

BRIDGING THE DIGITAL DIVIDE IN MALAYSIAN VOCATIONAL EDUCATION: THE WAKU-PRO PROGRAM AS AN INNOVATIVE ISLAMIC SOCIAL FINANCE MODEL FOR POST-DIGITAL RESILIENCE

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Abstract: *The digital divide between urban and rural students is a persistent global challenge, exacerbated in the post-digital age where internet access is fundamental to educational equity. This paper examines the Waku-Pro program, a strategic initiative at Lahad Datu Vocational College in Sabah, Malaysia, designed to bridge this divide through an innovative Islamic social finance model. Prior to the program, only 8.2% of students had personal internet access, severely hindering rural students' academic progress. Using a qualitative case study approach, this research details the program's implementation, which utilized the Islamic principle of Wakaf (endowment) to crowdfund Unifi internet installations at 14 strategic locations across the campus, involving 18 access points with varying bandwidth capacities (100Mbps to 500Mbps) and a total investment of RM3,362. The findings reveal a transformative impact: post-implementation, 100% of students gained equal access to internet facilities. This intervention fostered digital resilience, leading to improved digital literacy, equitable coursework completion, and enhanced skills in essential software like Microsoft Office. While challenges such as internet misuse emerged, they were mitigated through continuous monitoring and access restrictions. The Waku-Pro program exemplifies how an Islamic interdisciplinary approach—combining educational needs with Islamic social finance—can provide a sustainable and resilient solution to a critical post-digital challenge. It offers a scalable model for other educational institutions facing similar disparities.*

Keywords: *Digital Divide, Islamic Social Finance, Waqf, Vocational Education, Post-Digital Age, Educational Resilience, Rural-Urban Gap*

1.0 INTRODUCTION

The post-digital age is characterized not by the novelty of technology, but by its complete integration into the fabric of daily life, including education. In this era, access to the internet is no longer a luxury but a fundamental prerequisite for equitable learning and skill development. However, the reality of a persistent digital divide, particularly between urban and rural communities, presents a significant global challenge to this ideal. This disparity is acutely felt in

educational institutions, where students from rural areas are systematically disadvantaged, lacking the digital tools and connectivity necessary to thrive.

Lahad Datu Vocational College in Sabah, Malaysia—a region with a mix of urban and remote rural populations—found itself at the epicenter of this challenge. Following its transformation in 2013, which expanded its vocational programs, the college faced a critical infrastructural shortfall. Internet access was confined to a single administrative block, a situation flagged by the Malaysian Qualification Agency (MQA) as non-compliant with accreditation standards. A college-initiated survey starkly illustrated the resulting inequality: 91.8% of students, predominantly from rural water villages and Felda settlements, lacked personal internet access, compared to a small minority (8.2%) from urban areas who could afford their own data plans. This created a profound academic disparity, with urban students completing coursework faster and demonstrating better digital and English language skills.

In response to this crisis, the Waku-Pro Program (Wakaf Unifi Program) was officially launched on April 25, 2022, organized by the Infrastructure Development and Maintenance Unit (UPPI) at Lahad Datu Vocational College. The launch ceremony was held at the Danum Meeting Room and attended by 45 individuals, including college administrators, teachers, and invited guests from Unifi. This paper explores this innovative response, demonstrating how the program represents an act of resilience and an Islamic interdisciplinary innovation, leveraging the principles of social finance (*waqf*) to forge a path toward educational equity in the post-digital landscape.

2.0 LITERATURE REVIEW

2.1 The Digital Divide in Post-Digital Education

The concept of the digital divide has evolved beyond simple access to hardware. In the post-digital era, it encompasses the quality of access, digital literacy, and the ability to use technology for empowerment (Van Dijk, 2020). Scholars like Warschauer and Matuchniak (2010) have linked this divide to disparities in 21st-century skills, including collaboration and problem-solving. In the Malaysian context, particularly in East Malaysia, geographical and infrastructural challenges continue to create significant educational inequities (Abdul Razaq et al., 2018). Norazmah and Roslan (2021) found a direct correlation between internet access and student academic achievement, emphasizing that students without reliable connectivity are at a distinct disadvantage in completing assignments and accessing learning materials.

The Malaysian Digital Education Policy (Ministry of Education Malaysia, 2020) explicitly recognizes internet access as a critical enabler of educational transformation. However, Rohani and Yusoff (2015) highlighted that many vocational institutions, especially those in rural areas, struggle to provide adequate digital infrastructure, leaving students unprepared for the demands of Industry 4.0. This divide is not merely a technical problem but a social justice issue that hinders human capital development.

2.2 Islamic Social Finance (Waqf) as a Tool for Community Resilience

Islamic social finance offers instruments rooted in ethical and communal values to address societal needs. *Waqf*, an endowment made for religious, educational, or charitable purposes, is a prime example. Historically, *waqf* has funded the development of universities, libraries, and public infrastructure in the Islamic world (Hassan & Abd Jalil, 2019). The Ottoman

Empire, for instance, utilized *waqf* extensively to fund educational institutions, demonstrating the sustainability of this model.

In contemporary times, the concept of cash *waqf* has gained traction, allowing for collective, smaller-scale contributions to fund large-scale social projects (Ismail & Hassan, 2020). This mechanism embodies the Islamic principles of *ta'awun* (mutual cooperation) and shared responsibility for the *ummah's* (community's) welfare, making it a powerful tool for building community resilience against socio-economic challenges like the digital divide. Salleh and Ibrahim (2018) argue that *waqf*-based funding models are particularly suitable for educational institutions in Muslim-majority countries, as they align with cultural and religious values while providing sustainable financing.

2.3 Vocational Education in the Digital Era

Vocational education in Malaysia has undergone significant transformation since 2013, with increasing emphasis on technology-integrated learning (Yusuf & Abdullah, 2019). However, Mohamad and Ahmad (2017) identified that vocational colleges in rural areas face unique challenges, including limited infrastructure, difficulty attracting qualified teachers, and students' lack of exposure to digital tools. These challenges were exacerbated during the COVID-19 pandemic, when online learning became the norm (Abdullah & Bakar, 2020).

Zakaria and Zainal (2022) documented various initiatives to bridge the digital divide among B40 students in Malaysia, including device lending programs and subsidized internet plans. However, they noted that most initiatives are temporary and lack sustainability. The Waku-Pro program addresses this gap by offering a sustainable, community-funded model.

2.4 Bridging the Gap: An Interdisciplinary Approach

The challenge at Lahad Datu Vocational College required an interdisciplinary solution that transcended purely technical or pedagogical fixes. It demanded a funding model that was sustainable and rooted in community values. By integrating the educational need for internet access with the Islamic social finance mechanism of *waqf*, the Waku-Pro program pioneers a holistic, culturally resonant intervention. This approach aligns with the conference's call for "Islamic Interdisciplinary Approaches" by demonstrating how faith-based principles can be innovatively applied to solve a pressing global challenge in education.

Hashim and Yusoff (2022) emphasize that improving digital skills among vocational students requires not only infrastructure but also a supportive ecosystem involving teachers, administrators, and the community. The Waku-Pro program, by engaging all these stakeholders in a *waqf*-based initiative, creates precisely such an ecosystem.

3.0 Methodology

This study employed a qualitative case study design to provide an in-depth, contextualized analysis of the Waku-Pro program's implementation and impact. Data was collected through three primary methods:

3.1 Document Analysis

Official college records, the MQA accreditation document, program implementation reports, and the "**Laporan Projek Wakaf Unifi**" were reviewed to understand the pre-program

context, objectives, execution details, and financial data. This included analyzing the complete list of 14 Unifi installations, their locations, bandwidth specifications, costs, and contributors.

3.2 Semi-Structured Interviews

Informal interviews were conducted with key personnel, including:

- The program coordinator (Head of Infrastructure Development and Maintenance Unit)
- Teachers responsible for the 14 Unifi installation sites
- Administrators involved in the launch ceremony
- Representatives from contributing organizations (canteen operator, hostel food supplier, PIBG)

These interviews gathered insights on planning, challenges, perceived outcomes, and the sustainability of the *waqf* model.

3.3 Direct Observation

Observations were made of student internet usage patterns across the 18 newly connected campus areas (bengkel, makmal, bilik guru, asrama, kantin, pejabat am) to assess the program's reach and impact. Usage patterns, peak hours, and types of online activities were documented over a three-month period.

3.4 Program Implementation Framework

The program's implementation followed a systematic, four-phase approach known as TERLAKSANI:

1. **Teliti (Examine):** Identifying the core problem through observation and interviews, revealing the 91.8% access disparity and MQA non-compliance issues.
2. **Rancang (Plan):** Conducting discussions with stakeholders (teachers, administrators, PIBG, and external partners) to design a solution, leading to the adoption of the *waqf* model for funding Unifi installations.
3. **Laksana (Implement):** Crowdfunding through teacher contributions (RM20-RM50 monthly) and institutional partners, followed by installation of Unifi at 14 strategic locations covering 18 access points. The official launch was held on April 25, 2022.
4. **Nilai (Evaluate):** Assessing the program's impact on student access, skills, academic output, and documenting challenges for continuous improvement.

4.0 Results And Findings

4.1 Program Implementation Details

The Waku-Pro program successfully installed **14 Unifi accounts** serving **18 strategic locations** across the college campus. Table 1 presents the complete details of installations, including contributors, locations, bandwidth, and costs.

Table 1: Detailed Implementation of Waku-Pro Program

No	Contributor (Waqif)	Installation Location	Bandwidth	Quantity	Cost (RM)
1	Plant Agroindustry Program	Plant Unit 1, 2, 3	500 Mbps	3 units	747.00

2	Ruminant Agroindustry Program	Ruminant Unit	300 Mbps	1 unit	199.00
3	Poltri Agroindustry Program	Poltri Unit	500 Mbps	1 unit	249.00
4	Food Processing Program	Food Processing Teacher's Room	300 Mbps	1 unit	199.00
5	Computer Systems & Network Technology Program	Redhat Lab	500 Mbps	1 unit	249.00
6	Landscape Construction Program	Landscape Unit & Landscape Graphics Lab	100 Mbps & 300 Mbps	2 units	328.00
7	Agro Mechanization Technology Program	Agro Mechanization Unit	300 Mbps	1 unit	199.00
8	Accounting Program	Accounting Unit	500 Mbps	1 unit	249.00
9	Aquaculture Program	Aquaculture Unit	300 Mbps	1 unit	199.00
10	Hostel Catering Company	Agraria Hostel, Aspura & Aspuri	100 Mbps	2 units	258.00
11	College Canteen Company	Canteen	100 Mbps	1 unit	129.00
12	G5 Administrator KVLD	General Office	100 Mbps	1 unit	129.00
13	School Enterprise	Access Center	100 Mbps	1 unit	129.00
14	PIBG KV Lahad Datu	Danum Meeting Room	100 Mbps	1 unit	129.00
	TOTAL	18 Locations		14 Units	RM 3,362

Source: Laporan Projek Wakaf Unifi, Kolej Vokasional Lahad Datu (2022)

4.2 Launch Ceremony and Stakeholder Engagement

The program was officially launched on **April 25, 2022**, at the Danum Meeting Room, Lahad Datu Vocational College. The ceremony was attended by:

Category	Number of Attendees
Administrators	5
Teachers/Lecturers	36
Invited Guests (Unifi representatives)	4
Total Attendance	45

Source: Laporan Projek Wakaf Unifi (2022)

The launch ceremony included:

- Address by Unifi representatives on the importance of digital connectivity
- Official launch by the Director of Lahad Datu Vocational College
- Signing of acceptance agreements by workshop heads representing their programs

- Documentation through official photographs (see Appendix A)

This high level of engagement demonstrated strong stakeholder buy-in and commitment to the *waqf* model.

4.3 Impact on Digital Access

The Waku-Pro program's most significant impact was the immediate and complete elimination of the access gap. Post-implementation, **100% of students** gained the ability to use the internet for learning across 18 locations on campus. Table 2 compares pre- and post-program access.

Table 2: Comparison of Internet Access Before and After Waku-Pro Program

Indicator	Before Program	After Program
Students with personal internet access	8.2%	100% (campus-wide)
Locations with internet access	1 (Admin block)	18 (academic & support areas)
Total bandwidth available	~100 Mbps	~3.5 Gbps (across 14 connections)
Access for rural students	Severely limited	Full access
MQA compliance status	Non-compliant	Fully compliant

4.4 Impact on Digital Literacy and Academic Performance

The impact of universal access quickly cascaded into improved educational outcomes. Observations and teacher feedback indicated marked improvements:

Digital Skills Development:

- Students demonstrated increased proficiency in **Microsoft Office applications** (Word, Excel, PowerPoint)
- Ability to conduct **online research** for assignments improved significantly
- Access to **online learning platforms** (Google Classroom, YouTube tutorials, vocational e-learning portals) became routine
- Students began using **cloud storage** for assignment submission and collaboration

Academic Output:

- Quality of student assignments improved (neater, better organized, properly formatted)
- On-time submission rates increased from approximately 65% to over 90%
- Project-based learning outputs showed greater sophistication and research depth
- English language skills improved through exposure to online content

Teacher Observations:

One teacher from the Computer Systems program noted:

"Before Waku-Pro, students had to complete their research during class time or rush to the administration block during breaks. Now they can work on their projects anytime—during free periods, after class, even in the evening at the hostel. The quality of their work has improved dramatically."

4.5 Financial Sustainability of the Waqf Model

The *waqf* model proved to be financially sustainable and culturally appropriate. Key financial insights:

- **Total Investment:** RM 3,362 for initial installations
- **Contribution Range:** RM20 - RM50 monthly from teachers; lump-sum contributions from institutional partners
- **Contributor Categories:**
 - Academic programs (9 programs)
 - Commercial partners (Hostel Catering, Canteen)
 - Administrative units (G5 Administrator)
 - Community organizations (PIBG, School Enterprise)
 - Individual teachers (through pooled contributions)
- **Recurring Cost Management:** Monthly internet bills are covered through ongoing *waqf* contributions, demonstrating the model's sustainability.

This diversified funding base ensures that no single contributor bears excessive burden, embodying the Islamic principle of shared responsibility.

4.6 Challenges and Adaptive Management

The program's implementation was not without challenges. Table 3 summarizes challenges encountered and mitigation measures.

Table 3: Challenges and Mitigation Strategies

Challenge	Description	Mitigation Strategy
Internet overuse	Students spending excessive time on non-academic activities	Time-based access restrictions implemented
Inappropriate content	Access to non-educational websites	Content filtering and firewall implementation
Bandwidth competition	Peak-time congestion at popular locations	Load balancing across multiple connections
Maintenance issues	Router failures, cable damage	Regular monitoring by UPPI; quick response team
Contributor fatigue	Concern about long-term commitment	Transparent reporting; rotation of responsibility

The college's proactive, iterative approach to these challenges demonstrates a commitment to adaptive management and continuous improvement, ensuring the program's long-term positive impact is sustained.

4.7 Community and Cultural Impact

Beyond technical outcomes, the program fostered significant community and cultural impacts:

1. **Strengthened *Ta'awun* (Mutual Cooperation):** Teachers, administrators, and external partners collaborated effectively, strengthening the college community.
2. **Revitalized *Waqf* Culture:** The program reintroduced the concept of *waqf* in a contemporary context, making it accessible and relevant to modern challenges.

3. **Shared Ownership:** Contributors feel personally invested in the program's success, leading to collective responsibility for maintenance and monitoring.
4. **Model for Future Initiatives:** The success of Waku-Pro has inspired proposals for similar initiatives, including "**Wak-Lap**" (**Laptop Endowment**) to provide devices for needy students.

5.0 Discussion

5.1 Fostering Digital Resilience Through Equitable Access

The Waku-Pro program successfully transformed the college from a space of digital scarcity to one of digital abundance. This newfound access represents a form of "**digital resilience**"—providing students from rural backgrounds with the infrastructural stability needed to navigate the demands of a technology-driven curriculum. It levels the playing field, ensuring that a student's geographical origin no longer dictates their ability to participate fully in the post-digital learning environment.

This finding aligns with Van Dijk's (2020) assertion that digital resilience requires not just access, but the capacity to use technology meaningfully. By embedding internet access across all learning and living spaces, the program enables students to develop this capacity organically through consistent, contextualized use.

5.2 The Waqf Model: An Innovation in Educational Funding

The program's success is intrinsically linked to its innovative funding mechanism. By framing contributions as "**Wakaf Unifi**," the college tapped into powerful cultural and religious values. This model proved to be a resilient and sustainable alternative to relying on limited government or institutional budgets.

Comparative Advantage of Waqf Model:

Aspect	Traditional Funding	Waqf Model
Source	Government grant	Community contributions
Sustainability	One-time	Ongoing
Ownership	Institutional	Communal
Cultural resonance	Neutral	High (Islamic values)
Flexibility	Bureaucratic	Responsive
Accountability	Top-down	Collective

The collective contributions fostered a sense of shared ownership and responsibility among the staff, strengthening the college community (*ummah*) and demonstrating the practical application of Islamic social finance to solve a modern, secular challenge. This finding supports Hassan and Abd Jalil's (2019) argument that *waqf* can be effectively adapted for contemporary educational needs.

5.3 Enhancing Digital Literacy and Academic Equity

The cascade from access to improved educational outcomes confirms the findings of Norazmah and Roslan (2021) regarding the direct correlation between internet access and

academic achievement. Students who were once disadvantaged are now equipped with the digital tools necessary to compete and succeed.

Importantly, the program addressed not only the first-level digital divide (access) but also contributed to bridging the second-level divide (skills). Through regular, purposeful use of the internet for coursework, students naturally developed digital literacy skills that will serve them in higher education and employment.

5.4 Alignment with National and Islamic Educational Goals

The Waku-Pro program aligns with multiple policy frameworks:

1. **Malaysian Digital Education Policy (2020):** Supports the goal of technology-enabled learning environments.
2. **MQA Accreditation Standards:** Addresses Area 6 (Resources and Facilities) requirements.
3. **Sustainable Development Goal 4 (Quality Education):** Contributes to inclusive and equitable quality education.
4. **Maqasid al-Shariah (Objectives of Islamic Law):** Upholds the protection of intellect (*hifz al-'aql*) through education.

5.5 Scalability and Replicability

The Waku-Pro model offers valuable lessons for other institutions:

1. **Start with assessment:** Understand the specific access gaps in your context.
2. **Engage stakeholders:** Build community ownership from the outset.
3. **Frame in familiar values:** Use culturally resonant concepts like *waqf*.
4. **Document transparently:** Maintain clear records of contributions and usage.
5. **Adapt continuously:** Monitor and adjust based on feedback and challenges.
6. **Plan for expansion:** Use success as foundation for further initiatives (e.g., Wak-Lap).

6.0 Conclusion And Recommendations

6.1 Conclusion

The Waku-Pro program at Kolej Vokasional Lahad Datu stands as a compelling case study of resilience and innovation in the face of a global post-digital challenge. By creatively applying the Islamic principle of *waqf* to the pressing need for digital infrastructure, the college successfully dismantled the barriers of the rural-urban digital divide. The program's impact extends beyond mere internet access; it has fostered digital resilience, enhanced educational equity, built a stronger, more cohesive college community through the spirit of *ta'awun* (mutual cooperation), and established a sustainable funding model rooted in Islamic values.

The detailed documentation of 14 installations across 18 locations, involving diverse contributors and total investment of RM3,362, provides empirical evidence of the program's feasibility and impact. The transformation from 8.2% to 100% student access represents not just a quantitative improvement, but a qualitative shift in educational possibilities for rural students.

6.2 Recommendations

Based on the findings of this study, the following recommendations are offered:

For Lahad Datu Vocational College:

1. **Expand to Wak-Lap Program:** Launch a laptop endowment program to complement internet access, ensuring students have both connectivity and devices.
2. **Develop Digital Literacy Curriculum:** Formalize digital skills training to maximize the benefits of internet access.
3. **Strengthen Monitoring Systems:** Implement more sophisticated usage analytics to optimize bandwidth allocation.
4. **Document Best Practices:** Create a comprehensive implementation guide for sharing with other institutions.

For Other Educational Institutions:

1. **Adopt the Waqf Model:** Consider *waqf*-based funding for infrastructure needs, particularly in Muslim-majority contexts.
2. **Engage the Community:** Build broad stakeholder involvement from planning through implementation.
3. **Start Small, Scale Gradually:** Begin with strategic locations and expand based on demonstrated success.
4. **Integrate Islamic Values:** Frame initiatives in culturally resonant terms to enhance community buy-in.

For Policymakers:

1. **Recognize Waqf in Education Policy:** Formally acknowledge *waqf* as a legitimate funding mechanism for educational infrastructure.
2. **Provide Tax Incentives:** Offer tax deductions for *waqf* contributions to educational institutions.
3. **Facilitate Knowledge Sharing:** Create platforms for institutions implementing innovative *waqf* models to share experiences.

For Future Research:

1. **Longitudinal Study:** Track the long-term academic and career outcomes of students who benefited from the program.
2. **Comparative Analysis:** Compare the Waku-Pro model with other digital divide interventions in different contexts.
3. **Quantitative Impact Assessment:** Measure the precise correlation between program participation and academic performance indicators.
4. **Waqf Model Optimization:** Research optimal contribution structures and sustainability mechanisms for educational *waqf*.

7.0 References

Abdul Razaq, A., Norlidah, A., & Mohd Nazri, A. R. (2018). Digital divide among students in Malaysia: A literature review. *Journal of Curriculum & Asian Pacific Teaching*, 6(3), 1-10.

Abdullah, S., & Bakar, K. A. (2020). The role of teachers in overcoming the digital divide during the COVID-19 pandemic. *Journal of Science & Mathematics Education*, 10(2), 45-58.

Hamid, A., & Rahman, A. (2021). *Inclusive education in the digital era*. UKM Press.

Hashim, R., & Yusoff, N. (2022). Strategies to improve digital skills of vocational students. *Journal of Technical and Vocational Education*, 28(1), 33-48.

- Hassan, R., & Abd Jalil, M. I. (2019). Educational waqf: Concepts and implementation in Malaysian higher education institutions. *Journal of Fatwa Management and Research*, 14(2), 1-15.
- Ismail, A., & Hassan, R. (2020). The role of corporate waqf in the development of higher education in Malaysia. *Journal of Fatwa Management and Research*, 19(1), 45-60.
- Kolej Vokasional Lahad Datu. (2022). *Laporan Projek Wakaf Unifi*. Unit Pembangunan dan Penyelenggaraan Infrastruktur.
- Malaysian Qualification Agency. (2019). *MQA Accreditation Application Document: Area 6 – Resources and Facilities*. Kuala Lumpur: MQA.
- Ministry of Education Malaysia. (2020). *Malaysian Digital Education Policy*. Putrajaya: MOE.
- Mohamad, S., & Ahmad, S. (2017). Challenges of implementing vocational education in rural areas. *Malaysian Journal of Education*, 42(2), 101-110.
- Norazmah, M. R., & Roslan, A. (2021). The effect of internet access on student academic achievement. *Malaysian Journal of Learning and Instruction*, 18(1), 75-98.
- Rohani, M. M., & Yusoff, A. S. (2015). Level of student readiness in using technology, pedagogy, and content knowledge (TPACK) in curriculum learning in HEIs. *Proceeding of the 3rd International Conference on Artificial Intelligence and Computer Science*, Penang.
- Salleh, M. J., & Ibrahim, M. S. (2018). *Vocational education in Malaysia: Issues and challenges*. University of Malaya Press.
- Van Dijk, J. A. G. M. (2020). *The digital divide*. Polity Press.
- Warschauer, M., & Matuchniak, T. (2010). New technology and digital worlds: Analyzing evidence of equity in access, use, and outcomes. *Review of Research in Education*, 34(1), 179-225.
- Yusuf, M. A., & Abdullah, N. (2019). Transformation of vocational education in the era of the industrial revolution 4.0. *Journal of Educational Technology*, 21(2), 112-125.
- Zakaria, N., & Zainal, A. (2022). Initiatives to bridge the digital divide among B40 students. *Journal of Communication: Malaysian Journal of Communication*, 38(1), 220-235.
- This paper was prepared for submission to the 8th International Seminar in Islamic Studies (INSIS 2026), Istanbul University, Turkey, March 24-25, 2026.