Digital Comic Training: Empowering Non-Formal Learning Centers for Migrant Communities in Malaysia

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Abstract

The children of transnational migrant workers frequently face systemic institutional barriers that exclude them from formal education, forcing them to rely on under-resourced non-formal learning centers. At *Sanggar Bimbingan Sungai Mulia 05* (SBSM 5) in Kuala Lumpur, Malaysia, this structural vulnerability is compounded by traditional, text-dense, and monotonous pedagogical methods that trigger learner disengagement and academic anxiety. This study evaluates an international collaborative initiative designed to overcome these instructional bottlenecks by training non-formal educators to author and implement mobile-optimized digital comics. Grounded in Mayer's Cognitive Theory of Multimedia Learning and multicultural education principles, the project employed a mixed-methods action research design utilizing the ADDIE framework over a three-month period. Data were gathered through structured behavioral observations, user-experience surveys, and semi-structured qualitative interviews with educators and center administrators.

The empirical results demonstrate a profound dual-transformative impact: first, the structured training successfully elevated the technological self-efficacy and authoring skills of non-formal instructors transitioning them from passive media users into active digital content creators. Second, the deployment of the student-designed digital comics—integrated with Group Guidance (*Bimbingan Kelompok*) and game-based simulations—dramatically minimized cognitive load, boosted classroom participation,and enhanced peer-to-peer collaboration among the migrant children. The sequential narrative arcs allowed these vulnerable students to safely process accultua--tive stress, fostering heightened learning motivation, public speaking confidence, and positive identity formation. Crucially, while previous multimedia literature focus extensively on affluent public school infrastructures, this research proves that low-bandwidth digital visual storytelling possesses the structural elasticity to thrive in precarious educational landscapes. This study offers a scalable, economically viable, and culturally responsive blueprint for global educators and policymakers seeking to democratize premium interactive learning and foster psychosocial resilience among marginalized and displaced youth worldwide.

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I. Introduction

In an increasingly interconnected global ecosystem, the migration of populations across transnational borders has emerged as one of the most definitive socioeconomic phenomena of the twenty-first century. While international migration offers significant opportunities for macro-economic development, regional labor optimization, and cross-border remittances, it simultaneously generates complex humanitarian, legal, and systemic dilemmas within host nations. Among the most critical yet frequently neglected facets of this global phenomenon is the structural vulnerability faced by the dependents of migrant workers, specifically their children. The right to high-quality, inclusive education is universally recognized as a fundamental human right that must be guaranteed to every child, regardless of their geopolitical origin, socioeconomic status, or legal standing (UNESCO, 2015; UNICEF, 2019). However, severe systemic disparities often manifest within host-country educational frameworks, effectively marginalizing transnational children and stripping them of their academic and psychological well-being (Banks, 2008).

Within the Southeast Asian geopolitical landscape, Malaysia stands out as a primary destination hub for international migrant communities, particularly those migrating from neighboring Indonesia. While Indonesian migrant workers provide indispensable labor that fuels vital sectors such as construction, agriculture, and service industries, their structural position within the host country remains precarious. Consequently, their children routinely face multi-layered institutional and legal gridlocks that systematically bar them from entering formal public schooling systems (UNESCO, 2015). Deprived of formal state-sponsored education, these children face a heightened risk of lifelong illiteracy, social alienation, and prolonged economic disenfranchisement. To mitigate this critical humanitarian crisis, grassroots organizations, non-governmental entities, and academic institutions have collaborated to establish alternative educational institutions across urban centers like Kuala Lumpur. These non-formal learning centers, localized under the nomenclature of *Sanggar Bimbingan* (SB), operate as essential institutional sanctuaries, offering foundational academic instruction, cultural preservation, and psychological stabilization for marginalized migrant youth.

Despite the profound societal value and educational equity championed by these non-formal learning centers, they consistently operate under severe structural, operational, and infrastructural constraints. As exemplified by the operational realities of *Sanggar Bimbingan Sungai Mulia 05* (SBSM 5) in Kuala Lumpur, these alternative learning spaces grapple with extreme scarcity regarding operational funding, baseline instructional materials, and advanced technological infrastructure. Furthermore, the instructional workforce in these centers often consists of passionate volunteers or under-trained community educators who lack formal training in modern pedagogical design and classroom management. As a direct consequence of these compounding limitations, classroom instruction frequently regresses into conventional, archaic, and deeply monotonous teacher-centered methodologies, including rote memorization, repetitive lectures, and dense textual worksheets. For migrant children—who must concurrently process the psychological trauma of displacement, ambient socioeconomic stress, and complex linguistic shifts—such a rigid, uninspiring pedagogical environment fails to generate intrinsic cognitive engagement or emotional resonance. The persistent reliance on flat, non-interactive instructional mediums rapidly induces acute academic boredom, drops student participation rates, and exacerbates acculturative anxiety, effectively limiting the transformative power of non-formal education.

To dissolve these pedagogical bottlenecks, modern instructional design must transition toward interactive, visually driven paradigms that align with the cognitive processing habits of digital-native learners. Educational psychology indicates that multimedia-based learning environments can substantially optimize cognitive loads and catalyze deeper information processing (Mayer, 2009). Within this context, digital comics have emerged as a highly versatile, accessible, and pedagogically sound communication medium capable of breaking down abstract, culturally complex

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curricular materials into digestible learning modules. By integrating high-fidelity visual illustrations, sequential narrative arcs, and highly relatable conversational dialogues, digital comics evoke a psychological state known as narrative transportation. This state allows students to deeply engage with the characters and absorb contextual socio-cultural data without triggering defensive learning barriers or situational anxiety. In a multicultural, non-formal learning setting, digital comics transcend their conventional status as mere recreational artifacts; they serve as active mechanisms for siber-pedagogy, visual psychoeducation, and digital cultural diplomacy that directly validates the distinct identities of marginalized students (Banks, 2008; Payanti, 2022). Crucially, the mobile-optimized and open-access architecture of modern digital comics ensures that these high-quality instructional materials can be effortlessly disseminated across low-cost smartphones and digital tablets, presenting an exceptionally cost-effective, scalable solution for under-funded educational spaces.

While a substantial volume of contemporary research has validated the positive impacts of digital comic media on student learning motivation within affluent, formal public school sectors (Arfika et al., 2023; Mulia & Kristin, 2023; Syahnaz et al., 2020), a deep gap persists within the current literature regarding its execution within the precarious, non-formal landscapes of transnational migrant education. Most existing frameworks assume a baseline of structural stability, high digital literacy among educators, and consistent institutional support—variables that are conspicuously absent within the *Sanggar Bimbingan* network. Consequently, there is an urgent theoretical and practical necessity to examine how educational innovations can be sustainably implemented from the bottom up, specifically focusing on building the internal technological and instructional capacity of non-formal educators who serve at-risk migrant student populations.

This study directly addresses this empirical and societal gap by evaluating a structured, international community-driven capacity-building framework executed at *Sanggar Bimbingan Sungai Mulia 05* (SBSM 5) in Kuala Lumpur, Malaysia. Rather than merely introducing an external digital tool, this initiative focused on empowering non-formal instructors with the technical competencies and design strategies required to produce, curate, and implement their own culturally responsive digital comics. By utilizing a systematic Research and Development (R&D) lens embedded within a mixed-methods action research design, this inquiry tracks the dual-transformative impact of digital comic training. It assesses how specialized media training re-shapes the pedagogical efficacy and technological confidence of grassroots educators while simultaneously investigating the downstream effects of these digital visual tools on the academic engagement, cultural literacy, and emotional resilience of migrant children. Ultimately, the insights garnered from this study contribute to broader discourses on educational governance, public policy, and communication media, providing a scalable blueprint for leveraging low-cost digital innovations to cultivate inclusive, highly empowering educational environments for historically underserved communities worldwide.

II. Methodology

2.1 Research Design and Framework

To investigate the systemic transformation of pedagogical practices and learner engagement within non-formal education frameworks, this study utilizes an action-driven **Mixed-Methods Research and Development (R&D)** framework. The design operationalizes a collaborative action research model combined with the systematic structural components of the classic **ADDIE** (Analysis, Design, Development,Implementation, and Evaluation) instructional design model. By blending community-based action research with an R&D framework, this methodology allows the research team to serve not merely as passive observers, but as active catalysts for capacity building, media orchestration, and clinical educational intervention.

The empirical architecture of this study tracks a dual-layered intervention: first, it analyzes the capacity building and technological self-efficacy of grassroots non-formal educators; second, it evaluates the downstream psychosocial and cognitive impacts of the newly developed digital media on marginalized migrant children.

[Phase 1: Needs Analysis & Observational Survey]

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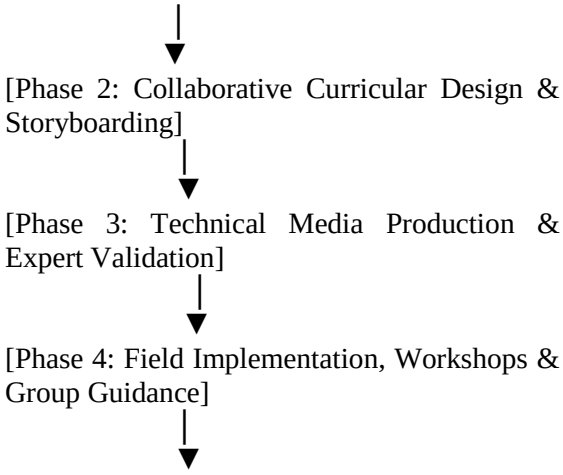

2.2 Participants and Research Setting

This inquiry was structurally anchored and carried out over a collaborative three-month timeline at **Sanggar Bimbingan Sungai Mulia 05 (SBSM 5)**, a localized, non-formal alternative educational center positioned within the urban center of Kuala Lumpur, Malaysia. The institutional target matrix for this field intervention comprised two primary groups:

1. **Educators and Administrators:** The primary stakeholders subjected to capacity building included the management staff, core educational coordinators, and volunteer instructors from the *Sekolah Indonesia Kuala Lumpur* network and local *Sanggar Belajar* communities.
2. **Learners:** The target student demographic encompassed a diverse cohort of primary and lower-secondary school-aged children navigating the center. These learners predominantly stem from socioeconomically marginalized Indonesian migrant worker households characterized by precarious legal status, low household income, and highly restricted access to formal institutional schooling.

2.3 Operational Phases (The ADDIE Approach)

Phase 1: Situation Analysis and Baseline Surveying

The initial phase involved field immersion characterized by systematic initial surveys and clinical observations. The research team conducted an exhaustive needs assessment to chart the primary structural bottlenecks of the learning center. This stage revealed extreme instructional resource scarcity and a heavy institutional dependency on text-dense, dry pedagogical styles that directly triggered student disengagement.

Following the field survey, a formal **Team Coordination Meeting** was convened. During this session, explicit task delegations were established among the lead investigators, technical personnel, and three designated student researchers. The team drafted a master operational timeline covering everything from baseline preparation to final field evaluation.

Phase 2: Strategic Program Socialization and Curricular Design

Before field implementation, the research team conducted a formal **Program Socialization** initiative targeting the host-center administrators, local community leaders, and volunteer educators. This phase was vital for securing institutional trust and ensuring the collaborative parameters of the intervention.

Once alignment was achieved, the team launched a joint curating workshop where raw educational curricula (focusing on fundamental values such as friendship, environmental stewardship, local wisdom, and core literacy skills) were mapped out. These concepts were translated into sequential storyboards, converting static instructional modules into relatable, empathetic conversational scripts optimized for visual delivery.

Phase 3: Digital Media Production and Technical Execution

During the development stage, the co-investigators collaborated with technical multimedia designers to translate the validated storyboards into functional, high-fidelity digital comics. The media assets were engineered using open-access digital illustration tools, text typography formatting, and vibrant color configurations tailored to maximize the visual attention span of young learners.

Crucially, the interface architecture of these digital comics was optimized for low-bandwidth mobile environments, ensuring that the final files could be effortlessly transferred and viewed on standard, low-cost smartphones without requiring constant, high-speed internet connectivity.

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Phase 4: Implementation through Technical Workshops and Interventions

The core field execution combined structured technical training workshops for educators with immediate instructional interventions for the students. Educators were trained in digital comic authorship, mobile-driven asset curation, and strategic integration techniques to incorporate visual media into active lesson plans.

Simultaneously, the students engaged in group-based learning activities utilizing the digital comics. To reinforce the psychosocial dimensions of the intervention, the team integrated **Group Guidance (*Bimbingan Kelompok*)** methodologies powered by structured simulation game techniques. Students were divided into collaborative teams, encouraging them to discuss the moral dilemmas presented in the comics, share peer insights, and co-create their own simple digital mini-stories.

2.4 Data Collection and Evaluation Matrix

To secure high internal validity, a comprehensive **Mixed-Methods Evaluation** matrix was deployed immediately after the field implementation phase. Data triangulation was achieved through three specific channels:

- **Quantitative Metrics:** The team distributed structured user-experience and engagement surveys to quantify shifts in student learning motivation, attention retention, and technology acceptance rates.
- **Qualitative Frameworks:** Semi-structured diagnostic interviews and Focus Group Discussions (FGDs) were conducted with the center's manager, volunteer teachers, and parent representatives. These sessions captured the lived experiences, emotional resonance, and perceived changes in classroom dynamics.
- **Direct Behavioral Observations:** The three tracking researchers used structured observation rubrics to measure explicit behavioral indicators during classroom sessions, focusing on student verbal participation, peer-to-peer collaboration, and task completion speed.

2.5 Data Analysis Procedures

The quantitative dataset was subjected to descriptive statistical modeling to observe patterns of improvement in technological familiarity and learner motivation scores. Concurrently, the extensive qualitative text corpus gathered from interviews and field notes was processed using systematic **Thematic Analysis**.

This qualitative text was transcribed, inductively coded, and categorized into dominant overarching themes, such as pedagogical shifts, the breaking of communication barriers, emotional transport through visual media, and systemic challenges regarding non-formal digital educational governance. By cross-referencing the quantitative trends with qualitative narrative insights, the study presents a valid, multi-dimensional evaluation of the digital comic intervention.

III. Result

3.1 Results

The international field implementation of the digital comic training program at *Sanggar Bimbingan Sungai Mulia 05* (SBSM 5) in Kuala Lumpur, Malaysia, yielded significant structural and pedagogical advancements. The empirical findings collected through mixed-methods triangulation are categorized into the following core dimensions:

3.1.1.Advancement of Technological Literacy and Media Authoring Skills

Prior to the intervention, the baseline evaluation indicated that educators and learners at SBSM 5 relied heavily on traditional, non-digital instructional methods due to limited technological familiarity. Following the intensive hands-on workshops, a noticeable transformation was observed in the technological self-efficacy of both the instructors and the students.

Participants successfully transitioned from passive media consumers to active digital content creators. Learners demonstrated proficiency in navigating mobile-optimized digital comic authorship applications, independent digital drawing, text-balloon typographyformatting, and sequential narrative structuring. This milestone underscores a shift in their cognitive approach toward digital devices, re-positioning mobile technology as a highly accessible instrument for active education rather than mere personal entertainment.

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3.1.2 Student-Led Content Creation and Creative Expression

The training program directly catalyzed the creative capabilities of the migrant children. Working in collaborative design teams, the students successfully produced high-fidelity digital comic artifacts characterized by rich educational messages and diverse thematic focuses.

An analysis of the student-generated comic portfolios revealed three dominant narrative themes: (1) deep bonds of transnational friendship, (2) civic duty regarding environmental stewardship, and (3) the absolute importance of educational resilience despite societal challenges. The students demonstrated an understanding of essential design elements, including spatial layout composition, character color symbolism, and typographic narrative alignment, which enriched their baseline artistic competencies.

3.1.3 Enhancing Learner Engagement, Interpersonal Skills, and Confidence

The deployment of digital comics dramatically alteredthe classroom ecosystem. Observational data gathered by the tracking researchers confirmed an immediate surge in student motivation and active participation during classroom hours. The integration of **Group Guidance (*Bimbingan Kelompok*)** through interactive simulation games provided a safe psychosocial space for peer-to-peer communication.

During collaborative storyboarding exercises, students demonstrated advanced soft skills, including cooperative problem-solving, empathetic peer listening, and systematic task delegation. Furthermore, the final phase of the intervention featured a public exhibition where student teams presented their completed digital comics. This presentation phase served as a powerful mechanism for building public speaking proficiency, cultivating personal agency, and reinforcing positive identity formation among these marginalized youth.

IV. Discussion

The empirical success derived from this transnational community-driven initiative confirms that systematically transitioning from flat, text-dense pedagogical tools to dynamic, mobile-optimized digital assets is highly effective within precarious and non-formal educational environments. The diagnostic pre-intervention baseline at *Sanggar Bimbingan Sungai Mulia 05* (SBSM 5) in Kuala Lumpur mirrored a systemic issue prevalent in displaced, marginalized learning environments worldwide: low learner participation, acute classroom boredom, and limited teacher self-efficacy driven by a severe lack of modern instructional infrastructure. By implementing a collaborative capacity-building framework that empowered non-formal educators to author and deploy interactive sequential narratives, this intervention effectively dismantled these long-standing operational bottlenecks.

From a cognitive and instructional standpoint, the substantial surge in student motivation and information retention observed at SBSM 5 can be comprehensively validated through Mayer's (2009) **Cognitive Theory of Multimedia Learning**. Mayer posits that the human working memory possesses two separate channels for processing information—auditory and visual—each operating with strict capacity limitations. Conventional rote-learning and text-heavy sheets overload the textual-auditory channel, triggering cognitive exhaustion and disengagement, particularly among children navigating complex socio-emotional stress. Digital comics resolve this processing bottleneck by elegantly splitting the cognitive load across both channels, integrating vivid character illustrations with minimalist, contextual text typography. By presenting socio-cultural literacy and curricular concepts through complementary visual-textual pathways, the digital comic medium lowers the initial cognitive barrier to comprehension. Consequently, marginalized migrant learners can redirect their finite mental energy away from basic decoding processes and toward higher-order cognitive tasks, including creative narrative writing, critical ethical reflection, and immediate contextual problem-solving.

Beyond basic cognitive advantages, the intersection of digital media authoring and **Group Guidance (*Bimbingan Kelompok*)** methodologies introduces a powerful paradigm shift for modern **Cyber-Pedagogy** and **Multicultural Counseling**. As argued by Banks (2008), for multicultural education to achieve true emancipatory value, the instructional materials must actively reflect, validate, and integrate the lived experiences and distinct cultural heritages of the student population. For the Indonesian migrant

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children navigating the urban landscapes of Kuala Lumpur, the digital comic development workshops functioned as a secure psycholgical outlet for creative externalization and identity formation. The collaborative storyboarding process allowed these vulnerable students to project their inner socio-emotional realities onto fictional comic characters. By designing narratives that openly addressed complex real-world dynamics like displacement, environmental stewardship, and transnational peer solidarity, the students safely processed their subjective anxieties. This process converted ambient acculturative stress into structured, empowering visual artifacts.

This psychological mechanism is deeply rooted in Green and Brock's **Narrative Transportation Theory**. When a learner becomes completely immersed in a sequential visual story, they experience high emotional resonance and lower psychological resistance to the underlying message. Rather than receiving top-down behavioral commands, students analyzing or building digital comics practice perspective-taking and develop cross-cultural empathy. When applied within a *Bimbingan Kelompok* framework using simulation game techniques, this media-driven transportation fosters prosocial behaviors and collaborative problem-solving. The observed improvements in student peer-to-peer communication, collective negotiation during design tasks, and public speaking confidence during the final media exhibition demonstrate how creative technology can be intentionally channeled to cultivate personal agency and psychological resilience among historically disenfranchised youth.

Furthermore, the macro-level implications of this study expand the boundary of existing educational technology literature. Prior prominent research has extensively documented the positive impacts of digital comic media on student learning engagement. For instance, Arfika et al. (2023) demonstrated that integrating digital comics into standard elementary classrooms could dramatically elevate student focus and academic interest, shifting student interest indices from a mediocre 47% baseline up to an exceptional 90%. In a similar vein, Mulia and Kristin (2023) validated the use of contextually designed digital comics to significantly boost student intrinsic learning motivation and outcomes within social studies curricula. However, a major limitation of these earlier foundational studies is their implicit reliance on structurally privileged environments. Their models assume formal state-sponsored public school systems characterized by stable student enrollment, high baseline digital literacy among staff, and continuous access to high-speed technological infrastructure.

This research explicitly breaks new ground by proving that the digital comic intervention model possesses immense structural elasticity and can be successfully replicated within highly fluid, non-formal, and resource-constrained transnational educational frameworks. By specifically focusing on building the long-term authoring capacity of non-formal volunteer instructors rather than merely treating them as passive consumers of westernized educational apps, this project establishes a sustainable, bottom-up model for digital educational governance. The mobile-optimized, open-access delivery format ensures that these high-quality visual materials can be readily shared, modified, and viewed via low-cost mobile smartphones without requiring constant broadband connectivity. This directly provides a scalable, economically viable, and culturally responsive blueprint for global educators, school counselors, and non-governmental entities seeking to democratize premium interactive education and foster inclusive psychological well-being for marginalized migrant communities globally.

V. Conclusion

This study demonstrates that the strategic integration of digital comic training represents a highly transformative, scalable, and culturally responsive intervention for non-formal learning centers serving marginalized migrant communities. By operationalizing a collaborative, action-driven Research and Development (R&D) framework at *Sanggar Bimbingan Sungai Mulia 05* (SBSM 5) in Kuala Lumpur, Malaysia, this initiative successfully bridged critical gaps in educati--onal media and technological infrastructure. The intervention successfully transitioned grassroots educators and vulnerable migrant children from passive media consumers into active digital content creators, significantly enhancing their technological self-efficacy and creative agency.

From a pedagogical and psychological standpoint, the deployment of contextually

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tailored digital comics effectively lowered the cognitive load of learners, transforming an historically flat, monotonous instructional environment into an interactive, emotionally resonant learning ecosystem. When embedded within a structured **Group Guidance (*Bimbingan Kelompok*)** framework, the visual storytelling process served as a powerful vehicle for multicultural education and peer socialization, significantly improving student learning motivation, collaborative problem-solving skills, and public speaking confidence. Crucially, while previous literature has primarily validated multimedia innovations within affluent, formal public school systems, this research breaks new ground by proving that mobile-optimized digital comic authoring possesses the structural elasticity required to thrive within under-resourced, highly fluid, and non-formal transnational educational settings.

Limitations and Future Research Directions

Despite its highly positive outcomes, certain limitations must be acknowledged. This study was bounded by a relatively short three-month implementation timeline and focused on a single non-formal learning center (SBSM 5) in an urban setting. Consequently, the long-term cognitive retention of students and the systemic sustainability of digital media production among volunteer teachers require further longitudinal evaluation. Future research should expand the empirical scope by conducting large-scale comparative studies across multiple *Sanggar Bimbingan* locations throughout Malaysia, including rural and plantation-based learning centers. Additionally, future inquiries could investigate the integration of automated artificial intelligence (AI) storyboarding tools to further streamline the digital comic asset creation process for educators operating under severe time and resource constraints.

Ultimately, the empirical insights garnered from this study offer a viable, low-cost digital blueprint for global policymakers, school counselors, and non-governmental organizations dedicated to democratizing interactive pedagogy, advancing educational equity, and fostering psychosocial resilience among marginalized and displaced youth worldwide.

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