

Empowering women entrepreneurs through digital literacy: a participatory action research in rural East Java

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ABSTRACT

Background: Women entrepreneurs in rural coastal East Java play a crucial economic role but face limited participation in digital markets due to low practical digital literacy. **Objective:** This program aimed to enhance digital skills, confidence, and agency of women micro-entrepreneurs through a participatory empowerment approach. **Method:** A participatory action-oriented model was implemented, including needs assessment, training, mentoring, and collaboration with local institutions and women's groups. **Results:** The program engaged 38 participants, with over 70% improving digital literacy and adopting social media for business promotion, alongside a shift toward hybrid online–offline practices supported by peer learning and a local UMKM digital community. **Implication:** These findings suggest that community-based, mentoring-driven digital literacy programs are effective in fostering sustainable and inclusive rural entrepreneurship. **Novelty:** The study introduces an integrated model combining participatory training, sustained mentoring, and village-level institutional support as a scalable framework for women's digital economic empowerment.

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1. INTRODUCTION

Rural women entrepreneurs play a pivotal role in sustaining household and village economies in East Java, particularly in coastal and semi-rural areas such as Mandaran Village, Situbondo Regency. In this context, women manage the majority of micro and home-based enterprises, especially in food processing, small-scale trading, and informal production linked to local resources. Regional development data indicate that approximately 60–70% of rural micro-enterprises are operated by women; however, digital adoption among these entrepreneurs remains disproportionately low. In Mandaran Village, preliminary assessments conducted with local partners show that fewer than one-third of women entrepreneurs actively use digital platforms for marketing or customer communication. More than half lack basic competencies in social media utilization for business purposes, while around 65% have never employed digital tools for simple financial record-keeping. This disparity highlights a critical structural gap between women's economic participation and their access to productive digital capabilities, underscoring the urgency of a community-based digital literacy intervention.

The importance of digital literacy for women's economic empowerment has been widely discussed in community engagement literature and development-oriented programs [1], [2], [3]. Previous community service initiatives have demonstrated that digital skills training can enhance awareness of online marketing tools and improve initial platform usage among women entrepreneurs [4], [5], [6]. Nonetheless, most existing programs are limited by short-term [7], [8], workshop-based approaches that prioritize technical exposure over sustained practice. Furthermore, many documented initiatives are concentrated in urban or peri-urban settings [9], [10], leaving rural and coastal villages such as Mandaran underrepresented. The literature also

reveals a tendency toward top-down instructional models [11], [12], [13], where participants are positioned as beneficiaries rather than active agents of change. What remains insufficiently addressed is a participatory, practice-oriented engagement framework that integrates digital literacy training with continuous mentoring and strong involvement of local institutions. This gap provides a clear rationale for implementing a community service program that emphasizes empowerment, contextual learning, and collective ownership of digital transformation processes.

This community engagement program aims to empower women entrepreneurs in Mandaran Village through a participatory digital literacy approach. The program is designed to address concrete community challenges, including limited market access, low confidence in technology use, and weak digital-based business management practices. Specifically, the initiative seeks to strengthen participants' capacities to utilize social media and basic digital tools for product promotion, customer interaction, and simple financial management. Targeting 30–40 women entrepreneurs, the program combines socialization sessions, hands-on training, and sustained mentoring over several weeks. Rather than focusing solely on skill acquisition, the program emphasizes the integration of digital practices into daily business routines. By adopting a participatory action orientation, women entrepreneurs are actively involved in identifying their own constraints, experimenting with digital strategies, and reflecting collectively on outcomes, ensuring that program objectives remain grounded in local realities.

The expected implications of this program extend beyond individual capacity building to broader social and institutional change within the village context. At the individual level, enhanced digital literacy is anticipated to increase self-confidence, autonomy, and adaptive capacity among women entrepreneurs, enabling them to respond more effectively to digital market dynamics. At the collective level, the program is expected to foster peer learning and collaboration through the formation of a local digital UMKM community, strengthening social capital among participants. Institutionally, the involvement of village authorities, PKK groups, and local entrepreneurship facilitators is intended to reinforce local support systems and promote program continuity beyond the initial implementation phase. In the medium term, these changes are expected to contribute to improved business performance, including expanded market reach and potential income growth. As such, this community engagement initiative offers a context-sensitive and replicable model for participatory digital empowerment of women entrepreneurs in rural Indonesia.

2. METHOD

The unit of analysis in this community engagement program consists of practical empowerment activities involving women micro-entrepreneurs in Mandaran Village, Situbondo Regency. Rather than textual or experimental units, the analysis focuses on structured engagement actions, participant interactions, and applied digital practices within real business contexts. These activities were designed to capture the dynamics of digital literacy adoption among women entrepreneurs and the effectiveness of participatory empowerment processes. To ensure methodological clarity and replicability, the program corpus was systematically documented, as summarized in Table 1. This activity-based unit of analysis aligns with best practices in community service methodologies, which emphasize contextual relevance and action-oriented outcomes over abstract measurement.

Table 1. Community engagement activities

No	Type of Activity	Description	Participants	Duration	Expected Output
1	Needs Assessment	Mapping digital skills and business challenges	Women UMKM, village facilitators	1 week	Needs map
2	Socialization	Introduction to digital literacy and market access	30–40 participants	1 session	Shared awareness
3	Training	Hands-on social media and content creation	Participants, trainers	2–3 sessions	Digital accounts
4	Mentoring	Guided application in daily business	Participants, mentors	4–8 weeks	Active usage
5	Facilitation	Community networking and reflection	UMKM groups	Ongoing	Digital network

The program design was developed through a participatory planning process involving village authorities, PKK representatives, and local UMKM facilitators. Initial planning focused on mapping partners' needs, constraints, and existing capacities through informal interviews and group discussions. This approach ensured that the program responded to actual community conditions rather than predefined external agendas. Based on this mapping, the program strategy was formulated to combine socialization, skills training, and

sustained mentoring. The design emphasized gradual learning, practical relevance, and flexibility in scheduling to accommodate participants' domestic responsibilities. Such a needs-based and adaptive design reflects community engagement literature highlighting the importance of contextual alignment and co-designed interventions in empowerment-oriented programs [14], [15].

Multiple sources of information were utilized to support program implementation and documentation. Primary sources included women entrepreneurs participating in the program, village government representatives, PKK leaders, and local entrepreneurship facilitators who possess contextual knowledge of the community. Facilitators and trainers served as both implementers and reflective observers, providing insights into participant engagement and learning progress. Secondary sources comprised program documents, attendance records, training materials, mentoring logs, and visual documentation of activities. These diverse information sources enabled triangulation of observations and strengthened the credibility of program implementation. The use of multi-actor information sources is consistent with participatory community engagement frameworks that prioritize inclusivity and collaborative knowledge production [16], [17].

Program implementation was conducted in sequential yet flexible stages. The process began with socialization sessions to establish shared understanding of digital literacy relevance for business sustainability. This was followed by hands-on training using experiential learning methods, allowing participants to directly practice creating digital business profiles and promotional content. The core intervention involved mentoring over several weeks, during which facilitators provided individualized guidance and problem-solving support. Peer learning was encouraged through group discussions and informal sharing sessions. This combination of structured training and ongoing mentoring reflects evidence from community service studies indicating that sustained accompaniment is more effective than short-term instructional interventions in fostering behavioral change [18], [19].

Evaluation was conducted using a formative and summative approach to capture both process quality and outcome achievement. Formative evaluation occurred throughout implementation through observation, mentoring reflections, and participant feedback, allowing real-time adjustments to activities. Summative evaluation was conducted at the end of the program by assessing participants' ability to independently use digital tools for business promotion and communication. Simple indicators, such as active social media usage and participation in digital UMKM groups, were employed to measure outcomes [20]. This practice-oriented evaluation approach aligns with community engagement literature that emphasizes practical impact, participant empowerment, and sustainability over purely quantitative performance metrics.

3. RESULTS

3.1. Program outcomes and community engagement achievements

This section presents the results of the community engagement program implemented in Mandaran Village, Situbondo Regency, focusing on measurable outcomes and capacity development among women entrepreneurs. The results are structured to reflect the alignment between program objectives, implemented activities, and achieved impacts. Emphasis is placed on changes in digital literacy, business practices, and collective engagement resulting from participatory intervention strategies. By adopting a backward design logic, outcomes as shown in Table 2 are examined in relation to predefined targets and indicators, ensuring analytical coherence between planning, implementation, and evaluation stages. The results demonstrate how structured socialization, hands-on training, and sustained mentoring translated into observable improvements at individual, group, and institutional levels within the rural community context.

Quantitative outcomes indicate that the program successfully reached 38 women entrepreneurs, representing 95% of the intended participant target. Digital literacy awareness improved significantly, with 84% of participants demonstrating basic understanding of digital business concepts, compared to less than 30% at baseline. Social media adoption for business purposes increased from 11 to 30 participants, exceeding the target threshold. Approximately 74% of participants were able to produce basic promotional content independently, while 63% demonstrated consistent weekly digital marketing activity. The use of simple digital tools for financial recording rose to 55% of participants, surpassing initial expectations. Mentoring engagement remained high, with 76% of participants attending sessions consistently. Additionally, a digital UMKM community group was successfully established, facilitating peer learning and ongoing collaboration. These figures illustrate substantial progress toward program objectives.

The results indicate that participatory digital literacy interventions can effectively bridge the gap between women's economic activity and technological capacity in rural settings. The observed behavioral shifts—from offline-only sales to hybrid digital practices—support empowerment theories emphasizing experiential learning and agency-based capacity building. The high adoption rate of social media platforms suggests that digital exclusion in rural contexts is less a matter of access than of guided practice and confidence development. Furthermore, the formation of a digital UMKM community underscores the importance of collective learning environments in sustaining behavioral change beyond individual training

outcomes. Institutionally, the active involvement of village authorities and PKK groups reflects the role of localized governance structures in reinforcing program sustainability. Overall, these findings demonstrate that community engagement models integrating participatory design, mentoring, and institutional collaboration can generate scalable and context-sensitive pathways for women's digital economic empowerment [21], [22].

Table 2. Summary of program activities, outputs, and measurable outcomes

No	Component	Indicator	Baseline	Target	Outcome	Rate
1	Recruitment	Participants	No data	30–40	38	95%
2	Literacy	Digital awareness	<30%	≥70%	32	84%
3	Social Media	Account ownership	11	≥26	30	115%
4	Content	Content skills	Low	≥70%	28	74%
5	Marketing	Weekly posting	<15%	≥60%	24	63%
6	Finance	Financial tools use	<10%	≥50%	21	55%
7	Mentoring	Attendance	None	≥75%	29	76%
8	Peer Learning	Group activity	Informal	≥50%	22	58%
9	Community	UMKM group	None	1 group	Active	100%
10	Institution	Village support	Ad hoc	Continuous	Formal	Yes
11	Behavior	Hybrid selling	Offline	≥60%	23	61%
12	Economic	Omzet growth	None	10–20%	12–18%	On track

3.2. Process quality, participation dynamics, and transformative effects

This section presents process-oriented results of the community engagement program, focusing on participation dynamics, learning quality, and transformative effects experienced by women entrepreneurs in Mandaran Village. Unlike Results A, which emphasized measurable outputs, Results B examines how the program unfolded in practice and how participants interacted with learning processes, mentors, and peer networks. As shown in Table 3, these results assess whether the implemented activities generated the intended qualitative changes necessary for sustainable empowerment. Attention is given to participant agency, confidence development, peer collaboration, and institutional engagement as key indicators of meaningful community transformation. This process-based analysis provides essential insights into how and why the program outcomes were achieved.

Table 3. Process-based outcomes and transformational indicators of the community engagement program

No	Dimension	Indicator	Baseline	Target	Outcome	Change
1	Participation	Active engagement	Passive	≥70%	29/38	High
2	Confidence	Digital confidence	Low	≥65%	26	High
3	Agency	Independent action	Minimal	≥50%	21	Mod–High
4	Peer	Peer support	Sporadic	Regular	18	Moderate
5	Mentoring	Feedback response	Inconsistent	≥70%	27	High
6	Problem-solving	Digital issues	Limited	≥60%	23	Moderate
7	Time	Work–home balance	Constrained	Improved	20	Gradual
8	Identity	Group belonging	None	Formed	Active	Achieved
9	Trust	Institutional trust	Moderate	Stronger	Formal	Achieved
10	Sustainability	Continuity intent	Uncertain	≥70%	28	High
11	Reflection	Learning reflection	Rare	≥60%	22	Moderate
12	Visibility	Business exposure	Local	Expanded	Hybrid	Emerging

Process evaluation data indicate that 29 out of 38 participants (76%) demonstrated active engagement during training and mentoring sessions, exceeding the minimum participation threshold. Self-reported confidence in using digital tools increased among 26 participants, compared to widespread hesitation at baseline. Approximately 55% of participants independently initiated digital marketing actions without direct facilitator assistance. Peer interaction intensified, with 18 participants regularly providing support or advice to others through informal discussions and digital group communication. Responsiveness to mentoring feedback was observed in 27 participants, reflected in iterative improvements to content and online engagement strategies. Additionally, 28 participants expressed strong commitment to continuing digital practices beyond the program period. These figures indicate that the program fostered not only skill acquisition but also meaningful shifts in learning behavior and engagement patterns.

The process-oriented results highlight that empowerment in community engagement contexts is deeply relational and iterative. Increased confidence, agency, and peer collaboration align with participatory empowerment theory, which emphasizes learning as a social and reflective practice rather than a linear transfer of skills. The gradual improvement in participants' ability to negotiate learning time alongside domestic responsibilities underscores the gendered dimensions of digital inclusion in rural settings. Furthermore, the emergence of collective identity through a digital UMKM group reflects social capital formation, a critical factor for sustaining behavioral change [23], [24]. Institutionally, strengthened trust between participants and village structures suggests that community-based digital initiatives are more effective when embedded within local governance frameworks. Practically, these findings affirm that sustained mentoring and peer learning are essential complements to technical training in fostering long-term digital engagement among women entrepreneurs.

3.3. Challenges, resistance, and unintended outcomes

This section presents critical reflections on challenges, resistance, and unintended outcomes encountered during the implementation of the community engagement program. While the program achieved its primary objectives, the implementation process revealed multiple layers of complexity inherent in participatory digital empowerment initiatives. As shown in Table 4, these findings are examined to understand how deviations from initial assumptions influenced both program delivery and outcomes. Rather than framing challenges as program deficiencies, this section treats them as analytical insights that inform program adaptation, contextual sensitivity, and future scalability. Attention is given to technological, social, and cultural constraints, as well as emergent dynamics that were not explicitly anticipated during the planning stage.

Table 4. Challenges, resistance patterns, and unintended outcomes observed during program implementation

No	Category	Indicator	Expectation	Observed	Participants	Response
1	Tech	Device limits	Minor	Frequent	14	Tool adjust
2	Anxiety	Fear online	Reduced	Early persist	12	Peer support
3	Time	Flexible	Domestic load	High	19	Reschedule
4	Fatigue	High focus	Mid drop	Temporary	9	Redesign
5	Resistance	Open digital	Prefer offline	Partial	8	Dialogue
6	Platform	Balanced use	Single reliance	Emerging	11	Diversify
7	Skills	Equal pace	Skill gap	Notable	16	Differentiated
8	Exposure	Neutral	Mixed response	Visible	6	Coaching
9	Economy	Gradual gain	Quick profit	Mismatch	10	Align exp
10	Gender	Supportive	Negotiated	Varied	13	Family talk
11	Leadership	Facilitator-led	Emergent	Active	5	Support
12	Spillover	Limited	Wider share	Spread	7*	Diffusion

Empirical observations indicate that technological limitations affected 14 participants, primarily due to low-specification smartphones that constrained content creation and application performance. Digital anxiety persisted during early stages among 12 participants, despite overall confidence gains reported in Results B. Time constraints related to domestic responsibilities were reported by 19 participants, influencing attendance consistency. Partial resistance to shifting from offline to digital sales practices was observed in eight participants, who expressed skepticism toward online marketing effectiveness. Skill disparity emerged as a notable issue, with 16 participants progressing at uneven learning speeds. Additionally, 10 participants initially expected immediate financial returns, revealing a misalignment between program objectives and economic expectations. These challenges required adaptive responses throughout implementation and shaped the trajectory of participant engagement.

The challenges and unintended outcomes observed underscore the non-linear nature of empowerment-oriented community engagement. Persistent digital anxiety and resistance to change align with adult learning theories that emphasize emotional readiness and experiential confidence as prerequisites for skill adoption. Gendered time constraints and household negotiations reflect broader sociocultural structures shaping women's participation in rural economic initiatives. Importantly, unintended outcomes—such as the emergence of informal peer leaders and the diffusion of digital knowledge beyond program participants—demonstrate positive spillover effects rarely captured in output-focused evaluations. These findings suggest that flexibility, reflexivity, and adaptive facilitation are critical to sustaining engagement in digitally mediated empowerment programs. [25], [26] Practically, acknowledging resistance and unintended effects allows future iterations of the program to better anticipate learning asymmetries, manage expectations, and leverage emergent community leadership as a resource rather than a challenge.

4. DISCUSSION

The first major implication of this community engagement initiative lies in its tangible contribution to improving women entrepreneurs' capacity to participate more actively in digitally mediated local economies. The program demonstrated that when digital literacy is framed as a practical, everyday business tool rather than abstract technical knowledge, women micro-entrepreneurs are more willing to adopt new practices. Increased use of social media for promotion, gradual shifts toward hybrid online–offline sales, and the emergence of peer-supported learning practices suggest that the program functioned as a catalyst for economic inclusion. At the same time, the initiative revealed functional limits, particularly for participants with lower technological readiness or constrained learning time. These findings reinforce existing community engagement literature emphasizing that digital empowerment initiatives are most effective when grounded in daily livelihood practices [8], [13], while also acknowledging that empowerment outcomes are uneven and shaped by local social realities.

The underlying mechanisms that shaped these outcomes are closely related to the program's participatory structure and adaptive delivery. Rather than relying on a fixed curriculum, the engagement model allowed facilitators and participants to co-adjust learning content based on emerging needs. This flexibility reduced resistance and enabled participants to internalize digital practices at their own pace. The combination of socialization, hands-on training, and sustained mentoring created a layered learning environment where confidence-building preceded skill mastery. Moreover, embedding the program within village-level institutions fostered trust and legitimacy, which are critical enablers of community participation. These patterns align with community-based learning frameworks that emphasize co-design, relational trust, and iterative facilitation as mechanisms for sustaining engagement beyond initial interventions [11], [12]. The findings suggest that structural adaptability and relational embeddedness are key determinants of successful community digital empowerment.

A second set of implications emerges from the observed transformation in participation dynamics and collective learning behavior. Beyond individual skill acquisition, the program contributed to the formation of shared learning spaces where women entrepreneurs began to exchange experiences, troubleshoot digital challenges collectively, and support one another's business experimentation. This shift indicates a move from individualized learning toward collective agency, strengthening social capital within the community. Practically, such peer interaction reduces dependency on external facilitators and increases the likelihood of sustained practice. Socially, it enhances women's visibility as economic actors within the village, subtly challenging traditional perceptions of women's roles in household-based enterprises. However, uneven participation levels also point to partial dysfunctions, as not all participants engaged equally in collective processes [4], [27], [28]. This underscores the need to design engagement strategies that account for varying confidence levels and social positioning among participants.

The mechanisms underpinning these collective outcomes are rooted in the program's emphasis on peer learning and reflective practice. Informal discussion spaces, mentoring interactions, and shared problem-solving activities enabled participants to reinterpret digital tools through locally meaningful frames. The emergence of informal peer leaders—participants who advanced more quickly and assisted others—played a critical role in normalizing digital experimentation. This aligns with social learning theory [29], [30], which highlights the importance of modeling and observational learning in adult education contexts. Furthermore, the presence of a digital UMKM group facilitated continuity by providing a low-barrier platform for interaction beyond formal sessions. These patterns suggest that collective learning is not an automatic outcome of training but a socially constructed process that depends on facilitative structures, peer recognition, and opportunities for shared reflection.

A third implication concerns the program's engagement with challenges, resistance, and unintended outcomes, which are integral to understanding its real-world impact. Persistent digital anxiety, time constraints related to domestic responsibilities, and initial resistance to online marketing illustrate the structural barriers faced by rural women entrepreneurs. Rather than undermining the program, these challenges reveal the complexity of digital inclusion processes in gendered rural contexts. Importantly, unintended outcomes—such as the diffusion of digital knowledge to non-participants and the spontaneous emergence of leadership roles—demonstrate positive spillover effects that extend beyond the program's formal scope. These outcomes suggest that community engagement initiatives can generate indirect social value when learning environments are open and relational [31], [32]. Acknowledging both constraints and emergent benefits enhances the program's credibility and reflective depth.

The patterns underlying these challenges and unintended effects are closely tied to broader sociocultural and technological conditions. Gendered divisions of labor continue to shape women's availability for learning, while uneven access to adequate devices constrains the pace of digital adoption. At the same time, resistance to digital practices often reflected rational risk assessment rather than unwillingness to learn, particularly when immediate economic returns were uncertain. The program's adaptive responses—

such as differentiated mentoring and expectation alignment—proved essential in navigating these tensions. The emergence of learning spillover and informal leadership reflects the porous nature of community boundaries [6], [31], where knowledge circulates through everyday social interactions. These mechanisms highlight the importance of reflexive facilitation and expectation management in sustaining inclusive and context-sensitive community engagement.

Taken together, the discussion underscores that digital empowerment through community engagement is not a linear process but a negotiated transformation shaped by social relations, institutional support, and lived experience. The Mandaran Village program illustrates that meaningful change occurs when digital literacy initiatives integrate practical relevance, participatory learning, and adaptive governance. While limitations remain, particularly in addressing structural inequalities beyond the program's scope, the initiative offers a replicable model for rural women's economic empowerment grounded in community realities [33]. By foregrounding practice, reflection, and relational learning, the program contributes to broader debates on inclusive digital development and the role of community engagement in fostering sustainable social change.

5. CONCLUSION

This community engagement program demonstrates that participatory digital literacy interventions can serve as an effective pathway for empowering women entrepreneurs in rural contexts such as Mandaran Village, Situbondo. The most important lesson derived from the program is that digital inclusion is not primarily a technical challenge but a relational and contextual process that requires sustained accompaniment. The program's strength lies in its integration of hands-on training, continuous mentoring, and peer-based learning within existing village institutions. By positioning women entrepreneurs as active agents rather than passive recipients, the initiative contributes a practice-oriented empowerment model that bridges digital skills development with everyday business realities. This approach enriches community engagement practice by offering a scalable framework for inclusive, gender-responsive digital empowerment in rural settings.

Despite these achievements, the program faced several limitations that warrant further attention. Constraints related to participants' time availability, uneven access to adequate digital devices, and varying levels of digital readiness limited the depth and pace of engagement for some participants. These limitations highlight the need for follow-up programs that extend mentoring duration, incorporate family- or household-level engagement, and provide differentiated learning pathways based on participants' capacities. Future community engagement initiatives should also strengthen collaboration with local governments and private sector partners to support infrastructure and market access. Such sustained and multi-stakeholder approaches are essential to ensuring the long-term impact and scalability of women-centered digital empowerment programs in rural communities.

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AUTHOR CONTRIBUTIONS STATEMENT

Irwan Darmawan: conceptualization (lead), community engagement (lead), investigation (lead), writing – original draft (lead), writing – review and editing (lead).

CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

INFORMED CONSENT

We have obtained informed consent from all individuals included in this study.

ETHICAL APPROVAL

This manuscript related to human use has been complied with all the relevant national regulations and institutional policies in accordance with the tenets of the Helsinki Declaration and has been approved by the authors' institutional review board or equivalent committee.

DATA AVAILABILITY

Data availability is not applicable to this article as no new data were created or analyzed in this study.

REFERENCES

- [1] J. Dura and D. Wardana, "The Sustainability Role of Women Entrepreneurs through the Digital Financial Literacy Movement," *Population and Economics*, Oct. 2024, doi: 10.3897/popecon.8.e116923.
- [2] R. Ratnawati, T. N. Rokhman, and A. A. T. Ningsih, "The role of digital financial inclusion in improving financial literacy and financial well-being for business sustainability: Indonesian women's export craft SMEs," *Problems and Perspectives in Management*, May 2025, doi: 10.21511/ppm.23(2).2025.28.
- [3] A. N. Anisyah, C. Fransisca, H. Nabillah, N. Y. Pohan, and I. S. Dewi, "Empowering Women and Youth through Entrepreneurship and MSME Training Based on Digital Marketing in Rural Communities," *Jurnal Pengabdian Masyarakat Berdampak*, Nov. 2025, doi: 10.64803/jupemba.v1i3.58.
- [4] U. Röger-Offergeld, E. Kurfer, and H. Brandl-Bredenbeck, "Empowerment through participation in community-based participatory research—effects of a physical activity promotion project among socially disadvantaged women," *Frontiers in Public Health*, vol. 11, Jul. 2023, doi: 10.3389/fpubh.2023.1205808.
- [5] M. Van Der Merwe *et al.*, "Collective reflections on the first cycle of a collaborative learning platform to strengthen rural primary healthcare in Mpumalanga, South Africa," *Health Research Policy and Systems*, vol. 19, Apr. 2021, doi: 10.1186/s12961-021-00716-y.
- [6] M. L. Piggott, Z. Zaizay, L. Dean, G. Zawolo, C. Parker, and R. McCollum, "Exploring the value of community engagement activities within a participatory action research study to improve care for people affected by skin neglected tropical diseases in Liberia," *Research Involvement and Engagement*, vol. 11, Mar. 2025, doi: 10.1186/s40900-025-00695-2.
- [7] A. Fauzia and S. Hidayati, "Improving Digital Literacy of Rural Women Entrepreneurs in Indonesia," *2023 11th International Conference on Cyber and IT Service Management (CITSM)*, pp. 1–5, Nov. 2023, doi: 10.1109/citsm60085.2023.10455473.
- [8] F. Cornish *et al.*, "Participatory action research," *Nature Reviews Methods Primers*, vol. 3, Apr. 2023, doi: 10.1038/s43586-023-00214-1.
- [9] A. Amelia, "DIGITAL FINANCIAL INCLUSION AND HOUSEHOLD WELFARE: EVIDENCE FROM RURAL INDONESIA," *Journal of Management Economic and Financial*, Oct. 2025, doi: 10.46799/jmef.v2i2.174.
- [10] A. Bakar *et al.*, "Financial Inclusion and Rural Development: Empowering Micro-entrepreneurs in Lubuk Beringin, Bungo Regency, Jambi, Indonesia," *Indonesian Community Empowerment Journal*, Oct. 2024, doi: 10.37275/icejournal.v4i2.60.
- [11] J. McDougall and C. Henderson-Brooks, "Lessons Learnt: Reflections on the 'Insider-Outsider Divide' in Working With Culturally and Linguistically Diverse Students in a Participatory Action Research Project," *International Journal of Qualitative Methods*, vol. 20, Jan. 2021, doi: 10.1177/16094069211066375.
- [12] H. Mehdipour *et al.*, "The importance of belonging: reflections on a participatory action research project in Jacksonville, Florida," *Disaster Prevention and Management: An International Journal*, Aug. 2024, doi: 10.1108/dpm-01-2024-0038.
- [13] S. Teixeira, A. Augsburg, K. Richards-Schuster, and L. S. Martínez, "Participatory Research Approaches with Youth: Ethics, Engagement, and Meaningful Action," *American journal of community psychology*, Apr. 2021, doi: 10.1002/ajcp.12501.
- [14] B. Alvianita and D. F. Rosida, "Chemical Characterization of Powdered Broth from the Use of Catfish Head Extract and Mulberry Fruit," *AJARCADE (Asian Journal of Applied Research for Community Development and Empowerment)*, vol. 9, no. 2, pp. 187–191, 2025.
- [15] L. Caperon, F. Saville, and S. Ahern, "Developing a socio-ecological model for community engagement in a health programme in an underserved urban area," *PLoS ONE*, vol. 17, Sep. 2022, doi: 10.1371/journal.pone.0275092.
- [16] S. Diapri, Jariyah, and A. Priyanto, "Sensory profile of candied tomatodates using the Just About Right method," *AJARCADE (Asian Journal of Applied Research for Community Development and Empowerment)*, 2024.
- [17] N. Hafni and T. Ningtyas, "OPTIMIZATION OF DESTANA POLICIES (RESILIENCE DISASTER VILLAGE) TO IMPROVE COMMUNITY PREPAREDNESS FOR FLOOD DISASTER IN BOJONEGORO DISTRICT, INDONESIA," *Management and entrepreneurship: trends of development*, vol. 1, no. 15, pp. 113–126, Apr. 2021, doi: 10.31219/osf.io/9gfwf.
- [18] K. Chenier *et al.*, "Development of a Community-Driven Waste Reduction Education and Action Program," *Sustainability*, Jun. 2024, doi: 10.3390/su16114823.
- [19] T. Ningtyas, E. Larasati, H. Warsono, and H. Purnaweni, "Optimization of Destana policies (Resilience Disaster Village) to improve community preparedness for flood disaster in Bojonegoro District, Indonesia," *Management and entrepreneurship: trends of development*, Jan. 2021, doi: 10.26661/2522-1566/2021-1/15-08.
- [20] A. Fawaid and A. Abdullah, "Desa Cerdas Ramah Gender: Analisis Penerapan Sertifikasi Halal dan Komersialisasi Produk Bagi Pelaku UMKM Perempuan," *lab*, vol. 8, no. 02, pp. 116–142, Dec. 2024, doi: 10.33507/lab.v8i02.2463.
- [21] K. Diyanah *et al.*, "EMPOWERING COASTAL COMMUNITIES IN KEPUTIH: WASTE MANAGEMENT AND CRAFTING FOR ECONOMIC EMPOWERMENT," *Jurnal Layanan Masyarakat (Journal of Public Services)*, Jun. 2025, doi: 10.20473/v9i2.2025.193-203.
- [22] K. Kushandajani, "Social and economic empowerment for village women as a strategy of village development," *The Indonesian Journal of Planning and Development*, vol. 4, no. 1, pp. 1–6, 2019, doi: https://doi.org/10.14710/ijpd.4.1.1-6.
- [23] W. Janssens, "Women's empowerment and the creation of social capital in Indian villages," *World Development*, vol. 38, no. 7, pp. 974–988, 2010, doi: https://doi.org/10.1016/j.worlddev.2009.12.004.
- [24] A. A. Shah, A. Khan, N. A. Khan, and B. A. Alotaibi, "The role of social capital as a key player in disaster risk comprehension and dissemination: lived experience of rural communities in Pakistan," *Natural Hazards*, vol. 120, no. 5, pp. 4131–4157, 2024.
- [25] R. Benameur, A. Dahane, B. Kechar, and A. Benyamina, "An Innovative Smart and Sustainable Low-Cost Irrigation System for Anomaly Detection Using Deep Learning," *Sensors (Basel, Switzerland)*, vol. 24, Feb. 2024, doi: 10.3390/s24041162.
- [26] A. Biancardi, A. Colasante, I. D'Adamo, C. Daraio, M. Gastaldi, and A. Uricchio, "Strategies for developing sustainable communities in higher education institutions," *Scientific Reports*, vol. 13, Nov. 2023, doi: 10.1038/s41598-023-48021-8.
- [27] N. Szoko, E. Slade, A. Fields, K. Blankenship, E. Miller, and A. Culyba, "Implementation evaluation of a community-based youth participatory action research program," *American journal of community psychology*, May 2025, doi: 10.1002/ajcp.12815.
- [28] K. Santos, J. Sládková, L. Gaias, and J. Tigert, "'We Expressed What We Needed, and the Center Made changes...I Think They Listened.' Exploring Complexities of Participatory Action Research in Adult English for Speakers of Other Languages Program," *Journal of Participatory Research Methods*, May 2025, doi: 10.35844/001c.133824.
- [29] R. S. Bernstein and P. Salipante, "Intercultural Comfort through Social Practices: Exploring Conditions for Cultural Learning," *Frontiers in Education*, vol. 2, 2017, doi: 10.3389/educ.2017.00031.

- [30] M. H. S. Eldaw, M. Levene, and G. Roussos, "Presence Analytics: Making Sense of Human Social Presence within a Learning Environment," presented at the Proceedings - 5th IEEE/ACM International Conference on Big Data Computing, Applications and Technologies, BDCAT 2018, 2018, pp. 174–183. doi: 10.1109/BDCAT.2018.00029.
- [31] A. Alamgir, P. Roy, and F. Taverna, "Levels of Engagement of South Asian Participants in Health Research: Effectiveness of Community-Based Research (CBR) Framework," *Journal of Scientific Research and Reports*, Sep. 2024, doi: 10.9734/jsrr/2024/v30i92415.
- [32] R. Crabtree and D. Sapp, "Technical Communication, Participatory Action Research, and Global Civic Engagement," *Reflections: A Journal of Community-Engaged Writing and Rhetoric*, Aug. 2025, doi: 10.59236/rjv4i2pp9-33.
- [33] J. F. Pardosi, N. Parr, and S. Muhidin, "Local government and community leaders' perspectives on child health and mortality and inequity issues in rural eastern Indonesia," *Journal of Biosocial Science*, vol. 49, no. 1, pp. 123–146, 2017, doi: 10.1017/S0021932016000134.

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