

Illusion of competence: social media and English writing proficiency among engineering students

Agus Wilson, Ahmad Munir, Him'mawan Adi Nugroho

Doctoral Program in Language and Literature Education, Faculty of Language and Arts, Universitas Negeri Surabaya, Surabaya, Indonesia

Article Info

Article history:

Received Mar 7, 2026

Revised Jun 26, 2026

Accepted Aug 5, 2026

Keywords:

EFL learning

Engineering students

Illusion of competence

Social media

Writing proficiency

ABSTRACT

An illusion of competence—defined as a mismatch between learners' perceived ability and their actual academic writing performance—has emerged among English as a foreign language (EFL) engineering students in the context of widespread social media use. To address this issue, this study employed a longitudinal quantitative ex-post facto design (N=200) to meticulously contrast students' perceptions of their social media learning experiences against their actual writing proficiency over a 24-week semester. Objective assessments and perception questionnaires revealed a significant metacognitive gap. Despite students holding highly positive perceptions of social media for learning, their objective writing improvement was practically negligible. Analysis of variance (ANOVA) results demonstrated that this digital confidence is highly discipline-dependent—peaking among Informatics and Architecture students. Multiple regression analyses confirmed that naturalistic social media habits failed to predict academic writing proficiency. These findings carry critical implications: high digital confidence must not be conflated with academic competence. Consequently, curriculum developers must implement targeted pedagogical solutions, specifically designing “Bridge Assignments” and “comprehensible output” strategies, to actively transform students' casual digital fluency into structured academic literacy, while future research should incorporate objective screen-time logs.

This is an open access article under the [CC BY-SA](#) license.



Corresponding Author:

Agus Wilson

Doctoral Program in Language and Literature Education, Faculty of Language and Arts

Universitas Negeri Surabaya

Street Lidah Wetan, Surabaya 60213, Indonesia

Email: agus.23030@mhs.unesa.ac.id

1. INTRODUCTION

English language proficiency—with a strong emphasis on written communication—remains an essential skill for engineering graduates. Furthermore, this skill enables them to engage effectively in global discussions and collaborate across disciplines in the context of Industry 4.0 and 5.0 [1], [2]. Apart from functioning as a medium of daily communication, English has developed into an internationally recognized lingua franca in the preparation of technical reports, scientific publications, and in the negotiation process for high-risk projects [3]. With regard to professional practice, Zawawi *et al.* [4] specifically emphasized that resume and report writing are crucial aspects, where English language skills—particularly clarity, accuracy, and professionalism—have a direct impact on career opportunities. Therefore, even the most technically gifted engineering students will face obstacles in their career development if they struggle to write clear and structured documents.

Driven by these demands, learning has increasingly shifted to informal digital platforms such as Instagram, TikTok, and YouTube [5], [6]. Grounded in Vygotsky's sociocultural theory [7]–[9] and the technology acceptance model (TAM) [10]–[14], these platforms effectively boost learner motivation and perceived engagement [15]–[17], particularly in social-media-integrated writing tasks [18]–[20]. However, a fundamental disconnect exists between informal digital immersion and formal academic literacy. Drawing on Cummins' framework, social media primarily cultivates casual basic interpersonal communicative skills (BICS) through passive consumption, whereas rigorous academic writing demands cognitive academic language proficiency (CALP) and active "comprehensible output" [21]. Consequently, transitioning from casual digital fluency to the highly structured documentation required in engineering constitutes a major pedagogical hurdle. Despite their high digital literacy, engineering students frequently struggle with basic writing mechanics and organization [22]–[25], often relying on superficial strategies with limited control over advanced writing processes [26], [27]. Moreover, the pervasive use of non-standard digital language—such as slang and abbreviations—actively interferes with their formal grammatical development [28].

This specific gap points to a classic case of the Dunning–Kruger effect, operationalized here as the illusion of competence [29]. Within academic writing, genuine competence is not merely defined by communicative fluency; it encompasses structural accuracy, syntactic mastery, and metacognitive regulation that facilitate the reflective construction of knowledge. The illusion occurs because students mistakenly conflate their high receptive familiarity with English content on social media for productive academic mastery [30]–[32]. Previous studies are divided, with most focusing either on students' subjective perceptions or on their mechanical writing errors [27]–[29]. Few studies have directly compared perceived competence with objective performance [33]. Additionally, while it is established that social media can boost motivation, there is a lack of empirical clarity on how pre-existing digital habits intersect with formal writing tasks.

Moreover, this cognitive miscalibration is exacerbated by the distinct academic culture of engineering education. The rigid focus on quantitative problem-solving often sidelines formal communication skills [34]–[36]. Consequently, engineering students frequently transfer the informal, code-mixed syntax of social media directly into academic assignments [37]. Lacking the structural linguistic tension required in formal discourse, their illusion of competence deepens. Despite these challenges, a prominent literature gap remains regarding how this phenomenon operates across diverse technical disciplines. Most English as a foreign language (EFL) social media studies focus on homogeneous language or humanities cohorts, neglecting cross-disciplinary comparisons within engineering. For instance, few studies contrast the highly visual, collaborative environments of architecture and informatics with the strict, algorithmic reporting of industrial engineering and information systems. This narrow scope limits our understanding of how varied disciplinary expectations shape students' digital perceptions and pedagogical social media use.

This perception–performance mismatch becomes particularly critical in science, technology, engineering, and mathematics (STEM) education, as inaccurate linguistic self-assessment may affect graduates' readiness to operate in high-stakes professional environments. Even minor deficiencies in written communication can result in misinterpretation of technical information and disrupt cross-disciplinary collaboration. Accordingly, addressing this gap is essential for ensuring professional readiness and effective participation in global engineering contexts. Against this backdrop, the study contributes to improving assessment practices by emphasizing the need for performance-based and metacognitively informed evaluation models, while also informing curriculum design through targeted pedagogical interventions that systematically transform informal digital exposure into structured academic literacy. Therefore, to address these critical demands, the novelty of this study lies in providing a systematic empirical comparison between perceived digital competence and objectively measured academic writing performance across multiple engineering disciplines. This specific cross-disciplinary dimension has been largely overlooked in prior EFL and social media research. Unlike most previous studies that primarily focus on subjective perceptions or isolated writing outcomes, this study integrates longitudinal measurement, cross-disciplinary analysis, and predictive modeling to empirically uncover the phenomenon of the 'illusion of competence'.

Integrating social media into formal academic writing assignments creates a unique environment to observe whether students' high digital confidence truly translates into academic competence. Positioned at the intersection of digital literacy, second language acquisition, and STEM education, this study employs an ex-post facto design to examine the phenomenon of the illusion of competence. By utilizing objective normalized gain (N-Gain) measurements and self-reported perception surveys over a 24-week period, the study meticulously contrasts the perceived and actual writing performance of students across four distinct undergraduate engineering programs. Ultimately, this study demonstrates whether digital fluency genuinely fosters academic literacy across different disciplinary cultures by addressing four key questions. Specifically, it investigates how engineering students perceive the effectiveness of social media in enhancing their writing proficiency, and whether there are statistically significant differences in these perceptions across various

undergraduate engineering programs. Furthermore, the study examines if there are statistically significant differences in students' actual writing proficiency over time during natural social media use. Finally, it identifies which factors—such as demographics, usage intensity, and perception—significantly predict both their perceived and actual writing proficiency.

2. METHOD

2.1. Research design and participants

This study employed a quantitative ex-post facto design with a longitudinal approach, measuring writing proficiency at two time points over a 24-week semester (Time 1: baseline scores prior to the study period; Time 2: during the study period). The study was conducted at a private university in Indonesia, specifically within the faculty of engineering and computer science. While the study was conducted within a single institutional context, the selected faculty represented a diverse range of engineering disciplines with varying academic cultures, thereby providing a meaningful basis for cross-disciplinary comparison. However, it is important to note that the ex-post facto design employed in this study does not establish causal relationships but rather identifies patterns of association between variables. Therefore, the findings should be interpreted within the context of observational analysis, and future studies are encouraged to incorporate experimental or intervention-based designs to strengthen causal inferences.

Participants were selected using a stratified random sampling technique from a total population of 3,814 first-year undergraduate students. The sampling frame was proportionally stratified across four study programs—architecture, industrial engineering, informatics engineering, and information systems—to ensure contextual representativeness and minimize sampling bias. Based on established statistical benchmarks for analysis of variance (ANOVA) and multiple regression analyses to detect medium-to-large effect sizes [38], [39], a minimum sample size of 200 was deemed sufficient. An initial sample of 243 students was selected and subsequently screened using predefined inclusion criteria: i) first-year undergraduate students in non-English major programs; ii) active social media users engaging with digital platforms (e.g., Instagram, TikTok) for at least one hour daily; and iii) current enrollment in an academic writing course.

To address potential data anomalies and guarantee data integrity, a stringent exclusion mechanism was implemented. Responses with missing data (e.g., incomplete questionnaire sections, absenteeism during the Time 2 writing test) or indicating extreme disengagement were removed from the dataset using a complete-case analysis approach (listwise deletion). Of the 243 participants initially selected, 43 were excluded, yielding a final valid sample size of 200 participants ($N=200$, response rate=82.3%). The final sample distribution comprised information systems ($n=60$), informatics engineering ($n=50$), architecture ($n=47$), and industrial engineering ($n=43$).

All participants provided written informed consent prior to data collection. To ensure adherence to ethical standards, the research protocol was reviewed and approved by the institutional research ethics committee. Furthermore, all participant data were de-identified using alphanumeric codes, ensuring full anonymity and strict confidentiality throughout the data analysis process.

2.2. Instruments

Data for this study were collected using two main instruments, which were meticulously selected to measure both subjective beliefs and objective linguistic competence. Both instruments were administered in a controlled setting to ensure data validity. The first instrument was a perception questionnaire. Adapted from the TAM and sociocultural theory, this 50-item instrument (5-point Likert scale) measured five constructs: usefulness, collaboration, threat, self-efficacy, and academic context. To ensure content validity, the questionnaire items were rigorously developed based on the technological pedagogical content knowledge (TPACK) framework. A back-translation process was also conducted to ensure semantic equivalence in Indonesian. The 50 items were then systematically reviewed by two experts in applied linguistics, who evaluated their relevance using a 4-point Likert scale. The expert agreement was calculated using the scale-level content validity index/average (S-CVI/Ave), yielding a score of .95. Because this value exceeded the recommended threshold of .80 [40], the instrument was deemed to have excellent content validity. Furthermore, construct validity was empirically confirmed during the pilot testing phase, as all corrected item-total correlations exceeded the .30 threshold. Reliability testing demonstrated high to excellent internal consistency across the five indicators, with Cronbach's α ranging from .876 (self-efficacy) to .962 (collaborative learning), yielding an overall α of .834.

The second instrument was a standardized writing test. Administered at Times 1 and 2, students wrote descriptive and personal narrative essays (200–500 words) focusing on topics they genuinely enjoy or are passionate about. Assessment utilized an analytical scoring rubric adapted from the original ESL composition profile by Jacobs *et al.* [41], drawing on modern adaptations by Weigle [42] and Ferris and Hedgcock [43]. The rubric assessed four criteria: content, organization, language use, and mechanics.

Each criterion was rated on a five-level scale from very poor to excellent, with scores ranging from 0–5 to 21–25 points. The scores for the four criteria were summed to obtain a final writing proficiency score on a 0–100 scale, which was subsequently classified into five qualitative categories ranging from very poor (0–40) to excellent (86–100). To ensure inter-rater reliability, each essay was blindly scored by two independent assessors (an English lecturer and a researcher), with the final score derived from the average (Pearson's r for inter-rater agreement $>.80$).

2.3. Data analysis

Descriptive statistics were used to address research question 1. For research question 2, paired-samples t -tests, Hake's N -Gain [44], and Pearson product-moment correlation were calculated to determine the significance, magnitude, and consistency of students' writing improvement over time. To answer research question 3, a one-way ANOVA followed by Tukey's honestly significant difference (HSD) post-hoc test was conducted to compare perception scores across the four study programs. Finally, multiple linear regression analysis (standard method) was conducted for research question 4 to identify factors predicting both students' perceptions and their actual writing proficiency. Prior to inferential testing, prerequisite assumptions, including normality, homogeneity of variances (Levene's test), and multicollinearity (tolerance and variance inflation factor (VIF)), were strictly verified. For normality testing, the Shapiro–Wilk test was utilized. Despite the total sample size ($N=200$), the Shapiro–Wilk test is recognized in contemporary educational and applied linguistics research as having superior statistical power compared to the traditionally used Kolmogorov–Smirnov test [45]. Furthermore, this test is highly robust for evaluating normality within our specific study program subgroups ($n \leq 60$), which is a critical prerequisite for the ANOVA procedures [46]. By rigorously verifying these statistical assumptions upfront, the study ensured the robustness and validity of the subsequent inferential interpretations. All statistical analyses were performed using SPSS version 27.

3. RESULTS AND DISCUSSION

Preliminary analyses confirmed that the data met the assumptions for parametric testing: residuals were normally distributed (Shapiro–Wilk test, $p > .05$), variances were homogeneous (Levene's test, $p > .05$), and multicollinearity was negligible ($VIF < 1.5$ for all predictors). Tables 1 and 2 present the demographic profile of the participants ($N=200$) as the empirical context of the study sample. Reported variables included gender distribution, intensity of daily social media use, and dominant social media platforms. This information serves as an indicator of potential exposure to informal English and serves as an analytical basis for examining the relationship between sample characteristics and language exposure patterns.

As shown in Tables 1 and 2, the participants were predominantly male (73.0%). Notably, they were heavy social media users, with 35.5% spending more than 5 hours daily on these platforms. Their preference leans heavily towards visual-centric platforms like Instagram (24.5%) and TikTok (23.5%), rather than text-based platforms, which provide context for their exposure to informal language styles. This demographic and behavioral context is crucial, as it sets the baseline for understanding how their heavy engagement with visual content shapes their perception of English writing.

Table 1. Demographic profile of participants (continuous variables)

Variable	Minimum	Maximum	Mean (M)	Standard deviation (SD)
Age	17	38	19.88	2.45
Range			N	%
17-20		161		80.5%
21-38		39		19.5%

3.1. Students' perception of social media use

The results of the descriptive analysis showed that students had a generally positive perception of the use of social media for writing learning. The overall average score of perception was 3.61 ($SD=.36$), which was above the midpoint of the scale. Theoretically, this positive overall perception supports the core component of the TAM [14], where the high perceived usefulness and enjoyment actively drive students' adoption of these platforms. As detailed in Table 3, the highest-scoring indicator was collaborative learning and social motivation ($M=4.35$, $SD=.687$), indicating that students highly valued social interaction and peer feedback as key elements of learning. Concurrently, the perceived threat indicator had the lowest score ($M=2.50$, $SD=1.242$), confirming that students viewed these platforms as benign or neutral rather than detrimental to their academic writing style.

Table 2. Demographic profile of participants (categorical variables)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	146	73.0
	Female	54	27.0
Study program	Architecture	47	23.5
	Industrial engineering	43	21.5
	Informatics engineering	50	25.0
	Information systems	60	30.0
Main social media used	Facebook	17	8.5
	Instagram	49	24.5
	Telegram	20	10.0
	TikTok	47	23.5
	X (Twitter)	24	12.0
	YouTube	43	21.5
Main purpose of social media use	Academic purposes	10	5.0
	Entertainment	67	33.5
	Information/news	81	40.5
	Socializing	42	21.0
Frequency of social media use/day	<1 hour	22	11.0
	1-3 hours	49	24.5
	3-5 hours	58	29.0
	≥5 hours	71	35.5
Frequency of academic writing (per semester)	Never	11	5.5
	1-2 times	54	27.0
	3-4 times	46	23.0
	More than 4 times	89	44.5

Table 3. Descriptive statistics of students' perceptions based on five key indicators

Perception indicators	Mean (M)	Std. Deviation (SD)	Interpretation
Collaborative learning and social motivation	4.35	.687	Very positive
Perceived usefulness and ease of use	3.95	.684	Positive
Influence of context and academic demands	3.83	.622	Positive
Self-efficacy in academic writing	3.43	.638	Moderate
Perceived threat to formal writing	2.50	1.242	Low (positive)*
Overall perception score	3.61	.36	Positive

Note: the threat indicator uses a reverse coded scale in the interpretation of positive meaning

However, while this collaborative motivation is exceptionally high, it necessitates a critical modification to our understanding of Vygotsky's sociocultural theory in the modern digital age. Vygotsky [7] emphasized interaction with a more knowledgeable other (MKO); however, students in this study likely misinterpreted horizontal interactions with peers—who may be equally grammatically incompetent—as valid scaffolding, which may thereby contribute to an inflated sense of mastery. This phenomenon is further reinforced by an extended frequency analysis of key items, which revealed a compelling functional paradox. On the affective dimension, there was a near-universal consensus (93.0% agreement) that students genuinely enjoy engaging in writing discussions on social media (item 2). Conversely, a sharp polarization emerged regarding its cognitive utility. For instance, regarding grammar acquisition (item 48), 59.5% of students explicitly disagreed that social media effectively improved their formal grammar usage.

These results highlight a distinct functional duality in students' digital habits. They confirm that the illusion of competence among these engineering students is not born out of total ignorance, but rather a metacognitive miscalibration. Students often conflate 'affective engagement' (enjoyment and peer interaction) with 'cognitive mastery' (grammatical accuracy and formal syntax). Echoing the critical findings of previous computer-assisted language learning (CALL) researchers [32], [47], [48], this study's outcome firmly establishes that high motivation and positive perceptions in informal digital environments do not automatically translate into tangible linguistic proficiency without explicit instructional scaffolding.

3.2. Actual writing proficiency and the illusion of competence

To address the second research question, students' actual writing proficiency was evaluated objectively prior to the research period (Time 1) and during naturalistic social media exposure (Time 2). As detailed in Table 4, a paired-samples t-test indicated a statistically significant score increase from Time 1 ($M=71.91$, $SD=10.39$) to Time 2 ($M=72.36$, $SD=10.53$), $t(199)=-2.239$, $p=.026$. However, despite this statistical significance, the result lacks practical significance. The actual mean increase between Times 1 and 2 was merely .45 points on a 100-point scale, yielding a very small effect size (Cohen's $d=.158$) and a "low category" N-Gain ($g=.01$ or 1.36%). Pedagogically, these metrics reveal a clear illusion of competence: frequent, unstructured exposure to English on social media is entirely insufficient to produce meaningful, measurable improvements in actual academic writing contexts.

Illusion of competence: social media and English writing proficiency among engineering ... (Agus Wilson)

Table 4. Paired-samples t-test results for the comparison of writing proficiency scores between Times 1 and 2

Measurement time	N	Mean	SD	t	df	Sig. (2-tailed)	Effect sizes (Cohen's d)	95% CI
Time 1	200	71.91	10.39	-2.239	199	.026*	-.158	[-.298, -.019]
Time 2	200	72.36	10.53					

Note: N-Gain categorization based on Hake [44]. $p < .05$.

As presented in Table 5, further mathematical validation of this academic stagnation is provided by a subsequent correlation analysis. The exceptionally strong alignment between Times 1 and 2 scores ($r = .964$, $p < .001$) confirms a static learning trajectory. The relative proficiency rankings of the cohort remained rigidly stable: weak writers remained weak, and competent writers retained their existing competencies, rendering the naturalistic use of social media effectively irrelevant in substantially altering learning curves.

Figure 1 illustrates this linear stagnation, where the data points tightly cluster along the regression line, leaving no room for significant variation caused by social media usage. The discrepancy between the students' high digital confidence identified in research question 1 and this marginal academic gain structurally encapsulates the central thesis of this study: the "illusion of competence". This empirical gap offers robust validation of the Dunning-Kruger effect [29] uniquely operationalized within the realm of digital literacy. Unlike Gignac and Zajenkowski [49], who approached this phenomenon cautiously as a mere statistical artefact, the present study provides robust empirical evidence suggesting that it functions as a tangible pedagogical barrier. Because students actively dwell in a socio-digital ecosystem full of English language artifacts, those with lower linguistic mastery inherently miscalibrate their subjective capabilities against objective standards.

Table 5. Pearson correlation between writing proficiency scores Times 1 and 2

Paired samples correlations				
Variable	N	Correlation (r)	Sig. (p)	
Writing proficiency score (Time 1) and actual writing proficiency score (Time 2)	200	.964	<.001	

Note: $N = 200$; correlations computed using Pearson's r .

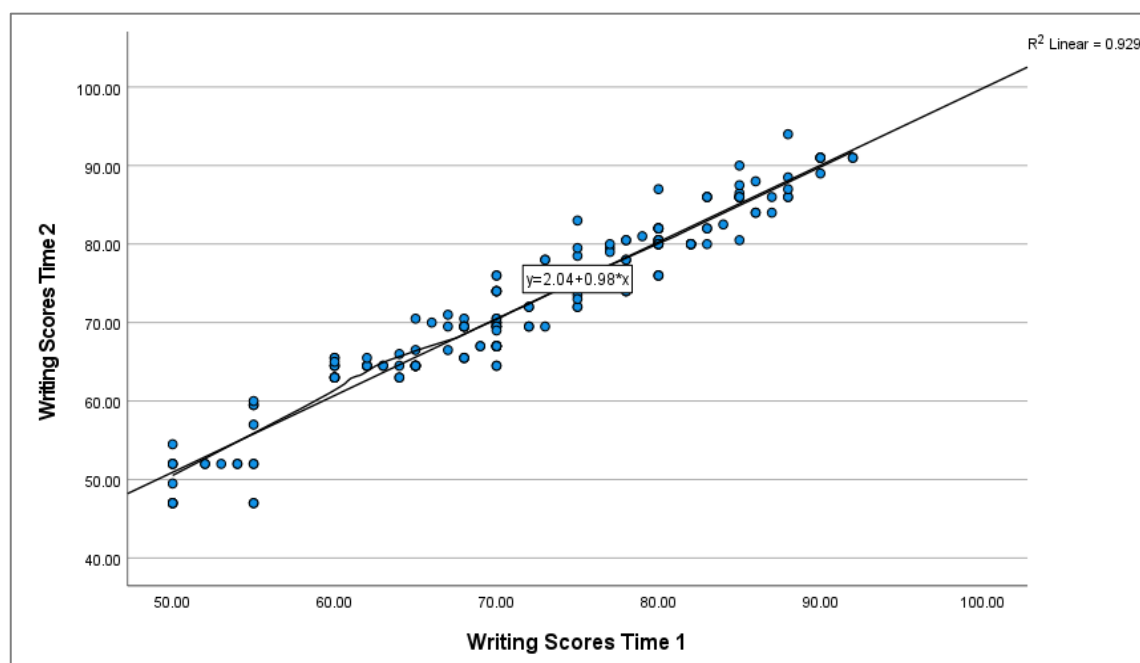


Figure 1. Scatter plot and regression line demonstrating the strong positive correlation ($r = .964$) between Times 1 and 2 writing proficiency scores

In accordance with the frameworks proposed by Chen *et al.* [32] and Matueny and Nyamai [30], this miscalibration represents a fatal flaw in digital perception. Students consistently err by equating high 'receptive familiarity'—their effortless ability to passively consume and decode multimedia content—with

rigorous ‘productive mastery’, which governs the intricate cognitive ability to deploy grammatical syntax in formal written compositions. The data unmistakably imply that unmediated social media scrolling provides little to no measurable leverage for cognitive academic output. Understanding this miscalibration generally prompts the necessity to investigate whether such phenomenon occurs uniformly across different engineering backgrounds.

3.3. Disciplinary cultures: variations in perceptions across engineering programs

To address the third research question, the analysis shifted from examining general perceptions to investigating whether the academic context of specific engineering disciplines significantly influences how students perceive social media as a writing tool. Despite the overall positive perception identified in research question 1, an essential theoretical assumption is that engineering students do not necessarily possess a monolithic digital learning culture. Therefore, investigating these disciplinary variations is crucial to understanding how different academic ecosystems shape students’ digital metacognition.

As presented in Table 6, a one-way ANOVA was performed to assess the differences between the various programs. The results yielded a highly significant statistical variance among at least two of the four study programs, $F(3, 196)=24.388$, $p<.001$, $\eta^2=.272$, indicating a large effect size. This demonstrates that disciplinary background exerted a substantial influence on students’ perceptions of social media use in academic writing. Because the p -value was far below the critical alpha threshold ($\alpha=.05$), the null hypothesis was firmly rejected. This establishes that a student’s disciplinary background heavily shapes their level of confidence in the utility of social media for academic writing.

To accurately map the pattern of these statistical differences, a Tukey’s HSD post-hoc analysis was executed. As summarized in Table 7, the pairwise comparisons exposed a clear, mathematically sound polarization. The analysis unequivocally divided the respondents into two distinct perception clusters.

Table 6. ANOVA results for perception score differences across study programs

Source of variation	Sum of squares	df	Mean square	F	Sig.
Between groups	6.981	3	2.327	24.388	<.001
Within groups	18.702	196	.095		
Total	25.683	199			

Note: $F(3, 196)=24.388$, $p <.001$, indicating a significant difference in mean perception scores among study programs.

Table 7. Summary of Tukey HSD post-hoc test results for pairwise comparisons

Study program comparison	Mean difference	Sig.	Interpretation
Informatics Engineering vs. Information Systems	.453*	<.001	Significant
Informatics Engineering vs. Industrial Engineering	.365*	<.001	Significant
Architecture vs. Information Systems	.336*	<.001	Significant
Architecture vs. Industrial Engineering	.248*	.001	Significant
Informatics Engineering vs. Architecture	.117	.248	Not significant
Industrial Engineering vs. Information Systems	.088	.485	Not significant

Note: * indicate significant differences at $p <.05$. *

Figure 2 illustrates a distinct polarization into two perception clusters, confirming that digital confidence in writing is deeply discipline-dependent. The high-perception cluster comprised informatics engineering and architecture students, whose median perceptions were visibly higher and statistically equivalent ($p=.248$). Because their core curricula intrinsically demand high digital interaction and peer-reviewed design, these students naturally view social media’s affordances as a fluid extension of their academic environment.

Conversely, a low-perception cluster emerged among Industrial Engineering and Information Systems students ($p=.485$), differing significantly from the first group ($p<.05$ across inter-cluster variables). This systemic skepticism fundamentally reflects the rigid structural requirements of their specific disciplines. Aligning with Chi *et al.* [37], complex academic demands—such as algorithmic reporting, strict formatting, and formal objective language—create distinct transitional barriers. Driven by a culture prioritizing exact syntax over fluid collaboration, these students maintain a strict epistemological boundary between casual social media platforms and formal academic resources. Ultimately, these findings challenge the “one-size-fits-all” assumption in language learning, demonstrating that modern digital pedagogy must be contextually tailored.

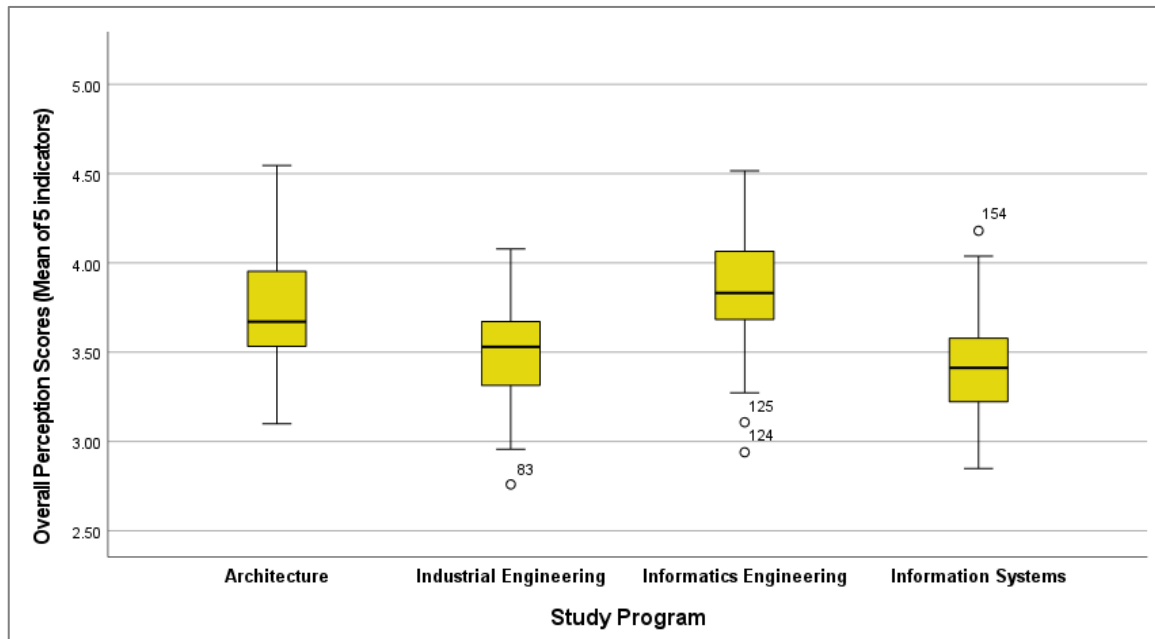


Figure 2. Boxplot illustrating the distribution and significant differences of overall perception scores across the four engineering study programs

3.4. The inefficacy of informal digital habits in predicting academic writing

To definitively uncover the driving factors behind the students' metacognitive landscape and their objective writing abilities, the final phase of analysis deployed two separate multiple linear regression models. Model 1 was designated to identify the demographic and behavioral factors predicting students' overall perception score, while Model 2 strictly evaluated predictors affecting the actual writing proficiency score. As depicted in Table 8, the first regression analysis (Model 1) was statistically significant, $F(19, 180)=4.803$, $p<.001$, successfully explaining 33.6% of the variance ($R^2=.336$) in how students perceive social media. Aligning consistently with the ANOVA results in research question 3, demographic study programs emerged as the strongest positive predictors. Specifically, students from informatics engineering ($\beta=.452$, $p<.001$) and architecture ($\beta=.392$, $p<.001$) held significantly higher optimistic views. Curiously, a behavioral usage predictor emerged negatively: respondents who relied predominantly on highly visual, non-textual platforms such as Instagram showed lower perceptions of the platform's educational efficacy ($\beta=-.245$, $p=.033$). Notably, the daily duration of screen time completely failed to predict a higher perception of learning.

While Model 1 confirmed that contextual and specific behavioral traits construct subjective digital beliefs, Table 9 uncovers a radically different objective reality. The regression analysis for Model 2 unequivocally failed to yield any predictive power. The overall regression was statistically non-significant ($F(24, 175)=.638$, $p=.902$), displaying a negative adjusted R^2 value (adj. $R^2=-.046$). Notably, none of the examined variables significantly predicted writing proficiency, indicating that informal digital exposure fails to produce measurable gains in academic writing performance. Even perception indicators fundamentally rooted in Bandura's [50] social learning theory—such as self-efficacy built through peer observation and digital modeling—failed entirely to manifest mathematically in objective, constrained academic tasks.

Rather than a statistical limitation, the profound lack of predictive power in Model 2 constitutes this study's most substantive finding. It strongly challenges the widespread assumption of technological determinism. This finding aligns with recent research emphasizing that technological exposure alone does not automatically translate into improved academic competence, as the effectiveness of digital learning environments depends heavily on learners' digital literacy and the pedagogical design of technology-mediated learning environments [51]. Extended exposure to English content in digital environments appears insufficient to produce measurable improvements in formal academic writing, particularly when such exposure is not accompanied by structured pedagogical support. The cognitive rigors required for formal grammatical mechanics and academic discourse operate on an entirely separate psychological channel from casual online networking.

Table 8. Coefficients of regression analysis for predicting overall perception scores (Model 1)

Predictor variables	Coefficients ^a				
	Unstandardized B	Std. Error	Beta (β)	<i>t</i>	<i>Sig.</i>
(Constant)	3.363	.264		12.738	<.001
Demographics					
Age	.006	.011	.039	.518	.605
Gender	-.015	.054	-.019	-.282	.779
Architecture	.331	.063	.392	5.68	<.001
Industrial engineering	.082	.065	.094	1.251	.213
Informatics engineering	.374	.071	.452	5.297	<.001
Usage behavior					
Instagram	-.204	.095	-.245	-2.149	.033
Telegram	.023	.105	.019	.217	.829
TikTok	-.042	.094	-.049	-.442	.659
X (Twitter)	-.037	.102	-.034	-.361	.718
YouTube	-.095	.093	-.108	-1.017	.311
Academic purpose	-.034	.106	-.021	-.323	.747
Entertainment purpose	-.085	.055	-.112	-1.555	.122
Socializing purpose	-.027	.062	-.030	-.434	.665
1-3 hours	-.009	.086	-.010	-.101	.919
3-5 hours	.001	.085	.001	.012	.990
More than 5 hours	.051	.080	.068	.644	.520
Write 1-2 times	.113	.107	.140	1.059	.291
Write 3-4 times	.059	.108	.069	.543	.588
Write more than 4 times	.021	.104	.029	.203	.830

Note: a=dependent variable: overall perception score. Model fit: $F(19, 180)=4.803$, $p<.001$; $R^2=.336$. Categorical predictors were dummy coded (program reference=information systems; gender reference=female). Multicollinearity was within acceptable limits (tolerance>.10; VIF<10).

Table 9. Coefficients of regression analysis for writing proficiency (Model 2)

Predictor variables	Coefficients ^a				
	Unstandardized B	Std. Error	Beta (β)	<i>t</i>	<i>Sig.</i>
(Constant)	57.080	14.373		3.971	<.001
Demographics					
Age	.435	.393	.101	1.106	.270
Gender	1.296	1.914	.055	.677	.499
Architecture	-.221	2.980	-.009	-.074	.941
Industrial engineering	-1.769	2.437	-.069	-.726	.469
Informatics engineering	1.086	3.567	.045	.305	.761
Usage behavior					
Instagram	1.103	3.434	.045	.321	.749
Telegram	-1.904	3.711	-.054	-.513	.609
TikTok	-2.181	3.376	-.088	-.646	.519
X (Twitter)	-1.242	3.599	-.038	-.345	.730
YouTube	-.741	3.303	-.029	-.224	.823
1 to 3 hours	3.355	3.042	.137	1.103	.272
3 to 5 hours	2.219	3.019	.096	.735	.463
More than 5 hours	3.338	2.828	.152	1.181	.239
Write 1 to 2 times	-2.641	3.817	-.112	-.692	.490
Write 3 to 4 times	-3.186	3.845	-.128	-.829	.408
Write more than 4 times	-.760	3.674	-.036	-.207	.836
Academic purpose	-.821	3.757	-.017	-.218	.827
Entertainment purpose	-1.967	1.954	-.088	-1.006	.316
Socializing purpose	.666	2.180	.026	.305	.760
Perception indicators					
Perceived usefulness and ease of use	1.746	1.243	.113	1.404	.162
Collaborative learning and motivation	.577	1.221	.038	.473	.637
Threat	-.910	.996	-.107	-.914	.362
Self-efficacy	-.006	1.364	<.001	-.005	.996
Academic context	-.060	1.407	-.004	-.043	.966

Note. a=dependent variable: writing proficiency score. Model fit: $F(24, 175)=.638$, $p=.902$; $R^2=.081$. Categorical predictors were dummy coded (program reference=Information Systems; gender reference=female). All predictors were non-significant ($p>.05$). Multicollinearity was within acceptable limits (Tolerance>.10; VIF<10).

In diagnosing the root cause of this disjuncture, it becomes apparent that the problem lies deeply within cognitive processing dynamics. Recent studies also highlight that learners' metacognitive awareness significantly shapes how digital writing tools are used, determining whether such technologies support genuine writing development or merely reinforce superficial confidence [52]. Without explicit mediation, shifting from the unregulated freedom of digital interaction to the strict paradigms of formal university

assignments rapidly induces emotional bottlenecks. Consistent with established paradigms, students confronting an authentic academic writing space inevitably experience EFL writing anxiety [53]–[55].

Informal social platforms deliberately eliminate structural tension, potentially leading to reduced cognitive engagement. As warned by Astrid [48], peer-to-peer discussions natively existing within a low-stakes digital sphere do little to repair fundamental errors unless there is highly scaffolded instructor intervention. Merely on the assumption that students can engage in self-paced language assimilation directly bypasses the foundational requirement for “comprehensible output” established earlier. Without explicit pedagogical mediation, these informal platforms fail to structurally push learners to actively construct accurate syntax, leaving them trapped in passive consumption.

These findings also align with recent discussions in digital literacy and second language acquisition research, which suggest that frequent exposure to English in digital environments does not automatically translate into academic language competence [56], [57]. Informal online interactions often encourage passive language consumption rather than cognitively demanding production of accurate written discourse. As a result, learners may develop inflated perceptions of their linguistic competence while their formal academic writing ability remains underdeveloped [18]. This discrepancy is particularly significant in STEM education, where engineering students must demonstrate precise written communication in technical reports, documentation, and international professional collaboration.

These findings must be interpreted within the broader intersection of digital literacy, second language acquisition, and STEM education. In the context of digital literacy, mere exposure to English through online platforms does not guarantee the development of higher-order academic language skills, particularly when learners engage predominantly in passive consumption rather than critical production. From a second language acquisition perspective, this reinforces the long-standing principle that meaningful language development requires cognitively demanding output and metacognitive regulation, not simply input-rich environments. Within STEM education, this mismatch becomes especially consequential, as engineering students are expected to produce precise, structured, and discipline-specific written communication. Therefore, understanding perception–performance discrepancies is not only theoretically relevant but also pedagogically essential for ensuring that digitally immersed learners can meet the rigorous communicative demands of technical and professional contexts. In answer to the fourth research question, the findings indicate that while certain demographic and behavioral factors significantly predict students’ perceptions of social media, none of the examined variables significantly predict their actual writing proficiency.

From a pedagogical perspective, these findings clearly indicate that exposure to social media alone is insufficient to develop academic writing proficiency. Educators should implement structured instructional strategies that explicitly bridge informal digital literacy and formal academic writing. One effective approach is the integration of “bridge assignments,” which require students to transform informal digital content into structured academic texts. Furthermore, guided “comprehensible output” activities are essential to promote active language production, metacognitive awareness, and syntactic accuracy. Without such intervention, students’ high digital confidence may continue to reinforce the illusion of competence rather than support actual academic development.

3.5. Practical implications for language teaching and STEM education

The practical implications of these findings signal a critical mandate for engineering curriculum developers and language instructors. To effectively address the illusion of competence, educators must implement targeted pedagogical interventions rather than assume that students’ digital fluency will naturally translate into academic literacy. One highly actionable strategy is the design of bridge assignments. These instructional tasks require students to meticulously restructure casual digital inputs into highly constrained technical essays, thereby explicitly contrasting informal digital discourse with rigorous engineering standards. Such pedagogical mediation is essential because the effectiveness of technology-supported language learning strongly depends on teachers’ digital literacy and their ability to strategically guide students’ engagement with digital environments [58]. Furthermore, instructors should systematically integrate calibrated metacognitive training into the curriculum. By utilizing analytic writing rubrics for continuous self- and peer-assessment, alongside explicit formative feedback from instructors, students are forced to confront and close the discrepancy between their perceived digital confidence and their actual academic writing performance.

To operationalize these pedagogical interventions, several concrete instructional strategies can be implemented. First, calibrated self-assessment tasks using analytic rubrics should be introduced to help students systematically compare their perceived performance with objective criteria. Second, structured peer-review activities guided by standardized academic writing rubrics can expose students to discrepancies between informal and formal language use. Third, contrastive transformation tasks—requiring students to

convert social-media texts into academically acceptable writing—can explicitly bridge the gap between informal exposure and formal expectations. Finally, reflective writing journals that focus on error awareness and revision processes can foster deeper metacognitive engagement, enabling learners to evaluate and regulate their own writing development.

From a broader pedagogical perspective, these findings carry important implications for teaching and learning practices in engineering education. First, the presence of a consistent perception–performance gap suggests that assessment practices should not rely solely on self-perceived competence but must integrate performance-based evaluations and metacognitive calibration mechanisms. Second, the results highlight the need for curriculum designs that explicitly bridge informal digital engagement and formal academic writing through structured instructional strategies. Third, educators should place greater emphasis on developing students' metacognitive awareness, enabling them to evaluate their own learning processes and outcomes more accurately. Taken together, these implications underscore that addressing the illusion of competence requires not only assessment reform but also deliberate instructional design to ensure the development of academically and professionally competent engineering graduates.

4. CONCLUSION

Overall, this study confirms that informal immersion in social media does not automatically translate into academic writing proficiency. The findings reveal a substantial gap between engineering students' perceived digital competence and their actual English academic writing performance. Four major conclusions emerged. First, students held generally positive perceptions of social media, particularly for its collaborative and affective benefits. Second, this confidence in digital tools depended on the discipline; students in visually oriented and digitally collaborative fields such as informatics engineering and architecture had significantly stronger perceptions than those in other engineering areas. Third, despite these positive beliefs, actual writing proficiency remained largely stable over time, indicating a clear illusion of competence. Fourth, regression analyses showed that demographic variables, platform preferences, and daily screen time did not significantly predict formal writing proficiency.

These findings challenge the passive assumption that high digital exposure inherently fosters academic literacy. Instead, they point to a metacognitive miscalibration that may create serious challenges for STEM graduates entering the precise and globally mediated environments of Industry 4.0 and Society 5.0. To address this illusion of competence, educators should implement targeted pedagogical scaffolding, including contrastive transformation tasks, reflective writing, and calibrated self-assessment, to seamlessly bridge the gap between informal digital fluency and structured academic competence. Consequently, these findings carry important implications for English for specific purposes (ESP) curriculum development and teacher training. Higher education institutions should systematically embed discipline-specific writing instruction within technical coursework rather than treating it as a peripheral skill. In addition, educational systems should move beyond product-oriented evaluation toward formative, process-based assessment approaches, equipping instructors with the pedagogical expertise to diagnose and address students' metacognitive misalignments.

Although the empirical evidence presented is robust, several limitations should be acknowledged. To begin with, the ex-post facto design limits causal interpretation between social media habits and writing competency, although the longitudinal data offer useful developmental insights. Moreover, reliance on self-reported perceptions may introduce response bias. Furthermore, this investigation was restricted to a single institutional environment in Indonesia, which inherently narrows the generalizability of the findings across different educational systems and cultural backgrounds. Finally, the study merely observed naturalistic social media usage without introducing deliberate teaching interventions. Future studies are encouraged to replicate this study across diverse educational contexts and examine whether specific instructional methods—such as guided digital writing tasks or the aforementioned bridge assignments—can effectively reduce the students' illusion of competence and drive tangible improvements in academic writing outcomes.

FUNDING INFORMATION

The authors of the article do not receive any financial support for this publication.

AUTHOR CONTRIBUTIONS STATEMENT

This journal uses the Contributor Roles Taxonomy (CRediT) to recognize individual author contributions, reduce authorship disputes, and facilitate collaboration.

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Agus Wilson	✓	✓	✓		✓	✓		✓	✓	✓				
Ahmad Munir	✓	✓		✓						✓		✓		
Him'mawan Adi Nugroho	✓	✓		✓			✓			✓		✓		

C : Conceptualization	I : Investigation	Vi : Visualization
M : Methodology	R : Resources	Su : Supervision
So : Software	D : Data Curation	P : Project administration
Va : Validation	O : Writing - Original Draft	Fu : Funding acquisition
Fo : Formal analysis	E : Writing - Review & Editing	

CONFLICT OF INTEREST STATEMENT

The authors declare that there is no conflict of interest regarding the publication of this paper.

INFORMED CONSENT

Informed consent was obtained from all individual participants included in the study. Participants were briefed about the research objectives, and their confidentiality and anonymity were rigorously maintained throughout the data collection and analysis processes. All individuals voluntarily agreed to participate without any coercion.

ETHICAL APPROVAL

The research protocol was reviewed and approved by the academic authorities of the Doctoral Program at Universitas Negeri Surabaya. Institutional permission to conduct the data collection was officially granted by Universitas Indraprasta PGRI, Indonesia. All procedures involving human subjects adhered to relevant national and institutional guidelines for educational research.

DATA AVAILABILITY

The datasets generated and analyzed during the current study are available from the corresponding author, [AW], upon reasonable request. Due to privacy considerations, the raw data are not publicly distributed online. However, researchers who meet the necessary criteria for confidential data access may request it directly.

REFERENCES

[1] S. H. Khan and A. H. I. Mourad, "Integrating Industry 4.0 in engineering education: implementation patterns, pedagogical strategies, and industry alignment," *Cogent Education*, vol. 12, no. 1, pp. 1–16, Dec. 2025, doi: 10.1080/2331186X.2025.2588010.

[2] S. B. Kausar, "Integrating English for specific purposes (ESP) in engineering education: a strategic approach to enhancing English proficiency and professional communication skills," *International Journal of Engineering and Advanced Technology Studies*, vol. 13, no. 3, pp. 32–41, Mar. 2025, doi: 10.37745/ijeats.13/vol13n33241.

[3] V. Murali, E. K. Chaitanya, and R. S. Reddy, "Building bridges: enhancing engineering students' English skills for global success," *International Journal of Research in English*, vol. 6, no. 2, pp. 498–504, Jan. 2024, doi: 10.33545/26648717.2024.v6.i2h.273.

[4] N. S. B. Zawawi *et al.*, "The impact of English proficiency in enhancing employment opportunities among university students," *International Journal of Research and Innovation in Social Science*, vol. 9, no. 22, pp. 321–327, Oct. 2025, doi: 10.47772/IJRISS.2025.922ILEIID0031.

[5] A. Meirbekov, S. Nyshanova, A. Meirbekov, L. Kazykhankyzy, Z. Burayeva, and B. Abzhekenova, "Digitisation of English language education: Instagram and TikTok online educational blogs and courses vs. traditional academic education. How to increase student motivation?" *Education and Information Technologies*, vol. 29, no. 11, pp. 13635–13662, Aug. 2024, doi: 10.1007/s10639-023-12396-y.

[6] M. B. Alghasab, "The use of smartphone apps for informal language learning among EFL students: focusing on students' choices, purposes, and perceptions," *Arab World English Journal*, vol. 16, no. 4, pp. 64–89, Dec. 2025, doi: 10.24093/awej/vol16no4.4.

[7] L. S. Vygotsky and M. Cole, *Mind in society: development of higher psychological processes*. Cambridge, MA: Harvard University Press, 1978, doi: 10.2307/j.ctvjf9vz4.

[8] J. M. Alharbi, "Insight into the role of interaction in language acquisition: Vygotsky's interactionist theory of language," *Arab World English Journal*, vol. 14, no. 2, pp. 281–294, Jun. 2023, doi: 10.24093/awej/vol14no2.20.

[9] R. Alkhudiry, "The contribution of Vygotsky's sociocultural theory in mediating L2 knowledge co-construction," *Theory and Practice in Language Studies*, vol. 12, no. 10, pp. 2117–2123, Sep. 2022, doi: 10.17507/tpls.1210.19.

[10] J. W. Mahendra, A. Maghfiroh, B. Harmanto, and R. Sudirman, "Research trends of digital literacy in English language learning: a systematic literature review," *EduLib*, vol. 14, no. 1, pp. 57–66, Jun. 2024, doi: 10.17509/edulib.v14i1.60790.

- [11] E. Y. Mulyanah, A. Amarullah, and Ishak, "TikTok: how the application became the motivation for online learning for EFL students during the COVID-19 pandemic in Indonesia," *Theory and Practice in Language Studies*, vol. 14, no. 4, pp. 1264–1273, Apr. 2024, doi: 10.17507/tpls.1404.34.
- [12] M. C. C. Pérez and R. R. Cecilia, "Creativity and social networks in English language learning: a systematic literature review," *Onomazein*, no. Special Issue 16, pp. 208–240, Jul. 2025, doi: 10.7764/onomazein.ne16.10.
- [13] M. Alkamel, "Social media in teaching English for EFL students: a review of challenges and suggestions," *International Journal of English Teaching and Learning*, vol. 2, no. 1, pp. 8–17, Jul. 2024, doi: 10.11648/j.ijetl.20240201.12.
- [14] F. D. Davis, "Perceived usefulness, perceived ease of use, and user acceptance of information technology," *MIS Quarterly*, vol. 13, no. 3, pp. 319–340, Sep. 1989, doi: 10.2307/249008.
- [15] C. M. Mitulescu, "The impact of social media on EFL learning and student motivation: a literature review," *Scientific Bulletin*, vol. 29, no. 1, pp. 61–67, Jun. 2024, doi: 10.2478/bsaft-2024-0007.
- [16] A. Soyoof and B. L. Reynolds, "Exploring the role of informal digital English learning in EFL students' communication behaviour in Iran and Macau: a cross-cultural mixed-methods study," *Journal of Computer Assisted Learning*, vol. 42, no. 2, pp. 1–16, Apr. 2026, doi: 10.1002/jcal.70220.
- [17] R. M. I. Khan, N. Radzuan, S. Farooqi, M. Shahbaz, and M. Khan, "Learners' perceptions on WhatsApp integration as a learning tool to develop EFL spoken vocabulary," *International Journal of Language Education*, vol. 5, no. 2, pp. 1–14, Jun. 2021, doi: 10.26858/ijole.v5i2.15787.
- [18] S. Jin, "Writing in the digital age: understanding the relationship between social media use and college students' writing skills and anxiety," *Humanities and Social Sciences Communications*, vol. 12, no. 1, p. 1048, Jul. 2025, doi: 10.1057/s41599-025-05443-1.
- [19] J. Shu, "EFL learners' problematic use of social media usage, classroom anxiety, perfectionism, and language attainment: correlations and perceptions," *BMC Psychology*, vol. 11, no. 1, p. 443, Dec. 2023, doi: 10.1186/s40359-023-01419-5.
- [20] G. Mustafa, R. M. I. Khan, and A. A. Abbasi, "Impact of social media on EFL writing learning," *Pakistan Languages and Humanities Review*, vol. 6, no. 1, pp. 1–11, Mar. 2022, doi: 10.47205/plhr.2022(6-i)1.
- [21] J. Cummins and M. Swain, *Bilingualism in education: aspects of theory, research and practice*, 1st ed. London, U.K.: Routledge, 2014, doi: 10.4324/9781315835877.
- [22] M. N. Patwary, M. M. Reza, H. Akter, and S. Chowdhury, "Exploring academic writing proficiency of tertiary EFL learners of Bangladesh: a pedagogical implication," *Integrated Journal for Research in Arts and Humanities*, vol. 3, no. 5, pp. 89–102, Sep. 2023, doi: 10.55544/ijrah.3.5.8.
- [23] M. A. Cantera, M.-J. Arevalo, V. García-Marina, and M. Alves-Castro, "A rubric to assess and improve technical writing in undergraduate engineering courses," *Education Sciences*, vol. 11, no. 4, p. 146, Mar. 2021, doi: 10.3390/educsci11040146.
- [24] S. M. Ramesh, T. Sathyaseelan, S. M. R. Pettela, and G. Arun, "Factors influencing students' performance in second language writing skills," *World Journal of English Language*, vol. 15, no. 5, pp. 189–207, Apr. 2025, doi: 10.5430/wjel.v15n5p189.
- [25] Q. Sun, H. Pan, and J. Zhan, "Untangling the relationship between English as a foreign language learners' metacognitive experiences and writing proficiency: a mixed-methods approach," *System*, vol. 117, p. 103100, Oct. 2023, doi: 10.1016/j.system.2023.103100.
- [26] X. Zhao and Y. Yang, "Impact of social media-supported flipped classroom on English as a foreign language learners' writing performance and anxiety," *Frontiers in Psychology*, vol. 13, p. 1052737, Jan. 2023, doi: 10.3389/fpsyg.2022.1052737.
- [27] D. R. Bailey and N. Almusharraf, "A structural equation model of second language writing strategies and their influence on anxiety, proficiency, and perceived benefits with online writing," *Education and Information Technologies*, vol. 27, no. 8, pp. 10497–10516, Sep. 2022, doi: 10.1007/s10639-022-11045-0.
- [28] A. H. Adeyemi, K. G. Obajemu, and T. O. Orunmbé, "Influence of social media language on students' grammar and writing in Kogi State College of Education Technical Mopa and Confluence University of Science and Technology, Osara Kogi State," *International Journal of English Language Teaching*, vol. 13, no. 3, pp. 15–22, Mar. 2025, doi: 10.37745/ijelt.13/vol13n31522.
- [29] M. Mazar and S. M. Fleming, "The Dunning-Kruger effect revisited," *Nature Human Behaviour*, vol. 5, no. 6, pp. 677–678, Apr. 2021, doi: 10.1038/s41562-021-01101-z.
- [30] D. R. M. Matuény and D. J. J. Nyamai, "Illusion of competence and skill degradation in artificial intelligence dependency among users," *International Journal of Research and Scientific Innovation*, vol. 12, no. 5, pp. 1725–1738, Jun. 2025, doi: 10.51244/IJRSL.2025.120500163.
- [31] A. Muller, L. A. Sirianni, and R. J. Addante, "Neural correlates of the Dunning–Kruger effect," *European Journal of Neuroscience*, vol. 53, no. 2, pp. 460–484, Jan. 2021, doi: 10.1111/ejn.14935.
- [32] M. Chen, Y. Liu, and E. Wall, "Unmasking Dunning-Kruger effect in visual reasoning & judgment," *IEEE Transactions on Visualization and Computer Graphics*, vol. 31, no. 1, pp. 743–753, Jan. 2025, doi: 10.1109/TVCG.2024.3456326.
- [33] K. Migallos and J. C. M. Parina, "Core language skills significant among engineering graduates to succeed in the global workplace," *Mextesol Journal*, vol. 47, no. 1, pp. 1–15, Jan. 2023, doi: 10.61871/mj.v47n1-15.
- [34] A. H. Nurudeen, A. Fakhrou, N. Lawal, and S. Ghareeb, "Academic performance of engineering students: a predictive validity study of first-year GPA and final-year CGPA," *Engineering Reports*, vol. 6, no. 5, p. e12766, May 2024, doi: 10.1002/eng2.12766.
- [35] M. Wilson-Fetrow, V. Svihla, E. Chi, C. Hubka, and Y. Chen, "Engineering students' writing perceptions impact their conceptual learning," *IEEE Transactions on Professional Communication*, vol. 66, no. 2, pp. 186–201, 2023, doi: 10.1109/TPC.2023.3251159.
- [36] H. Yoshikubo, G. Trovato, and A. Cetinkaya, "Can writing assignments help foster engineers who will thrive in a globalized world? Comparing students' written English levels and overall performance in humanities modules in engineering curricula," in *2024 ASEE Annual Conference & Exposition Proceedings*, 2024, pp. 1–16, doi: 10.18260/1-2-48441.
- [37] N. T. N. Chi, T. T. Thuy, and N. N. Ai, "Exploring factors influencing students' challenges in academic writing: a qualitative analysis based on student perspectives," *International Journal of Advanced Multidisciplinary Research and Studies*, vol. 4, no. 3, pp. 32–37, May 2024, doi: 10.62225/2583049X.2024.4.3.2737.
- [38] J. Cohen, "A power primer," *Psychological Bulletin*, vol. 112, no. 1, pp. 155–159, 1992, doi: 10.1037/0033-2909.112.1.155.
- [39] J. F. Hair, W. C. Black, B. J. Babin, and R. E. Anderson, *Multivariate data analysis*, 8th ed. Hampshire, U.K.: Cengage Learning, EMEA, 2019.
- [40] D. F. Polit and C. T. Beck, "The content validity index: are you sure you know what's being reported? Critique and recommendations," *Research in Nursing & Health*, vol. 29, no. 5, pp. 489–497, Oct. 2006, doi: 10.1002/nur.20147.
- [41] H. L. Jacobs, S. A. Zinkgraf, D. R. Wormuth, V. F. Hartfiel, and J. B. Hughey, *Testing ESL composition: a practical approach*. Rowley, MA: Newbury House, 1981.
- [42] S. C. Weigle, *Assessing writing*. Cambridge, U.K.: Cambridge University Press, 2002, doi: 10.1017/CBO9780511732997.
- [43] D. R. Ferris and J. S. Hedgcock, *Teaching L2 composition: purpose, process, and practice*, 4th ed. New York, NY: Routledge, 2023, doi: 10.4324/9781003004943.
- [44] R. R. Hake, "Interactive-engagement versus traditional methods: a six-thousand-student survey of mechanics test data for introductory physics courses," *American Journal of Physics*, vol. 66, no. 1, pp. 64–74, Jan. 1998, doi: 10.1119/1.18809.

- [45] J. Larson-Hall, *A guide to doing statistics in second language research using SPSS and R*, 2nd ed. New York, NY: Routledge, 2015, doi: 10.4324/9781315775661.
- [46] A. Field, *Discovering statistics using IBM SPSS statistics*, 6th ed. London, U.K.: SAGE Publications Ltd, 2025.
- [47] A. K. Okrah and J. S. A. Anku, "From social media English to academic English: analysis of surface errors in undergraduate ESL students' writing," *International Journal of Trend in Scientific Research and Development*, vol. 5, no. 1, pp. 1384–1393, 2020.
- [48] A. Astrid, "Students' perceptions toward feedback from their teachers and peers in writing activities by considering their writing anxiety," *Jadila: Journal of Development and Innovation in Language and Literature Education*, vol. 3, no. 3, pp. 271–284, Aug. 2023, doi: 10.52690/jadila.v3i3.472.
- [49] G. E. Gignac and M. Zajenkowski, "The Dunning-Kruger effect is (mostly) a statistical artefact: valid approaches to testing the hypothesis with individual differences data," *Intelligence*, vol. 80, p. 101449, May 2020, doi: 10.1016/j.intell.2020.101449.
- [50] A. Bandura, *Social learning theory*. New York, NY: General Learning Press, 1971.
- [51] U. Muawanah, A. Marini, and I. Sarifah, "The interconnection between digital literacy, artificial intelligence, and the use of e-learning applications in enhancing the sustainability of regional languages: evidence from Indonesia," *Social Sciences & Humanities Open*, vol. 10, no. 1, p. 101169, 2024, doi: 10.1016/j.ssaho.2024.101169.
- [52] M. F. Teng, "Understanding EFL student writers' metacognitive awareness in utilizing ChatGPT," *System*, vol. 135, p. 103848, Dec. 2025, doi: 10.1016/j.system.2025.103848.
- [53] H. Hartono and M. M. Maharani, "English writing anxiety and the writing problems of Indonesia EFL learners," in *Proceedings of the 2nd Social and Humaniora Research Symposium (SoRes 2019)*, 2020, pp. 513–517, doi: 10.2991/assehr.k.200225.111.
- [54] N. Rohmah and A. B. Muslim, "Writing anxiety in academic writing practice," in *Proceedings of the Thirteenth Conference on Applied Linguistics (CONAPLIN 2020)*, 2021, vol. 546, pp. 348–354, doi: 10.2991/assehr.k.210427.053.
- [55] J. Sun, S. Motevalli, and N. N. Chan, "Exploring writing anxiety during writing process: an analysis of perceptions in Chinese English as a foreign language (EFL) learners," *Qualitative Research in Education*, vol. 13, no. 2, 2024, doi: 10.17583/qre.12938.
- [56] B. Naghdipour, "ICT-enabled informal learning in EFL writing," *Journal of Second Language Writing*, vol. 56, p. 100893, Jun. 2022, doi: 10.1016/j.jslw.2022.100893.
- [57] R. Asafo-Adjei, R. O. Mensah, E. K. Klu, and E. Swanzy-Impraim, "Social media and English language writing performances of a Ghanaian ESL class: The nexus," *Cogent Education*, vol. 10, no. 1, pp. 1–18, Dec. 2023, doi: 10.1080/2331186X.2023.2189388.
- [58] L. Feng and P. Sumettikoon, "An empirical analysis of EFL teachers' digital literacy in Chinese higher education institutions," *International Journal of Educational Technology in Higher Education*, vol. 21, no. 1, p. 42, Jun. 2024, doi: 10.1186/s41239-024-00474-1.

BIOGRAPHIES OF AUTHORS



Agus Wilson    is a doctoral student in the Department of Language and Literature Education at Universitas Negeri Surabaya, Indonesia. He received both his bachelor's and master's degrees in the English Education Program from Universitas Indraprasta PGRI, Indonesia. His research interests include EFL, ELT, English education, writing, and literature. He can be contacted at: email: agus.23030@mhs.unesa.ac.id; wilsonaw2580@gmail.com.



Ahmad Munir    is an associate professor of English Teacher Education at Universitas Negeri Surabaya. He has obtained master and Ph.D. from Monash University in English language education. His research interests include English teacher education, theorizing practice, personal practical theory, English language skills, and classroom discourse. He is currently the coordinator of Master Program in English language education at Universitas Negeri Surabaya. He can be contacted at email: ahmadmunir@unesa.ac.id.



Him'mawan Adi Nugroho    is an associate professor in the doctoral program of Language and Literature Education at Universitas Negeri Surabaya. He completed his doctorate education at Universitas Negeri Malang majoring in English Language Education. His research interests include language learning, curriculum and material development, and teacher professional development. He can be contacted at email: himmawannugroho@unesa.ac.id.