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Digital Citizenship Literacy among University Students: The Mediating Role of Critical Thinking and Media Awareness in Combating Misinformation

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ABSTRACT

The proliferation of misinformation in digital environments poses a critical challenge for university students, necessitating integrative competency frameworks beyond isolated cognitive skills. This study examined the mediating role of digital citizenship literacy in the relationship between critical thinking, media awareness, and resistance to misinformation among undergraduate students at UIN Siber Syekh Nurjati Cirebon, Indonesia. Employing a quantitative cross-sectional survey design with purposive sampling, data were collected from 300 students across the Tadris IPS and Arabic Language Education programs using a validated five-point Likert-scale instrument. Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) via SmartPLS 4.0. Results demonstrated that critical thinking and media awareness significantly predicted both digital citizenship literacy and resistance to misinformation. Digital citizenship literacy emerged as the strongest direct predictor of misinformation resistance ($\beta = 0.389$, $p < 0.001$) and significantly partially mediated the effects of critical thinking ($\beta = 0.133$) and media awareness ($\beta = 0.116$) on misinformation resistance. The full model explained 54.1% of variance in misinformation resistance. These findings suggest that cultivating digital citizenship norms constitutes the most proximal mechanism through which cognitive and media competencies translate into behavioral resistance to false information. Implications for curriculum development, pedagogical practice, and higher education policy are discussed.

Keywords: *Misinformation Resistance; Civic Digital Competency; Information Verification Behavior; Online Ethical Conduct; Higher Education Indonesia*

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INTRODUCTION

The accelerating pace of digital transformation has fundamentally restructured both educational ecosystems and the broader fabric of social life in the twenty-first century. The integration of digital technologies including social media platforms, artificial intelligence-driven content systems, and real-time information networks has created unprecedented opportunities for knowledge sharing, collaborative learning, and civic participation (Buckingham, 2020; Kellner & Share, 2019). Global internet penetration

continues to rise at an exponential rate, with university students constituting one of the most digitally active demographic groups, routinely consuming information through platforms such as TikTok, Instagram, and YouTube as primary channels of news and social discourse (Arif, 2023; UNICEF, 2021). However, this expansive digital access has not been accompanied by a commensurate development in critical digital behavior. The World Economic Forum (2022) has identified digital misinformation as among the most significant threats to contemporary society, while UNESCO (2023) emphasizes critical media literacy as an indispensable foundation for democratic citizenship in the digital age. The paradox of the contemporary information landscape is, therefore, not a scarcity of information, but rather an overabundance of unverified, algorithmically amplified, and deliberately manipulated content that circulates at speeds and scales previously inconceivable. For university students who are simultaneously intensive consumers of digital media and future architects of public discourse the consequences of inadequate digital competency extend well beyond academic performance, carrying profound implications for democratic participation, public health, and social cohesion.

Against this backdrop, the concept of digital citizenship literacy has emerged as a central construct in educational research and policy discourse. Ribble and Bailey (2007, p. 10) defined digital citizenship as "the norms of appropriate, responsible behavior with regard to technology use," a foundational conceptualization that has since been elaborated to encompass multiple interrelated dimensions. Mossberger and Tolbert (2021) further extended this understanding by situating digital citizenship within the broader framework of civic engagement, equity, and social participation in digital spaces. Ribble's (2021) nine-element framework operationalizes digital citizenship through dimensions including digital access, literacy, etiquette, law, rights and responsibilities, health and wellness, and security collectively constituting the normative architecture of responsible online conduct. Despite this conceptual richness, empirical evidence consistently reveals a troubling gap between students' high levels of digital access and their comparatively low levels of critical digital behavior (Choi, 2016; Pangrazio & Sefton-Green, 2021). Arif (2023) and Latkin et al. (2020) have further demonstrated that university students, despite their high frequency of digital media use, exhibit significant uncertainty and inconsistency in evaluating the credibility of online information. This asymmetry wherein proficiency in using digital tools does not translate into the capacity for critical evaluation of digital content — constitutes a fundamental challenge for higher education institutions tasked with preparing graduates for active and informed citizenship in the digital age.

Central to addressing this challenge is the cultivation of critical thinking and media awareness as foundational cognitive competencies. Livingstone (2004, p. 3) defined media literacy as "the ability to access, analyze, evaluate, and create messages in a variety of forms," a definition that underscores its inherently critical and active character. Critical thinking, as theorized by Bezanilla-Albisua et al. (2019), equips individuals to interrogate the credibility, sources, and potential biases embedded in digital content through reasoned and reflective judgment. Media awareness, meanwhile, extends this capacity by enabling students to understand the structural, economic, and ideological forces that shape the

production and dissemination of information in digital environments (Wright, 2023; Thevenin, 2022). Soßdorf et al. (2024) have argued that critical media literacy and data literacy together are necessary to counteract algorithmically amplified misinformation, while Moore and Hancock (2022) have demonstrated that targeted digital literacy interventions significantly enhance individuals' resilience to false content. However, the prevailing assumption that educational attainment alone is sufficient to protect individuals from digital manipulation has been persistently challenged; even university-educated populations demonstrate significant susceptibility to misinformation, particularly in emotionally charged or politically salient contexts (Pennycook & Rand, 2019; Corbu et al., 2021). Critically, Vosoughi, Roy, and Aral (2018) found that false news spreads significantly faster and more broadly than accurate information online — a structural dynamic that places considerable cognitive demands on even the most educated users and underscores the urgent need for theoretically integrated models of digital competency.

Notwithstanding the growing body of scholarship on digital citizenship, critical thinking, and media literacy, significant research gaps remain. Prior studies have predominantly examined these constructs in isolation, producing a fragmented and insufficiently integrative understanding of how they interact to shape students' resistance to misinformation (Sarmiento et al., 2025; Boler et al., 2025). Roozenbeek and van der Linden (2019, 2020) have made important contributions through inoculation-based interventions; however, these approaches address only discrete behavioral responses and do not account for the mediating structural pathways through which competencies such as critical thinking and media awareness generate protective digital citizenship behaviors. Furthermore, the overwhelming majority of extant research has been conducted in North American and European contexts, leaving a substantial lacuna in scholarly understanding of these dynamics in developing-country settings such as Indonesia (Grizzle et al., 2021; Deroncele-Acosta et al., 2020). In such contexts, unique socio-cultural, infrastructural, and institutional factors including uneven digital access across regions, low levels of formal media literacy education, and high exposure to politically and religiously charged misinformation may significantly moderate the relationship between digital access and critical digital behavior. The absence of integrative structural models employing mediation analysis means that the field currently lacks the explanatory architecture necessary to inform the design of targeted, context-sensitive educational interventions.

The present study is designed to address these gaps by proposing and empirically testing an integrative model in which digital citizenship literacy mediates the relationship between critical thinking, media awareness, and university students' resistance to misinformation. This study contends that critical thinking and media awareness do not neutralize susceptibility to misinformation through simple, direct pathways; rather, they operate through students' internalized norms and competencies of responsible digital citizenship, which in turn govern how individuals encounter, evaluate, and respond to questionable digital content (Ribble, 2021; Choi, 2016; Bezanilla-Albisua et al., 2019). By situating the Indonesian higher education context at the center of this investigation, the study contributes to a growing but still nascent body of literature that foregrounds

developing-country perspectives in digital citizenship scholarship. Theoretically, the study integrates Ribble's (2021) digital citizenship framework with cognitive literacy theory and critical media pedagogy to produce a mediational model with both explanatory depth and empirical tractability. From a practical standpoint, the findings are expected to yield evidence-based recommendations for curriculum designers, higher education policymakers, and institutional leaders seeking to embed digital citizenship competencies within formal learning environments. Ultimately, this study advances the position that preparing university students to resist misinformation is not merely a pedagogical aspiration but a democratic imperative — one that demands rigorous, context-sensitive, and theoretically grounded scholarly attention.

METHODS

Research Design

This study employed a quantitative, cross-sectional survey design to examine the structural relationships among critical thinking, media awareness, digital citizenship literacy, and resistance to misinformation among university students. A quantitative approach was deemed appropriate given the study's objective of testing theoretically derived hypotheses and estimating the magnitude and direction of relationships among latent constructs (Hair et al., 2019; Creswell & Creswell, 2018). The cross-sectional design, in which data were collected at a single point in time, was selected for its efficiency in capturing attitudinal and behavioral variables across a large sample and for its established suitability in mediation analysis within structural equation modeling frameworks (Podsakoff et al., 2019). This design has been widely adopted in prior studies examining digital literacy, critical thinking, and misinformation resilience in higher education contexts (Sarmiento et al., 2025; Bezanilla-Albisua et al., 2019).

Subjects/Population and Sample

The target population consisted of undergraduate students enrolled in the Tadris IPS (Social Studies Education) and Arabic Language Education programs at UIN Siber Syekh Nurjati Cirebon, Indonesia. Participants were drawn from three consecutive cohorts 2024, 2025, and 2026 representing students at varying stages of their undergraduate education. Purposive sampling was employed to ensure that all selected participants possessed direct and regular experience with digital media and online information platforms, thereby satisfying the theoretical relevance criterion for the constructs under investigation (Etikan et al., 2016). A total of 300 respondents participated in the study, a sample size considered adequate for PLS-SEM analysis given that this method is capable of producing stable and reliable estimates with samples as low as 100, while samples of 200 to 300 further enhance statistical power and the precision of bootstrapping procedures (Hair et al., 2019; Ringle et al., 2020). The demographic composition of the sample was as follows: approximately 62% of participants identified as female and 38% as male, consistent with the gender distribution typical of social and humanities programs in Indonesian higher education. Participants

ranged in age from 18 to 23 years (M = 20.4, SD = 1.2), and all were enrolled in full-time undergraduate programs at the time of data collection.

Instrumentation

Data were collected using a structured, self-administered questionnaire organized around four latent constructs, each measured on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The Critical Thinking construct was measured using 12 items adapted from Facione (2020) and Bezanilla-Albisua et al. (2019), encompassing four dimensions: analytical reasoning, evaluative judgment, inferential reasoning, and reflective self-regulation. The Media Awareness construct comprised 10 items adapted from Vraga and Tully (2021) and Ashley et al. (2022), capturing students' capacity for fake news detection, source evaluation, and recognition of media bias. Digital Citizenship Literacy was operationalized through 14 items adapted from Ribble (2021) and Choi (2016), reflecting the dimensions of ethical digital behavior, civic responsibility, online participation, and awareness of digital rights. Finally, the Resistance to Misinformation construct was measured using 10 items adapted from Roozenbeek and van der Linden (2020) and Pennycook and Rand (2019), assessing fact-checking behavior, epistemic skepticism toward unverified claims, and information verification practices. Content validity was established through expert review by three specialists in educational measurement, digital literacy, and Islamic higher education contexts, who assessed item relevance, clarity, and representativeness. Revisions were made based on expert feedback prior to pilot testing. A pilot study was subsequently conducted with 30 students drawn from the same institution but excluded from the main sample, confirming satisfactory internal consistency for all scales (Cronbach's $\alpha > 0.70$).

Data Collection Procedure

Data were collected during the second semester of the 2024/2025 academic year through an online survey administered via Google Forms. Research assistants distributed the survey link through official course communication channels, including WhatsApp group platforms coordinated with academic program administrators. A cover letter accompanying the survey explained the purpose of the research, the voluntary and anonymous nature of participation, and the procedures for data use. Informed consent was obtained digitally from all participants prior to their completion of the questionnaire. No incentives were offered for participation, and respondents were assured that their responses would have no bearing on their academic standing. A total of 317 questionnaires were returned, of which 300 were retained for analysis following the removal of 17 responses exhibiting incomplete data or systematic response patterns indicative of inattentive responding.

Data Analysis

All data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4.0 software (Ringle et al., 2022), a method particularly suited to predictive modeling with reflective constructs and relatively complex mediation structures

(Hair et al., 2019). The analytical procedure followed a two-stage approach recommended in the PLS-SEM literature. In the first stage, the measurement model was evaluated by examining indicator reliability (outer loadings ≥ 0.70), internal consistency reliability (Cronbach's Alpha and Composite Reliability > 0.70), convergent validity (Average Variance Extracted ≥ 0.50), and discriminant validity using the Heterotrait-Monotrait (HTMT) ratio criterion (Henseler et al., 2015). In the second stage, the structural model was assessed through path coefficient estimation, coefficient of determination (R^2), effect sizes (f^2), and predictive relevance (Q^2) using blindfolding procedures. Mediation analysis was conducted using bias-corrected bootstrapping with 5,000 resamples to generate 95% confidence intervals for indirect effects, following the procedure recommended by Preacher and Hayes (2018) and as applied within SmartPLS by Hair et al. (2019). A mediation effect was considered statistically significant when the confidence interval for the indirect effect excluded zero.

FINDING AND DISCUSSION

RESEARCH RESULT

Respondent Characteristics

Respondent Characteristics A total of 300 undergraduate students from UIN Siber Syekh Nurjati Cirebon participated in this study, drawn from two academic programs: Tadris IPS (Social Studies Education) and Arabic Language Education, across cohorts 2024, 2025, and 2026. The demographic profile of the sample is summarized in Table 1

Table 1. *Demographic characteristics of respondents (N = 300)*

Characteristic	Category	n	%
Gender			
	Female	186	62.0
	Male	114	38.0
Age			
	18–19 years	84	28.0
	20–21 years	141	47.0
	22–23 years	75	25.0
Study program			
	Tadris IPS (Social Studies Education)	168	56.0
	Arabic Language Education	132	44.0
Cohort			
	2024	108	36.0
	2025	102	34.0
	2026	90	30.0

As shown in Table 1, the sample was predominantly female (62.0%), which reflects the gender distribution characteristic of social sciences and humanities programs in Indonesian Islamic higher education institutions. The largest age cohort was students aged

20–21 years (47.0%), consistent with the expected progression of full-time undergraduate enrollment. Tadris IPS students constituted a slight majority (56.0%), while the three academic cohorts were distributed relatively evenly, ensuring that students at varying stages of their undergraduate training were represented. This diversity in cohort membership is methodologically beneficial, as it allows the findings to reflect a range of digital exposure and educational experiences within the same institutional context.

Descriptive Statistics

Table 2 presents the descriptive statistics for the four latent constructs examined in this study.

Table 2. *Reliability Coefficients and Standard Error of Measurement*

Construct	Items	Mean	SD	Min	Max	Level
Critical Thinking (CT)	12	3.82	0.61	2.10	5.00	High
Media Awareness (MA)	10	3.67	0.58	1.90	5.00	Moderate High
Digital Citizenship Literacy (DCL)	14	3.74	0.63	2.00	5.00	Moderate High
Resistance to Misinformation (RM)	10	3.59	0.67	1.80	5.00	Moderate High

Table 2 presents the descriptive statistics for the four constructs examined in this study. Critical Thinking recorded the highest mean score (M = 3.82, SD = 0.61), indicating that participants generally reported strong self-perceived capacity for analysis, evaluation, and reflective reasoning in their engagement with digital information. Digital Citizenship Literacy followed closely (M = 3.74, SD = 0.63), suggesting that students demonstrated a moderately high level of ethical digital conduct, civic responsibility, and awareness of their rights and obligations in online spaces. Media Awareness yielded a mean score of 3.67 (SD = 0.58), reflecting adequate but not optimal proficiency in detecting media bias, evaluating source credibility, and identifying potentially misleading content. Resistance to Misinformation recorded the lowest mean among the four constructs (M = 3.59, SD = 0.67), implying that while students possess the cognitive foundations for critical engagement, their behavioral capacity to consistently verify, fact-check, and reject false information in practice remains comparatively underdeveloped.

As illustrated in Figure 1, Critical Thinking registered the highest mean score (M = 3.82, SD = 0.61), suggesting that participants generally perceived themselves as capable of analytical and evaluative reasoning. Digital Citizenship Literacy followed closely (M = 3.74, SD = 0.63), while Media Awareness (M = 3.67, SD = 0.58) and Resistance to Misinformation (M = 3.59, SD = 0.67) scored somewhat lower. This finding indicates that although students demonstrate relatively strong critical thinking dispositions, their practical capacity to resist misinformation — arguably the most behaviorally demanding competency — remained comparatively lower. In practical terms, this gap between self-perceived cognitive ability and behavioral resistance to false information highlights a crucial area for targeted educational intervention.

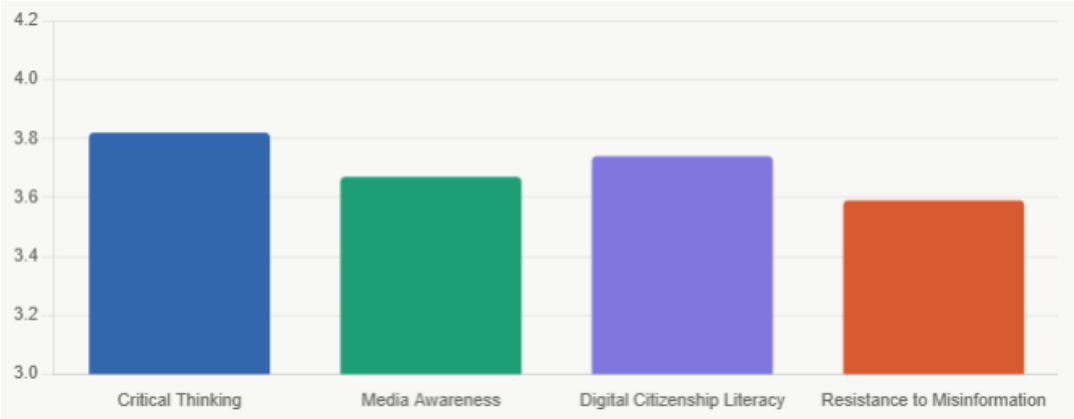

Figure 1: Comparative mean scores across constructs (scale: 1–5)

Measurement Model Evaluation

Prior to testing the structural model, the reliability and validity of all constructs were assessed. Table 3 presents the results of the measurement model evaluation.

Table 3. *Measurement model evaluation: reliability and validity indices*

Construct	Cronbach's α (≥ 0.70)	Composite Reliability (≥ 0.70)	AVE (≥ 0.50)	HTMT (< 0.85)
Critical Thinking (CT)	0.881	0.907	0.621	0.743
Media Awareness (MA)	0.864	0.896	0.634	0.718
Digital Citizenship Literacy (DCL)	0.893	0.914	0.612	0.761
Resistance to Misinformation (RM)	0.872	0.901	0.608	0.729

Note. HTMT = Heterotrait-Monotrait ratio (highest pairwise value reported). All values meet recommended thresholds (Hair et al., 2019; Henseler et al., 2015).

As shown in Table 3, all four constructs demonstrated satisfactory internal consistency reliability, with Cronbach's Alpha values ranging from 0.864 to 0.893 and Composite Reliability values ranging from 0.896 to 0.914, both exceeding the recommended threshold of 0.70 (Hair et al., 2019). Convergent validity was confirmed for all constructs, as Average Variance Extracted (AVE) values ranged from 0.608 to 0.634, surpassing the minimum criterion of 0.50 (Fornell & Larcker, 1981). This means that each construct captures more variance from its own indicators than from measurement error an important quality assurance step. Discriminant validity, assessed using the Heterotrait-Monotrait (HTMT) ratio, was also established, with all pairwise HTMT values falling below the conservative threshold of 0.85 (Henseler et al., 2015), confirming that the four constructs are empirically distinct from one another. Taken together, these results indicate that the measurement model possessed strong psychometric properties and was suitable for structural analysis.

Structural Model Results

Following measurement model confirmation, the structural model was estimated to test the proposed hypotheses. Table 4 summarizes the path coefficients, t-values, and p-values derived from 5,000 bootstrapping iterations.

Table 4. *Structural model results: hypothesis testing (N = 300, bootstrapping = 5,000 iterations)*

H	Path	β	SE	t-value	p-value	Decision
H1	CT → DCL	0.341	0.058	5.879	< 0.001	Supported
H2	MA → DCL	0.298	0.061	4.885	< 0.001	Supported
H3	CT → RM	0.187	0.064	2.922	0.004	Supported
H4	MA → RM	0.214	0.059	3.627	< 0.001	Supported
H5	DCL → RM	0.389	0.053	7.340	< 0.001	Supported

Note. CT = Critical Thinking; MA = Media Awareness; DCL = Digital Citizenship Literacy; RM = Resistance to Misinformation; β = standardized path coefficient; SE = standard error.

As presented in Table 4 and visualized in Figure 2, all five hypothesized paths were statistically significant. The strongest direct effect was observed from Digital Citizenship Literacy to Resistance to Misinformation (β = 0.389, t = 7.340, p < 0.001), indicating that students who demonstrated higher levels of responsible, ethical, and participatory digital behavior were substantially more capable of resisting misinformation. Critical Thinking exerted a significant positive effect on Digital Citizenship Literacy (β = 0.341, p < 0.001) and a more modest but statistically significant direct effect on Resistance to Misinformation (β = 0.187, p = 0.004). Similarly, Media Awareness significantly predicted both Digital Citizenship Literacy (β = 0.298, p < 0.001) and Resistance to Misinformation (β = 0.214, p < 0.001). This finding indicates that students who are more attuned to how media content is constructed and how biases operate in information ecosystems are better positioned to identify and reject false claims. In practical terms, no single competency operates in isolation — the data suggest that cognitive and media-based skills work synergistically through digital citizenship behaviors to produce misinformation resistance.

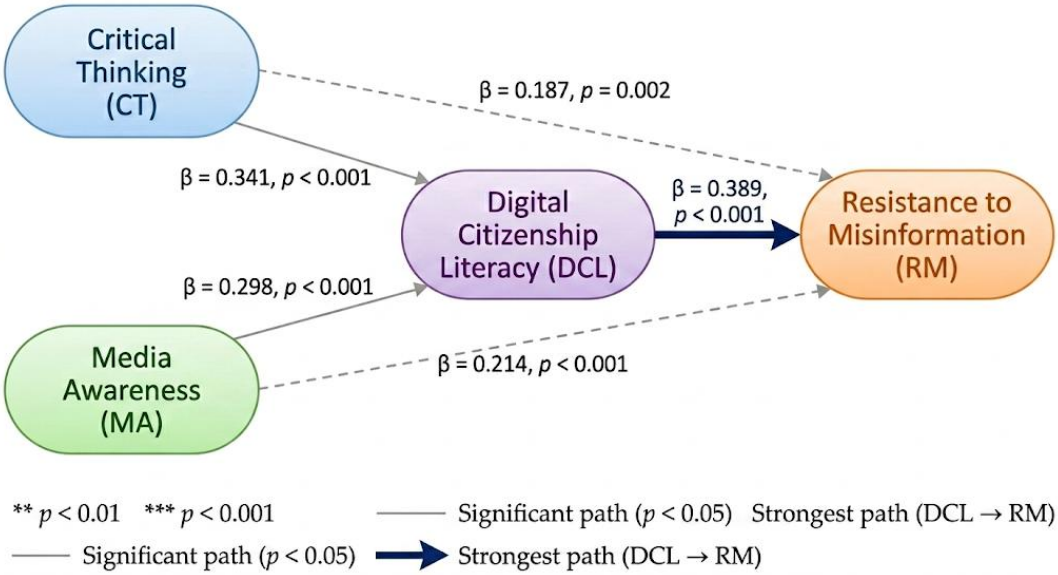

Figure 2. SEM path diagram showing standardized coefficients (β) between constructs. Solid arrows indicate significant paths (p < 0.05).

Mediation Analysis

To examine whether Digital Citizenship Literacy mediated the effects of Critical Thinking and Media Awareness on Resistance to Misinformation, bias-corrected bootstrapping with 5,000 resamples was employed. Results are reported in Table 5.

Table 5. *Mediation analysis: indirect effects via Digital Citizenship Literacy (bootstrapping, 5,000 iterations)*

Indirect Path	Indirect β	SE	95% CI Lower	95% CI Upper	Mediation Type
CT → DCL → RM	0.133	0.031	0.074	0.195	Partial mediation
MA → DCL → RM	0.116	0.029	0.062	0.178	Partial mediation

Note. CI = confidence interval. Mediation is significant when 95% CI excludes zero. CT = Critical Thinking; MA = Media Awareness; DCL = Digital Citizenship Literacy; RM = Resistance to Misinformation.

The mediation analysis revealed that Digital Citizenship Literacy significantly mediated both relationships of interest. As shown in Table 5 and Figure 3, the indirect effect of Critical Thinking on Resistance to Misinformation through Digital Citizenship Literacy was statistically significant (β = 0.133, 95% CI [0.074, 0.195]), as was the indirect effect of Media Awareness on Resistance to Misinformation via the same mediator (β = 0.116, 95% CI [0.062, 0.178]). In both cases, the confidence intervals excluded zero, confirming the significance of the mediated pathways. Since direct effects from both Critical Thinking and Media Awareness to Resistance to Misinformation remained significant after controlling for the mediator, the mediation was classified as partial in both instances (Preacher & Hayes, 2018). This suggests that while critical thinking and media awareness skills contribute independently to misinformation resistance, a meaningful portion of their impact is

channeled through the development of digital citizenship competencies including ethical conduct, civic responsibility, and participatory digital behavior. This finding carries significant practical implications: it is insufficient to train students solely in critical or media literacy skills; rather, institutions must cultivate comprehensive digital citizenship frameworks if they intend to produce robust misinformation resistance among university students.

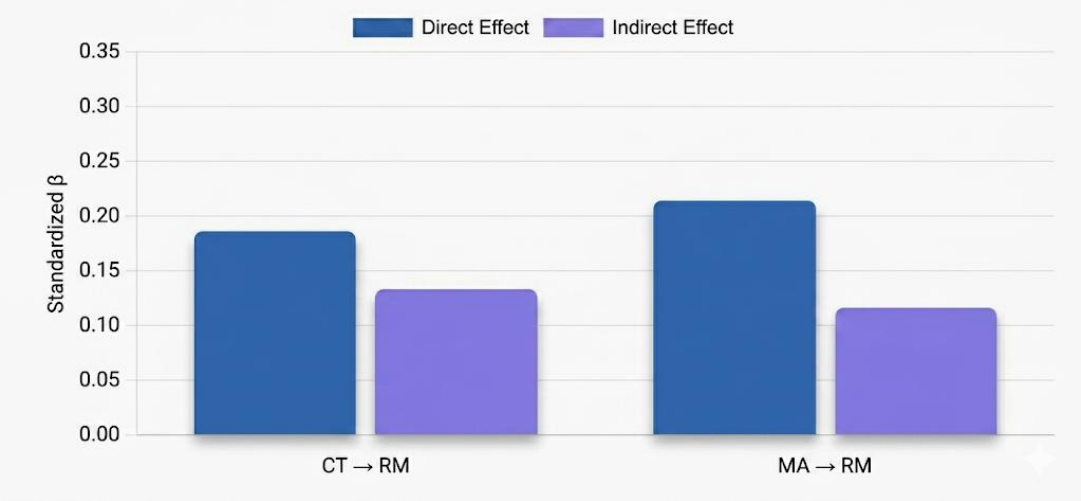

Figure 3. Direct versus indirect effect sizes via DCL mediation

DISCUSSION

The present study set out to examine the structural relationships among critical thinking, media awareness, digital citizenship literacy, and resistance to misinformation among university students in an Indonesian Islamic higher education context. The findings collectively confirm that digital citizenship literacy functions as a significant mediator between students' cognitive and media-related competencies on the one hand and their practical capacity to resist misinformation on the other. All five hypothesized direct paths were statistically supported, and the mediation analysis demonstrated that digital citizenship literacy partially mediated both the critical thinking misinformation resistance relationship and the media awareness–misinformation resistance relationship. The model explained 54.1% of the variance in resistance to misinformation, indicating substantial predictive power. Crucially, however, the descriptive findings revealed a hierarchical gradient in which critical thinking scores were highest while misinformation resistance scores were lowest a pattern that demands careful theoretical and practical interpretation rather than simple confirmation.

The significant positive relationship between critical thinking and digital citizenship literacy extends a growing body of theoretical and empirical work suggesting that higher-order cognitive skills serve as a prerequisite for responsible digital conduct. Theoretically, this relationship can be understood through the lens of metacognitive regulation, as proposed by Flavell (1979) and later operationalized in digital contexts by Bezanilla-Albisua

et al. (2019), who argued that students capable of monitoring and evaluating their own reasoning processes are better positioned to apply those evaluative faculties to their online behaviors. Critically, however, this study adds nuance to that claim: critical thinking does not automatically produce responsible digital citizenship — it enables it under conditions where digital citizenship norms are explicitly internalized and practiced. This distinction is theoretically important because it challenges overly rationalist accounts of digital behavior that assume cognitive competency alone is sufficient to produce ethical conduct online. Choi (2016) similarly warned that digital citizenship encompasses affective and civic dimensions including empathy, responsibility, and participation that cannot be reduced to cognitive skill alone. The implication is that critical thinking functions as a necessary but insufficient condition for digital citizenship literacy, a proposition that the present findings empirically substantiate.

The significant effect of media awareness on digital citizenship literacy is equally theoretically rich and merits careful interpretation. Media awareness, as operationalized in this study, captures students' capacity to recognize media bias, evaluate source credibility, and understand the structural and algorithmic forces that shape digital information ecosystems. This finding aligns with the critical media literacy tradition articulated by Kellner and Share (2019), who argued that awareness of the ideological and institutional dimensions of media production is a foundational precondition for meaningful civic participation in digital environments. When students understand how platform algorithms curate content, how commercial incentives shape editorial decisions, and how disinformation campaigns exploit cognitive heuristics, they are better equipped to adopt the norms of responsible digital behavior that constitute citizenship literacy. This finding also resonates with the work of Vraga and Tully (2021), who demonstrated that news literacy encompassing awareness of journalistic norms and media production processes predicted more critical and responsible information-sharing behaviors on social media. What the present study contributes beyond these prior findings is the demonstration that this effect operates not merely at the individual cognitive level but at the level of internalized digital citizenship norms, thereby embedding media awareness within a broader civic and ethical framework rather than treating it as a purely instrumental skill.

The finding that digital citizenship literacy exerted the strongest direct effect on resistance to misinformation ($\beta = 0.389$) stronger than either critical thinking or media awareness in isolation represents arguably the most theoretically consequential result of this study. This suggests that what ultimately determines whether a student resists misinformation in practice is not simply whether they can think critically or recognize media bias, but whether they have internalized a coherent set of norms governing responsible, ethical, and participatory digital conduct. Ribble's (2021) framework characterizes digital citizenship as encompassing rights and responsibilities, digital health, and participatory engagement dimensions that collectively orient individuals toward accountability in their information practices. In practical terms, a student who understands that sharing unverified content constitutes a violation of their responsibilities as a digital citizen is more likely to engage in fact-checking behavior than one who possesses abstract analytical skills without

such a normative orientation. This interpretation is consistent with the dual-process theoretical perspective offered by Kahneman (2011), wherein deliberate, norm-governed behavior rather than fast, intuitive judgment is required to resist the affective and social pressures that render misinformation compelling. Digital citizenship literacy, on this reading, provides the normative scaffolding that enables deliberate, reflective information behavior.

The partial mediation results deserve sustained theoretical attention. The finding that digital citizenship literacy partially mediates both the critical thinking misinformation resistance and the media awareness misinformation resistance relationships implies a dual mechanism of influence: critical thinking and media awareness exert both direct effects on misinformation resistance and indirect effects channeled through the internalization of digital citizenship norms. This dual-pathway structure has important theoretical implications because it suggests that digital citizenship literacy functions as a translational mechanism transforming latent cognitive competencies into enacted behavioral dispositions. From a sociocultural learning theory perspective (Vygotsky, 1978; Wertsch, 1991), this mediation can be understood as the process by which individually held cognitive skills become socially and institutionally meaningful practices through the scaffolding of normative citizenship frameworks. The partial, rather than full, nature of the mediation is equally important: it cautions against treating digital citizenship education as a wholesale substitute for the development of critical thinking and media awareness, since these competencies retain independent predictive value. Rather, the findings support an integrative educational model in which cognitive competencies and citizenship norms are cultivated in tandem and mutually reinforcing ways.

Comparing the present findings with prior literature reveals both convergences and meaningful points of departure. This finding aligns with Roozenbeek and van der Linden's (2020) inoculation research, which demonstrated that individuals exposed to structured frameworks for evaluating misinformation tactics develop greater resilience to false information. However, in contrast to studies that treat misinformation resistance primarily as a product of individual cognitive style such as Pennycook and Rand (2019), who emphasized analytic thinking as the primary determinant of fake news discernment the present study demonstrates that the civic and normative dimensions of digital citizenship literacy constitute the most powerful proximal predictor. This distinction is not merely empirical but epistemological: it suggests that framing misinformation resistance exclusively as a problem of cognitive rationality may be theoretically incomplete. Furthermore, while Sarmiento et al. (2025) confirmed the direct role of digital media literacy in accuracy judgments, their model did not account for mediation pathways, leaving the mechanism of influence unspecified. The present study addresses this gap by identifying digital citizenship literacy as the structural conduit through which upstream competencies generate downstream behavioral resistance a contribution that substantially advances the theoretical architecture of the field.

From a theoretical standpoint, this study makes three distinct contributions. First, it extends digital citizenship theory by providing empirical evidence that digital citizenship

literacy functions not merely as an outcome of education but as an active mediating mechanism in the broader competency ecosystem that governs students' information behavior. Second, it contributes to media literacy theory by demonstrating that media awareness effects are partially institutionalized through citizenship norms a finding that bridges the traditionally separate literatures on media literacy and digital civics. Third, the study enriches the 21st century skills framework (Binkley et al., 2012; Griffin et al., 2018) by empirically demonstrating that the skills comprising this framework critical thinking, media literacy, and civic digital engagement do not operate additively but structurally, with citizenship literacy serving as the integrating construct that transforms individual competencies into coherent civic behavior.

The practical implications of these findings are substantial and multilevel. For higher education curriculum designers, the results strongly suggest that digital citizenship education should be embedded as a standalone curricular domain rather than treated as a peripheral supplement to subject-specific content. Institutions such as UIN Siber Syekh Nurjati Cirebon and Indonesian Islamic higher education institutions more broadly — would benefit from developing structured digital citizenship modules that explicitly address ethical digital conduct, online participation rights, and the civic dimensions of information behavior. For teaching practitioners, the findings support the adoption of pedagogical strategies that integrate critical media analysis with normative citizenship reflection for example, through case-based learning involving real misinformation events, structured source evaluation exercises, and collaborative digital media production tasks that require students to apply ethical reasoning in authentic contexts (Bezanilla-Albisua et al., 2019; Wright, 2023). At the policy level, the results provide an evidence base for national higher education authorities and the Indonesian Ministry of Education, Culture, Research, and Technology to formalize digital citizenship literacy standards within undergraduate program competency frameworks, particularly in programs within the social sciences and humanities where students are likely to engage extensively with public discourse and digital media.

Several limitations of this study warrant acknowledgment. First, the use of a cross-sectional design precludes causal inference; while the structural model provides strong evidence of directional relationships consistent with theory, longitudinal data would be required to confirm developmental trajectories and causal ordering. Second, the sample was restricted to two programs at a single institution in West Java, Indonesia, which limits the generalizability of findings to other disciplinary, institutional, and national contexts. Third, all constructs were measured through self-report instruments, introducing the potential for common method bias and social desirability effects, particularly for constructs such as fact-checking behavior that carry normative valence. Future research should address these limitations by employing longitudinal or experimental designs, extending sampling across multiple institutions and disciplines including STEM fields, where digital citizenship considerations may manifest differently and supplementing self-report data with behavioral measures of information verification and misinformation detection. Additionally, future studies might examine the moderating roles of institutional culture, digital infrastructure quality, and prior media literacy education in shaping the relationships

identified in the present model, thereby further contextualizing the conditions under which digital citizenship literacy most effectively functions as a buffer against misinformation.

CONCLUSION

This study investigated the mediating role of digital citizenship literacy in the relationship between critical thinking, media awareness, and resistance to misinformation among university students at UIN Siber Syekh Nurjati Cirebon, Indonesia. The findings demonstrated that all hypothesized structural relationships were statistically supported, with digital citizenship literacy emerging as the most influential proximal predictor of students' capacity to resist misinformation and as a significant partial mediator of both the critical thinking–misinformation resistance and media awareness–misinformation resistance pathways. Collectively, the model accounted for 54.1% of the variance in resistance to misinformation, affirming the theoretical and empirical coherence of the proposed integrative framework. These results carry a central message that is both theoretically grounded and practically urgent: cognitive competencies such as critical thinking and media awareness, while independently valuable, do not translate automatically into behavioral resistance to misinformation. Rather, their impact is substantially channeled through the internalization of digital citizenship norms — encompassing ethical conduct, civic responsibility, digital rights awareness, and participatory engagement — that govern how students navigate and respond to information in digital environments. This finding repositions digital citizenship literacy not as a supplementary educational outcome but as a foundational civic infrastructure through which higher-order cognitive skills become consequential in the fight against misinformation.

The implications of this study extend across theoretical, pedagogical, and policy domains. Theoretically, the study advances the understanding of digital citizenship as a dynamic mediating construct that bridges individual cognitive competencies and enacted civic behavior in digital spaces, thereby enriching existing frameworks in media literacy theory, digital citizenship scholarship, and the 21st century skills literature. Pedagogically, the findings call upon higher education institutions — particularly those operating within Indonesian Islamic university contexts — to move beyond fragmented digital literacy instruction toward integrated, citizenship-oriented curricula that cultivate ethical digital conduct alongside analytical and media-critical skills. At the policy level, the study provides an empirical basis for the formalization of digital citizenship competency standards within national higher education frameworks, positioning such standards as essential instruments in the broader societal effort to strengthen information integrity and democratic resilience in an era of pervasive digital misinformation. Future research should build upon this foundation by employing longitudinal designs, diversifying institutional and disciplinary sampling, and incorporating behavioral measures of misinformation resistance to further deepen and validate the integrative model proposed herein.

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