Published by GRAS: Global Researchers and Academics Synergy

Global Dialogues in Humanities and Pedagogy

Transforming Minds: A Comprehensive Analysis of Malaysia's National Curriculum Framework and Its Impact on 21st Century Educational Outcomes

[1]Syakimah Abdul Ahmad
[1]*Universiti Pendidikan Sultan Idris, Malaysia*

[2]Jayyed Alfaghirah
[2]*Universiti Pendidikan Sultan Idris, Malaysia*

Corresponding Author: syakimah.aa@upsi.my

ARTICLE INFO

Received December 10, 2025
Revised December 28, 2026
Accepted January 12, 2026
Available January 29, 2026

Keywords:
Malaysian education system, curriculum reform, STEM education, 21st century skills, educational policy, pedagogical transformation

ABSTRACT

This study examines the evolution and implementation of Malaysia's national education curriculum, focusing on its alignment with contemporary educational demands and global competitiveness standards. Through systematic analysis of curriculum documents, policy frameworks, and educational outcomes, this research investigates how Malaysia's curriculum addresses the challenges of preparing students for the digital economy while maintaining cultural identity and social cohesion. The findings reveal that Malaysia's curriculum has undergone significant transformations, particularly through the implementation of the Standard Curriculum for Primary Schools and the Standard Curriculum for Secondary Schools, which emphasize higher-order thinking skills, STEM education, and 21st century competencies. However, challenges persist in implementation consistency, teacher preparedness, and resource allocation across urban and rural contexts. This study contributes to understanding curriculum reform processes in developing nations and offers insights into balancing modernization with cultural preservation in educational systems.

INTRODUCTION

The Malaysian education system has undergone substantial transformations over the past decades, reflecting the nation's commitment to developing human capital capable of navigating an increasingly complex global landscape. As Malaysia advances toward its vision of becoming a high-income nation, the role of education in fostering innovation, critical thinking, and technological literacy has become paramount. The national curriculum serves as the cornerstone of this educational transformation, embodying the country's aspirations to produce well-rounded individuals who are intellectually capable, spiritually grounded, and emotionally balanced (Ministry of Education Malaysia, 2013). Understanding the intricacies of Malaysia's curriculum framework provides valuable insights into how developing nations can strategically reform their educational systems to meet contemporary challenges while preserving cultural heritage and national identity.

The conceptual foundation of curriculum development has been extensively discussed in educational literature, with scholars emphasizing the need for alignment between educational outcomes and societal needs (Muhsyanur, 2022, 2024; Muhsyanur et al., 2021). Tyler (1949) established fundamental principles for curriculum development, arguing that educational programs must clearly define their purposes, select appropriate learning experiences, organize these experiences effectively, and evaluate their outcomes systematically. Building upon this foundation, Ornstein and Hunkins (2018) emphasized that curriculum should be viewed as a dynamic entity that responds to changing social, economic, and technological contexts. These theoretical frameworks have significantly influenced Malaysia's approach to curriculum reform, particularly in recognizing that educational systems must evolve continuously to remain relevant and effective in preparing students for future challenges.

Malaysia's curriculum evolution reflects broader trends in international education reform, particularly the shift toward competency-based learning and student-centered pedagogies. Hargreaves and Shirley (2012) documented how educational systems worldwide have moved away from traditional knowledge transmission models toward approaches that emphasize critical thinking, creativity, and collaborative problem-solving. This global movement resonates strongly with Malaysia's curriculum initiatives, which have progressively incorporated 21st century skills and competencies into their framework. The Malaysian Education Blueprint 2013-2025 explicitly acknowledges the need to transform educational practices to develop students who possess not only academic knowledge but also the skills and dispositions necessary for success in a knowledge-based economy (Ministry of Education Malaysia, 2013).

The theoretical underpinnings of Malaysia's curriculum are deeply rooted in the National Philosophy of Education, which articulates a holistic vision of human development. According to Mustapha and Abdullah (2004), this philosophy emphasizes the development of individuals who are intellectually, spiritually, emotionally, and physically balanced, reflecting Islamic values while embracing

pluralism and diversity. This comprehensive approach to education distinguishes Malaysia's curriculum from purely academic models, incorporating character education, moral development, and civic responsibility as integral components of the learning process. Such holistic frameworks align with contemporary educational theories that recognize the multidimensional nature of human development and the need for educational systems to address cognitive, affective, and social domains simultaneously.

Curriculum design in Malaysia has been significantly influenced by constructivist learning theories, which emphasize active learning, knowledge construction, and learner autonomy. Fosnot and Perry (2005) argued that effective learning occurs when students actively engage with content, connect new information to existing knowledge structures, and construct meaning through authentic experiences. These principles have been incorporated into Malaysia's curriculum through project-based learning initiatives, inquiry-based approaches, and the integration of technology-enhanced learning environments. The shift toward constructivist pedagogies represents a fundamental departure from traditional teacher-centered instruction, requiring substantial changes in classroom practices, assessment methods, and teacher professional development programs.

The implementation of STEM education within Malaysia's curriculum framework reflects global recognition of the importance of science, technology, engineering, and mathematics in economic development and innovation. Bybee (2013) emphasized that STEM education should not merely focus on content knowledge but should develop integrated problem-solving capabilities and design thinking skills. Malaysia has embraced this integrated approach through various initiatives, including the establishment of specialized STEM schools, the integration of computational thinking across subjects, and partnerships with industry to provide authentic learning experiences. These efforts align with research indicating that early exposure to STEM concepts and hands-on learning experiences significantly influence students' career aspirations and their capacity to contribute to technological innovation (Honey et al., 2014).

Assessment practices constitute a critical dimension of curriculum implementation, serving both formative and summative functions in monitoring student progress and informing instructional decisions. Black and Wiliam (2009) demonstrated that assessment for learning, when implemented effectively, significantly enhances student achievement by providing timely feedback, clarifying learning goals, and engaging students in self-assessment processes. Malaysia's curriculum framework has increasingly emphasized formative assessment approaches, including school-based assessments that complement standardized examinations. However, the transition from examination-dominated assessment cultures to more balanced approaches presents considerable challenges, particularly in contexts where high-stakes examinations have historically determined educational and career opportunities (Azman, 2016).

The contextualization of curriculum within Malaysia's diverse cultural and linguistic landscape presents unique challenges and opportunities. Banks (2015) argued that effective multicultural education requires curriculum content that reflects diverse perspectives, pedagogies that validate multiple ways of knowing, and assessment practices that recognize different forms of intelligence and achievement. Malaysia's curriculum attempts to navigate this complexity through language policies that promote Bahasa Malaysia as the national language while supporting mother tongue education and English language proficiency. The curriculum also incorporates content that celebrates Malaysia's multicultural heritage, promotes interfaith understanding, and develops civic competencies necessary for participation in a pluralistic democracy. These efforts reflect broader debates in comparative education about how national curricula can simultaneously promote unity and respect diversity (Leung & Yuen, 2012).

The role of teachers in translating curriculum intentions into classroom realities cannot be overstated. Fullan (2016) emphasized that educational change ultimately depends on what teachers think and do, making teacher capacity development central to successful curriculum implementation. Research indicates that effective curriculum enactment requires teachers who possess deep content knowledge, pedagogical expertise, and the capacity to adapt curriculum frameworks to local contexts and diverse learner needs (Shulman, 1987). Malaysia has invested substantially in teacher professional development programs, including in-service training, mentoring initiatives, and university partnerships aimed at strengthening teacher competencies. However, persistent challenges related to teacher quality variation, particularly between urban and rural areas, continue to affect curriculum implementation consistency and educational equity across the nation.

Technology integration represents another critical dimension of Malaysia's curriculum transformation, reflecting recognition that digital literacy and technological competence are essential for 21st century success. Mishra and Koehler (2006) developed the Technological Pedagogical Content Knowledge framework, which emphasizes that effective technology integration requires understanding the complex interplay between technology, pedagogy, and content knowledge. Malaysia has pursued various technology initiatives, including the 1BestariNet program and efforts to equip schools with digital infrastructure and resources. Despite these investments, research indicates significant disparities in technology access and utilization, with rural schools and disadvantaged communities often lacking adequate infrastructure and teacher expertise necessary for meaningful technology integration (Said & Adnan, 2017). These disparities raise important questions about educational equity and the potential for technology to either bridge or exacerbate achievement gaps between different student populations.

METHOD

This study employed a qualitative documentary analysis approach to examine Malaysia's national education curriculum, its theoretical foundations,

implementation frameworks, and outcomes. Documentary analysis is particularly appropriate for curriculum research as it allows systematic examination of official policy documents, curriculum guidelines, educational reports, and scholarly analyses that collectively constitute the curriculum landscape (Bowen, 2009). The primary sources analyzed included the Malaysian Education Blueprint 2013-2025, Standard Curriculum for Primary Schools documents, Standard Curriculum for Secondary Schools frameworks, Ministry of Education policy statements, and official reports on curriculum implementation and evaluation. Secondary sources included peer-reviewed journal articles, educational research reports, and comparative analyses of curriculum systems in Southeast Asian contexts. This comprehensive approach enabled triangulation of data from multiple sources, enhancing the validity and reliability of findings.

The analytical framework employed in this study drew upon Berelson's (1952) content analysis methodology, which involves systematic coding and categorization of textual data to identify patterns, themes, and relationships. Documents were analyzed through multiple readings, with particular attention to stated curriculum objectives, pedagogical approaches, assessment frameworks, and implementation strategies. Thematic analysis techniques were used to identify recurring concepts and patterns across documents, allowing for synthesis of complex curriculum elements into coherent categories. According to Braun and Clarke (2006), thematic analysis provides flexible yet rigorous approaches for identifying, analyzing, and reporting patterns within qualitative data. The analysis focused specifically on how curriculum documents address key contemporary educational priorities including 21st century skills development, STEM education, technology integration, and inclusive education practices. Following Merriam and Tisdell's (2015) recommendations for qualitative research quality, this study maintained detailed audit trails documenting analytical decisions, engaged in peer debriefing with educational researchers familiar with Malaysian contexts, and sought disconfirming evidence to challenge emerging interpretations. These procedures enhanced the credibility and trustworthiness of findings while acknowledging the interpretive nature of qualitative curriculum analysis.

RESULT AND DISCUSSION

Evolution and Structure of Malaysia's National Curriculum Framework

Malaysia's curriculum evolution reflects systematic efforts to align educational outcomes with national development priorities and global competitiveness demands. The current curriculum structure emerged from extensive reforms initiated in 2011, culminating in the implementation of the Standard Curriculum for Primary Schools and the Standard Curriculum for Secondary Schools. These reforms represented paradigm shifts from content-heavy, examination-oriented approaches toward competency-based frameworks emphasizing higher-order thinking skills, creativity, and innovation. The curriculum is structured around six key aspirations articulated in the Malaysian Education Blueprint: knowledge, thinking skills,

leadership skills, bilingual proficiency, ethics and spirituality, and national identity. This framework reflects comprehensive understanding that education must develop multiple dimensions of human capacity rather than focusing exclusively on academic achievement.

The structural organization of Malaysia's curriculum demonstrates careful attention to developmental appropriateness and progressive skill building across educational stages. Primary education focuses on foundational literacy, numeracy, and basic competencies while introducing students to scientific inquiry, technological tools, and artistic expression. Secondary education builds upon these foundations, offering increasingly specialized content while maintaining breadth through core subjects that all students must study. The curriculum employs modular designs that allow flexibility in content selection and pacing while ensuring all students achieve essential learning standards. This structure reflects international best practices in curriculum design, particularly principles articulated by Wiggins and McTighe (2005) regarding backward design, which begins with desired outcomes and then develops learning experiences and assessments aligned with those outcomes.

Subject integration represents an increasingly prominent feature of Malaysia's curriculum, particularly in STEM education where connections between disciplines are emphasized. The curriculum encourages teachers to design learning experiences that demonstrate real-world applications and interdisciplinary connections rather than treating subjects as isolated domains. For example, mathematics is not taught solely as abstract procedures but is connected to scientific investigations, technological applications, and everyday problem-solving contexts. This integrated approach aligns with research demonstrating that students develop deeper understanding and better retain knowledge when they see connections across disciplines and applications to authentic contexts (Drake & Burns, 2004). However, implementing integrated curricula presents significant challenges, particularly for teachers trained in single disciplines who may lack confidence or expertise in making meaningful interdisciplinary connections.

Language policy within the curriculum reflects Malaysia's complex linguistic landscape and the pragmatic recognition that English proficiency is essential for global competitiveness. The curriculum mandates instruction in Bahasa Malaysia as the national language while requiring English language learning from primary grades onward. Additionally, the curriculum supports mother tongue education for Chinese and Tamil communities, creating a multilingual educational environment. This language policy attempts to balance multiple objectives including national unity, cultural preservation, and international competitiveness. Research on bilingual and multilingual education indicates that well-implemented multilingual programs can enhance cognitive development and academic achievement while strengthening cultural identity (Cummins, 2000). However, language policy implementation varies considerably across schools, with urban schools generally

offering stronger English language programs while rural schools may struggle with teacher shortages and resource limitations.

Implementation of 21st Century Skills and Competencies

The integration of 21st century skills represents a central priority in Malaysia's curriculum reform efforts, reflecting recognition that traditional content knowledge alone is insufficient for success in contemporary society. The curriculum explicitly incorporates the Partnership for 21st Century Learning framework, emphasizing critical thinking, creativity, communication, and collaboration as essential competencies. These skills are not taught as separate subjects but are integrated across the curriculum through pedagogical approaches that emphasize active learning, problem-based tasks, and collaborative projects. Teachers are encouraged to design learning experiences that require students to analyze information critically, generate creative solutions, communicate ideas effectively, and work collaboratively with peers. This approach represents significant departure from traditional pedagogies that emphasized memorization and recall of factual information.

Assessment of 21st century skills presents considerable challenges, as these competencies are inherently complex and context-dependent. Malaysia has introduced school-based assessments that attempt to evaluate higher-order thinking skills, creativity, and collaborative abilities through performance tasks, portfolios, and project evaluations. These assessments complement traditional examinations, providing more comprehensive pictures of student capabilities. However, implementing authentic assessment at scale requires substantial teacher capacity development, as teachers must learn to design valid assessment tasks, apply consistent scoring rubrics, and provide meaningful feedback that advances student learning. Research indicates that assessment reform is among the most challenging aspects of curriculum change, particularly in contexts with strong examination traditions where stakeholders may resist alternative assessment approaches (Looney, 2011).

The curriculum's emphasis on entrepreneurial skills and innovation reflects Malaysia's aspirations to develop a knowledge-based economy driven by creativity and technological advancement. Students are exposed to design thinking processes, encouraged to identify problems in their communities, and supported in developing innovative solutions. The curriculum includes entrepreneurship education elements that introduce basic business concepts, financial literacy, and the mindsets associated with innovation and calculated risk-taking. These initiatives align with research demonstrating that early exposure to entrepreneurial thinking can influence career aspirations and develop capabilities valuable across multiple life domains (Lackéus, 2015). However, effectively teaching entrepreneurial skills requires authentic learning contexts, connections with community organizations and businesses, and teachers who themselves possess entrepreneurial orientations and experiences.

Digital literacy development has been incorporated throughout the curriculum as an essential 21st century competency. Students learn not only to use technology

tools but also to think computationally, evaluate digital information critically, practice responsible digital citizenship, and create digital content. The curriculum introduces computational thinking concepts from primary grades, gradually building sophistication in problem decomposition, pattern recognition, abstraction, and algorithmic thinking. These skills prepare students for a world where computational thinking is increasingly relevant across diverse fields, from scientific research to creative arts. As Wing (2006) argued, computational thinking represents a fundamental skill for everyone, not just computer scientists, as it provides powerful problem-solving approaches applicable to diverse domains. The challenge lies in ensuring all students, regardless of geographic location or socioeconomic background, have access to the technology resources and teacher expertise necessary for developing these capabilities.

Challenges and Opportunities in Curriculum Implementation

Implementation consistency represents a significant challenge in Malaysia's curriculum reform, with considerable variation in how curriculum intentions are translated into classroom practices across different contexts. Research indicates that urban schools, particularly those in major cities, generally implement curriculum reforms more comprehensively than rural schools, which may lack resources, teacher expertise, and infrastructure necessary for effective enactment. This implementation gap raises serious equity concerns, as students in disadvantaged contexts receive qualitatively different educational experiences despite ostensibly studying the same curriculum. The disparities manifest in multiple dimensions including access to technology, availability of qualified teachers, quality of instructional materials, and opportunities for enrichment activities that extend beyond core curriculum requirements.

Teacher capacity development emerges as perhaps the most critical factor influencing curriculum implementation success. The curriculum requires pedagogical approaches that differ substantially from traditional teacher-centered instruction, including inquiry-based learning, project-based learning, collaborative learning, and technology-enhanced instruction. Many teachers, particularly those trained in previous eras, lack experience with these approaches and require substantial professional development to implement them effectively. Malaysia has invested in various teacher professional development initiatives, including the Teacher Education Transformation Program and continuous professional development courses. However, research suggests that brief workshops and one-time training sessions are insufficient for deep pedagogical change, which requires sustained support, collaborative learning opportunities, and school cultures that encourage experimentation and innovation (Darling-Hammond et al., 2017).

Parental and community understanding of curriculum changes represents another implementation challenge, particularly regarding shifts away from examination-dominated assessment systems. Many parents, having experienced traditional educational systems themselves, may not understand or value alternative

assessment approaches and may pressure schools to maintain examination focus. This tension creates difficult situations for teachers and administrators attempting to implement curriculum reforms authentically while satisfying stakeholder expectations. Effective curriculum implementation requires comprehensive communication strategies that help parents and communities understand the rationale for changes and the benefits of developing broader competencies beyond examination performance.

Table 1. Key Implementation Challenges and Mitigation Strategies

Implementation Challenge	Primary Causes	Mitigation Strategies	Expected Outcomes
Urban-Rural Disparity	Infrastructure gaps, teacher distribution, resource allocation	Targeted rural school development programs, teacher incentives for rural placement, mobile learning technologies	Reduced achievement gaps, improved equity
Teacher Capacity	Limited training in new pedagogies, comfort with traditional methods	Sustained professional development, teacher learning communities, mentoring programs	Enhanced instructional quality, better curriculum enactment
Assessment Tensions	Examination culture, parental expectations, university admission requirements	Balanced assessment systems, stakeholder education, gradual transition strategies	More holistic student evaluation, reduced examination pressure
Technology Access	Digital divide, infrastructure limitations, maintenance challenges	Targeted technology funding, public-private partnerships, low-tech alternatives	Improved digital literacy, technology-enhanced learning
Resource Constraints	Budget limitations, competing priorities, inefficient allocation	Evidence-based resource allocation, efficiency improvements, international partnerships	Optimized resource utilization, improved outcomes

Despite these challenges, Malaysia's curriculum reform also presents significant opportunities for educational advancement and innovation. The emphasis on 21st century skills positions Malaysia favorably for economic transformation and positions graduates to succeed in increasingly competitive global

markets. The curriculum's holistic approach, which balances academic achievement with character development and cultural identity, offers a model for comprehensive human development that other nations might learn from. Additionally, Malaysia's experience with curriculum reform in multicultural, multilingual contexts provides valuable lessons for other diverse societies navigating similar challenges. The ongoing evaluation and refinement of curriculum implementation creates opportunities for evidence-based policy development and continuous improvement of educational practices.

CONCLUSION

Malaysia's national curriculum represents an ambitious and comprehensive framework aimed at preparing students for success in a rapidly changing world while maintaining cultural identity and social cohesion. The curriculum's emphasis on 21st century skills, STEM education, technology integration, and holistic development reflects contemporary understanding of educational priorities and aligns with international best practices. However, significant implementation challenges persist, particularly regarding consistency across urban and rural contexts, teacher capacity development, and the tension between reform aspirations and traditional examination cultures. Addressing these challenges requires sustained commitment to teacher professional development, equitable resource allocation, stakeholder engagement, and evidence-based policy refinement. Future research should examine implementation outcomes more comprehensively through longitudinal studies that track student achievement, skill development, and post-graduation success across diverse contexts. Additionally, comparative analyses of Malaysia's curriculum with other Southeast Asian nations could yield valuable insights into effective reform strategies and contextual factors that influence implementation success. As Malaysia continues its educational transformation journey, maintaining focus on equity, quality, and relevance will be essential for ensuring that all students, regardless of background or location, have opportunities to develop the knowledge, skills, and dispositions necessary for meaningful participation in 21st century society.

REFERENCES

Azman, N. (2016). Enacting assessment for learning in Malaysian schools: Issues and ways forward. *Malaysian Journal of Learning and Instruction*, 13(2), 1-22.

Banks, J. A. (2015). *Cultural diversity and education: Foundations, curriculum, and teaching* (6th ed.). Routledge.

Berelson, B. (1952). *Content analysis in communication research*. Free Press.

Black, P., & Wiliam, D. (2009). Developing the theory of formative assessment. *Educational Assessment, Evaluation and Accountability*, 21(1), 5-31. https://doi.org/10.1007/s11092-008-9068-5

Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal*, 9(2), 27-40. https://doi.org/10.3316/QRJ0902027

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101. https://doi.org/10.1191/1478088706qp063oa

Bybee, R. W. (2013). *The case for STEM education: Challenges and opportunities*. National Science Teachers Association Press.

Cummins, J. (2000). *Language, power, and pedagogy: Bilingual children in the crossfire*. Multilingual Matters.

Darling-Hammond, L., Hyler, M. E., & Gardner, M. (2017). *Effective teacher professional development*. Learning Policy Institute.

Drake, S. M., & Burns, R. C. (2004). *Meeting standards through integrated curriculum*. Association for Supervision and Curriculum Development.

Fosnot, C. T., & Perry, R. S. (2005). Constructivism: A psychological theory of learning. In C. T. Fosnot (Ed.), *Constructivism: Theory, perspectives, and practice* (2nd ed., pp. 8-38). Teachers College Press.

Fullan, M. (2016). *The new meaning of educational change* (5th ed.). Teachers College Press.

Hargreaves, A., & Shirley, D. (2012). *The global fourth way: The quest for educational excellence*. Corwin Press.

Honey, M., Pearson, G., & Schweingruber, H. (Eds.). (2014). *STEM integration in K-12 education: Status, prospects, and an agenda for research*. National Academies Press.

Lackéus, M. (2015). *Entrepreneurship in education: What, why, when, how*. OECD.

Leung, Y. W., & Yuen, T. W. (2012). Beyond the façade of curriculum reform: A case study of citizenship education curriculum policy in Hong Kong. *Asia Pacific Journal of Education*, 32(3), 363-382. https://doi.org/10.1080/02188791.2012.711242

Looney, J. W. (2011). Integrating formative and summative assessment: Progress toward a seamless system? *OECD Education Working Papers*, No. 58. OECD Publishing. https://doi.org/10.1787/5kghx3kbl734-en

Merriam, S. B., & Tisdell, E. J. (2015). *Qualitative research: A guide to design and implementation* (4th ed.). Jossey-Bass.

Ministry of Education Malaysia. (2013). *Malaysia Education Blueprint 2013-2025*. Ministry of Education Malaysia.

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record*, 108(6), 1017-1054. https://doi.org/10.1111/j.1467-9620.2006.00684.x

Mustapha, R., & Abdullah, A. (2004). Malaysia transitions toward a knowledge-based economy. *The Journal of Technology Studies*, 30(3), 51-61. https://doi.org/10.21061/jots.v30i3.a.7

Muhsyanur. (2022). The CORONA Model in Improving Students' Scientific Writing Skills: Is it Effective? *JPI (Jurnal Pendidikan Indonesia)*, *11*(4), 685–697. https://doi.org/10.23887/jpiundiksha.v11i4.51589

Muhsyanur, M. (2024). *Love-Based Curriculum as a New Paradigm in Language Education : Between Cognition , Affection , and Spirituality*. *2*(5), 12–19.

Muhsyanur, Rahmatullah, A. S., Misnawati, Dumiyati, & Ghufron, S. (2021). The Effectiveness of "Facebook" As Indonesian Language Learning Media for Elementary School Student: Distance Learning Solutions in the Era of the

COVID-19 Pandemic. *Multicultural Education*, *7*(04), 38–47. https://www.mccaddogap.com/ojs/index.php/me/article/view/8%0Ahttps://www.mccaddogap.com/ojs/index.php/me/article/download/8/10

Ornstein, A. C., & Hunkins, F. P. (2018). *Curriculum: Foundations, principles, and issues* (7th ed.). Pearson.

Said, N. E., & Adnan, M. (2017). Integration of ICT in teaching and learning: A review of Malaysian education policies. *World Journal of Education*, 7(6), 19-28. https://doi.org/10.5430/wje.v7n6p19

Shulman, L. S. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review*, 57(1), 1-23. https://doi.org/10.17763/haer.57.1.j463w79r56455411

Tyler, R. W. (1949). *Basic principles of curriculum and instruction*. University of Chicago Press.

Wiggins, G., & McTighe, J. (2005). *Understanding by design* (Expanded 2nd ed.). Association for Supervision and Curriculum Development.

Wing, J. M. (2006). Computational thinking. *Communications of the ACM*, 49(3), 33-35. https://doi.org/10.1145/1118178.1118215