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Digital Literacy for Safer Practices among Mothers in Rural Indonesia: A Participatory Community-Based Intervention in Tiris Village, Probolinggo, East Jawa

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ABSTRACT : This study reports and examines a participatory community-based digital literacy intervention conducted with mothers in Tiris Village, Probolinggo, East Java, Indonesia. The intervention was designed to strengthen participants' understanding of digital literacy and practical smartphone skills. The program was implemented through participatory educational sessions, discussion, demonstrations, hands-on smartphone practice, and individual and group assistance. Activities were conducted on 27 and 30 June 2026. Data were derived from participant interaction, questions and discussions, observations during practical activities, and qualitative comparison of participants' understanding before and after the intervention. The findings indicated changes across three interconnected domains. First, participants developed a broader understanding of digital literacy beyond basic smartphone and social-media use. Second, hands-on practice supported participants in performing everyday digital tasks with greater confidence and independence. Third, participants demonstrated increased awareness of personal-data protection, suspicious messages, online fraud, and the need to verify information before sharing it. The findings suggested that context-sensitive, participatory, and practice-oriented digital literacy education can help address the gap between access to digital technologies and meaningful digital capability in rural communities. However, because the evaluation did not employ standardized pre- and post-intervention measures or a comparison group, the findings should be interpreted as qualitative evidence of observed learning rather than causal evidence of program effectiveness.
KEYWORDS: *digital literacy; digital safety; rural communities; mothers; smartphone use*

I. INTRODUCTION

Digital technologies have increasingly embedded in everyday life, including in rural communities (Pew Research Center. 2024). Smartphones are no longer used solely for voice communication but have become multifunctional tools for accessing information, communicating through social media and messaging applications, conducting economic activities, and supporting family-related tasks. The expansion of access, however, does not automatically ensure that users possess the competencies required to navigate digital environments critically, safely, and responsibly (Sisbintari, *et al* 2021).

This distinction between access and capability of using smarphone is particularly important in relation to mothers. Mothers frequently participate in household communication and information practices and may also influence how children encounter and use digital media Holmgren, *et al* 2024)

Consequently, digital literacy among mothers is relevant not only to their individual digital practices but also to patterns of technology use within the family, more spesifically to their children. Previous studies have associated problematic smartphone use among mothers with patterns of smartphone use among children and with aspects of children's behavioral and emotional development (Jeong et al., 2022; Kim et al., 2022). These findings did not imply that smartphone use itself was inherently harmful; rather, they highlight the importance of the ways in which digital technologies are incorporated into everyday family life.

This issue is particularly relevant in rural settings where increasing digital access may coexist with uneven levels of digital competence. The situation identified in Tiris Village, Probolinggo, reflects this broader challenge. The community-service report indicates that smartphones had become commonplace among residents, while the increased use of digital technologies was not necessarily accompanied by corresponding abilities to use them wisely, safely, and productively (Rumawas, W. 2022). Mothers have been identified as an important group requiring support in developing digital and media literacy, particularly in understanding digital media and mediating its use within everyday family life (Homleng, 2024).

The challenge, therefore, should not be framed simply as a problem of excessive gadget use. A more productive perspective is to consider digital literacy as a multidimensional capability involving access to information, understanding and evaluating content, appropriate communication, practical technological skills, and protection against digital risks. Such a perspective shifts the intervention from restricting technology toward empowering users to make informed decisions.

This approach is consistent with participatory models of community development, in which local participants are not treated merely as recipients of expert knowledge but as active contributors whose experiences and everyday problems shape the learning process (Jeong *et al*, 2022) .

The present manuscript therefore examines the Tiris community-based intervention as a practice-oriented digital literacy initiative. Rather than measuring digital literacy as an abstract construct, the study focuses on three practical dimensions emerging from the intervention: (1) understanding of digital literacy and information evaluation, (2) practical digital skills, and (3) digital safety awareness. The study asks how participants' understanding and practices change following a participatory, practice-oriented educational intervention.

II. METHODS

2.1 Study Design and Setting

The study employed a participatory, community-based educational intervention design. The intervention was conducted at Tiris Village, Probolinggo Regency, East Java, Indonesia. The program was implemented in collaboration with the village community and focused primarily on mothers as the intended participants. The intervention was conducted on 27 and 30 June 2026.

The selection of Tiris Village was based on the observation that digital technologies had become integrated into everyday community life while users still encountered challenges concerning responsible use, information evaluation, and digital safety.

2.2 Participants and Community Engagement

The target group consisted of mothers at Tiris Village. The available program documentation does not provide a sufficiently precise record of the final number of participants; consequently, no specific participant count is reported in this manuscript.

The intervention was implemented through collaboration between the university team and the village community. Three student assistants also participated in field activities, including data collection and practical support. Rather than treating participants as passive recipients, the intervention encouraged them to describe their own experiences with smartphones and digital applications. This participatory orientation allowed facilitators to adapt explanations to participants' levels of familiarity and to address problems emerging during the sessions.

2.3 Intervention Structure

The intervention combined four complementary educational strategies:

1. participatory explanation and discussion;
2. demonstrations of smartphone and digital applications;
3. hands-on practice using participants' own devices; and
4. individual and small-group assistance.

The educational sessions were delivered using accessible language and examples drawn from participants' everyday experiences. Following the explanatory component, participants practiced digital activities directly on their smartphones while facilitators provided assistance individually or in groups.

The intervention focused on three major content areas.

Digital literacy and information evaluation

Participants were introduced to digital literacy as more than the ability to operate a smartphone or access social media. The sessions addressed obtaining, understanding, evaluating, using, and sharing information responsibly. Participants were encouraged to examine information sources before forwarding information and to consider appropriate communication behavior in digital environments.

Practical digital skills

Participants practiced searching for information online, using communication applications, managing social-media accounts, and operating smartphone features relevant to everyday activities. The practical component was deliberately conducted on participants' own devices to connect learning with the technologies they regularly use.

Digital safety

The intervention addressed personal-data protection and common forms of digital fraud. Participants were encouraged to protect passwords, telephone numbers, verification codes, banking information, and other

personal information. Examples of suspicious messages and requests for money, personal data, one-time passwords (OTPs), or unfamiliar links were discussed.

2.4 Evaluation

Evaluation was descriptive and qualitative rather than experimental. Three sources of evidence were used:

a. questions and responses during educational discussions;
b. observations of participants during practical activities; and
c. qualitative comparison of participants' understanding before and after the intervention.

The program documentation reports positive changes in participants' understanding of digital technology, personal-data security, and responses to suspicious information, as well as improved ability to perform several digital activities after demonstrations and assistance.

No standardized digital-literacy instrument, numerical pre-test/post-test score, control group, or statistical significance testing was available. Accordingly, the findings are presented as qualitative evidence of observed learning and changes in understanding rather than as estimates of causal intervention effects.

III. RESULTS

3.1 From Operational Smartphone Use to Broader Digital Literacy

One of the most important changes observed during the intervention concerned participants' conceptual understanding of digital literacy. At the beginning of the activity, some participants associated digital literacy primarily with operating smartphones and using social media. Following the educational sessions, participants demonstrated a broader understanding that digital literacy also involves obtaining, understanding, evaluating, using, and sharing information responsibly.

This change is important because it indicates a shift from an operational conception of digital competence toward a more critical and responsible conception. The intervention therefore addressed not only the question of whether participants could use a device but also whether they could make appropriate judgments about information and digital communication.

Participants were also introduced to digital communication ethics. They were encouraged to be more cautious when commenting, sharing photographs or personal information, and forwarding messages through communication applications.

3.2 Development of Practical Digital Skills

The second major finding concerned participants' practical ability to use digital devices. Participants practiced internet searching, communication applications, social-media account management, and other smartphone functions. The learning process revealed differences in participants' initial levels of digital familiarity. Some participants experienced difficulty with account settings, information searches, and distinguishing among smartphone functions. Following demonstrations and guided practice, participants began to perform several activities more independently.

The findings suggest that direct practice was particularly relevant for participants who experienced technical hesitation. Rather than relying exclusively on verbal explanations, facilitators allowed participants to immediately reproduce the demonstrated actions on their own devices. This created a direct connection between explanation, observation, practice, and feedback.

3.3 Increased Awareness of Digital Safety

Digital safety emerged as a particularly salient area of learning. Participants were introduced to risks involving personal information, passwords, telephone numbers, verification codes, and banking information. They were also presented with examples of suspicious digital messages and common forms of online fraud.

Importantly, discussion with participants indicated that almost all participants had encountered suspicious messages or information. The intervention consequently addressed a risk that participants could relate to their own experiences rather than presenting digital safety as an abstract concept.

After the educational sessions, participants demonstrated greater awareness that information received through digital media should not automatically be regarded as trustworthy. They also recognized the importance of verification before responding to or distributing suspicious information.

The finding is significant because digital safety in this context involves more than technical protection. It also requires judgment, including the ability to recognize potentially deceptive information and decide whether an action—such as clicking a link, sharing personal information, or forwarding a message—is appropriate.

3.4 Participatory Interaction as a Learning Mechanism

Participant engagement was evident throughout the educational, practical, and evaluative components. Participants asked questions concerning applications, account security, digital fraud, and social-media use and shared experiences from their own digital practices. These interactions were not merely indicators of participant satisfaction. They also functioned as a mechanism through which facilitators identified specific learning

difficulties. The facilitators could adjust explanations according to participants' technical abilities and the problems they encountered.

Thus, the intervention operated as a two-way learning process: facilitators introduced concepts and demonstrations, while participants contributed real-life cases that helped contextualize subsequent explanations.

3.5 Summary of Observed Changes

The main qualitative changes observed during the intervention are summarized in Table 1.

Table 1. Observed changes across the three main digital-literacy domains

Domain	Initial condition observed	Learning process	Observed change
Digital literacy	Some participants equated digital literacy with smartphone and social-media use	Explanation, discussion, information-evaluation examples	Broader understanding of evaluating, using, and sharing information responsibly
Practical digital skills	Some participants experienced difficulty with account settings, searches, and smartphone functions	Demonstration, hands-on practice, individual/group assistance	Greater ability to perform several digital tasks independently
Digital safety	Participants encountered suspicious messages and were not always aware of associated risks	Examples of fraud, discussion of personal-data protection and verification	Greater awareness of suspicious information and the need for verification
Digital communication	Participants used digital communication in everyday life	Discussion of responsible comments, photos, personal information, and forwarding	Greater awareness of digital communication ethics

Overall, the evaluation indicated positive changes in participants' understanding and practical skills. The report specifically notes improvements in explaining the benefits of digital technology, protecting personal data, responding to suspicious information, and performing smartphone-related activities.

IV. DISCUSSION

The findings suggest that digital literacy interventions in rural communities need to move beyond a narrow emphasis on device operation. In Tiris Village, the intervention addressed a more complex relationship between **access, capability, judgment, and safety**. Participants already had access to smartphones, but access alone did not ensure that they could evaluate information, manage digital risks, or confidently perform various digital tasks. This finding highlights an important distinction between **digital access** and **meaningful digital participation**. The presence of smartphones in a community represents technological availability, but meaningful participation requires users to possess the knowledge and confidence to use those technologies for appropriate purposes (Kim, J *at al*, 2022). The intervention attempted to address this gap by combining conceptual education with practical application.

4.1 Why Practice-Oriented Learning Matters

The practical component appears to have been particularly important for participants who initially experienced technical difficulties. Demonstrations followed by hands-on practice allowed participants to immediately translate abstract explanations into concrete actions.

The finding is consistent with the participatory orientation of the intervention. Participants did not merely listen to instructions; they practiced tasks on devices they already used in everyday life. This reduced the distance between the educational setting and real-world digital practices.

The implication is that community-based digital literacy programs may benefit from treating technical confidence as a learning outcome in its own right (Utami, A. D., & Setiawan, M. 2022). Participants who are technically hesitant may not necessarily lack interest in technology. Rather, they may require an environment in which they can practice without fear of making mistakes and receive immediate assistance when difficulties occur.

4.2 Digital Literacy as Critical Information Practice

The expansion of participants' understanding of digital literacy is another important finding. Initially, some participants understood digital literacy primarily as smartphone operation and social-media use. The intervention broadened this understanding to include information evaluation and responsible sharing.

This distinction is especially relevant in environments where messaging applications and social media facilitate rapid circulation of information . Digital literacy cannot therefore be reduced to the ability to access information (Jeong, *at al* 2022). Users also need to consider the credibility and potential consequences of the information they receive and distribute.

The participants' experiences with suspicious messages provided a meaningful entry point for this learning process. Rather than introducing misinformation and digital fraud as hypothetical risks, facilitators connected them to situations that participants had actually encountered. This contextualization may have increased the relevance of the material and facilitated discussion.

4.3 Digital Safety as an Everyday Competence

The digital-safety findings also indicate that online safety should be treated as an integral component of digital literacy. Participants were exposed to examples involving personal information, OTPs, money requests, and unfamiliar links. These examples linked technical knowledge to everyday decision-making.

This is particularly important because many digital risks do not depend on sophisticated technical vulnerabilities. They may instead involve social manipulation, misleading messages, or users' decisions to disclose information. Consequently, digital safety requires both technical awareness and critical judgment (Rumawas, W. 2022).

The intervention's emphasis on verification before responding to or sharing information represents a practical form of risk management. It encourages users to introduce a moment of reflection into otherwise rapid digital communication.

4.4 Mothers as Strategic Actors in Household Digital Practices

The focus on mothers is also theoretically and practically significant. Mothers' digital practices may influence household routines, family communication, and children's encounters with technology. The intervention therefore has potential relevance beyond individual participants.

The findings suggest that mothers can be approached not simply as beneficiaries of digital-literacy programs but as potential mediators of digital practices within families and communities. Once participants understand principles of information verification, digital safety, and responsible use, these principles may potentially be transferred to interactions with family members and peers (Sisbintari *et al*, 2021).

However, such transfer should not be assumed. The present evaluation documents participants' learning during and immediately around the intervention but does not include longitudinal evidence demonstrating sustained changes in household behavior or children's digital practices. Future research should therefore examine whether mothers' newly acquired knowledge translates into longer-term changes in family digital routines.

4.5 Implications for Rural Community Programs

Several practical implications emerge from the intervention.

First, rural digital-literacy programs should be context-sensitive. Training materials should use examples drawn from participants' actual digital experiences rather than relying exclusively on generic explanations.

Second, educational programs should integrate conceptual and practical learning. Understanding what misinformation is, for example, is insufficient if participants cannot apply verification practices to an actual message.

Third, digital-safety education should be embedded within broader digital-literacy programs rather than treated as a separate technical topic.

Fourth, sustainability requires mechanisms for continued practice. The community-service report recommends follow-up programs or the development of a local digital-literacy community and suggests integrating digital-literacy activities into existing community organizations such as *PKK* or *Karang Taruna.*

These recommendations are important because a short intervention can introduce knowledge and skills, but sustained digital competence requires repeated opportunities for application, problem solving, and peer learning.

4.6 Limitations

This study has several limitations that should be acknowledged explicitly.

First, the evaluation was based on qualitative observation, discussion, participant responses, and practical activities rather than standardized quantitative measures. Therefore, the magnitude of learning gains cannot be statistically estimated.

Second, the available documentation does not provide a sufficiently precise final participant count. This prevents analysis according to demographic characteristics or subgroup differences.

Third, there was no comparison or control group. Consequently, the observed changes cannot be attributed exclusively to the intervention.

Fourth, the evaluation focused primarily on immediate or near-immediate learning outcomes. It does not establish whether participants maintained the acquired skills or transferred them to other family and community members over time.

These limitations do not invalidate the value of the intervention, but they define the appropriate level of inference. The findings provide practice-based qualitative evidence that a participatory and hands-on approach can support learning among rural mothers, rather than experimental evidence of intervention efficacy.

V. CONCLUSION

This study examined a participatory digital-literacy intervention for mothers in Tiris Village, Probolinggo, East Java. The intervention addressed a practical challenge increasingly encountered in rural communities: digital technologies may become widely accessible while users' capacities to evaluate information, use devices confidently, and protect themselves from digital risks remain uneven.

The findings indicate changes in three interconnected areas. Participants developed a broader understanding of digital literacy, including responsible information evaluation and communication; they demonstrated improved practical engagement with smartphone functions and digital applications; and they showed greater awareness of personal-data protection, suspicious information, and online fraud.

The findings also highlight the value of combining explanation, discussion, demonstration, hands-on practice, and individualized assistance. Such an approach appears particularly appropriate for participants with different levels of prior technological experience because it connects digital concepts directly to everyday problems.

At the same time, the findings should not be interpreted as quantitative evidence of program effectiveness. The absence of standardized measurements, a comparison group, and longitudinal follow-up limits causal and generalizable conclusions.

Future community-based programs should therefore build on the intervention through sustained digital-literacy activities, peer-learning mechanisms, and integration with existing community organizations. Future studies could strengthen the evidence base by employing validated digital-literacy measures, systematic pre- and post-intervention assessment, larger samples, and longitudinal follow-up to examine whether learning is translated into sustained changes in household and community digital practices.

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