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EIGHT IMPACTS OF INTEGRATING ISLAMIC CIVILIZATION INSIGHTS AND DRAWING-BASED APPROACHES IN DEVELOPING COMPUTATIONAL UNDERSTANDING AMONG PRIMARY SCHOOL STUDENTS

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Abstract: *This study investigates the impact of integrating insights from Islamic civilisation with drawing-based learning approaches on the development of computational understanding among primary school students. Recognising that children in the digital era are immersed in technology from an early age, the research emphasizes the importance of connecting technological concepts to their historical and cultural origins. Two research methods were employed: (1) motivational computing lecture sessions combined with experimental illustration-based games without gadgets, and (2) domain expert survey sessions using the Nominal Group Technique (NGT) to validate instructional design. Findings reveal that structured engagement with technological content through culturally and historically contextualised activities enhances students' digital literacy while fostering broader cognitive and socio-emotional development. Students demonstrated improvements in analytical, logical, and visual thinking, problem-solving, creativity, and higher order thinking skills.*

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Simultaneously, their motivation, autonomy, and collaboration abilities were strengthened, reflecting gains in soft skills and overall character development. Incorporating perspectives from Islamic civilisation situates computational learning within an authentic intellectual heritage, enriching students' appreciation of the evolution of science and technology while promoting holistic understanding and critical reflection. Overall, the study highlights the pedagogical effectiveness of combining historical, cultural, and visualisation-based strategies in primary education. Integrating civilisational insights with drawing-based learning not only supports computational understanding but also cultivates creativity, discipline, and sustained engagement, producing students who are both digitally competent and equipped with critical and creative thinking skills.

Keywords*:* *Computational understanding, Primary Students, Islamic Civilization, Drawing Game.*

Introduction

Today's world is inseparable from technology. Children born in the digital era are naturally familiar with gadgets, digital media, and online communication. However, even though they have been exposed to technology from an early age, it is crucial for them to understand the origins and evolution of the tools they now use so effortlessly. Learning about the history of technological development helps them appreciate human creativity, innovation, and the advancement of knowledge across civilizations. By exploring how inventions from the Islamic Civilization laid the foundation for modern computing and communication systems, students can cultivate deeper curiosity and critical thinking skills toward the technological world they live in (OECD, 2023).

Early exposure to computer science concepts is vital for cultivating computational thinking and problem-solving skills required in today's era (Su, Zhong, and Chen 2023). Traditional classroom approaches that rely heavily on electronic devices can reduce inclusivity for learners in resource-constrained settings, motivating the use of technology-free ("unplugged") pedagogies. This may limit inclusivity for learners in resource-constrained environments. Unplugged learning strategies, which convey core computing concepts through hands-on, technology-free activities, have been shown to enhance conceptual understanding and foster cognitive engagement among young learners (Agbo et al. 2024). Embedding such approaches within culturally relevant and historically grounded contexts can further strengthen learners' motivation and facilitate deeper connections between abstract concepts and lived experiences.

The intellectual heritage of Islamic civilization offers a compelling framework for contextualizing computing education, particularly through its contributions to mathematics and algorithmic thought. The works of scholars such as Al-Khwarizmi, whose development of algebra and systematic problem-solving methodologies laid the foundations for modern algorithms, exemplify the enduring link between historical scholarship and contemporary technological advancement (Elamin 2025). This study introduces an educational video that synthesizes Islamic historical narratives with game-based, unplugged activities to teach primary school students' fundamental concepts in computing. Central to this approach is the "Drawing Game," which operationalizes the Input, Process and Output model in an interactive

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format, enabling learners to internalize computational processes while cultivating strategic thinking, resilience, and an appreciation of the civilizational trajectory of technology.

Computational Understanding Among Primary School Students

Computational understanding (often operationalised as computational thinking, CT) for primary-age learners has shifted from a niche topic into a central target of early-years curricula and pedagogical innovation. Recent systematic reviews and meta-analyses indicate a steady growth in empirical work focused on introducing CT concepts such as abstraction, decomposition, pattern recognition and algorithmic reasoning, through age-appropriate, often play-based modalities (robotics, unplugged activities, block-based coding, and storytelling) (Giannakoulas and Xinogalos 2024). Evidence synthesised across K6 contexts shows that such interventions yield measurable gains not only in domain-specific CT skills but also in related cognitive outcomes (problem-solving, logical reasoning) and socio-affective gains (persistence, collaborative skills). Moreover, teacher professional development (PD) is repeatedly highlighted as a critical mediator: PD that combines content knowledge, pedagogical strategies, and in-class coaching improves teacher confidence and fidelity of CT enactment, which in turn improves pupil outcomes (Ma et al. 2025). Assessment work also matured in the last five years, with newer validated instruments and task-based performance assessments allowing more reliable measurement of CT progression among primary pupils (del Olmo Muñoz et al. 2025).

Despite encouraging evidence, the literature repeatedly flags persistent implementation barriers that shape how computational understanding plays out in primary classrooms. First, most effective CT interventions depend on contextual adaptation such as what works in a high-resource, small-class pilot does not translate directly to large and under-resourced classrooms. Thus, scalability remains an empirical challenge (Vassallo 2025) . Second, teachers limited pedagogical content knowledge about CT, time pressures within packed curricula, and insufficient assessment literacy constrain sustainable adoption; studies show PD must be long-term, practice-embedded, and culturally grounded to produce lasting change (Monteyne et al. 2025). Finally, recent reviews emphasise equity considerations: interventions that use multimodal, unplugged, and arts-integrated methods (e.g., story, drawing, physical manipulatives) are more effective at reaching diverse learners and aligning CT with existing classroom practices and community values (Leung et al. 2025). Taken together, current evidence suggests the field is moving from proof-of-concept towards models of context-sensitive scale-up, but success will hinge on robust teacher support, culturally relevant instructional design, and assessment systems that align with primary learners' developmental trajectories (Bernier et al. 2025).

Deep Insights into Islamic Civilization

Recent scholars argue for active curricular integration as a means to both decolonise knowledge and to provide culturally relevant entry points into STEM and computational topics for Muslim learners. Contemporary analyses articulate how classical Islamic scholarship practised empiricism, algorithmic thought, and cross-disciplinary synthesis (mathematics, astronomy, medicine) in ways that map naturally onto modern computational ideas; using these historical linkages can situate CT within a lineage of inquiry that resonates with students' cultural and moral frameworks (Ahmad, Fayes, and Aaizulrahman 2024). Beyond historical appreciation, theoretical work (Islamic Scientific Critical Consciousness) proposes a framework where

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historical case studies from Islamic civilisation are mobilised not merely as exemplars but as epistemic resources that teach students how to critique, contextualise, and morally evaluate scientific-technological knowledge—important when teaching technologies that have social implications. Such scholarship foregrounds inquiry-based, story-driven pedagogy where historical figures, instruments (e.g., astrolabes), and texts become anchors for project work that integrates ethics, measurement, and algorithmic thinking (Judijanto and Yusniar 2025).

Empirical and curriculum-development studies from 2020 to 2025 demonstrate practical pathways for embedding these deep insights into classroom practice. Case studies from Muslim-majority contexts and international pilots illustrate hybrid models that combine value-oriented STEAM, local histories of scientific practice, and digital inquiry projects to produce both cognitive and identity-related outcomes: learners report stronger engagement, greater sense of intellectual lineage, and improved ability to reason about scientific methods when lessons explicitly link contemporary problems to historical Islamic scholarship (Muzakkir, Abd Rauf, and Zulnaidi 2024). At the policy and curriculum level, authors caution against superficial "heritage tokenism" and instead recommend design principles: (1) centring primary-age narratives and artefacts, (2) aligning historical episodes with concrete inquiry tasks (measuring, mapping, prototyping), and (3) using values-based reflection prompts to connect technological practice with social purpose. This recent body of work suggests that integrating deep insights from Islamic civilisation can be a powerful lever for culturally congruent STEM and computational education in provided curriculum designers and teachers commit to inquiry-driven, historically informed, and ethically reflective pedagogy (Bahri and Hamid 2024).

Drawing Game

Drawing, whether as free-form mark-making, guided sketching, or game-like drawing tasks has gained renewed empirical attention as a multimodal learning tool that externalises internal representations and supports cognitive development. Cognitive science and education research from 2020 to 2024 frame drawing as a "representation practice" that scaffolds memory, concept formation, and problem decomposition; drawing externalises latent structures, making them accessible for reflection, feedback, and iterative refinement (Dechamps and Skulmowski 2025). Large-scale developmental studies using machine-vision analysis of thousands of child drawings show systematic developmental trajectories: as children mature, their drawings become more category-diagnostic and communicative, mirroring gains in conceptual knowledge and symbol grounding (Long et al. 2024). Educational research emphasises that when drawing is embedded intentionally (as a scaffolding tool within a lesson or game), it can improve explanatory reasoning and creativity, foster fine motor and visuospatial skills, and serve as an assessment window into children's conceptual models (Dechamps and Skulmowski 2025)

The concept of drawing as a game, which involves structured drawing activities with rules, goals, feedback, and social interaction, combines play-based pedagogy with representational practice and creates fertile ground for integrating computational concepts in primary classrooms. Empirical research and practitioner studies report several benefits. Guided draw and debug tasks, such as drawing a sequence of steps to solve a problem, collaborative drawing games, such as joint story illustration with turn taking, and digital drawing applications with stepwise prompts can all support decomposition, sequencing, and iterative refinement, which

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are fundamental elements of computational thinking(Areljung et al. 2025). Furthermore, drawing-games are low-barrier (minimal tech required), culturally adaptable (local motifs, stories), and inclusive for diverse learners, making them especially attractive for primary settings where time, resources, and teacher confidence vary. Design guidelines emerging from recent literature recommend: (1) explicit pairing of drawing tasks with reflective questioning (why did you draw that?), (2) scaffolds that progressively shift responsibility to learners, and (3) multimodal feedback (peer, teacher, or digital) to make the implicit steps in a child's reasoning visible and discussable. Collectively, these findings support the use of drawing-game approaches as a pragmatic bridge between embodied, culturally grounded learning and the abstraction required for early computational understanding (Dechamps and Skulmowski 2025).

Methodology

This section explains the two methods implemented as the study's research methodology, namely: (1) motivational computing lecture sessions accompanied by experimental sessions of illustration-based games without involving any gadgets, and (2) domain expert survey sessions using the Nominal Group Technique (NGT). The following subsections provide a detailed explanation of each method employed.

Motivational Computing Lecture and Computer Concept Illustration Activity

This motivational lecture engages students in understanding how challenges and setbacks can be addressed through logical reasoning and problem-solving approaches, as commonly practised within the discipline of Computer Science. Through an introduction to the history of Islamic civilisation and prominent scholars such as Al-Khwarizmi, students are exposed to the notion that arithmetic and systematic problem-solving are valuable and innovative intellectual legacies. Subsequently, a game-based activity grounded in the Input–Process–Output concept is implemented through an exercise in which students draw selected objects while blindfolded. Working in groups, students are assigned the roles of planners and illustrators, whereby the planners provide verbal instructions to guide the drawing process without any direct physical interaction. This activity assesses students' communication skills, the precision of their planning, and their ability to adapt when initial plans do not unfold as intended. Findings from the activity demonstrate that students are able to strengthen logical thinking and develop greater flexibility in addressing problems. Additionally, they gain experience in regulating emotions, communicating effectively under pressure, and appreciating the significance of strategic planning across various situational contexts.

Domain Expert (DE) Survey Session Using the NGT Method

The Nominal Group Technique (NGT) was employed to systematically gather the domain expert opinions and reach a collective consensus on the key factors under investigation. Table 1 presents the scale assigned to the answer choices by the domain expert (DE). In this study, domain experts are defined as primary school teachers who possess comprehensive knowledge and experience in teaching and learning processes, including children's learning behaviour, curriculum content, pedagogical approaches, and classroom challenges. The study comprised a group of eleven DEs from Sekolah Rendah Islam Nurul Iman (SRINI). Due to participants' scheduling constraints, the NGT session was conducted online over a five-day period. This asynchronous approach preserved the structured phases of the traditional NGT process, namely (1) idea generation, (2) round-robin sharing, (3) clarification and discussion, and (4) ranking and prioritization. Participants were first briefed through face-to-face meeting and provided

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with clear instructions and templates for idea submission via a shared Google Form. Over the following days, they reviewed and commented on each other's ideas using an online discussion board before completing the final ranking through an anonymous online survey. This extended online format allowed for reflective input while maintaining methodological rigour, transparency, and inclusivity in data collection.

Table 1: Answer Scale

Scale	Represent
1	Not Agree
2	Neutral
3	Agree

NGT techniques step

The Nominal Group Technique (NGT) is a structured method designed to capture the collective perspectives of a group on a specific issue. Originally developed as a participatory approach for social planning contexts, NGT was intended to support exploratory research, citizen engagement, interdisciplinary collaboration, and proposal evaluation (McMillan, King, and Tully 2016; Mustapha et al. 2025). Over time, this methodology has been widely applied across various group settings, particularly in empirical investigations within the social sciences. Although its use has been documented in educational research, most applications remain concentrated in social science research, notably within health studies. NGT is particularly effective in identifying problems, generating potential solutions, and establishing priorities, and it has proven especially valuable in "stranger groups," where balancing participants' status and communication dominance is critical.

The NGT process typically follows four sequential steps. First, participants engage in independent brainstorming, a cognitive exercise in which individuals silently reflect and document their responses to a specific prompt. During the round-robin session, each participant contributes a single idea, which is recorded on a large flipchart visible to all. No discussion occurs at this stage, and the facilitator ensures that all ideas are captured, continuing until the group deems that an adequate number of suggestions have been collected. Subsequently, the group discusses each idea to clarify meanings and ensure a shared understanding.

Voting constitutes a critical component of NGT, enabling participants to actively identify and prioritize the most important ideas. Each individual ranks preferences sequentially, recording selections on the flipchart, followed by a discussion of observed voting patterns. The combination of anonymous voting and structured facilitation fosters an environment that encourages honest responses and strengthens commitment to outcomes. Finally, the use of flipchart pages throughout the NGT process ensures that all contributions and modifications are thoroughly documented, creating a durable record of the group's procedural steps and final decisions. These records also facilitate continuity in subsequent meetings and provide a reference for participants who were absent or only partially present, enhancing transparency and collective accountability (Smith et al. 2024).

Sampling

There is considerable debate regarding the optimal sample size for studies employing the Nominal Group Technique (NGT). Previous research suggests that NGT can be conducted with

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either a single cohort or a larger group (Dobbie et al., 2004; Lomax & McLeman, 1984; Muqsith Ahmad et al., 2017). Nevertheless, it has also been proposed that dividing participants into smaller subgroups may facilitate more effective communication, depending on the specific objectives and context of the study. In alignment with prior studies, the current research refers to the sample sizes reported in previous literature, as summarized in Table 2. For this study, eleven specialists were selected to participate in the NGT session, reflecting a balance between manageable group interaction and diverse expert input.

Table 2: Sample size in conducting studies using NGT techniques.

Author	Sample
Van de Ven dan Delbecq (1971)	5-9 experts/participants
Horton (1980)	7-10 experts/participants
Harvey and Holmes (2012)	6-12 experts/participants
Abdullah & Islam (2011)	7 – 10 experts/ participants
Carney et. al (1996)	Min. 6 experts/participants

Findings

Based on Table 3 and Figure 1, the findings indicate a strong improvement in students' development of knowledge, skills, and character related to technology. Overall, nearly all items recorded percentage scores exceeding 84%, reflecting a high level of appropriateness as agreed upon by all domain experts (DEs). The element with the highest score was the item "self-identity among students increased, and students have become more ambitious" (93.94%). This suggests that exposure to technology not only supports their understanding of technical competencies but also strengthens their self-confidence and ambition to pursue greater achievements. In addition, elements related to students' personal interest and character development also recorded high ratings (90.91%), indicating that the learning approach employed successfully fostered intrinsic motivation and a positive attitude towards the learning process. Awareness of the origins of technology, including cultural and historical values, similarly demonstrated favourable impact (87.88%), showing that students are not only learning technology at a surface level but are also gaining an appreciation of its broader societal context in modern development.

From the perspective of cognitive and technical skills, the findings indicate consistent improvement. Students' understanding of basic computer concepts recorded 87.88%, while their comprehension of foundational technology across various domains obtained 84.85%, the lowest score but still within an acceptable range and suitable. This suggests that although basic technological competencies have improved, there remains room for deeper strengthening, particularly in interdisciplinary aspects. Visual and logical thinking skills also achieved a score of 87.88%, reflecting the effectiveness of the instructional interventions in enhancing higher order thinking skills. At the same time, students' level of engagement in technology learning also increased (87.88%), demonstrating their readiness and active interest in exploring technology-related content. Social aspects such as communication and teamwork likewise recorded significant improvement (90.91%), indicating that learning activities involving technology also help nurture students' collaborative abilities.

Overall, the findings as shown in Figure 1 reveal a consistent and convincing pattern, illustrating that technology-based learning not only enhances students' digital literacy but also

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plays an important role in shaping their character, strengthening their soft skills, and expanding their academic and personal aspirations. Evidence from the study indicates that when students engage with technological content through structured and meaningful activities, they develop greater self-confidence, autonomy, and readiness to participate in more complex learning environments. At the same time, exposure to technological concepts across various domains contributes to broader cognitive flexibility, enabling students to analyse and solve problems more effectively in diverse learning contexts. Furthermore, the findings highlight that the integration of historical perspectives, particularly those rooted in the origins and contributions of Islamic civilisation, adds significant value to the learning experience by situating technological understanding within an authentic intellectual heritage. This context-based approach strengthens students' appreciation of the evolution of knowledge systems and cultivates a holistic worldview by recognising that scientific and technological advancement has its roots in Islamic civilisation.

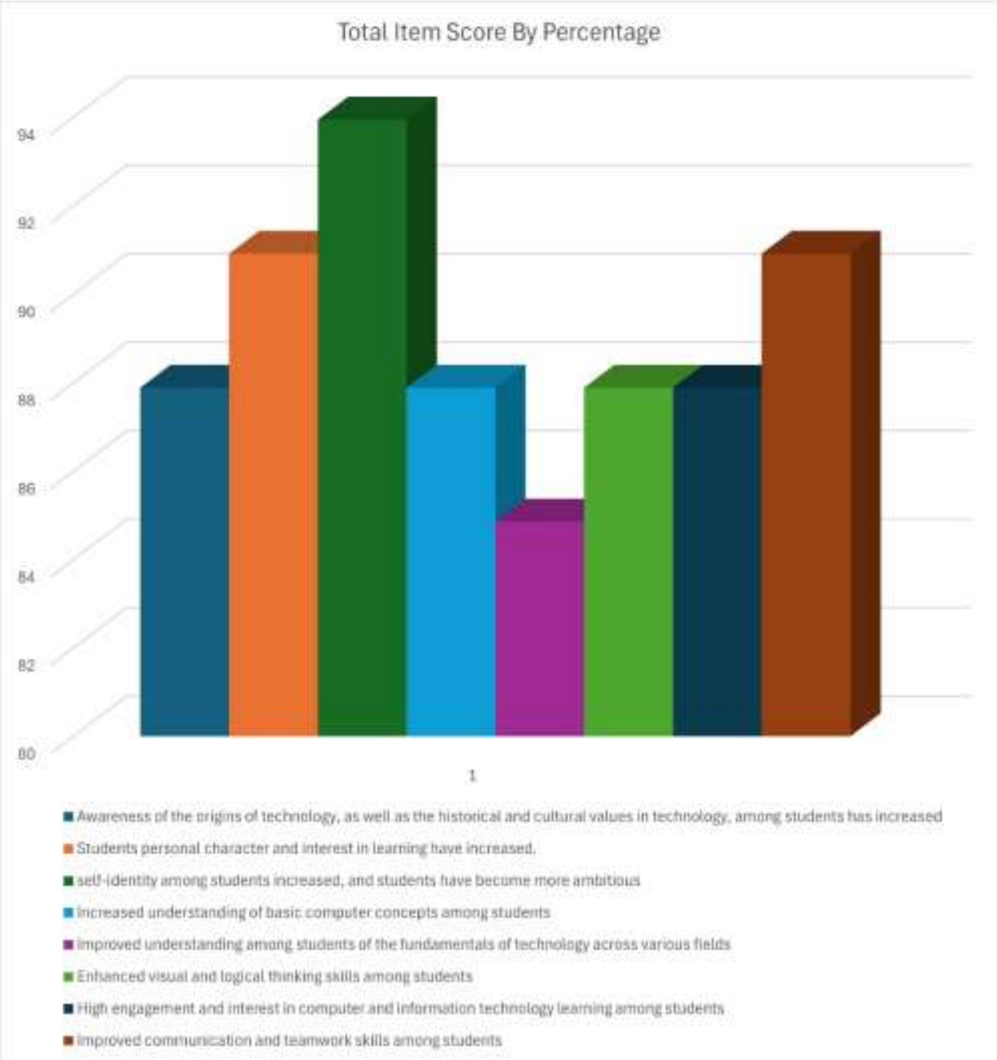

Figure 1: NGT Data Findings Char

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Table 3: NGT Data Findings Table based on DEs Vote.

Items/Elements	DE1	DE2	DE3	DE4	DE5	DE6	DE7	DE8	DE9	DE10	DE11	Total item score	Percentage	Rank Priority	Voter Consensus
Awareness of the origins of technology, as well as the historical and cultural values in technology, among students has increased.	2	2	2	2	3	3	3	3	3	3	3	29	87.88	3	Suitable
Students personal character and interest in learning have increased.	2	2	2	3	3	3	3	3	3	3	3	30	90.91	2	Suitable
Self-identity among students increased, and students have become more ambitious	2	2	3	3	3	3	3	3	3	3	3	31	93.94	1	Suitable
Increased. Understanding of basic computer concepts among students.	2	2	2	2	3	3	3	3	3	3	3	29	87.88	3	Suitable
Improved understanding among students on the fundamentals of technology across various fields.	2	2	2	2	2	3	3	3	3	3	3	28	84.85	4	Suitable
Enhanced visual and logical thinking skills among students.	3	3	3	3	3	3	3	2	2	2	2	29	87.88	3	Suitable
High engagement and interest in computer and information technology learning among students.	2	2	2	2	3	3	3	3	3	3	3	29	87.88	3	Suitable
Improved communication and teamwork skills among students.	2	2	2	3	3	3	3	3	3	3	3	30	90.91	2	Suitable

Conclusion

In conclusion, the integration of the history of technology from the Islamic civilisation with drawing-based approaches has demonstrated significant and multifaceted impacts on the development of computational understanding among primary school students. This approach not only enhances students' digital literacy but also supports the holistic development of character, soft skills, creativity, as well as their academic and personal aspirations. Structured activities that combine historical, cultural, and visualisation elements through drawing enable students to connect technological concepts with broader contexts, thereby reinforcing their understanding of basic computer concepts and technological principles in an intuitive and engaging manner. Furthermore, exposure to Islamic civilisational perspectives provides substantial intrinsic value by emphasising the evolution of science and technology originating from Islamic history, which in turn fosters an appreciation of intellectual heritage while promoting higher order thinking. The study's findings indicate consistent improvement in cognitive skills, including analytical abilities, logical and visual thinking, as well as problem solving, highlighting the effectiveness of this pedagogical approach in developing students' critical and creative thinking capacities. Socially, students also demonstrated enhanced communication and teamwork skills, while their motivation and engagement in technology learning increased markedly. Collectively, these findings suggest that the integration of civilisational context and drawing based learning not only supports technical understanding but also cultivates values, discipline, and a sustained interest in learning. Based on these outcomes, it can be concluded that educational programmes integrating insights from Islamic civilisation with visual based approaches have the potential to provide a more holistic, relevant, and long-

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lasting learning experience, while producing students who are not only digitally competent but also critical, creative thinkers equipped to face academic and life challenges on a global scale.

References

Agbo, Friday Joseph, Linda Ojone Okpanachi, Patrick Ocheja, Solomon Sunday Oyelere, and Godwin Sani. 2024. "How Can Unplugged Approach Facilitate Novice Students' Understanding of Computational Thinking? An Exploratory Study from a Nigerian University." *Thinking Skills and Creativity* 51: 101458. doi:10.1016/j.tsc.2023.101458.

Ahmad, Rizqan, Zayyan Fayes, and Aaizulrahman Aaizulrahman. 2024. "The Contribution of Andalusian Islamic Science to the Development of Modern Technology." *Journal on Islamic Studies* 1(2): 133–44. doi:10.35335/bgmzj705.

Areljung, Sofie, Johanna Andersson, Carina Hermansson, Marianne Skoog, and Bodil Sundberg. 2025. "Co-Drawing to Learn in Science." *Research in Science Education* 55(5): 1189–1204. doi:10.1007/s11165-024-10217-x.

Bahri, Sumaiyah, and Anis Hamizah Hamid. 2024. "Exploration Of Stem And The Quran For Holistic Teaching And Learning." *Journal of Multidisciplinary Islamic Studies* 4(1): 45–51. www.majmuah.com.

Bernier, Jeremy, Kristina Kramarczuk, Ebony Terrell Shockley, Francheska Figueroa, Lin Yan, Yue Xin, Janice Mak, et al. 2025. "Exploring Culturally Responsive Teaching Practices in Computational Thinking + Science Lesson Planning." *Discover Education* 4(1): 465. doi:10.1007/s44217-025-00897-6.

Dechamps, Theresa, and Alexander Skulmowski. 2025. "The Effective Design of Tasks Involving Learning by Drawing: Current Trends and Methodological Progress in Research on Drawing to Learn." *Educational Psychology Review* 37(2): 50. doi:10.1007/s10648-025-10026-2.

Elamin, Mustafa Osman I. 2025. "Muhammad Ibn Musa Al-Khwarizmi: The Pioneer of Algorithms and His Enduring Legacy in Artificial Intelligence." *Journal of Ecohumanism* 3(8). doi:10.62754/joe.v3i8.5695.

Giannakoulas, Andreas, and Stelios Xinogalos. 2024. "Studying the Effects of Educational Games on Cultivating Computational Thinking Skills to Primary School Students: A Systematic Literature Review." *Journal of Computers in Education* 11(4): 1283–1325. doi:10.1007/s40692-023-00300-z.

Judijanto, Loso, and Yusniar Yusniar. 2025. "Integration of Islamic Values in STEM Teaching (Science, Technology, Engineering, Mathematics)." *West Science Islamic Studies* 3(01): 26–31. doi:10.58812/wsiss.v3i01.1613.

Leung, Suzannie K. Y., Joseph Wu, Jenny Wanyi Li, Yung Lam, and Oi-Lam Ng. 2025. "Examining Young Children's Computational Thinking through Animation Art." *Early Childhood Education Journal* 53(5): 1563–75. doi:10.1007/s10643-024-01694-w.

Long, Bria, Judith E. Fan, Holly Huey, Zixian Chai, and Michael C. Frank. 2024. "Parallel Developmental Changes in Children's Production and Recognition of Line Drawings of Visual Concepts." *Nature Communications* 15(1): 1191. doi:10.1038/s41467-023-44529-9.

Ma, Hongliang, Yuhan Dong, Bin Jing, Yu Zeng, and Jinmei Sun. 2025. "Effectiveness of In-Service Computer Science Teachers' Professional Development in K-12 Education: A Systematic Review and Meta-Analysis." *International Journal of STEM Education* 12(1): 29. doi:10.1186/s40594-025-00548-0.

McMillan, Sara S., Michelle King, and Mary P. Tully. 2016. "How to Use the Nominal Group

Volume: 10 Issues: 78 Special Issue [November, 2025] pp. 971 – 981
Journal of Islamic, Social, Economics and Development (JISED)
eISSN: 0128-1755
Journal website: www.academicinspired.com/jised
DOI: 10.55573/JISED.107877

and Delphi Techniques." *International Journal of Clinical Pharmacy*. doi:10.1007/s11096-016-0257-x.

Monteyne, Sara, Charlotte Struyve, Natacha Gesquière, Tom Neutens, Francis Wyffels, Johan van Braak, and Koen Aesaert. 2025. "Teachers' Computational Thinking Content Knowledge: Development of a Measurement Instrument." *Computers and Education* 225(October 2024). doi:10.1016/j.compedu.2024.105181.

Mustapha, Ramlan, Abu Bakar Jaafar, Maziah Mahmud, Wan Azmi, Wan Ahmad, Siti Norma, Aisyah Malkan, Jazimin Zakaria, and Asjad Mohamed. 2025. "Developing An Islamic Digital Literacy Framework For Muslim Youth : A Nominal Group." : 258–71. doi:10.55573/JISED.107020.

Muzakkir, Rose Amnah Abd Rauf, and Hutkemri Zulnaidi. 2024. "Development and Validation of the Quran – Science, Technology, Engineering, Art, And Mathematics (Q-STEAM) Module." *STEM Education* 4(4): 346–63. doi:10.3934/steme.2024020.

del Olmo Muñoz, Javier, Alicia Jiménez Toledo, Sergio Tirado Olivares, José Antonio González-Calero, and Ramón Cózar Gutiérrez. 2025. "Assessing Computational Thinking in Primary Education: A Cross-Sectional Study Using a Multidimensional Perspective." *Informatics in Education*: 299–320. doi:10.15388/infedu.2025.12.

Smith, Duncan, Martin Cartwright, Judith Dyson, and Leanne M. Aitken. 2024. "Use of Nominal Group Technique Methods in the Virtual Setting: A Reflective Account and Recommendations for Practice." *Australian Critical Care* 37(1): 158–65. doi:10.1016/j.aucc.2023.09.004.

Su, Jiahong, Yuchun Zhong, and Xinyu Chen. 2023. "Technology Education in Early Childhood Education: A Systematic Review." *Interactive Learning Environments*: 1–14. doi:10.1080/10494820.2022.2160470.

Vassallo, Diane. 2025. "Fostering Computational Thinking in Early Learners: An Iterative Approach in a Maltese Primary School." *Discover Education* 4(1): 126. doi:10.1007/s44217-025-00553-z.