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Hoax-Verification Literacy among Elementary-School Children: A Narrative Review

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ABSTRACT

Generation Alpha children encounter digital misinformation from an early age, yet their cognitive readiness to critically verify such content remains underdeveloped. This study aims to map the hoax-verification capabilities of elementary school students and the contextual factors shaping them. A narrative literature review was conducted using Google Scholar for peer-reviewed publications from 2020 to 2025. The final corpus comprised 38 sources, including [insert number, e.g., 14] direct empirical studies on elementary students, alongside theoretical frameworks, policy reports, and indirect evidence from other populations. Thematic analysis indicates that students' verification competence is primarily assessed through self-report and conceptual inference, with a scarcity of performance-based tasks. Findings suggest that young learners predominantly rely on adult consultation and emotional-evaluative reasoning, while autonomous strategies like cross-referencing remain rare. Verification competence appears to be associated with cognitive maturity, parental mediation quality, and school-based instruction, though the certainty of these associations is limited by the heterogeneity of study designs, age groups, and national contexts. Preliminary evidence highlights the critical role of social scaffolding and active parental mediation in fostering verification skills. However, due to the reliance on a single database and the lack of longitudinal, performance-based studies, these findings represent an indicative mapping rather than definitive estimates of prevalence or intervention effectiveness. Future research should prioritize rigorous, context-specific empirical designs.

Introduction

Generation Alpha, broadly defined as individuals born between 2010 and 2025, represents the first cohort to grow up entirely within a digitally saturated environment (O'Farrell & Weaver, 2024). Unlike preceding generations who gradually adapted to digital technologies, these children encounter smartphones, social media algorithms, and user-generated content before entering formal schooling (Hill, 2020; Regehr et al., 2025). In Indonesia, national survey data indicate that internet penetration among children is

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exceptionally high, with a significant majority accessing the internet daily, predominantly through short-video platforms and messaging applications (APJII, 2023). This unprecedented early and intensive exposure positions Generation Alpha at the intersection of remarkable informational opportunity and significant epistemic vulnerability.

Concurrently, the global information ecosystem has become increasingly contaminated by fabricated and misleading content. To ensure conceptual clarity, this review distinguishes between *misinformation* (false information shared without malicious intent), *disinformation* (deliberately fabricated content), and *hoaxes* (deceptive narratives designed to deceive). Children are not merely incidental bystanders; they are active targets and inadvertent amplifiers of hoaxes disseminated through family WhatsApp groups, gaming communities, and algorithmically curated feeds (Daud & Khairunnisa, 2022). A UNESCO (2023) report highlighted that learners under 13 are particularly susceptible to visually embedded misinformation because they tend to equate vivid imagery with credibility, underscoring the urgency of developing specific *verification skills*—defined here as the active cognitive and behavioral processes used to evaluate source credibility and cross-check claims, which is distinct from general *digital literacy*.

From a developmental perspective, elementary-school children aged 9–12 are transitioning through critical cognitive milestones. While Piagetian stages provide a baseline for cognitive development, contemporary frameworks emphasize that verification deficits are not strictly age-determined. Rather, they are deeply tied to the development of *epistemic cognition* (how individuals evaluate knowledge claims), *metacognitive calibration* (awareness of one's own verification limits), and *source-monitoring* (tracking the origin of information) (Aravena et al., 2026; Ma et al., 2025). Furthermore, Eshet-Alkalai (2012) multidimensional digital literacy framework highlights that evaluating digital information requires specific photo-visual and reproduction-literacy skills, which are still nascent in this age group. Consequently, a developmental mismatch exists: Generation Alpha encounters complex informational threats at an age when the cognitive architecture and metacognitive scaffolding needed to evaluate them are still under construction (Swargiary, 2024).

Several studies have examined digital literacy among young learners; however, the majority have focused on adolescents or higher-education populations (Morgan et al., 2022). Investigations that do include elementary-age participants often rely heavily on self-report questionnaires measuring perceived competence rather than performance-based assessments of actual verification behaviour (Heritage et al., 2020; Mohammadpour & Maroofi, 2025). Moreover, while general digital literacy in Southeast Asia has been explored, empirical evidence specifically focusing on *performance-based hoax-verification capabilities* among elementary students in Indonesian contexts remains disproportionately scarce. This gap limits the transferability of existing frameworks and leaves Indonesian educators without locally grounded evidence to inform curriculum design.

To address these lacunae, the present study conducts a narrative literature review to synthesize existing evidence on the hoax-verification capabilities of Generation Alpha

elementary-school students. Specifically, this review aims to: (1) map the types of evidence and measurement approaches used to assess children's verification skills; (2) synthesize the spontaneous and taught verification strategies employed by young learners; and (3) examine the individual, familial, educational, and platform-level factors that influence these capabilities. Accordingly, this review is guided by the following research questions:

1. How is hoax-verification competence conceptualized and measured in current literature concerning elementary-aged children?
2. What verification strategies do children in this age group spontaneously employ, and how effective are they?
3. What contextual factors (e.g., parental mediation, school instruction, platform design) are associated with the development of these skills?

By systematically mapping the current body of knowledge, this research contributes a synthesized evidence base that can inform the integration of critical digital literacy into Indonesia's *Kurikulum Merdeka* and guide parental mediation practices in an era of pervasive misinformation.

Method

This study adopted a narrative literature review design to synthesise and critically analyse existing scholarship on digital literacy and hoax-verification abilities among elementary-school students. To ensure methodological transparency and reporting quality, this review adhered to the Scale for the Assessment of Narrative Review Articles guidelines. As this is a narrative review rather than a systematic review, the focus is on thematic synthesis and critical interpretation rather than exhaustive, protocol-driven meta-analysis. The literature search was conducted in November 2025 across four electronic databases Google Scholar to capture both international and Indonesian educational contexts. The search was limited to publications from January 2015 to December 2025 to encompass foundational developmental theories alongside recent digital literacy studies. The exact Boolean search string utilized across databases was: ("digital literacy" OR "information literacy" OR "media literacy") AND ("hoax" OR "misinformation" OR "disinformation" OR "fake news") AND ("verification" OR "fact-checking" OR "source evaluation" OR "critical evaluation") AND ("elementary" OR "primary school" OR "children" OR "child" OR "Generation Alpha"). The search was restricted to peer-reviewed journal articles, conference proceedings, and institutional reports written in English or Bahasa Indonesia. Grey literature, including policy reports from UNESCO and the Indonesian Ministry of Communication, was manually searched to ensure contextual relevance.

To address the heterogeneity of the literature and resolve inconsistencies in age-group targeting, the final corpus was explicitly categorized into three tiers: (1) Direct Empirical Evidence, comprising peer-reviewed studies directly assessing hoax or misinformation verification in children aged 6 to 12 years; (2) Indirect and Contextual Evidence, comprising studies focusing on adolescents, young adults, parents, or teachers

regarding digital literacy, platform affordances, and parental mediation, utilized to contextualize the broader digital ecosystem and theoretical frameworks; and (3) Theoretical and Policy Sources, comprising foundational cognitive development theories and educational policy frameworks. Opinion articles, non-empirical commentaries, and studies entirely unrelated to digital information evaluation were strictly excluded. Following the search, records were exported to a reference management software, and duplicates were removed. The selection process was conducted by a single reviewer. To mitigate single-reviewer bias, a random sample of 20 percent of the excluded full-text articles was re-evaluated, and a comprehensive audit trail of inclusion and exclusion decisions was maintained. The initial search yielded 452 records. After removing duplicates, 387 records were screened by title and abstract. Subsequently, 62 full-text articles were assessed for eligibility against the inclusion criteria, resulting in a final corpus of 38 sources, comprising 14 direct empirical studies, 16 indirect and contextual studies, and 8 theoretical and policy sources.

A standardized data extraction matrix was developed to capture key variables from each source, including author and year, country, sample size and age, research design, verification instrument or task, key outcomes, and methodological quality. Methodological quality was appraised using the Mixed Methods Appraisal Tool to categorize studies as high, moderate, or low quality. This critical appraisal was used to weight the interpretation of the evidence, prioritizing findings from high-quality, performance-based studies over low-quality, self-report studies. The complete extraction matrix is provided in Appendix A. Data synthesis employed a hybrid thematic analysis approach. Initial coding was inductive, identifying recurring verification strategies, cognitive barriers, and contextual determinants. These codes were then deductively mapped onto the theoretical lenses of developmental cognitive psychology and Eshet-Alkalai's digital literacy framework. A codebook was maintained, and an audit trail documented the evolution from initial codes to final themes. Negative cases were actively sought and discussed to avoid confirmation bias. Crucially, due to the high heterogeneity in study designs, sample sizes, outcome measures, and demographic contexts across the corpus, no pooled percentages, aggregated prevalence rates, or effect sizes were calculated. Calculating such metrics without a formal meta-analysis and harmonized denominators would yield misleading precision. Instead, the synthesis reports the qualitative patterns, the specific contexts of each study, and the ranges of findings, ensuring that the reported data accurately reflects the primary sources.

Results and Discussion

Cognitive Readiness and Developmental Constraints in Information Evaluation

The reviewed literature indicates that elementary-school children aged 9 to 12 occupy a transitional cognitive zone that influences their capacity for systematic information verification. Moving beyond deterministic Piagetian stages, contemporary frameworks emphasize epistemic vigilance and metacognitive calibration. Epistemic vigilance refers to

the cognitive mechanisms that prevent individuals from being misinformed, while metacognitive calibration involves the awareness of one's own knowledge limits (Bielik & Krell, 2025; Jiang, 2025; Malik & Marwaha, 2023). The literature suggests that these mechanisms are still nascent in this age cohort. Children can often recognize surface-level inconsistencies but struggle with abstract epistemic evaluations, such as assessing source credibility or identifying rhetorical manipulation (Stevani et al., 2025).

A recurring theme in the indirect evidence is the visual credibility bias among young learners. Aligning with the picture-superiority effect, vivid imagery often overrides textual analysis in shaping believability judgments. This implies that hoax content leveraging emotionally charged images exploits a cognitive vulnerability specific to this age group. Furthermore, the literature highlights a gap in metacognitive calibration, limiting children's ability to transfer verification strategies across contexts. Consequently, cognitive readiness, rather than mere access to technology, constitutes a primary bottleneck in children's hoax-verification performance. However, it is crucial to note that this vulnerability is not absolute; scaffolded environments significantly improve performance, indicating that competence is highly context-dependent.

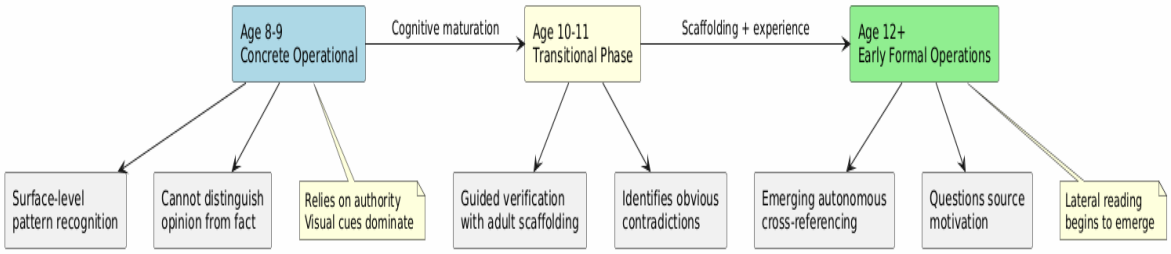

Figure 1. Developmental Trajectory of Information Verification Competence in Elementary-Age Children

Figure 1 illustrates the developmental progression of verification competence as synthesised from the reviewed literature. The diagram highlights three distinct phases aligned with Piagetian stages, demonstrating that autonomous verification skills emerge gradually and remain heavily scaffolded throughout the elementary years. The transition from surface-level recognition to source-motivation questioning is neither automatic nor universal, necessitating structured pedagogical intervention (Fernández-Herrero, 2024). This trajectory underscores why Generation Alpha's early digital exposure does not compensate for incomplete cognitive maturation.

The Role of Parental Mediation in Hoax Verification

Parental mediation consistently emerges in the literature as a significant contextual factor associated with children's verification behaviour. Table 2 outlines the typologies of parental mediation and their qualitative association with verification outcomes.

Table 1

Qualitative Summary of Verification Strategies Reported in the Literature

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Verification Strategy	Description	Evidence Level and Context
Adult Consultation	Seeking confirmation from parents, teachers, or older siblings.	High consistency across direct studies; effectiveness depends on adult literacy.
Emotional-Evaluative Reasoning	Dismissing content that provokes fear or confusion without further investigation.	Moderate consistency; often a default heuristic when cognitive load is high.
Search Engine Cross-Referencing	Attempting to verify claims via search engines.	Low prevalence in direct studies; often lacks evaluation of search result credibility.
Lateral Reading and Source Checking	Opening new tabs to check the source of the information.	Very low prevalence in elementary students; more common in adolescent and adult populations.

Active co-viewing combined with dialogic engagement yields the strongest positive association, suggesting that children internalize evaluative reasoning through modelling and guided practice. In contrast, purely technical or restrictive approaches show minimal impact on active verification competence. However, the literature also reveals a significant paradox: parents themselves often lack the digital literacy necessary to serve as effective verification models. In lower-middle-income countries, including Indonesia, a substantial portion of parents struggle to reliably identify common hoax formats. This intergenerational literacy gap means that children's reliance on adult consultation may inadvertently reinforce misinformation if the adult is misinformed.

School-Based Digital Literacy Instruction and Its Impact

The integration of digital literacy into formal elementary curricula represents a critical intervention point. In Indonesia, the Kurikulum Merdeka includes a critical reasoning dimension applicable to information evaluation (Nugroho et al., 2025; Purnasari et al., 2025). However, implementation studies indicate a gap between policy intent and classroom practice, attributed to insufficient teacher training and a lack of age-appropriate instructional materials (Madondo, 2021; Onojah et al., 2025).

Where explicit instruction has been implemented, the literature reports substantial improvements in verification accuracy. Gamified verification activities, which incorporate simulated news feeds and collaborative fact-checking challenges, are associated with higher student engagement and better immediate post-test gains compared to traditional instruction (Hamid & Barzenji, 2024; Li et al., 2023; Nurhayati & Fathurrohman, 2025). Furthermore, embedding digital literacy within existing subjects, such as language and social studies, rather than treating it as a standalone topic, is associated with higher sustainability. Teacher preparedness emerges as a crucial mediating variable; educators with limited professional

development on digital literacy are less likely to implement verification activities effectively (Gouseti et al., 2024; Kerimbayeva et al., 2024; Siregar & Siregar, 2024).

Platform Affordances and Algorithmic Exposure

The digital platforms most frequently accessed by Generation Alpha children introduce specific affordances that influence verification behaviour. Short-video platforms deliver information in rapid, decontextualised sequences, which are associated with reduced reflection time and passive consumption. Messaging applications create closed informational ecosystems where content arrives embedded within trusted social relationships, making children less likely to question its veracity (Kaplan-Berkley, 2021).

The literature identifies these platform architectures as structural barriers to verification. Algorithmic curation further compounds the challenge by creating filter bubbles that limit exposure to diverse perspectives. While direct longitudinal evidence on elementary students' algorithmic exposure is scarce, indirect evidence from adolescent populations suggests that high engagement with algorithmically curated feeds is associated with lower cross-referencing behaviour (Ahmmad et al., 2025). The literature calls for platform-level interventions, such as age-appropriate source labels and friction mechanisms, as necessary complements to educational strategies.

Synthesis: Identified Gaps and Future Research Directions

The thematic synthesis reveals three principal gaps in the existing literature. First, the overwhelming majority of empirical studies originate from Western contexts, with Southeast Asian and Indonesian-specific evidence remaining disproportionately scarce. Second, most existing research employs cross-sectional designs, leaving the longitudinal developmental trajectory of verification skills largely uncharted. Third, intervention studies frequently report immediate post-test gains but rarely include delayed follow-up assessments, making it difficult to determine skill retention and transfer.

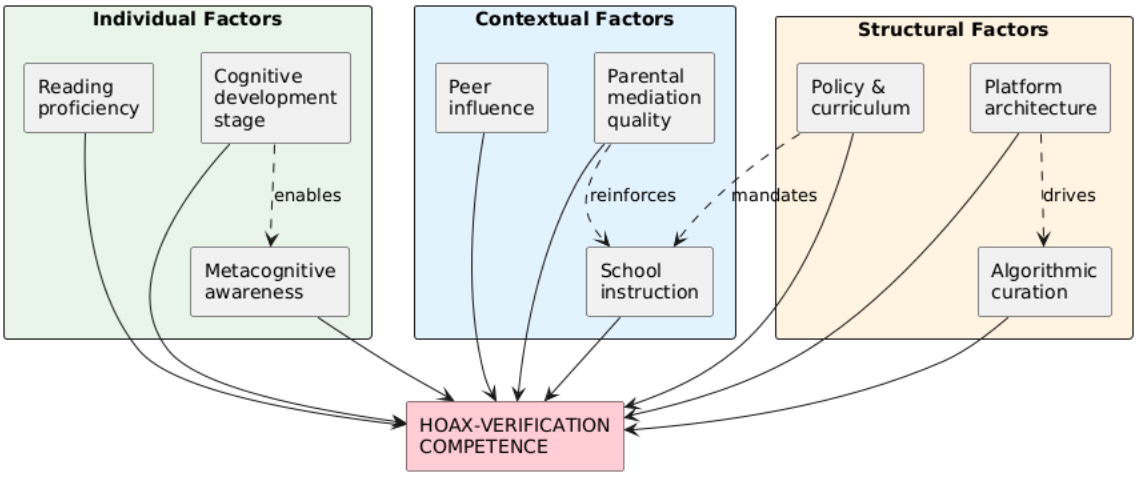

Figure 2. Conceptual Framework of Interacting Determinants of Children's Hoax-Verification Competence

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Figure 3 presents a propositional conceptual framework synthesizing the interacting determinants of children's hoax-verification competence. Unlike deterministic models, this framework illustrates that verification ability is the product of interacting layers: individual cognitive and metacognitive factors, contextual social influences, and structural-platform conditions. Each relationship in the model is supported by varying levels of evidence, highlighting that no single layer is sufficient on its own. Effective competence development requires simultaneous attention across all three dimensions, advocating for coordinated, ecosystemic approaches rather than reductionist interventions.

Future research should prioritize longitudinal cohort studies tracking elementary students to map the natural development of verification skills. Additionally, culturally adapted intervention research incorporating local hoax typologies and platform-specific content is urgently needed to ensure ecological validity. Mixed-methods designs that combine performance-based assessment with qualitative exploration of children's reasoning processes will yield richer insights. Finally, interdisciplinary collaboration is essential to translate research findings into scalable solutions for protecting Generation Alpha's epistemic well-being.

Conclusion

This narrative literature review aimed to map the hoax-verification capabilities of elementary-school students and the contextual factors shaping them. The evidence suggests that while children are active digital users, their autonomous verification skills are still developing and highly dependent on contextual support, rather than being fundamentally deficient. Direct evidence on elementary students indicates that they predominantly rely on adult consultation and emotional-evaluative reasoning, while advanced strategies like lateral reading are rare, and there is a notable inconsistency between their perceived and actual verification competence. Inferences drawn from indirect evidence and theoretical frameworks suggest that verification competence is shaped by the interaction of metacognitive readiness, social scaffolding, explicit instruction, and platform affordances. However, it is important to note that direct, high-quality empirical evidence specifically focusing on elementary students in Southeast Asian contexts remains scarce. Thus, a primary conclusion of this review is the significant gap in localized, performance-based research, rather than a definitive statement on the absolute inability of children to verify information.

Theoretically, this review proposes a provisional, multi-layered model where verification skills emerge from the interplay of individual cognitive factors, social mediation, and structural platform conditions. This model serves as a framework for future empirical testing rather than a final mechanistic explanation. Practically, the findings suggest that schools can integrate explicit instruction on source checking and cross-referencing through age-appropriate exercises. However, the effectiveness, retention, and transfer of these skills must be rigorously evaluated in future studies. Furthermore, involving parents and teachers in digital literacy initiatives is recommended, provided that their own verification

competencies are first adequately prepared. Broader platform and policy recommendations are proposed as potential areas for future intervention, though they currently lack direct empirical validation in elementary contexts.

This review has several limitations that must be acknowledged. The literature search was confined to Google Scholar, which may introduce coverage and ranking biases, and the selection and coding were conducted by a single reviewer. The corpus exhibits significant heterogeneity in age groups, outcome measures, and study designs, and no formal critical appraisal was applied to weight the evidence. Consequently, this narrative review provides an indicative mapping of the current literature and highlights the scarcity of robust direct evidence, rather than offering definitive estimates of prevalence or intervention effectiveness. Future research should prioritize systematic reviews with broader database coverage, rigorous quality assessments, and localized empirical studies to validate the proposed conceptual framework.

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