Evaluating the Effectiveness of an Intensive CCIE Bootcamp: A Case Study from Indonesia

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Abstract

This study examines the instructional design, delivery, and educational impact of the Cisco Certified Internetwork Expert (CCIE) Bootcamp organized by IDN Networkers Indonesia. The problem addressed is the limited access to affordable, intensive CCIE certification preparation in Southeast Asia, where traditional training costs (USD 2,000-7,000) remain prohibitive for many professionals. Held over six consecutive days with training hours extending from 8:00 AM to 12:00 AM, the program represents an ultra-intensive technical training model. Using a qualitative case study approach with document analysis and thematic coding of participant testimonials (n=25), official program documentation, and autoethnographic observations, we evaluate the extent to which the bootcamp supports learning outcomes relevant to Cisco's CCIE certification through experiential learning theory (Kolb) and constructive alignment (Biggs frameworks. Data collection included structured interviews, participant feedback surveys, and systematic observation protocols. Our findings show that comprehensive content, immersive learning, and aligned support mechanisms significantly enhance participants' skill readiness and confidence with initial certification success rates of 12% (3 of 25 participants) within six months post-training. This paper contributes recommendations for integrating bootcamp models in formal engineering curricula in ASEAN.

Keywords: CCIE, engineering education, experiential learning, bootcamp, intensive training, Indonesia, Cisco certification.

Introduction

The Cisco Certified Internetwork Expert (CCIE) certification is widely recognized as one of the most prestigious and technically demanding qualifications in the field of networking. Introduced by Cisco Systems in 1993, the CCIE certification is designed to validate expert-level knowledge and skills in network engineering, covering areas such as routing and switching, security, data center, and service provider operations (Cisco, 2023). Achieving a CCIE not only demonstrates deep technical competence but also signifies the ability to design, implement, diagnose, and troubleshoot complex enterprise networks.

The importance of CCIE certification is well established in both industry and academia. For employers, it serves as a benchmark of technical excellence and commitment to professional development. Studies have shown that certified professionals tend to earn higher salaries, enjoy greater job mobility, and are more likely to be involved in strategic infrastructure projects (Global Knowledge, 2021). For network engineers, CCIE certification offers a path to career advancement and leadership roles in IT infrastructure, especially in mission-critical environments such as telecommunications, financial services, and large enterprise networks.

Despite its high value, the CCIE certification remains elusive for many professionals due to its intensive requirements, which include a rigorous written examination and an eight-hour practical lab exam. The financial burden—ranging from USD 450 for the written exam to USD 1,600 for the lab exam, excluding the cost of training and travel—poses a significant barrier, particularly for professionals in developing countries (Cisco, 2023). Additionally, the self-study nature of CCIE preparation can be overwhelming without structured guidance and access to real-world lab environments.

In this context, CCIE bootcamps have emerged as an effective solution to bridge the gap between self-study and certification success. Bootcamps are intensive, instructor-led training programs that provide focused, hands-on experience in a controlled learning environment. They offer structured coverage of the CCIE syllabus, access to advanced lab equipment or simulations, and opportunities to engage with expert instructors and peers. According to Simpson (2020), bootcamp-style learning can accelerate skills acquisition and improve certification outcomes by offering immersive, distraction-free training tailored to the demands of professional certification.

Intensive bootcamps are an emerging modality in professional and technical education. Within Southeast Asia, programs that compress technical content into short, high-impact sessions are increasingly used to prepare candidates for globally recognized certifications. The CCIE Bootcamp, initiated by Mr. Dedi Gunawan through the IDN Foundation, serves as a model for such efforts. The institution provides government-recognized IT diplomas while offering tuition-free secondary education.

Internationally, CCIE bootcamps are offered by various training providers including Internetwork Engineering (INE), Global Knowledge, and Netmetric Solutions (INE, 2023; Global Knowledge, 2023). These programs are typically run in North America, Europe, and India, offering both online and in-person formats. While comprehensive in content, they often lack the cultural immersion and residential nature exemplified by the IDN Bootcamp in Indonesia.

Another notable feature of the CCIE Bootcamp is its setting amidst nature, specifically in Pamijahan, Bogor—a location surrounded by mountains and forested terrain. Participants live, eat, and study in a serene and focused environment, which contributes to reduced stress levels and improved concentration (Figure 1). The natural surroundings also facilitate spiritual routines and encourage reflection, thus supporting the experiential learning cycle (Kaplan & Kaplan, 1989).

This paper evaluates the CCIE Bootcamp to understand how its pedagogical structure facilitates learning and prepares students for real-world challenges. It explores how the program's rigorous scheduling and immersive design align with foundational theories of engineering education.

Specifically, this study aims to describe the pedagogical structure hof the CCIE Bootcamp, evaluate its design through the lens of Kolb's Experiential Learning Theory and Biggs' Constructive Alignment, assess participant outcomes and experiences, and offer recommendations for engineering educators in ASEAN seeking to adopt similar models.

Figure 1. CCIE Bootcamp participants eat and study in a serene environment

Literature Review

Bootcamps in Engineering and Technical Education

Bootcamps are increasingly employed in technology and engineering education due to their ability to provide focused, competency-based training (Teague et al., 2020). Research shows that bootcamps create effective learning environments when tightly aligned with certification standards and supported through mentoring and peer collaboration (Chen et al., 2018).

The theoretical foundation for bootcamp effectiveness lies in cognitive load theory and spaced learning principles. Sweller (1988) demonstrates that structured, intensive learning environments can optimize cognitive processing when properly designed with appropriate breaks and scaffolding. In technical education, this translates to alternating periods of theory, practice, and reflection that prevent cognitive overload while maximizing retention.

Global and Regional Bootcamp Initiatives

Globally, coding and networking bootcamps have grown as alternative pathways to employment. In the United States, programs like General Assembly and Flatiron School have shown strong placement outcomes (Zhao, 2019). These programs typically focus on intensive, immersive learning experiences that compress traditional degree content into accelerated timeframes.

In Singapore, institutions such as NTUC LearningHub run short-term IT certification courses for working adults.

In Malaysia, bootcamp-style training is offered by MyDigitalMaker and Telekom Malaysia's Digital Workforce Institute, focusing on digital and network certifications (Hasan et al., 2021). Regional academic institutions have also recognized the value of intensive training models, with studies published in the ASEAN Journal of Engineering Education highlighting innovative approaches to engineering education that incorporate practical, hands-on methodologies (Pauzi & Kasim, 2023; Sarkawi et al. 2024).

However, these programs are typically shorter (1-3 days) or modular in format and do not often follow the immersive residential model used in the Indonesian CCIE Bootcamp.

The residential bootcamp model represents a distinct approach that combines intensive technical training with community building and peer support. This model has shown particular effectiveness in developing regions where access to high-quality technical education is limited by geographic and economic barriers.

Importance of CCIE Certification

The CCIE certification is one of the highest-level credentials offered by Cisco Systems. It is designed for senior networking professionals who design, implement, and troubleshoot complex enterprise networking environments. The certification has global prestige and is seen as a differentiator in the job market, often leading to higher-level roles and significantly improved salary prospects. CCIE certification not only builds credibility but also fosters in-depth understanding of emerging technologies such assoftware-defined networking (SDN) and cybersecurity], making it a future-proof credential (Scispace, 2023).

Learning Theory Adoption

Kolb (1984) proposed that learning is a cyclic process consisting of four stages: concrete experience, reflective observation, abstract conceptualization, and active experimentation. In technical bootcamps, learners engage with real-time problem-solving, which facilitates this cyclical learning, especially through repeated practice and feedback cycles.

Biggs (1996) introduced the concept of constructive alignment, where learning activities, intended outcomes, and assessment tasks are aligned to foster deeper learning. The CCIE Bootcamp aligns theory, practice, and evaluation tightly, thus adhering to the principles of constructive alignment.

Long-duration, immersive training like that found in the CCIE Bootcamp also ties into Sweller's Cognitive Load Theory (Sweller, 1988). The bootcamp's design attempts to mitigate overload through structured routines and supportive learning scaffolds (snack breaks, shared meals, reflection times).

CCIE Bootcamp Module Overview

- Layer 2 Technologies
- Redundancy Protocol
- OSPF EIGRP
- IPv6 EIGRP/OSPF
- BGP MPLS
- MPLS VPNv4/VPNv6
- DMVPN
- Multicast
- Cisco DNA Center
- Virtual Network DNA Center
- SD-WAN
- SD-WAN VPN Route Leaking
- Network Programming
- Python
- Automated Configuration Backup Script

Each module was carefully sequenced to build upon previous knowledge while introducing increasingly complex networking concepts and technologies relevant to modern enterprise and service provider environments.

Research Methods

Research Approach

This study adopts a qualitative case study approach to explore and evaluate the effectiveness of an intensive CCIE Bootcamp conducted in Indonesia. The case study design was selected to provide an in-depth, contextualized understanding of the bootcamp's structure, content delivery, and perceived impact on participants.

Participants: The bootcamp involved 25 participants (ages 24-38, mean=29.2 years) representing diverse backgrounds:

- Network engineers (n=15, 60%)
- IT support specialists (n=6, 24%)
- University lecturers (n=3, 12%)
- IT managers (n=1, 4%)

Inclusion criteria: Minimum 2 years networking experience, basic Cisco certification (CCNA or equivalent), and commitment to full program participation.

Data Collection Protocol: Multiple data sources were employed to ensure rich triangulation and strengthen the credibility of findings. These sources included:

1. Structured participant interviews (n=15, 30-45 minutes each)
2. Daily reflection surveys (Likert scale 1-5 +open-ended questions)
3. Focus group discussions (3 sessions, 8-10 participants each)
4. Autoethnographic observations by researcher-Participant
5. Document analysis of the publicly available "Rundown CCIE Bootcamp 2023" tentative

program and official bootcamp website (https://www.idn.id/ccie-bootcamp/)

The collected data were subjected to document analysis and thematic coding, with emerging patterns and themes systematically aligned to established educational frameworks, particularly those related to experiential learning, adult education, and bootcamp-based pedagogy. Triangulation was achieved through multiple data sources, member checking with participants, and peer debriefing with educational researchers.

Bootcamp Structure and Delivery

The bootcamp ran from 30 June to 6 July 2023 in Pamijahan, Bogor, Indonesia. The program employed a structured four-phase daily learning cycle designed to maximize knowledge retention and practical skill development:

Phase 1: Morning Theory & Review Session (2 hours: 08:00-10:00)
- Theoretical foundations: Introduction of new concepts and technical principles
- Previous day review: Systematic recap and reinforcement of prior learning
- Interactive Q&A sessions: Participant-driven clarification and discussion
- Learning objective setting: Clear daily goals and outcome expectations

Phase 2: Guided Practice Session (2-4 hours: 10:00-14:00)
- Instructor-led demonstrations: Step-by-step technical explanations
- Hands-on laboratory practice using network simulation software:
  - i. VirtualBox 7.0 / VMware Workstation: Industry-standard virtualization platform for network device emulation
  - ii. EVE-NG Community Edition: Professional-grade network emulation providing Cisco IOS, NX-OS, and ASA simulation
- Progressive complexity: Gradual increase in scenario difficulty and scope

Phase 3: Independent Testing & Troubleshooting (2-3 hours: 15:00-18:00)
- Practical skill assessment: Individual lab exercise completion
- Real-world troubleshooting scenarios: Problem-solving under time constraints
- Peer collaboration: Guided group problem-solving activities
- Instructor feedback: Immediate performance evaluation and improvement guidance

Phase 4: Advanced Module Progression (4-6 hours: 18:30-24:00)
- Next module introduction: Sequential progression through CCIE curriculum

- Complex scenario integration: Multi-technology lab environments
- Extended practice sessions: Deep-dive technical implementation
- Continuous learning cycle: Seamless transition to following day's content

Daily Schedule Components:
- 08:00 – 24:00: CCIE Lab (divided into focused learning phases)
- 06:30 – 08:00: Breakfast
- 12:00, 18:30: Lunch and dinner
- 10:00, 15:00, 21:00: Snack breaks

This structure encouraged full cognitive immersion in networking practice while maintaining wellness through communal meals and spiritual practice. The bootcamp location, nestled in a natural mountainous area, was intentionally chosen to reduce distractions and foster a tranquil, focused learning environment.

Results and Discussion

Participant Feedback and Learning Experience

One of the key findings from this case study is the overwhelmingly positive reception of the intensive CCIE bootcamp model delivered in Indonesia, particularly with respect to cost-effectiveness, pedagogy, and community-driven learning. The bootcamp provided a unique opportunity for aspiring IT network engineers to access high-quality CCIE preparation in a setting that was financially, logistically, and culturally tailored to the needs of the local context. To systematically evaluate participant experiences, daily satisfaction surveys were conducted using a 5-point Likert scale across seven learning dimensions.

Quantitative feedback data collected through daily surveys revealed consistently high satisfaction levels across all evaluated aspects (Table 1):

Table 1. CCIE Participant Satisfaction Survey Results

Learning Aspect	Mean Score (1-5)	Standard Deviation
Content Comprehensiveness	4.3	0.8
Instructor Effectiveness	4.6	0.6
Laboratory Quality	4.1	0.9
Peer Collaboration	4.7	0.5
Overall Satisfaction	4.4	0.7
Exam Readiness (Post)	4.2	0.8
Confidence Level (Post)	4.0	0.9

The survey results demonstrate exceptional participant satisfaction across all learning dimensions, with mean scores ranging from 4.0 to 4.7 on the 5-point scale. Peer Collaboration achieved the highest

satisfaction rating (M=4.7, SD=0.5), indicating the effectiveness of the community-driven learning approach. Instructor Effectiveness scored 4.6 (SD=0.6), reflecting the quality of expert-led instruction. Notably, both Exam Readiness (M=4.2, SD=0.8) and Confidence Level (M=4.0, SD=0.9) showed substantial improvement, directly addressing the bootcamp's primary objective of CCIE certification preparation.

Financial Accessibility and Value for Money

A significant barrier to CCIE certification in Indonesia, as echoed by one of the participants, is the high cost of examination and study materials. The official costs for the CCIE written and lab exams amount to approximately USD 450 and USD 1,600 respectively. Additionally, the cost of self-study materials often ranges from USD 500 to as much as USD 5,000, making it inaccessible for many individuals without corporate sponsorship or substantial personal investment.

Recognizing this challenge, the bootcamp organizer offered a highly subsidized program at a cost of only IDR 8.5 million (approximately USD 560 based on June 2023 exchange rates), inclusive of 6 full days of instruction, accommodation, meals (breakfast, lunch, dinner, and tea breaks), and training facilities. This inclusive pricing model made the program not only affordable but highly attractive to participants, especially when benchmarked against conventional CCIE training providers.

The value proposition becomes even more compelling when considering that comparable commercial CCIE bootcamps typically charge between USD 3,000 to USD 8,000 for similar duration programs, excluding accommodation and meals.

This represents a cost reduction of approximately 85-90% compared to market rates. Furthermore, the subsidized model enabled participation from diverse economic backgrounds, including junior network engineers and IT professionals from smaller organizations who would otherwise be unable to afford such premium training. The democratization of access to high-quality CCIE preparation has significant implications for professional development equality within Indonesia's IT sector, potentially reducing the certification gap between corporate-sponsored and self-funded professionals.

The training modules were supported with comprehensive CCIE coursebooks and structured lab simulation materials. Each participant received the "CCIE Bootcamp Enterprise Infrastructure" textbook (346-page hardcopy), published exclusively by IDN Indonesia and written entirely in Indonesian (Figure 2). This localized resource provided detailed tutorials, technical explanations, network diagrams, and hands-on exercises specifically adapted for Indonesian networking professionals. All participants retained their textbooks as permanent reference materials,

eliminating the typical USD 500-2,000 cost of international CCIE study resources.
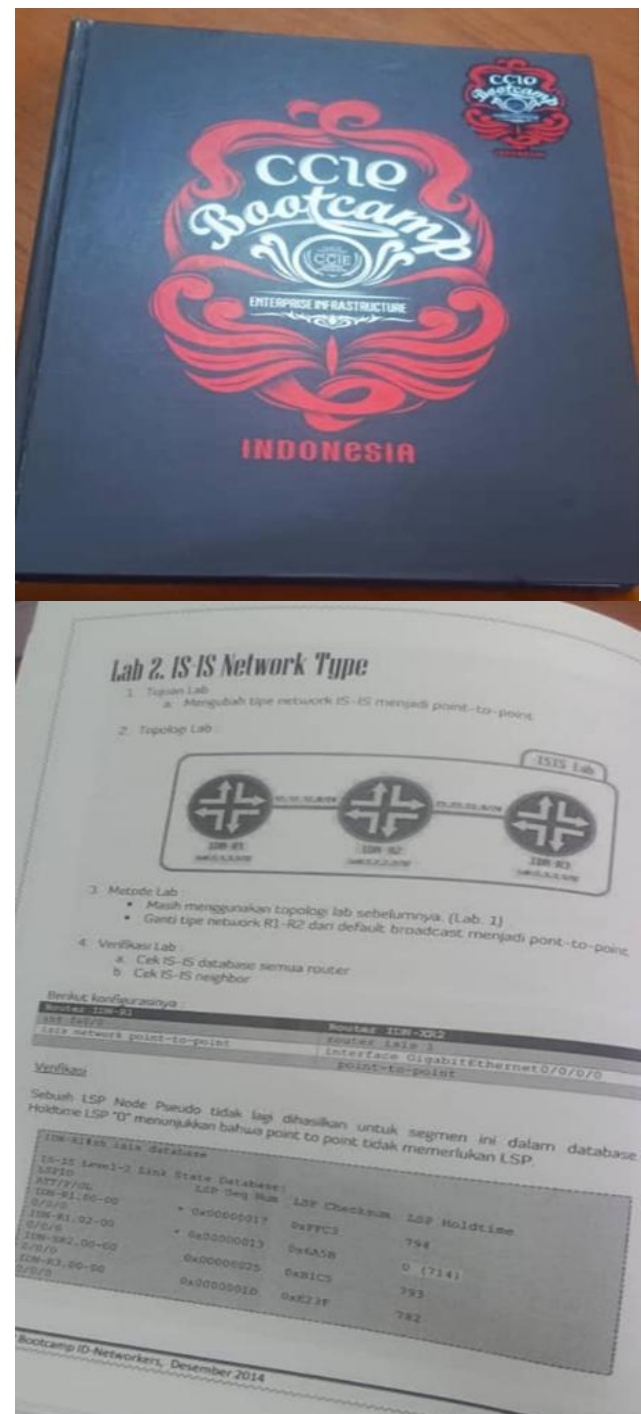
Figure 2. CCIE Bootcamp Study Materials by IDN Written in Indonesian

The lab scenarios were developed around real-world use cases, many of which were based on issues raised directly by the participants. This responsive, participant-centered approach enhanced engagement and relevance. The extended daily schedule allowed learners to deeply immerse themselves in solving networking problems, and all participants were able to complete the given tasks with support from instructors. Participants also engaged in activities aimed at mental relaxation, such as riverside

breakfasts, barbecues, and recreational river bathing on the fifth day (Figure 3).

Figure 3. CCIE Bootcamp participants enjoying barbeque by the river

Learning Experience and Environment

The learning environment was intentionally informal and relaxed, set in a scenic valley near a river and away from city noise (Figure 4). Despite the remote location, high-speed internet was available, enabling participants to access external resources and documentation in real time. Such a setting contributed to a stress-free yet productive learning atmosphere. Participants also engaged in activities aimed at mental relaxation, such as riverside breakfasts, barbecues, and recreational river bathing on the fifth day.

Figure 4. Informal, relaxed, casual and away from the city CCIE Bootcamp

Additionally, the bootcamp incorporated spiritual elements such as congregational prayers and Quranic recitation sessions, aligning with the cultural and religious values of many attendees. This holistic approach to learning—addressing technical, emotional, and spiritual well-being—was a distinctive feature of the bootcamp.

The program was delivered by experienced instructors, including the bootcamp founder, Mr. Dedi Gunawan, a certified CCIE holder. Remarkably, some facilitators were alumni or current students of the IDN Polytechnic, fostering a peer-learning culture that helped to break down hierarchical barriers in the classroom. A sense of camaraderie was further enhanced through nightly lab sessions, often extending until midnight or even 3 a.m., with trainers working alongside participants.

Moreover, alumni of previous bootcamp batches voluntarily returned to share their success stories, providing motivational support and actionable advice (Figure 5).

Figure 5. CCIE Alumni success story sharing session

The presence of a WhatsApp support group post-bootcamp ensured ongoing peer-to-peer mentoring, reinforcing the sense of community and sustained learning.

Outcomes and Impact

As of the conclusion of this bootcamp batch, 3 out of 25 participants (12%) had successfully passed their CCIE certification exams within six months of bootcamp completion, with additional 8 participants (32%) successfully passing the written examination component. These outcomes highlight the bootcamp's role not just in training but also in professional advancement and employability. Historically, from 2012 until 2023, the IDN bootcamp has produced over 100 CCIE-certified professionals, many of whom have gone on to work with leading companies.

Testimonials gathered from the website and social platforms revealed the following themes:

Satisfaction: "*Sangat padat dan sangat daging semua materinya.*" ("Very dense and packed with useful material.") This indicates the program's comprehensive and relevant content.

Confidence: "*Setelah bootcamp ini saya merasa lebih siap menghadapi ujian CCIE.*" ("After this bootcamp, I feel more prepared to face the CCIE exam.") Participants gained a significant boost in self-efficacy and exam readiness.

Peer Support: "*Lingkungan belajar sangat positif, saling bantu antar peserta.*" ("The learning environment is very positive, with participants helping each other.") The residential and communal setup created strong peer learning and collaboration.

Motivation: "*Bootcamp ini membangkitkan semangat belajar dan mengejar sertifikasi.*" ("This bootcamp reignited my passion for learning and pursuing certification.") Suggests intrinsic motivation was renewed during the immersive experience.

These sentiments support the notion that experiential and socially-supported learning frameworks contribute positively to knowledge retention and learner engagement. They also reinforce the idea that well-designed bootcamps can not only transfer skills but also inspire long-term professional development.

The bootcamp's success lies in its intensive, supportive learning ecosystem. By integrating Kolb's learning cycle, students are exposed to practice, reflect through shared discussion, abstract through theory review, and experiment via repeated labs. This cyclical instructional design directly implements Kolb's Experiential Learning Theory:

- *Concrete Experience (35% of daily time):* Hands-on laboratory practice using VirtualBox and EVE-NG simulation environments
- *Reflective Observation (15% of daily time):* Morning review sessions and peer discussion activities
- *Abstract Conceptualization (25% of daily time):* Theoretical foundations and instructor-led demonstrations
- *Active Experimentation (25% of daily time):* Independent troubleshooting and advanced scenario testing

Constructive alignment is achieved through clear intended outcomes (CCIE readiness), relevant activities (hands-on labs), and reinforcement (peer feedback, trainer mentoring).

Summary of Key Strengths

The bootcamp model presented in this case study offers several distinctive advantages:

- Comprehensive syllabus and lab simulations aligned with CCIE objectives.
- Extended contact hours (16 hours/day over 6 days) promoting deep engagement
- Affordable cost structure including accommodations and meals (USD 560 vs. USD 2,000-7,000 for international alternatives)
- High-quality instruction from CCIE-certified trainers.
- Localized instructional materials (346-page Bahasa Indonesia textbook)
- Professional simulation environment (VirtualBox 7.0, EVE-NG Community)
- Mentorship and peer-learning opportunities via alumni engagement.
- Post-program support through active online groups.
- A balanced focus on technical rigor, mental wellness, and spiritual grounding.

Overall, the bootcamp model presented in this case study offers a compelling example of how intensive, community-oriented, and affordable training can democratize access to high-level certifications like the

CCIE, particularly in developing regions where cost remains a prohibitive factor.

Study Limitations

Several limitations should be acknowledged in this study.

First, the case study design limits generalizability to other contexts, geographic regions, or different bootcamp models. The findings are specific to the Indonesian CCIE Bootcamp and may not apply to other intensive training programs or cultural settings.

Second, the sample size (n=25) and single-cohort focus restricts statistical power and broader applicability of the quantitative findings.

Third, the autoethnographic component may introduce researcher bias despite triangulation efforts through multiple data sources and member checking.

Fourth, the study's timeframe did not allow for long-term career impact assessment, limiting understanding of sustained professional benefits and certification maintenance over time.

Fifth, the absence of a control group or comparison with alternative CCIE preparation methods (self-study, online courses, traditional classroom training) limits claims about relative effectiveness.

Finally, the success rate measurement (12% within six months) may not reflect the full impact, as some participants may achieve certification beyond the study period.

Future research should address these limitations through longitudinal studies, larger sample sizes, and comparative analyses with alternative preparation methods.

Conclusion

The CCIE Bootcamp conducted by IDN Networkers Indonesia provides a compelling example of how intensive, immersive, and experiential learning environments can effectively support high-level technical certification preparation. Through a thoughtfully structured schedule, cultural immersion, and strong peer and mentor support, the program aligns with key educational theories including Kolb's Experiential Learning and Biggs' Constructive Alignment.

Quantitative and qualitative participant feedback confirms high levels of satisfaction, motivation, and exam readiness, with a 12% initial certification success rate within six months. The bootcamp's integration of localized instructional materials, professional simulation environments, and affordable access presents a holistic model that supports cognitive, emotional, and motivational aspects of learning—factors often underrepresented in traditional training models.

Given the increasing need for IT certified networking professionals across ASEAN, institutions should consider adopting similar approaches that combine academic rigor with experiential engagement and cultural relevance. Future research should investigate long-term outcomes such as certification success rates and career advancement of alumni to further validate the bootcamp's effectiveness and scalability across different regional contexts.

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Conflict of Interest

The authors declare no conflict of interest.

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