

Introduction to Technology and Its Impact on the Indonesian Migrant Children in Malaysia

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Submitted: 11th Oct 2025 | **Edited:** 20th Dec 2025 | **Issued:** 01st January 2026

Cited on: Firdaus, F., Noegroho, A. D., Tiara, A. Q., Ismanto, F., Jatmiko, MR., Nurrahmah, W. O. S., Mulyanto, K., Hendriyanto, A., Rahman, A. A., Proborini, E., Yulianto, H., & Mahmud, N. (2026). Introduction to Technology and Its Impact on the Indonesian Migrant Children in Malaysia. *Jurnal PKM Manajemen Bisnis*, 6(1), 316-326.

ABSTRACT

This community service program addressed the digital literacy gap among Indonesian migrant children at SB Pandan Jaya, Malaysia, who face limited access to digital resources and online safety education. The initiative aimed to strengthen students' foundational digital skills, promote safe and ethical internet use, and equip teachers with practical tools to facilitate sustained digital literacy. The program was implemented in October 2025 at SB Pandan Jaya, involving 43 students aged 8–15 and 8 teachers, with 12 facilitators from Universitas Muhammadiyah Semarang, STIE Anindyaguna, and STT Pati. A mixed-method participatory approach was employed, combining pre- and post-assessments, classroom observations, reflective interviews, hands-on workshops, and simulated online scenarios. The intervention followed four stages: needs assessment, capacity building and training, guided practice and mentoring, and evaluation and monitoring. Findings indicate significant improvements in student competencies: basic internet knowledge increased by 94%, device operation by 80%, digital safety by 113%, and educational application use by 76%. Teachers' capacity to integrate ICT and monitor students' online safety also improved by 61% on average. High attendance and active engagement demonstrated the relevance and effectiveness of the program. Practical sessions and structured guidance enabled students to apply digital skills confidently while fostering safe online behavior. Overall, this program highlights the importance of community-based digital literacy initiatives in enhancing technological readiness and promoting safe internet practices among marginalized migrant children.

Keywords: Digital Literacy, Migrant Children, Technology Introduction, Internet Safety, Community Engagement

INTRODUCTION

The rapid advancement of information and communication technologies (ICT) has transformed educational possibilities globally. However, access to these technologies

remains uneven especially among marginalized and migrant communities (Christanti, et al., 2024). In many contexts, even as overall digital infrastructure improves, certain groups continue to experience a multi-dimensional “digital divide,” encompassing disparities in physical access, digital skills, safe-use literacy, and meaningful usage (Fang, et al., 2022; Mulyaningsih, et al., 2020).

In Malaysia, for example, studies among indigenous and rural communities reveal that although device and internet penetration have increased, significant gaps in digital competence and safe internet use persist (Arbine & Abd Hamid, 2023; Horn & Rennie, 2018). For migrant children particularly those without secure legal status the situation is often exacerbated. The formal education system and civil services (e.g., birth registration, schooling, social support) increasingly rely on digital platforms yet digitalization of such services may exclude undocumented or stateless individuals who lack stable access or necessary documentation (Razali, Duraisingam, & Lee, 2022; Salleh, et al., 2023).

These realities situate this project within a theoretical framework that views digital inclusion not simply as a matter of device distribution, but as a matter of equitable access across multiple dimensions physical access, skills access, usage access, and safe/informed usage (Jasber Kaur GS & Halimatus Saadiah Ab Karim, 2024). This multi-dimensional approach echoes classical models of digital divide which emphasise that providing hardware or connectivity alone does not guarantee meaningful or safe participation in the digital world (Syed Hamid & Sueb, 2021; Latha Subramaniam, et al., 2023).

Empirically, the COVID-19 pandemic has underscored the consequences of digital exclusion. Remote learning during school lockdowns disproportionately disadvantaged rural and underprivileged students in Malaysia, amplifying educational inequities (Surianshah, 2021). Moreover, marginalized children including migrant, refugee, and stateless children have limited access to formal education: for instance, as recently as mid-2024, reports indicate that only about 34% of refugee and stateless children of school age in Malaysia attend informal or alternative learning centres, while the remainder lack any structured education access (UNICEF Malaysia, 2024).

Given these conditions, the children at SB Pandan Jaya a community-based learning centre for Indonesian migrant children are likely to experience compounded vulnerabilities: restricted legal/social status, limited access to formal education, and insufficient digital literacy. Without structured intervention, digitalization might

inadvertently deepen their marginalization. On the other hand, a well-designed, community-rooted digital literacy programme could offer dual benefits: improving educational access and enhancing online safety and empowerment.

Therefore, this project proposes a comprehensive community-based digital literacy intervention at SB Pandan Jaya, aimed at (1) strengthening foundational digital skills, (2) improving awareness about safe and ethical internet use, and (3) building capacity among teachers and community volunteers to deliver sustainable digital education. By combining needs-assessment, participatory training, ongoing facilitation and evaluation, this project seeks to generate empirical evidence on how technology introduction when mediated with pedagogical guidance and social protection can promote inclusive learning, social inclusion, and child protection for migrant children living outside formal systems.

METHOD

This community service program employed a mixed-method participatory approach designed to strengthen the digital literacy and safe-internet practices of Indonesian migrant children at SB Pandan Jaya, Malaysia. The method integrates quantitative assessment, qualitative exploration, and community-based facilitation to ensure contextual relevance and measurable outcomes.

PKM Design

The project adopted a Participatory Action Learning (PAL) model, combining needs assessment, intervention, guided practice, and evaluation. This model positions children, teachers, and volunteers as active participants rather than passive recipients, allowing continuous refinement of activities based on feedback from the learning centre.

Object and Unit of PKM

The primary object of the PKM is the enhancement of digital literacy and internet-safety competencies.

The unit of analysis includes:

1. 43 Indonesian migrant students enrolled at SB Pandan Jaya (ages 8–15).
2. Teachers and community volunteers (N = 16) responsible for digital-learning facilitation.

The learning environment of the community school, including available devices, internet connectivity, and existing teaching practices.

Instruments

A combination of structured and semi-structured instruments was used:

1. Digital Literacy Pre-test and Post-test
Multiple-choice and performance-based items measuring basic operations, navigation skills, search ability, and recognition of online risks.
2. Observation Checklists
Used to evaluate student engagement, operational performance (e.g., opening apps, safe password creation), and behavioural changes during supervised online sessions.
3. Interview Guides
Short reflective interviews with teachers and volunteers to capture perceptions of student progress, challenges, and sustainability needs.
4. Field Notes and Activity Logs
Documenting the flow of workshops, participation levels, technical constraints, and unplanned incidents during sessions.
5. Digital-Safety Scenario Cards
Problem-based cases used during simulation activities to assess students' decision-making skills.

Implementation Procedures

The program was executed in four sequential stages:

1. Needs Assessment (Week 1)
 - a. Mapping students' access to devices, previous exposure to digital tools, and baseline digital-safety awareness.
 - b. Evaluating teachers' readiness and existing teaching materials.
2. Capacity Building and Training (Weeks 2–3)
 - a. Workshops on foundational digital skills: device operation, browser use, search strategies, and identification of credible information.
 - b. Internet-safety modules including privacy protection, ethical online behaviour, cyberbullying prevention, and screen-time management.
 - c. Training-of-Trainers (ToT) for teachers and volunteers.

3. Guided Practice and Mentoring (Week 3–4)
 - a. Structured practice sessions where students operate devices under supervision.
 - b. Simulated cases using real-life online scenarios.
 - c. Peer-learning to encourage collaborative digital tasks.
4. Evaluation and Monitoring (Week 4)
 - a. Conducting post-test assessments and debrief interviews.
 - b. Analysing improvements, challenges, and sustainability strategies for SB Pandan Jaya.

Data Analysis Techniques

A mixed-method analysis was employed:

1. Quantitative Analysis
 - a. Descriptive statistics (percentage change, mean scores, improvement rate).
 - b. Comparison of pre-test and post-test scores to evaluate learning gains.
 - c. Frequency distribution to identify common digital-safety misconceptions.
2. Qualitative Analysis
 - a. Thematic coding of interview transcripts and field notes.
 - b. Triangulation between student performance, observations, and teacher reflections to ensure data validity.
 - c. Narrative synthesis to interpret behavioural changes in digital-safety practices.
3. Program Effectiveness Evaluation
 - a. Effect size estimation at practical level (percentage increase in safe-use knowledge and operational skills).
 - b. Mapping outcomes against project objectives for sustainability planning.

DISCUSSION

The community engagement initiative *Introducing Internet Technology to Indonesian Migrant Children at SB At-Tanzil Hicom* aimed to strengthen digital literacy, fundamental internet skills, and online safety awareness among both students and teachers. A total of 43 students and 8 teachers participated in the program. The implementation strategy emphasized experiential learning, combining short lectures, guided practice, and hands-on digital tasks.

Participation and Engagement

Participant attendance was consistently high, reflecting strong interest and the perceived relevance of the program. As shown in Table 1, student attendance reached 95%, while teacher attendance was 100%.

Table 1. Participant Attendance

Group	Registered	Present	Attendance (%)
Students	43	41	95%
Teachers	8	8	100%
Total	51	49	96%

Source: Data of Community Service Program, 2025

The high engagement throughout the sessions created a conducive environment for collaborative learning, allowing both groups to benefit from shared experiences and real-time feedback.

Learning Outcomes and Skill Development

To capture changes in digital competency, the program utilized pre- and post-assessments covering four dimensions: basic internet knowledge, device operation, digital safety, and use of educational applications. The results demonstrate a substantial improvement among students, particularly in digital safety an area where initial understanding was notably low.

Table 2. Student Pre–Post Competency Scores

Competency Area	Pre-test Mean	Post-test Mean	Improvement (%)
Internet Basics	1.8	3.5	94%
Device Operation	2.0	3.6	80%
Digital Safety	1.5	3.2	113%
Learning Apps	2.1	3.7	76%
Average	1.85	3.5	89%

Source: Data of Community Service Program, 2025

Students demonstrated the greatest gains in recognizing online risks, creating stronger passwords, and evaluating what information is safe to share. These results indicate the urgency and relevance of digital safety education for migrant children with high online exposure. Teachers also showed consistent progress. Although their initial scores were higher, the post-program gains suggest that structured guidance, practical exposure, and ready-to-use digital teaching resources can meaningfully enhance educator readiness.

Table 3. Teacher Pre–Post Competency Scores

Competency Area	Pre-test Mean	Post-test Mean	Improvement (%)
ICT Integration	2.3	3.6	56%
Student Digital Safety	2.0	3.4	70%
Learning Platforms	2.4	3.7	54%
Digital Literacy Facilitation	2.1	3.5	67%
Average	2.2	3.55	61%

Source: Data of Community Service Program, 2025

The improvement in teachers’ capacity to oversee students’ digital activities is particularly valuable, given the increasing need for vigilance and guidance in technology-mediated learning environments.

Practical Implementation and Observed Performance

Hands-on sessions formed the core of the program, allowing students to experiment with search engines, educational platforms, and basic cyber-safety practices. Students were encouraged to evaluate information sources, navigate learning platforms such as Google Classroom and Khan Academy Kids, and simulate safe online behavior.

Table 4. Observed Student Performance During Practice

Activity	Indicator of Success	Achievement
Online Search	Identifying trustworthy sources	88% successful
Practice Learning Applications	Ability to log in and complete tasks	90% successful
Cyber-Safety Tasks	Creating strong passwords	76% successful
Digital Ethics	Understanding safe data sharing	83% demonstrated awareness

Source: Data of Community Service Program, 2025

Overall, the practical component validated that students not only understood the concepts but were able to apply them in real contexts an essential benchmark for sustainable literacy.

Qualitative Insights

Field observations and follow-up discussions provided additional depth to the quantitative findings. Three key insights emerged: Younger students required more structured guidance, especially in tasks involving text entry and interface navigation. However, they showed rapid adaptability through repetition and peer modeling.

Teachers benefited significantly from modular teaching materials, which helped them integrate digital tools into their instructional routines with minimal disruption. Infrastructure constraints, such as unstable internet access, highlighted the importance of adopting an offline-first teaching model to ensure continuity of learning.

These insights support the need for sustainable digital literacy programs that consider both pedagogical and infrastructural realities in migrant learning environments.

1. Program Contributions and Impact

The initiative contributed to three stakeholder groups:

2. For Students

The program heightened digital confidence, improved awareness of cyber risks, and encouraged constructive use of internet resources. For many students, this was their first structured exposure to formal digital literacy training.

3. For Teachers

The program enhanced technological pedagogical skills and equipped teachers with practical tools to monitor students’ online habits, strengthening their role in safeguarding digital learning.

4. For the School

SB Pandan Jaya gained a clearer mapping of its digital literacy needs, enabling it to identify priority areas for future development and to adopt a more systematic approach to technology integration.

Overall Achievement of the Program

The aggregated outcomes show that the program surpassed most of its key targets. Gains in student literacy, teacher capacity, and participant engagement indicate that the intervention was both effective and contextually appropriate.

Table 5. Summary of Program Achievements			
Component	Target	Actual	Achievement (%)
Student Literacy Improvement	70%	89%	127%
Teacher Competency Improvement	60%	61%	102%
Participant Attendance	90%	96%	106%
Module Implementation	100%	100%	100%

Source: Data of Community Service Program, 2025

These results affirm the significant contribution of the program in strengthening digital readiness among Indonesian migrant learners and their educators.



Figure 1. Documentation Introduction about Handphone and Laptop to SB Pandan Jaya

Figure 1 illustrates the opening session of the digital literacy program, where facilitators introduced the basic functions and safe-use principles of handphones and laptops to the students of SB Pandan Jaya. This session served as the foundation for the entire program, ensuring that all participants regardless of prior exposure developed a shared understanding of essential digital concepts.

The activity began with a demonstration of the physical components of each device, including the power button, keyboard, touchpad, volume controls, camera, and basic connectivity features. Students were encouraged to identify these parts directly on their own devices, creating an interactive learning environment that promoted confidence and curiosity. Facilitators explained how mobile phones and laptops differ in terms of operating systems, storage capacity, and functionality, helping students understand the appropriate contexts for each tool.

During the session, students were also introduced to key digital operations such as turning the devices on and off, connecting to Wi-Fi, navigating home screens, and opening essential applications. Many of the students had previously used smartphones only for entertainment or communication, so the shift toward purposeful, education-oriented usage represented an important mindset transition. Teachers observed that several students showed significant enthusiasm when they learned how to access learning applications and organize files independently.

In addition to technical skills, facilitators emphasized safe device usage highlighting practices such as maintaining strong passwords, avoiding suspicious pop-ups, and handling devices carefully to prevent damage. This early introduction proved

crucial, as it established a culture of responsible digital behavior from the outset. Overall, the activity depicted in Figure 1 laid a strong foundation for the subsequent modules. By combining hands-on practice with clear explanations and guided demonstrations, the session effectively prepared SB Pandan Jaya students to engage more deeply with digital tools throughout the remainder of the program.

CONCLUSION

The community engagement initiative *Introduction to Technology and Its Impact on Indonesian Migrant Children in Malaysia* demonstrates that structured digital literacy programs can significantly elevate the digital competencies of underserved learners. Through the participation of 43 students and 8 teachers, the program successfully enhanced foundational internet skills, strengthened awareness of online safety, and improved the ability to navigate educational applications. Quantitative assessments revealed substantial learning gains, while qualitative observations showed increased confidence and more responsible digital behavior among students.

Beyond measurable improvements, the program generated strategic benefits for the learning ecosystem at SB Pandan Jaya. Teachers developed stronger capabilities in guiding digital learning, identifying online risks, and integrating technology into instruction skills that will be essential for sustaining long-term digital empowerment within the school. Importantly, the results highlight several areas of opportunity for SB Pandan Jaya to continue strengthening its digital readiness. The school would benefit from establishing a more structured digital literacy curriculum, improving device availability, and enhancing internet stability to support continuous learning. Regular teacher training, coupled with student-centered digital activities, would ensure that skills gained through the program remain relevant and consistently practiced.

Overall, this PKM initiative contributes not only to immediate improvements in digital literacy but also lays the foundation for future capacity building. Continued collaboration, investment in digital infrastructure, and periodic skill-refresh programs will enable SB Pandan Jaya to maintain momentum and further empower Indonesian migrant children to participate safely and confidently in an increasingly digital world.

Acknowledgment

The authors would like to express sincere gratitude to the Institute for Research and Community Service (LPPM) Universitas Muhammadiyah Semarang (UNIMUS) for

providing financial and institutional support for this community service program through the Community Service Grant with Contract Number:158/UNIMUS.L/PM/PKMLN/PJ.INT/2025. Appreciation is also extended to Sekolah Indonesia SB Pandan Jaya, Hulu Langat, Ampang, Malaysia, for the collaboration, hospitality, and active participation of the teachers and students, whose enthusiasm greatly contributed to the success of this activity.

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