

Techno-linguistic Complementarity: Digital Proficiency and the Formation of Youth National Language Attitudes

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Abstract

Technological advancement has transformed how young people communicate in digital environments, potentially influencing the existence of the Indonesian language. This study fills a research gap by examining young people's attitudes toward the Indonesian language based on their level of technological proficiency, exploring the cognitive, affective, and behavioral aspects. The research employed a cross-sectional survey design. A total of 1,338 young adults (aged 18–23) who were university students from various fields of study across nine public and private universities in Indonesia were included as the research sample. The findings show that the level of technological proficiency significantly affects all dimensions across the cognitive (useful, important, educated), affective (connected, comfortable, attractive), and behavioral (study, use, media, class) aspects. Students with a very high level of technological proficiency consistently achieved the highest scores across all dimensions of cognitive and affective aspects. In the behavioral aspect, students with very high proficiency achieved the highest scores in the media and class dimensions, whereas those with very low proficiency scored slightly higher in the study and use dimensions. These findings confirm that technological proficiency is a key factor in strengthening young people's cognition, affection, and behavior toward the Indonesian language in the digital era. The theoretical contribution of this research expands the scope of language attitude theory by introducing technological proficiency as a new mediating variable. Practically, the results of this study provide a basis for designing integrative language strategies and digital literacy policies.

Key words: language attitude, language and technology, Indonesian language, youth language, digital technology

Introduction

The development of digital technology has transformed the way humans communicate and use language in everyday contexts (Aladini & Gheisari, 2025; Trianto et al., 2025). This transformation is most evident among young generations who grow up in digitally intensive environments, such as social media platforms and artificial intelligence-based systems. With technological advancement, today's youth can access, process, and use language in more dynamic and multimodal contexts (Gu et al., 2023; Yelland, 2018). However, this development has also had negative implications for the existence of Indonesian as the national language. The widespread use of abbreviations, emoticons, acronyms, and code-mixing on social media platforms may reduce sensitivity toward formal linguistic norms (Panjaitan & Patria, 2024; Thurlow & Mroczek, 2011). The language use of young people in the digital era thus reflects their language attitude. Speaker attitude is one of the nine evaluative factors of language vitality established by UNESCO (Tamburelli et al., 2025). Therefore, exploring young people's language attitudes toward the Indonesian language in the digital era is urgently needed.

Various international studies have examined youth language attitudes. The study by Nie and Wang (2025) revealed that linguistic landscape disparities in public spaces strongly influence language attitudes and practices, confirming the vital role of digital communication in public domains. In another perspective, young people also

contribute to language vitality. Banguis et al. (2025) found that the low use of the Subanen language among Filipino youth has raised concerns about its sustainability. Similarly, young Chinese speakers exhibit an inferior attitude toward their local language and aspire to master American or British English (Pan, 2019). Determining language attitudes in multiethnic and multilingual societies requires an exploratory approach (Ghyselen et al., 2022). Given that Indonesia meets both conditions, exploring its youth's language attitudes is crucial. This phenomenon underscores the importance of research that connects young people's attitudes toward the Indonesian language.

Studies on language attitudes in Indonesia have been conducted; however, research that considers the influence of technology remains scarce. Trianto et al. (2025) compared the use of Sundanese and Indonesian among millennials. Sukamto et al. (2021) found that students in international schools in Jakarta feel more comfortable using English than Indonesian. Similarly, Wati (2023) explored the language attitudes of urban Javanese and Sundanese communities. Nevertheless, empirical studies demonstrating the influence of technology on young people's linguistic knowledge, attitudes, and practices toward the national language are still rare. Previous studies on language attitude have primarily focused on social factors (McKenzie et al., 2025; Suebwongsuwan & Nomnian, 2020), stages of language use in public spaces (Iye et al., 2023; Osman et al., 2022), and generational perspective differences (Hamzah et al., 2024). Therefore, exploring young people's language attitudes toward the Indonesian language in the digital era is essential. This research is strategically significant for supporting efforts to preserve and strengthen the Indonesian language's role as the national language in digital spaces. Hence, this study provides a foundation for developing more inclusive, adaptive, and linguistically equitable language and technology policies.

This research aims to fill the existing gap in the literature by investigating three dimensions of language: cognitive, affective, and behavioral, toward the Indonesian language among young people actively engaged in digital environments. The findings of this study provide new theoretical insights into language use in digital spaces, expand the framework of language attitude theory in the context of digital multilingualism, and offer an empirical foundation for developing relevant language and education policies in the technological era.

Literature Review

Language Attitude

Language attitude is a psychological and social aspect that reflects an individual's perspective, feelings, and tendencies toward a particular language (Garrett, 2010). It encompasses speakers' beliefs and evaluations of a specific language, which influence their linguistic choices and behaviors. Holmes and Wilson (2022) assert that language attitude consists of three components: cognitive, affective, and behavioral. More recently, Li and Wei (2022) developed specific indicators for these three main components: cognition (useful, important, educated), affect (connected, comfortable, attractive), and behavior (study, use, media, class). These components are adopted as the analytical foundation for examining language attitudes in this study.

Language attitude serves as a key factor in language maintenance (Włosowicz, 2017). It can have either a positive or negative impact on language sustainability depending on the speakers' perceptions (Bell, 2013). Gomashie (2025) reported the crucial role of language attitude in intergenerational transmission. Various studies have demonstrated the role of language attitude in both language maintenance and language shift. Letsholo (2009) found that young speakers aged 17–25 tended to shift from Ikalanga (a minority language in Botswana) to Setswana and English, even within communities of native Ikalanga speakers. This finding confirms

that language attitudes can be shaped by the influence of dominant languages in one's social environment. A cross-generational study by Hamzah et al. (2024) on the Kensi language (Lubuk Gelong, Malaysia) revealed contrasting perspectives between older and younger generations.

Empirical studies have also explored language attitudes within Indonesia's multilingual context. Mukhamdanah et al. (2025) revealed that young people tend to use local languages in direct interactions with older family members but rarely use them in written, digital, or peer communication. Another study by Santoso et al. (2024) found that Indonesian university students perceive English as a means to access better employment opportunities. Tran et al. (2024) identified factors influencing language attitudes toward language maintenance, reporting that language practice, language ideology, and language management contribute to language preservation among Vietnamese-Australian parents. Therefore, language attitude can be understood as a reflection of social relations that symbolize status, identity, and resistance.

Several studies have discussed efforts to maintain language vitality through fostering positive language attitudes. Włosowicz (2017) examined language maintenance strategies among Polish-speaking English teachers, which included reading books, watching films, and conversing with native Polish speakers. Ianos et al. (2019) found that heritage language programs helped Romanian youth develop a positive attitude toward maintaining their language. Solutions for language maintenance related to language attitudes can be implemented in two primary domains: schools, through community language programs, and families, to stimulate positive language-use attitudes (Suek, 2014). Social networks also serve as a primary factor in understanding language maintenance (Casesnoves et al., 2019). These empirical findings demonstrate that language attitudes can be strengthened through targeted interventions. Within this context, exploring young people's attitudes toward the Indonesian language in the digital era serves as a preventive and strategic effort to sustain linguistic vitality.

Language and Technology

Empirical studies indicate a strong relationship between technology, language processing, interaction, and human linguistic behavior. Massaroni et al. (2023) revealed the negative effects of screen time on cognitive and linguistic development. The more time individuals spend on screens, the greater the negative impact on their language development. Another study investigated digital discourse and patterns of language use in digital spaces, a phenomenon referred to as "e-language" (Knight, 2015). Social media users can send and receive messages instantly, view when messages are being typed, and see the exact time they are delivered, thereby creating new patterns of shared digital interaction. Consequently, technological advancement influences not only cognitive linguistic abilities but also interactional patterns and linguistic practices in digital spaces, rendering language a dynamic and contextual phenomenon.

From a modern sociolinguistic perspective, language is viewed as a social practice that adapts to its communicative context and medium. As the medium shifts—from oral to written, and from written to digital—both the form and function of language evolve (Blommaert, 2018). The emergence of digital media and artificial intelligence has expanded communicative spaces, making language increasingly multimodal through text, images, sound, and emojis that convey communicative intent (Tumasang, 2025). Technology actively shapes how individuals think, communicate, and evaluate languages. Androutsopoulos (2015) introduced the concept of digital language practices, which examines how linguistic behaviors on digital platforms reflect attitudes, ideologies, and linguistic identities. A positive attitude toward a

language manifests in user preferences for writing, commenting, or interacting in that language online, whereas negative attitudes appear through the avoidance or subordination of certain languages in digital spaces. Gee (2017) conceptualized digital literacy as a new form of literacy that requires an understanding of social norms, ethics, and communication strategies in virtual environments. Language in digital spaces thus functions as a marker of both personal and collective identity. Consequently, technology mediates a transformation of linguistic values—from prescriptive toward pragmatic orientations.

Within the framework of technolinguistics, these transformations are understood as the result of an active interplay between linguistic systems and technological design. Technolinguistic research emphasizes that language technologies are not neutral instruments but sociotechnical systems that shape linguistic representation, access, and legitimacy (Helm et al., 2023). Studies on minority and low-resource languages demonstrate that technological infrastructures often privilege dominant languages, resulting in systematic exclusion and what Krutrök & Isling (2025) describe as *technolinguistic suspension*, a condition in which languages are symbolically recognized yet structurally marginalized within AI-driven ecosystems. From an applied perspective, technolinguistics also calls for a closer integration between linguistic theory and technological development, arguing that technology should support meaningful, context-sensitive language use rather than merely formal or structural accuracy (Zhang, 2019). Furthermore, critical discussions within technolinguistics highlight the need to situate language technologies within broader sociocultural and ideological contexts, as communicative practices, language ideologies, and technological design mutually shape how language evolves in digital environments (Kockelman, Gershon, Alač, & Castelle, 2023).

These findings have inspired sociolinguistic inquiry into Indonesian youth's language attitudes in the digital era. The language attitudes of young people reflect their linguistic preferences and embody social values within digital spaces. Therefore, understanding the language attitudes of the younger generation in the context of digital technology is essential to comprehending the ongoing evolution of language and linguistic identity in contemporary society.

Methods

Respondents

This study, using a cross-sectional survey, aimed to investigate young people's cognition, attitudes, and behaviors toward the national language. A total of 1,338 young adults, aged 18–23, who were university students from nine public and private universities in Indonesia, were recruited as research participants. They represented various fields of study from Universitas Negeri Makassar, Universitas Muhammadiyah Makassar, Universitas Khairun Ternate, Universitas Tadulako, Universitas Muslim Indonesia, Universitas Muhammadiyah Sorong, Universitas PGRI Padang, Universitas Muslim Indonesia, and Universitas Negeri Gorontalo. Respondents from these diverse higher education institutions represented a wide range of geographical, social, and cultural characteristics. The age range of respondents was between 18 and 23 years. Table 1 presents the demographic information of the participants.

Instruments and Data Collection

The research data were collected using a questionnaire adapted and modified from the instrument developed by Li and Wei (2022). The questionnaire consisted of three main aspects: cognition, attitude, and behavior. The cognitive aspect included the dimensions of useful, important, and educated; the affective aspect comprised connected, comfortable, and attractive; and the behavioral aspect encompassed study,

use, media, and class. The adaptation process was carried out to adjust the items to the context and status of the Indonesian language as the national language. The questionnaire used a four-point Likert scale, consisting of (1) strongly disagree, (2) disagree, (3) agree, and (4) strongly agree. Examples of items include: cognitive aspect, "I believe Indonesian is an important part of national identity"; affective aspect, "I enjoy socializing using the Indonesian language"; behavioral aspect, "I make it a habit to speak Indonesian according to grammatical rules".

Table 1. Demographic information of participants (n=1338)

Category	Description	n	%
Gender	Male	328	24.51
	Female	1010	75.49
Domicile	Rural	755	56.43
	Urban	583	43.57
Field of Study	Science	74	5.53
	Education	839	62.71
	Social	267	19.96
	Technology	130	9.72
Social Media Access	Arts	28	2.09
	≤3 (hours/day)	525	39.24
	4–6 (hours/day)	662	49.48
	≥7 (hours/day)	151	11.29

Data were collected through an online survey. The researchers distributed a link inviting participants to voluntarily take part in the study. The questionnaire consisted of two parts: the first part gathered respondents' demographic information, while the second part contained statements regarding young people's perceptions of the Indonesian language as the national language. The demographic section included questions related to university affiliation, semester, study program, gender, academic achievement, parents' income category, parents' educational background, domicile, field of study, and ICT competence.

The cognitive aspect comprised 17 statements, divided into useful (5 items), important (7 items), and educated (5 items). The affective aspect contained 19 statements, covering connected (6 items), comfortable (8 items), and attractive (5 items). The behavioral aspect included 23 statements, divided into study (6 items), use (7 items), media (5 items), and class (5 items). All instruments used in this study were tested for validity and reliability. The validity test, conducted using Pearson Product Moment Correlation, showed that all statement items had correlation coefficients with a significance value of .000 (<.05). Therefore, all questionnaire items were declared valid. The internal consistency of the instrument was then measured using Cronbach's Alpha. The results indicated that all aspects and dimensions had high reliability. In the cognitive aspect, the alpha coefficients for the three dimensions were: useful=.860, important=.867, and educated=.899. For the affective aspect, the alpha coefficients were: connected=.875, comfortable=.880, and attractive=.887. Meanwhile, the behavioral aspect showed alpha coefficients of study=.834, use=.834, media=.852, and class=.897. Based on these results, all aspects and dimensions of the instrument were classified as reliable.

Data Analysis

The analysis of differences in young people's perceptions of the Indonesian language as the national language based on technological variables was conducted using Analysis of Variance (ANOVA). This test was selected because it enables comparisons of mean perceptions among groups with varying levels of technological competence or access. Through ANOVA, statistically significant differences in perceptions among youth can be identified. If the ANOVA results indicate significant differences between groups, further analysis is carried out using the Tukey post hoc test. The Tukey post hoc test determines which group pairs exhibit significant differences, ensuring that the analysis not only concludes that differences exist but also explains the relational patterns and the degree of variance among sub-variables.

Ethical Approval

The research procedures were conducted in accordance with ethical principles that respect respondents as human participants. Respondents provided voluntary consent before completing the survey. They were informed that the data collected would be used solely for academic purposes and that their identities would remain anonymous. Ethical approval for this study was obtained from the Institutional Ethics Committee of the Institute for Research and Community Service, Universitas Negeri Makassar.

Results

Technology and Youth Cognition toward the National Language in the Digital Era

The useful cognition of young people toward the national language in the digital era shows a significant relationship with their level of technological proficiency. The ANOVA test results indicate an F-value of 9.433 with $p=.000$ ($p<.05$), demonstrating a statistically significant difference in useful cognition toward the national language based on the category of technological proficiency. The group categorized as highly proficient in technology obtained the highest useful cognition score ($M=18.98$; $SD=1.52$); the proficient group scored ($M=18.40$; $SD=1.87$); the less proficient group scored lower ($M=17.85$; $SD=2.13$); and the very low proficiency group scored ($M=18.18$; $SD=1.77$). These results confirm that the higher the technological proficiency of young people, the better their useful cognition of the national language in the digital era.

The important cognition of young people toward the national language in the digital era also shows a significant relationship with their level of technological proficiency. The ANOVA test yielded an F-value of 9.789 with a significance level of $p=.000$, indicating a statistically significant difference between groups. The group with very high technological proficiency achieved the highest important cognition score ($M=26.13$; $SD=2.67$); the proficient group scored ($M=25.22$; $SD=2.70$); the less proficient group scored ($M=24.45$; $SD=2.88$); and the very low proficiency group scored ($M=24.36$; $SD=2.41$). This result emphasizes that the higher the level of technological proficiency among youth, the stronger their cognitive importance of the national language in the digital era.

The educated cognition of young people toward the national language in the digital era also shows a significant relationship with their level of technological proficiency. The ANOVA test results show $F=8.590$ with $p=.000$, indicating a significant difference in educated cognition toward the national language among groups categorized by technological proficiency. This demonstrates that technological proficiency significantly influences the educated cognition of young people in using the Indonesian language. The group with very high technological proficiency obtained the highest educated cognition score ($M=17.95$; $SD=2.57$); the proficient group scored

(M=16.80; SD=2.62); the less proficient group scored lower (M=16.26; SD=2.47); and the very low proficiency group scored (M=16.09; SD=2.98). These findings confirm that the higher the level of technological proficiency possessed by young people, the stronger their educated cognition toward the national language in the digital era.

Table 2. Differences in Levels of Technological Proficiency Based on Youth Cognition toward the National Language in the Digital Era

Aspect of Cognition	Technological Proficiency	N	M	SD	F	p
Useful	Very Proficient	61	18.9836	1.52197	9.433	.000
	Proficient	940	18.4000	1.87626		
	Less Proficient	326	17.8466	2.12699		
Important	Very Low	11	18.1818	1.77866	9.789	.000
	Very Proficient	61	26.1311	2.67380		
	Proficient	940	25.2277	2.70197		
	Less Proficient	326	24.4540	2.88594		
Educated	Very Low	11	24.3636	2.41962	8.590	.000
	Very Proficient	61	17.9508	2.57828		
	Proficient	940	16.8074	2.62172		
	Less Proficient	326	16.2607	2.47997		
	Very Low	11	16.0909	2.98176		

Technology and Youth Affect toward the National Language in the Digital Era

The connected affect of young people toward the national language in the digital era shows a significant relationship with their level of technological proficiency. The ANOVA test results indicate an F-value of 7.409 with $p=.000$, suggesting a statistically significant difference in connected affect toward the national language based on the level of technological proficiency. The group categorized as highly proficient in technology obtained the highest connected affect score (M=21.12; SD=2.49); the proficient group scored (M=20.05; SD=2.69); the less proficient group scored lower (M=19.54; SD=2.50); and the very low proficiency group scored (M=20.81; SD=2.40). These findings confirm that the higher the technological proficiency of young people, the stronger their connected affect toward the national language in the digital era.

The comfortable affect of young people toward the national language in the digital era also shows a significant relationship with their level of technological proficiency. The ANOVA test results show an F-value of 7.002 with $p=.000$, indicating a statistically significant difference in comfort level toward the national language across different levels of technological proficiency. The group with very high technological proficiency achieved the highest comfortable affect score (M=24.78; SD=2.96); the proficient group scored (M=23.36; SD=2.96); the less proficient group scored (M=22.95; SD=2.82); and the very low proficiency group scored (M=23.90; SD=2.11). These findings demonstrate that the higher the technological proficiency, the higher the comfort level of young people toward the national language in the digital era.

The attractive affect of young people toward the national language in the digital era also shows a significant relationship with their level of technological proficiency. The ANOVA test results indicate an F-value of 4.723 with $p=.000$,

revealing a statistically significant difference in attractive affect based on levels of technological proficiency. The group with very high technological proficiency obtained the highest attractive affect score (M=17.95; SD=2.26); the proficient group scored (M=17.08; SD=2.20); the less proficient group scored (M=16.82; SD=2.17); and the very low proficiency group scored (M=17.45; SD=1.69). These results affirm that the higher the technological proficiency, the stronger the attractive affect of young people toward the national language in the digital era.

Table 3. Differences in Levels of Technological Proficiency Based on Youth Affect toward the National Language in the Digital Era

Aspect of Affect	Technological Proficiency	N	M	SD	F	p
Connected	Very Proficient	61	21.1311	2.49316	7.409	.000
	Proficient	940	20.0532	2.69803		
	Less Proficient	326	19.5460	2.50219		
	Very Low	11	20.8182	2.40076		
Comfortable	Very Proficient	61	24.7869	2.96150	7.002	.000
	Proficient	940	23.3681	2.96458		
	Less Proficient	326	22.9571	2.82592		
	Very Low	11	23.9091	2.11918		
Attractive	Very Proficient	61	17.9508	2.26146	4.723	.000
	Proficient	940	17.0862	2.20224		
	Less Proficient	326	16.8282	2.17283		
	Very Low	11	17.4545	1.69491		

Technology Proficiency and Youth Behavior Toward the National Language in the Digital Era

The study of young people's behavior toward the national language in the digital era reveals a significant relationship with their level of technological proficiency. The ANOVA test results show an F-value of 6.328 with p= .000, indicating a significant difference among levels of technological proficiency in relation to youth's study behavior toward the national language in the digital era. However, the influence pattern is not entirely linear, partly due to the small sample size in the “very low” category. The group with low technological proficiency recorded the highest study behavior score (M=20.18; SD=3.15), followed by the very proficient group (M=20.08; SD=2.78), the proficient group (M=19.32; SD=2.52), and the low group (M=18.81; SD=2.30). These findings affirm that technological proficiency is related to the youth's study behavior toward the national language in the digital era, though the pattern of influence is not fully linear.

Youth's use of behavior toward the national language in the digital era also demonstrates a significant association with technological proficiency. The ANOVA results show F=5.600 with p=.000, confirming significant differences among technological proficiency levels. However, the relationship pattern is again not fully linear, as it is influenced by the small sample size in the “very low” category. The low-proficiency group obtained the highest use behavior score (M=24.00; SD=2.78), followed closely by the very proficient group (M=23.91; SD=2.78), the proficient group (M=23.00; SD=2.71), and the low group (M=22.56; SD=2.54). These findings suggest that youth with extreme levels of technological proficiency (very high or very low) tend to exhibit greater use of the national language in the digital era.

Youth's media behavior toward the national language in the digital era is also significantly related to technological proficiency. The ANOVA results indicate $F=8.805$ with $p=.000$, demonstrating significant differences among proficiency levels. The very proficient group achieved the highest media behavior score ($M=17.34$; $SD=2.27$), followed by the proficient group ($M=16.61$; $SD=2.12$), the low group ($M=16.07$; $SD=1.96$), and the very low group ($M=17.00$; $SD=2.19$). This finding emphasizes that the higher the technological proficiency, the greater the interest of youth in using the national language in digital contexts. Furthermore, extreme proficiency groups (very high and very low) exhibited higher media behavior scores compared to middle-level groups.

Similarly, the youth's class behavior toward the national language in the digital era shows a significant correlation with technological proficiency. The ANOVA results ($F=9.204$; $p=.000$) indicate meaningful differences among groups. The very proficient group obtained the highest class behavior score ($M=17.32$; $SD=2.27$), followed by the proficient group ($M=16.64$; $SD=2.15$), the low group ($M=16.05$; $SD=1.98$), and the very low group ($M=16.81$; $SD=2.27$). This suggests that even youth with very low technological proficiency display relatively higher class behavior compared to those in the middle proficiency group.

Table 4. Differences in Technological Proficiency Levels Based on Youth Behavior Toward the National Language in the Digital Era

Aspect of Behavior	Technological Proficiency	N	M	SD	F	p
Study	Very Proficient	61	20.08	2.79	6.328	.000
	Proficient	940	19.32	2.53		
	Low	326	18.82	2.30		
	Very Low	11	20.18	3.16		
Use	Very Proficient	61	23.92	2.79	5.600	.001
	Proficient	940	23.01	2.72		
	Low	326	22.56	2.54		
	Very Low	11	24.00	2.68		
Media	Very Proficient	61	17.34	2.27	8.805	.000
	Proficient	940	16.62	2.13		
	Low	326	16.08	1.97		
	Very Low	11	17.00	2.19		
Class	Very Proficient	61	17.33	2.27	9.204	.000
	Proficient	940	16.64	2.16		
	Low	326	16.06	1.99		
	Very Low	11	16.82	2.27		

Discussion

A Paradigm Shift in Digital Proficiency as Mediator of National Linguistic Identity

The research findings indicate that the level of technological proficiency is directly proportional to the level of young people's cognition toward the national

language, both in the dimensions of useful, important, and educated. Sociolinguistically, this finding reinforces the theory of attitudinal linguistics (Li & Wei, 2022), which places cognitive belief as the first component in the structure of language attitude. Young people with high digital literacy demonstrate strong cognitive awareness that the Indonesian language is useful as a means of national communication, important for collective identity, and reflective of social intelligence. This finding is consistent with the study by Jones and Procter (2023), which affirms the relationship between digital literacy, critical thinking ability, and identity awareness among European youth exposed to digital technology.

This research asserts that technological proficiency does not weaken linguistic nationalism but rather expands the functional domain of the Indonesian language into the digital sphere. From a sociolinguistic perspective, this condition can be understood as the modernization of the national language function (Fishman, 1972), characterized by its domain expansion into social media, online platforms, and technology-based academic communication. In other words, young people with high technological competence do not reject the national language but creatively adapt it within digital contexts. This finding is supported by Ren et al. (2022), who found the strengthening of local languages as a consequence of multimodal linguistic expressions in digital spaces.

The affective aspects, including connected, comfortable, and attractive, also show a positive and significant correlation with technological proficiency. The higher the technological ability, the greater the sense of attachment and comfort young people feel toward the Indonesian language. Sociolinguistically, this represents the evaluative component of language attitude (Garrett, 2010), which reflects positive feelings of speakers toward the language they use. This aligns with the findings of Obojska and Vaiouli (2025), who discovered that the use of digital media in multilingual families strengthens emotional attachment to the heritage language through digital interaction and online literacy activities.

This finding also reinforces the concept of symbolic attachment to the Indonesian language as a symbol of collective identity amid the penetration of global languages (Baker, 1992). Such emotional attachment is important because it forms the foundation of linguistic loyalty among the digital generation. Thus, technological proficiency not only enhances cognitive awareness of the national language but also deepens the emotional dimension that strengthens pride in using Indonesian. The study by Lumbanbatu (2024) on Indonesia's Z Generation shows that exposure to technology and global languages does not eliminate pride in the national language but creates a new form of hybrid linguistic identity.

A Novel Theoretical Contribution to the Techno-linguistic Complementarity Hypothesis

Our findings lead us to propose the “Techno-linguistic Complementarity Hypothesis” as a novel theoretical framework for understanding the relationship between technological proficiency and national language attitudes. This hypothesis suggests that high digital literacy doesn't displace national language competence but rather complements and enhances it by expanding its functional domains and symbolic resonance.

This hypothesis is substantiated by our affective dimension findings, which reveal that digitally proficient youth experience stronger emotional connections to Indonesian. The consistent pattern across connected, comfortable, and attractive dimensions suggests that technological competence creates new affective pathways to national language appreciation through digital identity expression and multimodal communication. This contradicts simplistic assumptions that technology-mediated communication invariably diminishes emotional attachment to national languages.

What makes this hypothesis particularly valuable is its explanatory power for the paradoxical behavioral patterns observed in our study. The non-linear relationship between technological proficiency and behavioral dimensions suggests that language behavior in digital contexts follows a more complex adaptive pattern than previously theorized. Youth at extreme ends of the technological proficiency spectrum (very high and very low) demonstrated stronger behavioral engagement with Indonesian than mid-range groups, suggesting a U-curve relationship that conventional linear models fail to capture.

This hypothesis provides a more nuanced framework than existing models of language attitude by accounting for the mediating role of technological competence in transforming how youth conceptualize, experience, and use their national language. It also explains why digitally proficient youth simultaneously embrace global communication styles while maintaining strong national linguistic identity a duality that previous theories struggled to reconcile. This aligns with Blommaert's (2018) concept of language as a social practice that adapts to its communicative medium, but extends it by identifying technological proficiency as a crucial mediating factor in this adaptation process.

Digital Ecology as a New Domain for Language Attitude Formation

Our research introduces the concept of digital ecology as a crucial new domain for language attitude formation, a dimension largely overlooked in conventional sociolinguistic frameworks. This digital ecology encompasses not just social media platforms but also the entire ecosystem of digital interfaces, algorithms, content-creation tools, and multimodal expression channels through which youth engage with language. What makes this concept particularly innovative is its recognition that digital spaces aren't merely channels for language transmission but constitute distinct sociolinguistic environments with their own norms, practices, and mechanisms for identity formation. Our findings show that highly proficient digital users develop stronger connections to Indonesian precisely because they navigate this ecology more effectively, integrating the national language into diverse digital contexts. This perspective builds upon Androutsopoulos's (2015) concept of digital language practices but extends it by demonstrating how technological proficiency mediates these practices in relation to national language attitudes.

This perspective significantly advances language attitude theory by reconceptualizing how attitudes form in contemporary communication environments. Traditional models focused primarily on family, school, and peer groups as domains of attitude formation, overlooking the increasingly central role of digital interfaces in linguistic socialization. Our research addresses this gap by demonstrating how technological proficiency shapes language attitudes within these digital ecologies. The relevance of this concept is further evidenced by behavioral findings, which show that digitally proficient youth had higher media behavior scores, indicating that those who navigate the digital ecology most competently are also most likely to actively use and promote Indonesian in these spaces. This suggests that mastery of digital environments translates into more confident assertion of national linguistic identity within them, creating a virtuous cycle between technological competence and language maintenance. These findings align with Knight's (2015) observations on "e-language" patterns but reveal how they specifically influence national language attitudes and practices.

Linguistic Paradox in Digital Behavior: A New Interpretative Framework

Unlike cognition and affection, research shows that young people's linguistic behavior is not always directly proportional to technological proficiency. Some groups with extreme technological abilities (either very high or very low) show higher

language behavior scores than the intermediate group. This pattern indicates a linguistic behavior paradox explained by the theory of language behavior inconsistency, namely the discrepancy between belief and linguistic practice (Fasold, 1985). In the context of digital sociolinguistics, this means that although young people possess knowledge and positive attitudes toward the Indonesian language, their actual language practices in digital spaces continue to be influenced by global communication styles, such as code-mixing, acronyms, and slang. Therefore, their linguistic behavior is situational and adaptive, adjusting to digital communication contexts that demand efficiency and expressiveness (Li et al., 2021).

We propose that this paradox can be understood through what we term “technological identity positioning,” where youth at opposite ends of the technological spectrum engage with the national language for different but equally powerful reasons. Highly proficient users strategically integrate Indonesian into their digital practices as an expression of technological nationalism, while low-proficiency users emphasize the language's formal aspects as an aspirational strategy to compensate for limited digital access. This interpretation substantially refines and extends Fasold's (1985) theory of language behavior inconsistency by identifying specific technological factors that influence the cognitive-behavioral gap. Our framework explains not only that inconsistencies exist (as previous theories noted) but also precisely how technological proficiency mediates them in contemporary digital contexts.

The correlation between aligned cognition and affection but contrasting behavior illustrates the three-dimensional structure of language attitude as formulated by Lambert (1967). In this study, cognition and affection form the foundation of the ideal attitude toward the national language, while behavior represents the actualization that is still being negotiated with global digital communication norms. This means that linguistic loyalty to the Indonesian language exists at the cognitive and emotional levels but has not been fully internalized in actual digital behavior. These findings confirm that changes in young people's language behavior are not a decline in attitude but rather a transition in the function of the national language within the digital ecology. The Indonesian language is entering a new domain that requires symbolic and functional adaptation to remain relevant. Therefore, future language policy strategies should focus on technology-based development of language attitudes rather than merely strengthening formal norms.

Policy Implications and Future Research Directions

This study presents an important novelty by positioning young people's attitudes toward the national language within the framework of digital ecology—a context that has received little large-scale empirical attention in international literature. Previous studies (Gu et al., 2023; Tumasang, 2025; Yelland, 2018) show that digital spaces (social media, instant messaging, short-form content platforms) are not merely communication media but also arenas for the formation of attitudes, stylistic norms, and dynamic language practices among youth. These findings highlight the need to analyze the three dimensions of attitude (cognition, affection, and behavior) in the digital context, as digitalization mediates cross-language and stylistic exposure, as well as language use as a form of generational identity expression. Thus, this research not only complements the literature on linguistic change but also extends the theoretical framework of language attitudes into multimodal and platform-affiliated domains.

The findings of this study have significant implications for language policy in multilingual societies experiencing digital transformation. Rather than treating technology and national language maintenance as opposing forces, policymakers should develop integrated approaches that leverage technological literacy to strengthen national linguistic identity. This approach is supported by Włosowicz's

(2017) research on language maintenance strategies, which can be adapted to digital contexts. Specific strategies might include: (1) developing national language digital content creation programs that engage youth as producers rather than mere consumers; (2) integrating digital literacy and national language education in complementary rather than competitive frameworks; (3) creating technological platforms that specifically support creative expression in the national language; and (4) designing targeted interventions for different technological proficiency segments based on their specific attitudinal patterns

This research opens several promising avenues for future investigation. Longitudinal studies could track how language attitudes evolve alongside technological proficiency over time, extending Hamzah et al.'s (2024) work on cross-generational perspectives to include technological dimensions. Cross-cultural comparative research could examine whether the relationships identified here hold across different linguistic and technological contexts, building on the multicultural findings of Suebwongsuwan and Nomnian (2020). Qualitative investigations could explore the specific digital practices through which technologically proficient youth express and reinforce their national linguistic identity.

Future research should also investigate the potential threshold effect suggested by our data, where reaching certain levels of technological proficiency may trigger qualitative shifts in language attitudes. Additionally, exploring how different types of digital engagement (content creation vs. consumption, public vs. private communication) influence language attitudes would further refine our understanding of these complex relationships, expanding on the digital discourse work of Thurlow and Mroczek (2011).

The implications of these findings for the field of sociolinguistics are as follows: (1) the vitality of the national language depends on the balance between technological literacy and linguistic identity awareness; (2) young people's positive cognitive and affective attitudes serve as sociolinguistic capital for maintaining the national language in digital spaces; and (3) the gap between cognition–affection and behavior highlights the need for contextual and participatory language policy approaches that encourage the use of Indonesian in creative content, artificial intelligence, and local digital platforms.

Conclusion

This study demonstrates that technological proficiency plays a crucial role in shaping young people's language attitudes toward the Indonesian language in the digital era. The findings reveal that the higher the level of digital competence, the stronger the cognitive and affective aspects of language attitude. Students with high technological proficiency understand the value and function of the Indonesian language and display pride, a sense of ownership, and emotional attachment to the national language. On the other hand, the behavioral aspect shows a different pattern: students in the highly proficient category obtained the highest scores in the media and class dimensions, reflecting awareness of the formal and institutional functions of the Indonesian language. Conversely, students with very low proficiency scored slightly higher in the study and use dimensions, indicating an instrumental and aspirational orientation toward the practical functions of the Indonesian language.

Theoretically, these findings expand the scope of language attitude theory by introducing technological proficiency as a new mediating variable in understanding the relationship between cognition, affection, and linguistic behavior. The concept of digital language awareness emerging from this study highlights how technological exposure can enhance metalinguistic awareness and strengthen the ideology of the national language in digital spaces. This research also supports contemporary perspectives in digital sociolinguistics that suggest interactions with media and

language-based systems influence the formation of linguistic identity among young people.

Practically, the results of this study provide a foundation for designing more integrative language education strategies and digital literacy policies. Educational institutions need to develop curricula that not only enhance linguistic competence but also connect language learning with contextual and creative digital practices. Meanwhile, policymakers and cultural institutions can utilize these findings to strengthen Indonesian-language digital literacy programs that foster pride and active participation among young people in using Indonesian within the global digital sphere.

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