact. Wibowo [18] demonstrates that service-learning in creative entrepreneurship courses in Indonesia contributes to poverty reduction and social development.

Innovation, sustainability, and digital inclusion have become central to entrepreneurial education. Kong [19] argues that experiential learning enhances students' ability to launch service-oriented start-ups. Garg et al. [10] highlight AI-driven sustainability marketing as a transformative tool for consumer engagement. These findings underscore the importance of equipping students with digital tools to expand access and engage broader audiences.

2.4 Community Service in Higher Education: Cultural and Social Dimensions

Beyond MSME development and entrepreneurial education, community service in higher education encompasses broader cultural and social dimensions. Projects documenting traditional food practices, for example, counteract declining awareness and reinforce cultural identity. Álvarez-Vanegas et al. [11] highlight service-learning as a niche innovation for sustainability, emphasizing cultural preservation as part of institutional missions.

Faculty mentorship plays a crucial role in bridging academic theory with community practice. Mentors such as Dr. Samuel PD Anantadjaya, Dr. Amelia Naim Indrajaya, and Abdul Haris Lahuddin, MT, exemplify this role, guiding students through projects that merge innovation with cultural sensitivity. Their mentorship transforms classroom exercises into community service initiatives with tangible societal impact. By facilitating

projects such as food heritage preservation and café-based innovation, they ensure that students develop both scholarly competence and civic responsibility.

Community service initiatives such as TruCafé demonstrate how HEIs foster economic empowerment through entrepreneurial hubs. Social innovations such as the "Play Concept" integrate leisure, creativity, and inclusivity, reinforcing higher education's role in collective well-being. These initiatives illustrate how community service can simultaneously empower local economies and foster social innovation.

2.5 Critical Comparisons and Deeper Synthesis

Taken together, the literature on MSME development, entrepreneurial education, and community service in higher education reveals both convergence and divergence.

- Convergence: Across all three strands, service-learning, experiential education, and faculty mentorship consistently emerge as foundational principles. Whether addressing MSME resilience, fostering entrepreneurial innovation, or preserving cultural heritage, these pedagogical strategies ensure that projects are academically rigorous and socially impactful.
- Divergence: The contexts differ in emphasis. MSME-focused projects highlight economic resilience and sustainability; entrepreneurial education emphasizes innovation, digital inclusion, and social responsibility; and broader community service initiatives underscore cultural preservation and social innovation.

Critically, these strands are not isolated but mutually reinforcing. For instance, MSME development projects benefit from entrepreneurial education's emphasis on innovation and digital inclusion, while cultural preservation initiatives enrich entrepreneurial projects by grounding them in local identity. Faculty mentorship provides the connective tissue, ensuring coherence across diverse projects.

3 Methodology

3.1 Research Design

This study adopted a qualitative research design to explore the integration of community service into higher education through projects focusing on MSME development, entrepreneurial education, and cultural preservation. Qualitative inquiry was selected because it allows for a rich, contextualized understanding of participants' experiences and the social impact of service-learning initiatives [20], [21]. The design was interpretive, drawing on service-learning pedagogy and experiential learning theory to frame the analysis.

3.2 Participants and Context

The research was conducted at IPMI Institute, Jakarta, during the September–December 2025 academic term. Participants included undergraduate students from project groups and faculty mentors (Dr. Amelia Naim Indrajaya, Abdul Haris Lahuddin, MT, and Dr. Samuel PD Anantadjaya). Projects addressed MSME resilience, entrepreneurial innovation, and cultural preservation. Purposeful sampling was employed to ensure that participants were directly engaged in the initiatives under study [22].

3.3 Data and NVivo Thematic Analysis

Data sources included student reports and presentations documenting project processes and outcomes; faculty reflections and mentorship notes highlighting pedagogical strategies; community feedback gathered during project implementation; and visual documentation (photographs, posters, and artifacts). All materials were digitized and imported into NVivo 12 for systematic coding and analysis.

NVivo facilitated thematic analysis by enabling systematic coding, categorization, and visualization of qualitative data. Following Braun and Clarke's six-phase approach [23], analysis proceeded through familiarization (reading and re-reading student and faculty narratives), initial coding (open coding in NVivo to capture emergent concepts), categorization (grouping codes into categories reflecting pedagogical and community themes), theme development (synthesizing categories into overarching themes, for instance, student development and community empowerment), reviewing themes (comparing across groups to identify convergence and divergence), and defining and naming themes (finalizing the thematic framework with NVivo visualization tools such as word frequency, coding matrices, and cluster analysis).

3.4 Trustworthiness and Ethics

Credibility and rigor were ensured [24] through triangulation of multiple data sources (students, faculty, and community); peer debriefing with faculty mentors to validate interpretations; an audit trail maintained in NVivo

documenting coding decisions and analytic memos; and reflexivity to acknowledge researcher positionality and potential biases.

This research protocol was reviewed by the Research & Community Services team of IPMI Institute and by Irma M Nawangwulan (IPMI Institute), Timotius Agus Rachmat (PT. Kang Guru Beruang, BSD City, Serpong), DC Ethan Samuel (Selasar-Padepokan Kalisoga, Brebes, Central Java), and Daniella CE Samuel (Universitas Bunda Mulia, Alam Sutera, Tangerang). To mitigate the power differential between faculty authors and enrolled students, written informed consent for the research use of project deliverables, reflections, and media was sought only after the official submission of final academic grades. Participation was entirely voluntary, and the materials of non-consenting students were excluded from the analysis without penalty. All qualitative data, student reports, and community feedback were anonymized and assigned alphanumeric identifiers before being imported into NVivo 12. Written media releases were obtained from community partners and MSME owners for all visual artifacts included in the study.

4 Analysis and Findings

4.1 Population and Sample

The population for this study consisted of undergraduate students and faculty members at IPMI Institute, Jakarta, engaged in community service projects between September and December 2025. The sample was drawn purposively from student groups (MSME Development, Entrepreneurial Education, and Higher Education Service-Learning) and faculty mentors (Dr. Samuel PD Anantadjaya, Dr. Amelia Naim Indrajaya, and Abdul Haris Lahuddin, MT). A total of 36 students participated across the three groups, with each group contributing project documentation, reflective narratives, and visual artifacts. Faculty mentors provided evaluative notes and pedagogical reflections.

Positionality and bias mitigation. Because the authors served as project mentors and lead researchers, several steps were taken to prevent confirmation bias. First, data source triangulation was enforced so that claims about the effectiveness of mentorship were contrasted with faculty reflections, students' reflective comments, and community feedback. Second, an external researcher blind-reviewed the NVivo coding framework. Third, negative cases, such as students' challenges with scaffolding and project implementation, were coded explicitly.

4.2 Method of Research

This study employed a qualitative research design grounded in interpretive inquiry. Data were collected from student reports, presentation transcripts, mentorship notes, and community feedback. NVivo 12 was used to manage, code, and analyze the data systematically. Thematic analysis was conducted following Braun and Clarke's six-phase model [23], supported by NVivo's visualization and query tools to enhance analytic depth and transparency.

4.3 Qualitative Review Using NVivo

Initial open coding generated 87 distinct nodes, which were grouped into 12 categories and synthesized into 7 overarching themes. The coding framework followed a parent–child hierarchy, with pedagogical foundations (service-learning, experiential education, and faculty mentorship) as parent nodes and applied domains (MSME strategies, cultural preservation, and entrepreneurial mindset) as child nodes. Table 1 shows how raw data were organized into nodes, categories, and themes, and Table 2 lists the parent and child nodes.

Table 1. Coding framework.

Nodes (initial codes)	Categories	Themes
Loyalty programs, seasonal menus, branding events	MSME strategies	Economic empowerment
Roleplay exercises, customer empathy, adaptability	Experiential learning practices	Entrepreneurial mindset
Traditional food documentation, cultural identity, heritage awareness	Cultural projects	Cultural preservation
Faculty mentorship, reflective notes, scaffolding	Pedagogical support	Faculty role in service-learning
Digital outreach, Instagram ads, GrabFood integration	Technology adoption	Digital inclusion and innovation
Student reflection, problem-solving, intercultural competence	Learning outcomes	Student development
Community bonding, Play Concept, inclusivity	Social innovation	Community empowerment

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The NVivo visualization outputs used in the analysis comprised word frequency clouds to highlight recurring terms such as innovation, community, and sustainability; coding matrices to compare themes across groups; and cluster analysis diagrams to show relationships between faculty mentorship and student development outcomes.

Table 2. Parent and child nodes.

Parent node	Child nodes
Service-learning	Community engagement, reflective practice, civic responsibility
Experiential education	Roleplay, problem-solving, adaptability, empathy
Faculty mentorship	Scaffolding, feedback loops, project supervision
MSME development	Branding, customer retention, green marketing, AI integration
Entrepreneurial education	Innovation, risk management, digital outreach, sustainability
Cultural/social innovation	Heritage documentation, inclusivity, leisure-based bonding

Each student group was treated as a case in NVivo, with attributes assigned for project type, pedagogical focus, and community impact. Cross-case analysis revealed thematic convergence in mentorship strategies and student development outcomes, while divergence was noted in domain-specific interventions (for instance, MSME branding versus cultural preservation).

4.4 Visual Outputs and Thematic Connections

Word cloud. A word frequency query generated a word cloud highlighting dominant terms such as "innovation," "community," "sustainability," "digital inclusion," "culture," and "reflection." These terms reflect the thematic density across all three groups and reinforce the centrality of service-learning as a pedagogical anchor.

Code–case connections. NVivo's coding matrix showed strong connections between faculty mentorship and student development across all cases. For example, Group 1 showed high co-occurrence between "branding" and "faculty scaffolding," while Group 3 linked "heritage documentation" with "reflective practice."

Matrices and crosstab. Coding matrices were used to compare theme frequency across cases (Table 3). The crosstab showed that Group 2 had the highest density of "digital inclusion" and "entrepreneurial mindset" codes, Group 1 emphasized "customer retention" and "green marketing," and Group 3 showed dominant coding in "cultural preservation" and "community bonding."

Table 3. Coding matrix and crosstab: coding references by theme and group, n (% of the group's total references).

Theme	Group 1 (n = 12) MSME development	Group 2 (n = 12) Entrepreneurial education	Group 3 (n = 12) Service-learning
MSME strategies	42 (18.4%)	14 (6.1%)	3 (1.2%)
Entrepreneurial mindset	18 (7.9%)	48 (21.0%)	15 (6.2%)
Cultural preservation	2 (0.9%)	11 (4.8%)	52 (21.6%)
Faculty mentorship	35 (15.4%)	38 (16.6%)	39 (16.2%)
Reflective practice	12 (5.3%)	31 (13.5%)	36 (15.0%)

The values in Table 3 are raw counts of coding references and percentages of each group's total references. No fixed thresholds were used to label themes as high, medium, or low; comparisons describe the relative concentration of themes across the three groups.

4.5 Conceptual and Structural Mapping

Mind map. A mind map was generated to visualize the flow from pedagogical foundations to applied domains (Figure 1). Rooted in Novak's theory of meaningful learning [25], mind maps help visualize how learners organize and connect concepts. In this study, the central node was "Service-Learning," which branched into three primary pedagogical supports: "Experiential Education," "Faculty Mentorship," and "Reflective Practice." From these anchors, the map extended into the thematic domains "MSME Development," "Entrepreneurial Education," and "Cultural/Social Innovation," each subdivided into student-led interventions such as branding strategies, roleplay exercises, heritage documentation, and community bonding.

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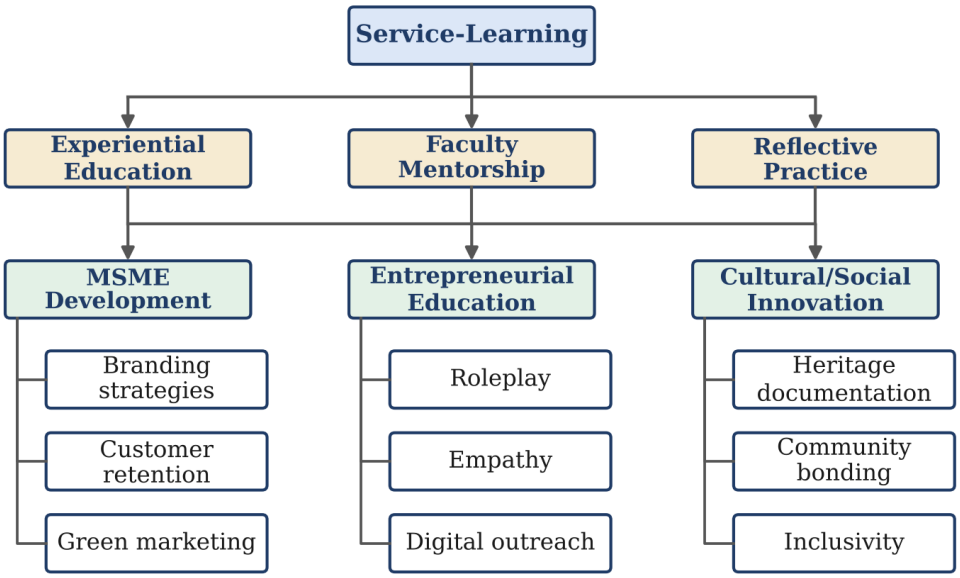


Figure 1. Mind map of the coding structure, from service-learning through pedagogical supports to applied domains and student-led interventions.

The mind map showed how students linked theory to practice. Students in Group 2 connected "Experiential Education" to "Roleplay" and "Empathy," which in turn linked to "Customer Retention" and "Digital Outreach." Group 3's branches emphasized "Cultural Preservation" and "Intercultural Competence," showing a strong connection between "Reflective Practice" and "Community Identity." Interpretively, the mind map suggests that service-learning is not a linear process but a dynamic, recursive system of meaning-making, consistent with Kolb's experiential learning cycle [4], [16], and it illustrates how faculty mentorship supports deeper conceptual integration.

Project map. The NVivo project map provided a structural overview of the research, detailing how raw data were organized, coded, and synthesized (Figure 2). It functioned as a visual audit trail, enhancing transparency and methodological rigor [26]. At the top level, it displayed three primary folders: "Student Reports," "Faculty Reflections," and "Community Artifacts," each containing files tagged with metadata such as group affiliation, project type, and date. These files were linked to coding sets that reflected thematic categories (e.g., "Innovation," "Sustainability," and "Cultural Identity"). The map also visualized the progression from open coding to axial coding. For example, initial codes such as "Instagram Ads," "Seasonal Menus," and "Customer Feedback" were grouped under the category "Digital Outreach," which was linked to the theme "Entrepreneurial Mindset." Similarly, codes such as "Heritage Recipes," "Oral Histories," and "Community Play" were grouped under "Cultural Preservation." The map showed that Group 1's MSME strategies were coded mainly from student reports, whereas Group 3's cultural initiatives drew more on community artifacts and faculty reflections, reinforcing the study's triangulation strategy.

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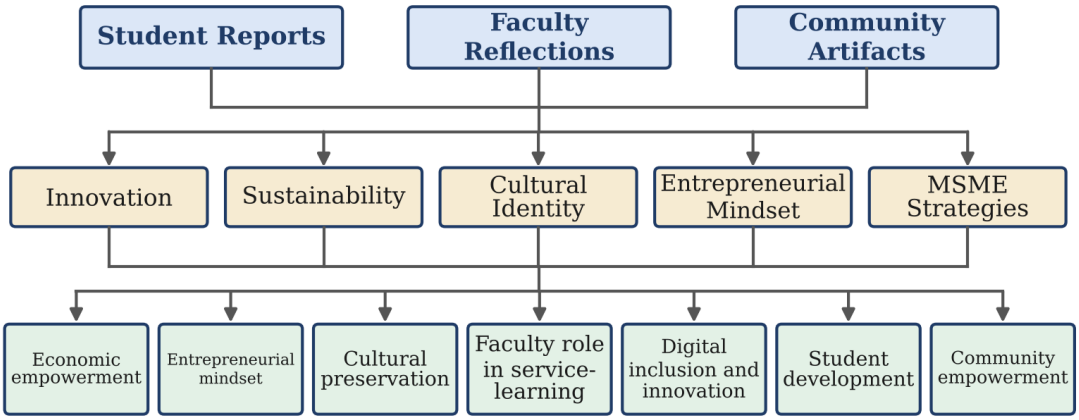


Figure 2. Project map showing how data sources were organized into coding sets and synthesized into the seven themes of Table 1.

Concept map. The concept map linked theoretical constructs (for instance, experiential learning and social entrepreneurship) with empirical findings (Figure 3). Drawing on Ausubel's cognitive theory of meaningful learning [27], concept maps help visualize how abstract constructs are operationalized in real-world contexts. Central constructs included "Service-Learning," "Experiential Learning," "Social Entrepreneurship," and "Faculty Mentorship," linked to pedagogical strategies such as "Roleplay," "Reflective Journaling," and "Community Immersion," and from these to the applied domains "MSME Branding," "Digital Inclusion," "Cultural Documentation," and "Social Innovation." For example, "Experiential Learning" was linked to "Roleplay," which was connected to "Empathy" and "Customer Retention," a pathway prominent in Group 2's entrepreneurial education project. Similarly, "Service-Learning" was linked to "Community Immersion," which connected to "Heritage Documentation" and "Cultural Identity," reflecting Group 3's focus.

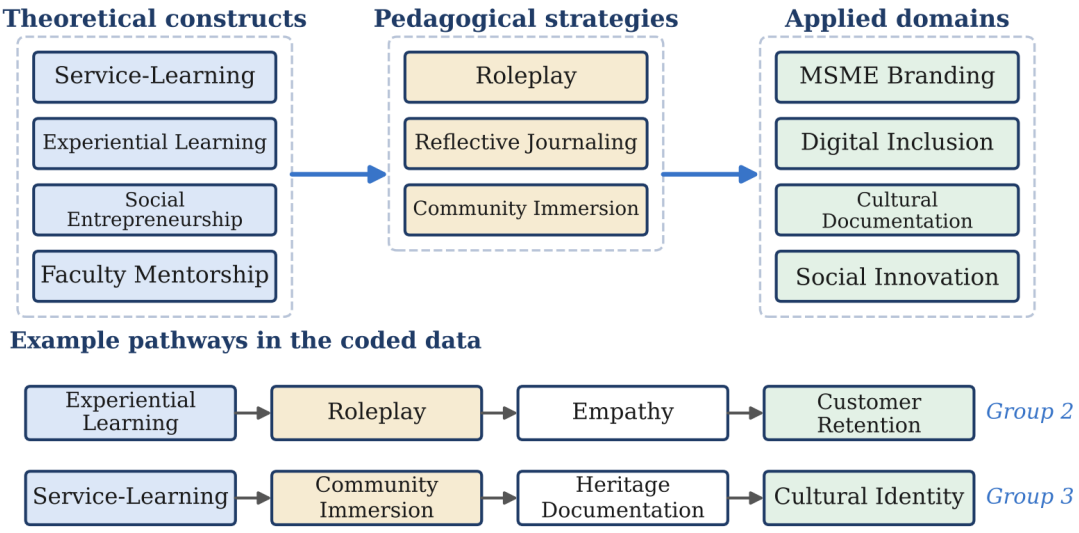


Figure 3. Concept map linking theoretical constructs, pedagogical strategies, and applied domains, with two example pathways from the coded data.

Interpretively, the mind map and concept map indicate that student reflections and project outcomes were conceptually consistent with Kolb's experiential learning cycle [4], [16]. Because these maps depict the researchers' own coding decisions, they illustrate interpretive alignment with the theoretical framework rather than validating it. Formal validation would require longitudinal tracking of individual students through the stages of the cycle, a comparison group, validated pre- and post-intervention instruments, explicit searches for disconfirming cases, and independent inter-coder reliability (e.g., Cohen's kappa or Krippendorff's alpha above 0.80).

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Cluster analysis. Cluster analysis was used to identify thematic proximities among coded data, revealing patterns of co-occurrence and conceptual overlap, an approach consistent with the emphasis of grounded theory on emergent relationships [28]. An agglomerative hierarchical cluster analysis was performed in NVivo 12 on coding similarity, using Pearson's correlation coefficient (r) and complete linkage. Two main clusters emerged (Figure 4). The first comprised Digital Outreach and Entrepreneurial Mindset (r = 0.82), coded primarily from Group 2's project. The second comprised Heritage Documentation and Community Bonding (r = 0.76), drawn from Group 3's cultural initiative. Reflective Practice acted as a bridge between the two clusters (r = 0.64), and Sustainability intersected both clusters, reinforcing its cross-cutting relevance in MSME and cultural initiatives. A further bridging group formed around Faculty Mentorship, including codes such as "Scaffolding," "Feedback Loops," and "Project Supervision," indicating that mentorship was a cross-cutting theme. "Digital Inclusion" and "Sustainability" were closely linked across Groups 1 and 2, while "Empathy" and "Intercultural Competence" clustered tightly in Group 3. These findings suggest that, while each group had distinct thematic emphases, certain pedagogical outcomes, such as adaptability and civic engagement, were shared across contexts.

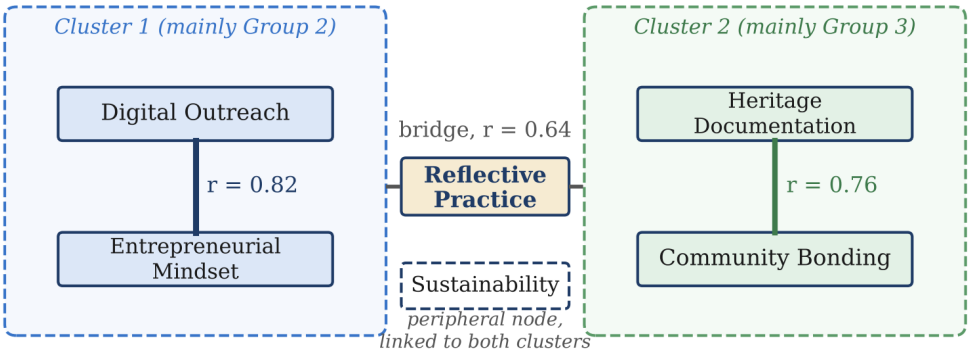


Figure 4. Thematic proximity among key nodes from the hierarchical cluster analysis (coding similarity, Pearson's r, complete linkage).

Hierarchy chart. The hierarchy chart displayed the parent–child structure of the coding framework, providing a visual taxonomy of themes and subthemes (Figure 5). This structure follows Miles et al.'s approach to qualitative data analysis, which emphasizes hierarchical coding for analytic clarity [29]. Parent nodes included "Service-Learning" (community engagement, civic responsibility, and cultural preservation), "Experiential Education" (roleplay, empathy, and problem-solving), "Faculty Mentorship" (scaffolding, reflection, and project supervision), and "Reflective Practice." Further branches extended into domain-specific codes: "MSME Development" (branding, customer retention, and green marketing), "Entrepreneurial Education" (digital outreach, innovation, and risk management), and "Cultural/Social Innovation" (heritage documentation, community play, and inclusivity). The chart enabled systematic comparison across cases: Group 1 emphasized green marketing and customer loyalty, Group 2 focused on digital outreach and empathy, and Group 3 prioritized cultural identity and community bonding.

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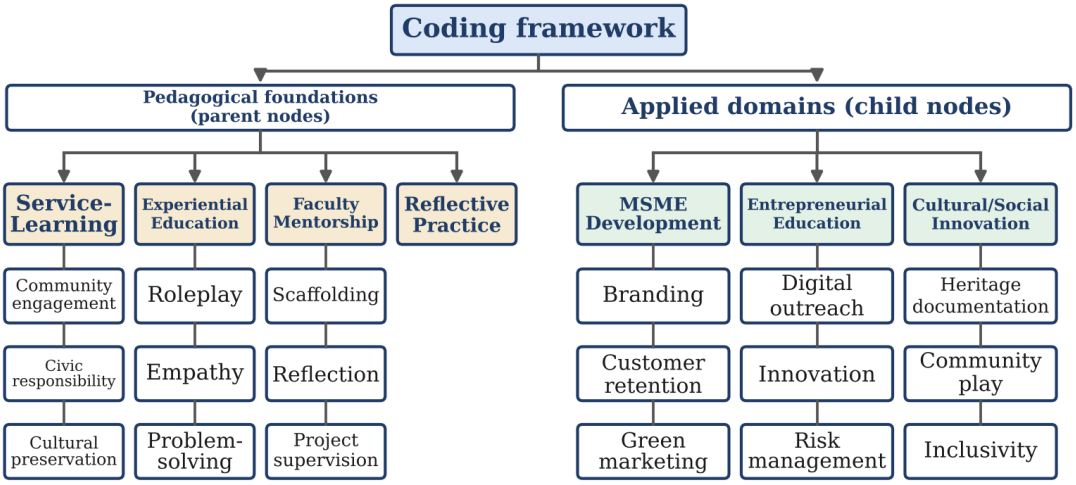


Figure 5. Hierarchy chart of the parent–child coding structure.

The NVivo-assisted analysis revealed that:

- service-learning is a unifying pedagogical strategy across diverse domains;
- faculty mentorship is critical in translating theory into practice;
- experiential learning fosters empathy, adaptability, and innovation;
- MSME development benefits from branding, digital tools, and sustainability strategies;
- entrepreneurial education thrives on roleplay, risk-taking, and digital inclusion; and
- cultural preservation initiatives strengthen community identity and student reflection.

These findings underscore the institutional value of embedding community service into higher education curricula, not only for student development but also for sustainable community impact.

5 Conclusion and Recommendations

5.1 Conclusion

This study demonstrates the transformative potential of service-learning as a pedagogical strategy in higher education, particularly when integrated with experiential education and faculty mentorship. Through qualitative analysis of student-led projects at IPMI Institute, the research shows how service-learning fosters civic engagement, entrepreneurial thinking, and cultural preservation. The thematic findings, supported by NVivo coding frameworks, cluster analysis, and visual mapping, indicate that MSME development benefits from student-driven branding, sustainability, and digital outreach strategies; that entrepreneurial education is enriched through roleplay, empathy-building, and adaptive problem-solving; and that cultural and social innovation emerges through heritage documentation, community bonding, and inclusive practices.

Faculty mentorship played a pivotal role in scaffolding student learning, ensuring academic rigor, and bridging theory with practice. The use of NVivo enabled systematic coding, cross-case comparison, and visual synthesis, reinforcing the study's methodological transparency. The research affirms that service-learning, when institutionalized with reflective and experiential components, can produce meaningful educational and community outcomes.

The evidence presented reflects qualitative appraisals, project outcomes, and short-term implementation during one academic term. While these indicators demonstrate initial engagement and strategic execution, longer-term indicators such as MSME revenue growth, customer retention rates, and sustained cultural engagement require post-intervention monitoring. The next step will be quantitative assessment of the economic and social impact on the targeted communities six and twelve months after implementation.

5.2 Recommendations

Based on the findings, the following recommendations are proposed for academic institutions, curriculum designers, and community partners:

1. Institutionalize service-learning: embed service-learning into core curricula across disciplines to promote interdisciplinary collaboration and community impact.
2. Strengthen faculty mentorship models: develop structured mentorship frameworks that support reflective practice, project supervision, and pedagogical alignment.
3. Leverage NVivo and other qualitative tools: encourage the use of qualitative software to enhance transparency, rigor, and visual communication in student research.
4. Promote MSME and cultural partnerships: expand collaborations with MSMEs and cultural organizations to provide real-world contexts for student learning and innovation.
5. Integrate reflective and experiential pedagogies: design learning experiences that combine roleplay, journaling, and community immersion to deepen student engagement and empathy.
6. Report qualitative analyses transparently: present word clouds, cluster maps, hierarchy charts, and concept maps together with their analytic parameters so that readers can follow how findings were derived.

Disclosure Statements

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Conflict of Interest

The authors declare the following potential conflict of interest. TruCafé, one of the project sites, is owned by Dr. Amelia Naim Indrajaya and her family. To prevent this relationship from affecting students, grades for the TruCafé project were determined by faculty members not employed by the business; reflection notes on TruCafé were collected anonymously by a research assistant after grades had been submitted; and a comparative NVivo sentiment analysis was carried out to check that students' feedback on TruCafé was treated in the same way as feedback on the other MSME projects. The authors declare no other conflicts of interest.

Author Contributions

S.P.D.A.: Conceptualization, Methodology, Formal Analysis, Supervision, Writing – Original Draft. A.N.I.: Supervision, Investigation, Writing – Review & Editing. A.H.L.: Supervision, Investigation, Validation. I.M.N.: Validation, Writing – Review & Editing. T.A.R., D.C. Ethan Samuel, and D.C. Eryn Samuel: Validation, Writing – Review & Editing. All authors have read and approved the final version of the manuscript.

Acknowledgements

The authors would like to acknowledge the Research & Community Services team of IPMI Institute for reviewing the research protocol, and the students, community partners, and MSME owners who took part in the projects.

Artificial Intelligence (AI) Use Statement

During the preparation of this manuscript, the authors used Claude (Anthropic) for language editing (US English), formatting to the journal template, and conversion of references to IEEE style. All AI-assisted output was reviewed, verified, and revised by the authors. The authors take full responsibility for the accuracy, integrity, originality, and final content of the manuscript.

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