



Incidental English learning through social media and English Proficiency among Indonesian Gen Z: A cross-sectional survey

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ARTICLE INFO

Keywords:

Gen Z
Social media
Incidental learning
English ability

ABSTRACT

Social media platforms expose many Generation Z learners to English outside the classroom, raising the question of whether such incidental encounters are associated with measurable language ability. This study examined whether the frequency of incidental English learning (IL) through social media is associated with English proficiency among Indonesian secondary-school learners of English as a foreign language. A cross-sectional survey design was used. IL frequency was measured with a 25-item Likert-scale questionnaire capturing self-reported encounters with English on platforms such as YouTube, Instagram, and TikTok, while English ability was assessed with a 45-item test of listening, vocabulary, and grammar. Descriptive statistics, Pearson and Spearman correlations (with bootstrap confidence intervals), and linear regression were used to estimate the zero-order relationships between IL frequency and overall as well as sub-skill scores. Across all analyses, IL frequency showed no statistically significant association with total proficiency or with listening, vocabulary, and grammar sub-scores, and confidence intervals suggested that any undetected positive relationships, if present, are likely to be small. These findings, within the limits of a self-report, cross-sectional design, and a single EFL context, suggest that frequent incidental exposure via social media may not be sufficient on its own to produce measurable gains in formal proficiency. The study is preliminary and does not address causal effects, but it provides a baseline for future longitudinal and theory-rich work that considers not only *how often*, but also *how* and *why* adolescents engage with English on social media.

Introduction

Social media has become a ubiquitous part of the daily lives of Generation Z (Gen Z). Recent survey data indicate that many Gen Z adolescents are online almost constantly and spend several hours per day on social media. YouTube, Instagram, TikTok, and Snapchat are among the most popular platforms in this age group [1,16]. The interactive features of social media can be viewed as potential opportunities for English exposure. Activities such as messaging, chatting, commenting, reading news or posts, and watching videos occur frequently among users, and these activities often involve English in ways that may activate, recycle, or extend existing linguistic knowledge [7]. Furthermore, social media platforms can facilitate a personalised English-learning environment in which users follow accounts and channels that align with their interests and perceived proficiency levels. In such environments, learners may have opportunities to develop self-regulation and make autonomous choices about when and how they engage with English [17,18]. Content that resonates with learners' personal experiences and cultural backgrounds can also be highly motivating. Sustained

foreign language (FL) or second language (L2) development fundamentally requires motivation and engagement, which tend to increase when content feels relevant to real-life concerns and identities [41]. Several studies, therefore, argue that social media platforms provide rich opportunities to encounter foreign languages in authentic contexts, supporting incidental learning (IL) [19]. Yet despite this promise, the learning potential of social media is not straightforward.

Research evidence remains mixed. On the one hand, a number of studies report positive outcomes of incidental exposure: learners can acquire vocabulary and formulaic expressions through repeated encounters in reading, television, or digital environments [36,38,48,49]. Social media in particular has been associated with increased motivation, greater access to authentic linguistic input, and opportunities for learner autonomy in many EFL settings, although most existing evidence is correlational rather than experimental [4,18]. On the other hand, concerns have been raised that the informal, distraction-rich nature of these platforms may undermine the acquisition of accurate, formal language. Learners may be exposed to slang, errors, or language varieties that do not align with educational goals [33]. This tension suggests

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<https://doi.org/10.1016/j.caeo.2026.100358>

Available online 15 April 2026

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that incidental learning outcomes may depend heavily on the quality, depth, and pedagogical scaffolding of the input rather than on frequency of exposure alone.

At the theoretical level, classic SLA frameworks help clarify these ambiguities. Krashen's Input Hypothesis [23] posits that acquisition requires comprehensible input slightly beyond the learner's current level ($i + 1$). Schmidt's Noticing Hypothesis [43] emphasizes that input must be consciously attended to in order to become intake. The Depth of Processing framework [13] further highlights that shallow, surface-level encounters are unlikely to consolidate into long-term memory. Together, these theories suggest that incidental exposure on social media will foster learning only when it is sufficiently comprehensible, noticed, and processed deeply—a set of conditions that cannot be assumed in informal, entertainment-oriented contexts.

Globally, the question of how out-of-class digital practices contribute to second language proficiency is of increasing importance. As English learning extends beyond classrooms into ubiquitous digital spaces, researchers and educators seek to understand whether such practices can complement formal instruction or offset concerns about declining proficiency scores. Yet much of the existing research has examined incidental learning in more structured contexts (e.g., vocabulary gains from reading tasks, captioned video experiments), leaving a gap in understanding how unstructured, everyday engagement with social media relates to measurable proficiency.

This study addresses that gap by quantifying the frequency of incidental English learning activities on Instagram, YouTube, and TikTok among Indonesian Gen Z learners and examining their correlation with performance on a researcher-developed English ability test aligned with the local curriculum. It tackles a basic measurement question that has received little attention: whether everyday, unstructured social media encounters with English are associated with formal proficiency outcomes when no additional scaffolding is provided. Accordingly, this study has two objectives: (1) to describe the overall level and variability of Gen Z learners' incidental English engagement on major social media platforms, and (2) to test whether the frequency of this engagement is associated with their English ability in listening, vocabulary, and grammar. These objectives translate into the following research questions:

RQ1. Does the frequency of incidental social-media engagement correlate with overall English proficiency?

RQ2. Does it correlate with listening, vocabulary, and grammar subscores?

Literature review

Gen Z

Secondary school students today are categorized as members of Generation Z, Gen Z; they are also referred to as digital natives or members of the generation that grew up with the development of the internet. In many different information sources, the words "Gen Z" and "digital generation" are sometimes used interchangeably, similar to how they are used interchangeably but have the same meaning in this study. Gen Z has a strong engagement with social media as a form of their social, cultural, and even academic identity [37]. Their sustained engagement with YouTube, TikTok, and Instagram creates routine encounters with English, positioning Gen Z as a population with unprecedented informal access to the language. Research across diverse contexts confirms that adolescents and young adults are among the heaviest users of YouTube, Instagram, TikTok, and Snapchat [16].

Yet the educational implications of this engagement are contested. On the one hand, studies in Yemen and Turkey indicate that students perceive social media as enhancing their vocabulary, grammar, and even affective traits such as motivation and confidence [10,11,22].

Similar findings in Europe suggest that discipline-specific Instagram feeds or TikTok projects can bolster both English proficiency and digital literacies [31,51]. On the other hand, research also suggests that social media interactions may foster reliance on non-standard varieties, encourage linguistic simplification, or provide inconsistent input that does not align with formal proficiency goals [4,33]. Thus, while Gen Z's ubiquitous exposure appears promising, it cannot be assumed that frequency alone leads to durable linguistic gains.

Social media and language learning

The advance of human communication technology has offered a wide range of sources and media for English learning. This eliminates regional and time barriers to individual learning [5]. *social media* is one of the latest phenomena in English learning. The pedagogical potential of social media has attracted growing attention in applied linguistics. Because platforms provide abundant multimodal input—text, audio, image, and video—they have been championed as environments for authentic exposure and interaction [21,52]. Studies demonstrate that structured uses of social media can foster engagement, collaboration, and even cross-cultural exchanges. For example, one study [6] demonstrated the use of *WhatsApp* for group learning in blended learning classrooms, while in another study, teachers gave learners organized assignments to utilize real-world opportunities with native speakers via video chat on *Facebook*, *Skype*, and *WhatsApp* [44]. Similarly, YouTube has been advocated as a tool to combine linguistic input with cultural awareness [47], while college students in Spain found a *TikTok* project to be interesting because it promoted their creativity and language practice [51].

However, the benefits of social media hinge on guided, intentional use. When employed as pedagogical tools within blended learning frameworks, social media activities can be structured to ensure comprehensible input and promote active noticing. The informal nature of social media language may undermine the acquisition of standard linguistic proficiency required for formal education. Without scaffolding, their informal and entertainment-oriented nature may lead to superficial engagement. Learners may encounter linguistic simplification such as erroneous standard grammatical structures or spelling, as well as slang that may confuse rather than facilitate their understanding [4]. Moreover, the sheer abundance of online content risks overwhelming learners, with distraction outweighing potential learning opportunities [9]. Recent research reinforces this tension. A Saudi study reported significant vocabulary gains among daily *TikTok* users but attributed these improvements to captions and iterative exposure rather than to mere frequency [2]. Similarly, Slovak ESP learners demonstrated discipline-specific vocabulary acquisition when their exposure was linked to academic content in *Instagram* [31]. These findings point to a critical distinction: social media can support language learning, but only when input is sustained, comprehensible, and contextually relevant.

Incidental learning

The construct of incidental learning (IL) has long been of interest to SLA researchers. Classically defined as learning without the intention to learn [39], IL occurs when learners acquire knowledge as a by-product of another activity (e.g., reading, chatting, watching television, gaming, or completing non-language tasks) [30]. SLA scholars have emphasized its importance in developing implicit knowledge and in complementing formal instruction [15,23]. This present study fits with this concept of incidental learning, in which the learners engage freely in their everyday social-media practices, with any linguistic uptake occurring incidentally.

Empirical results are consistently positive for vocabulary under repeated, supported exposure, mixed for formulaic sequences, and weak or uneven for grammar and listening without guidance. Studies provide strong evidence for incidental acquisition of vocabulary and some

phraseological learning [34,38,48]. Meta-analytic work indicates that repetition, control of prior knowledge, and assessment type substantially moderate outcomes; mere contact with input rarely guarantees learning in the absence of multiple meaningful encounters and processing depth [46,49]. By contrast, incidental acquisition of grammatical morphology or improved listening tends to require more structured input and attentional support [1,12]. This differential pattern is crucial in understanding why some studies report robust gains while others, including the present one, observe no measurable effects.

New syntheses further clarify when incidental digital exposure helps and when it does not. A large meta-analysis of incidental vocabulary learning reports substantial variability in gains across studies and highlights key moderators such as repetition, prior knowledge control, and assessment type; in other words, mere contact with input rarely guarantees learning without conditions that promote multiple meaningful encounters and processing depth [49]. Closely related, a 2024 review [24] on captioned viewing concludes that captions/subtitles tend to amplify incidental uptake, with stronger effects for intralingual captions and tasks that direct attention to form—pointing to noticing and comprehensibility as the mechanism rather than screen time per se. A systematic review on specific platform, *TikTok*, frames short-video gains as contingent on caption use, repetition, and teacher-designed tasks—not on raw watch time [20].

A further source of inconsistency across studies is how exposure and learning are operationalized and which conditions moderate effects. Self-report frequency scales can blur true engagement compared to logs or trace analytics; “time on platform” is a weak proxy for quality of contact (e.g., language variety, speech rate, density of lexical targets). Effects are also shaped by pedagogic scaffolds (captions/subtitles, pre-/post-viewing tasks, focused prompts), learner proficiency and topic familiarity (which determine comprehensibility), and assessment type (recognition vs. production; decontextualized items vs. integrated tasks). These issues caution against treating raw frequency as sufficient and motivate studies—such as the present one—that test whether everyday exposure by itself relates to proficiency when moderators are uncontrolled.

Theoretically, three frameworks are relevant. Krashen's Input Hypothesis [23] argues that acquisition requires comprehensible input slightly above the learner's level ($i + 1$). Incidental encounters on social media may fail to meet this condition if input is too advanced, too colloquial, or too fragmented. Schmidt's Noticing Hypothesis [43] posits that attention is essential. Learners must notice linguistic forms to convert input into intake. Social media's fast-paced, multimodal environment may limit noticing, as learners focus more on visuals and entertainment than on language. Finally, Craik and Lockhart's Deep Processing framework [13] highlights that durable learning arises from semantically rich and elaborative processing. Superficial scrolling and passive viewing, typical of social media use, may therefore produce little long-term retention.

Research gap

Taken together, the literature highlights both the promise and the limits of incidental learning through social media. Many studies demonstrate gains in controlled, scaffolded contexts, particularly for vocabulary acquisition. Yet unstructured, entertainment-driven exposure often results in motivation or affective benefits rather than measurable proficiency. Importantly, much of the existing evidence comes from experimental or classroom-based designs in which exposure was intentionally optimized. There is comparatively little research on naturalistic, informal engagement in out-of-school contexts, especially in underrepresented regions such as Indonesia.

This gap motivates the present study. By quantifying secondary school students' frequency of incidental English encounters on *YouTube*, *Instagram*, and *TikTok*, and correlating these data with standardized test performance, the study tests whether everyday social media practices

can serve as a meaningful predictor of proficiency. In doing so, it contributes to applied linguistics in two ways: first, by clarifying whether frequency of informal exposure is sufficient for measurable gains, and second, by situating the findings within global debates about the role of digital input in second language development.

Methodology

Design

A quantitative, cross-sectional, correlational design was applied in this study. 170 EFL Grade XI students from three high schools in a medium-sized Indonesian city participated in the study. The students ranged in age from 16 to 17 years old and were classified as Gen Z. The aim of this study was to examine the correlation between students' incidental-learning (IL) frequency and their English ability (EA). At school, English was taught once a week for 100 min. English is a foreign language in Indonesia. The participants were selected using the cluster random sampling technique. They all admitted to being regular users of social media for friendship and entertainment. It was the fact that social media had not been widely used as a teaching media in English classroom instruction. The students did not have a student-teacher interaction with the researcher. These students voluntarily participated in completing a Likert-scale questionnaire measuring their frequency of IL and doing English proficiency test. All variables were measured in a single session without any experimental manipulation. Although the sample size is modest, it is comparable to or larger than many survey-based studies in EFL contexts. It provides sufficient precision to estimate small-to-moderate correlations between IL and proficiency; however, very small effects may have gone undetected, and generalisability is limited to similar secondary-school populations.

Instrumentation

This research used two instruments i.e.:

Incidental learning (IL) questionnaire

A 25-item Likert-scale questionnaire was developed to capture students' everyday engagement with English on three popular social media platforms: Instagram, YouTube, and TikTok. The items focused on three broad aspects of English use—listening, vocabulary, and grammar—operationalised as typical activities that may provide opportunities for incidental learning while using these platforms. An initial item pool was informed by prior work on informal digital learning of English and out-of-class exposure [26,27,35] and covered receptive activities (e.g., watching English videos, listening to audio, reading captions or comments) as well as light productive or interactive activities (e.g., posting or replying in English). In this study, the IL score therefore reflects the self-reported frequency of incidental English exposure during social-media use, rather than learning outcomes per se.

To support content validity, items were reviewed for clarity, relevance, and redundancy by two EFL practitioners (an English teacher at a secondary school and an English lecturer at a university). Using a 4-point content validity index (CVI) scale, reviewers rated each item for domain relevance and provided qualitative suggestions; flagged items were revised for clarity, single-construct focus (avoiding double-barrel wording), or contextual appropriateness. A brief cognitive debriefing with eight students was then conducted to check how they interpreted the items and response options and to confirm that the wording was understandable. This process resulted in a final set of 25 items rated on a 5-point frequency scale: always (5), frequently (4), sometimes (3), rarely (2), and never (1).

The questionnaire was administered via Google Forms and distributed to participants through their WhatsApp class groups. The form was configured with an approximate 30-minute response for completion, primarily to encourage spontaneous, experience-based responses rather

than prolonged reflection, in line with the study’s focus on typical, largely unplanned behaviours on social media. In the present sample, internal consistency for the IL scale was Cronbach’s $\alpha = 0.97$, indicating excellent reliability.

English proficiency test

English ability was assessed with a researcher-developed multiple-choice test. To ensure alignment with the local curriculum and typical classroom content, items were drawn from existing school examinations used in the participating schools. The final test comprised 45 items targeting three subskills: Listening, Vocabulary, and Grammar (15 items per subscale). Items were selected and arranged to approximate a lower-intermediate difficulty level and to maintain a balance of content across subscales.

Each item was scored dichotomously (1 point for a correct answer, 0 for an incorrect or blank response), yielding a maximum total score of 45 (EA_Total) and subscale scores ranging from 0 to 15. Students were given 45 min to complete the test. Administration took place in regular classrooms at the three participating schools on three consecutive days (one school per day). The researcher administered all sessions using standardised instructions in order to keep testing conditions and timing as comparable as possible across sites. The English Ability (EA) scales (15 dichotomous items each) achieved acceptable reliability for Grammar (KR-20/ $\alpha = 0.72$) and Vocabulary (KR-20/ $\alpha = 0.73$), though Listening was somewhat weaker (KR-20/ $\alpha = 0.65$). For the overall 45-item EA_Total composite, internal consistency was excellent (KR-20/ $\alpha = 0.89$).

Procedure

After school approval, the study aims and confidentiality were explained to participants. The IL questionnaire link was distributed via class WhatsApp groups; participants completed it individually in a supervised classroom setting. The EA test was then followed under standardised timing with the researcher acting as proctor to minimize environmental variance (noise, device use). Data were exported directly from Google Forms (survey) and scored from paper sheets, then merged via anonymous codes.

Data analysis

The IL score was the predictor, operationalized as the item mean of a 25-item Likert questionnaire (1–5). The outcomes were (a) EA_Total (sum score across all 45 test items) as the primary outcome and (b) the three EA subscales—Listening, Vocabulary, and Grammar—as secondary outcomes (each based on 15 dichotomous items). Internal consistency was evaluated to document score reliability (Cronbach’s α for IL; KR-20/ α for EA subscales and EA_Total).

The analytical framework was specified in advance and comprised four steps: (1) descriptive statistical analysis for both IL and EA scores; (2) Pearson correlation coefficients assessing the relationship between IL and each EA outcome, accompanied by bias-corrected and accelerated (BCa) 95 % bootstrap confidence intervals and supplemented by Spearman correlations to ensure robustness; (3) control of familywise error rates for the three subscale assessments utilizing Bonferroni correction and Benjamini-Hochberg false discovery rate (BH-FDR) methods; and (4) a simple linear regression analysis in which EA_Total was regressed on IL to quantify the association in raw-score units and to report variance explained (R^2). All statistical tests were two-tailed with a significance level set at $\alpha = 0.05$, adjusted where appropriate.

The present analyses were deliberately limited to zero-order relationships between IL and proficiency outcomes. Given the exploratory, baseline nature of this study and the length constraints on the questionnaire, we did not collect additional covariates such as learners’ perceptions of social media usefulness, motives for social media use, habitual use, self-rated proficiency, or socio-economic background. As a

result, the reported correlations and regression represent unadjusted associations between IL frequency and English ability. We view these estimates as a starting point that future, more elaborated models can build on by incorporating theoretically grounded control variables and mediators.

Results and discussion

Results

Incidental learning (IL) scale

The present study began with validating the Incidental Learning (IL) scale. The 25-item IL scale showed excellent internal consistency ($N = 170$; Cronbach’s $\alpha = 0.97$). Corrected item–total correlations were uniformly positive (range = $\sim .67$ – $.80$), and “if item deleted” remained between 0.97 – $.97$, indicating no item reduced reliability. The mean inter-item correlation was $r = 0.57$, consistent with a homogeneous construct. Exploratory factor analysis (principal axis factoring) on 25 IL items (KMO = 0.947 ; Bartlett’s $\chi^2(300) = 4052.74, p < .001$) indicated a dominant general factor (initial eigenvalue 14.15 , 56.61 % variance; next eigenvalues 2.43 , 1.28). In the unrotated solution, standardised loadings on Factor 1 ranged 0.58 – $.81$ ($M \approx 0.74$), with extraction communalities 0.38 – $.83$, supporting essential unidimensionality and the use of a total IL score. This provides confidence that the construct of incidental learning frequency was measured reliably. The IL total (item mean, 1–5 scale) was $M = 2.91$, $SD = 0.92$, observed range 1.04 – 4.84 .

English ability (EA) scales

The English Ability (EA) scales (15 dichotomous items each) achieved acceptable reliability for Grammar (KR-20/ $\alpha = 0.72$) and Vocabulary (KR-20/ $\alpha = 0.73$), though Listening was somewhat weaker (KR-20/ $\alpha = 0.65$). The weakest item (EA14; CITC ≈ 0.09) was examined; removing it increased α slightly to 0.66 , and all inferential results were unchanged, so it was retained to preserve content coverage. Given the lower reliability of Listening, associations involving this subscale should be interpreted cautiously. Nonetheless, the EA_Total composite proved sufficiently robust to serve as the primary criterion variable. The distribution of subscale scores was: Listening $M = 9.24$, $SD = 3.01$ (range 1 – 15), Vocabulary $M = 9.35$, $SD = 3.31$ (2 – 15), and Grammar $M = 9.10$, $SD = 3.33$ (2 – 15). The overall EA_Total (sum of 45 items) averaged $M = 27.68$, $SD = 8.99$ (range 7 – 43 , $N = 170$), thus, in percentage, $M = 61.52$ %, $SD = 20.00$ %, range 15.56 – 95.56 %.

Correlation between IL and EA

Pearson correlations (with 2000-sample BCa 95 % CIs) indicated no reliable correlation between students’ incidental-learning frequency and English ability. IL was trivially related to overall EA ($r = 0.02$, 95 % CI $[-.13, 0.18]$, $p = .79$), Listening ($r = 0.03$, 95 % CI $[-.11, 0.19]$, $p = .66$), Vocabulary ($r = 0.02$, 95 % CI $[-.14, 0.18]$, $p = .80$), and Grammar ($r = 0.01$, 95 % CI $[-.14, 0.16]$, $p = .94$). Results were unchanged after Bonferroni and FDR corrections, and rank-based (Spearman) correlations led to the same conclusions. With $N = 170$, the CIs rule out effects larger than about $|r| \approx 0.18$ (Table 1).

Regression analysis

A simple linear regression testing whether IL frequency predicted EA was not significant, $F(1168) = 0.07$, $p = .788$, with a negligible effect

Table 1
Correlations of IL vs. English Ability ($N = 170$).

Outcome	R	95 % CI	p	p (Bonf.)	Q(FDR)
EA_Total	.021	–.130 to 0.179	.788	1.000	1.000
Listening_Total	.034	–.107 to 0.188	.662	1.000	1.000
Vocabulary_Total	.020	–.138 to 0.176	.800	1.000	1.000
Grammar_Total	.006	–.142 to 0.164	.936	1.000	1.000

size ($\beta = 0.02$, $R^2 = 0.0004$). The unstandardized slope ($b = 0.21$, 95 % CI $[-1.27, 1.75]$) indicated no reliable change in EA as IL scores increased.

Discussions

In contrast to some reports of positive outcomes, the analyses in the present study found no statistically significant association between the frequency of incidental English learning (IL) through social media and learners' English ability (EA) in listening, vocabulary, or grammar. Although a null result may initially seem disappointing, it provides valuable insight into the boundary conditions under which incidental exposure is less likely to translate into measurable proficiency. By challenging the common assumption that "more exposure equals more learning", these findings add nuance to debates in applied linguistics about out-of-class digital input. As an exploratory, baseline study, the primary contribution of this work is not to provide a definitive answer to whether social-media-based incidental learning "works" in a causal sense, but to map the zero-order relationship between everyday IL frequency and formal proficiency in an under-represented EFL context. By documenting a carefully analysed null association and situating it within relevant theoretical perspectives, the study provides conceptual and methodological groundwork that later, more elaborated designs (e.g., longitudinal and multivariate studies) can build on.

It is important to emphasise that the present results are strictly correlational. The cross-sectional design does not allow us to determine the direction of influence between incidental engagement and English ability. It is plausible that higher proficiency could lead learners to seek out more English content on social media, that social media use might influence proficiency, or that both are driven by third variables (e.g., motivation, access to devices, parental support). Our analyses therefore speak only to the absence of an association at one point in time, not to the presence or absence of any causal effects.

Motives, habitual use, and mindsets as boundary conditions

One explanation for the null association is that the frequency of encountering English may be a weak proxy for the type and purpose of social media engagement. Uses and Gratifications (U&G) scholarship conceptualises media use as goal-directed and suggests that users select content to satisfy needs such as entertainment, passing time, social interaction, or information seeking [42,50]. Different motives are associated with different patterns of platform choice and content engagement, which plausibly shape the quantity—and especially the quality—of language input available for incidental uptake [50]. Because the present study measured only self-reported frequency of incidental English encounters, it could not distinguish learners who engage with information-rich, text-supported English content from those whose "English encounters" are brief or peripheral while primarily consuming Indonesian-language entertainment content.

A second explanation concerns the role of habit and automaticity. Habit research suggests that frequently repeated behaviours can become increasingly automatic and less dependent on deliberate intention, implying reduced attentional engagement during use [28]. Reduced attention can be consequential for incidental language development because noticing and deeper processing are widely considered important for converting input into durable knowledge [13,43]. In a highly habitual "scrolling" routine, learners may accumulate frequent English encounters but process them shallowly, which could help explain why higher IL frequency did not correspond to higher test performance in this sample.

Related work draws a useful distinction between overall time spent on social media, problematic or addictive use, and the quality of engagement. Reviews and meta-analyses on adolescents' media use indicate that problematic or compulsive patterns—marked by loss of control and interference with daily life—tend to show stronger associations with negative outcomes than usage time alone [8,32,45].

Moreover, supportive and purposeful interactions can be more predictive of positive outcomes than mere time online [29]. In the context of language learning, these distinctions imply that similar IL frequency scores may reflect very different kinds of engagement: some learners may interact actively with English-rich content, whereas others may experience passive or compulsive exposure with limited attention. Because our IL measure captured frequency but not problematic use or engagement quality, such heterogeneity could attenuate any relationship with formal proficiency.

A third lens concerns beliefs about agency and expected effects of social media [25] operationalise "social media mindsets" as core beliefs organised around perceived agency ("in control" vs "out of control") and perceived valence ("enhancing" vs "harmful"), and show that these mindsets relate to how people use social media and how they interpret their use. Applied to incidental learning, learners with more agentic, "enhancing" mindsets may be more likely to adopt constructive behaviours (e.g., curating English-rich accounts, using captions strategically, pausing and replaying segments), whereas learners who feel their use is out of control may engage in more passive, low-attention patterns. Importantly, the present study did not measure motives, habit, problematic use, or mindsets; these interpretations are therefore offered as plausible boundary conditions and priorities for future research, not as mechanisms supported by the current data.

The potential of incidental learning in second language acquisition (SLA) has been highlighted by several lines of research. Vocabulary studies, for example, consistently report that repeated exposure through reading and listening can lead to measurable word gains [14,46,48]. Research on grammar learning likewise suggests that learners can incidentally acquire morphosyntactic patterns when these are embedded in meaningful input [1,40]. Studies on media use have also demonstrated positive outcomes as found by Peters & Webb [36] that incidental vocabulary growth through viewing captioned television, while [38] showed that learners acquired formulaic sequences from TV exposure. More recent work in digital learning suggests that platforms such as *TikTok* and *Instagram* can provide authentic contexts for informal English practice, particularly when engagement is sustained and learning-oriented [3,11].

At the same time, the present findings differ from studies reporting measurable proficiency gains and align with concerns that unstructured, entertainment-oriented exposure may yield limited proficiency benefits. Depth of Processing framework [13] suggests that shallow, surface-level engagement—such as brief viewing of entertaining clips—rarely produces durable learning. Although students in the present study reported frequent encounters with English on social media, much of this exposure may have been passive and entertainment-oriented, lacking the attentional focus required for consolidation. In the same vein, Schmidt's [43] Noticing Hypothesis posits that input must be consciously noticed to become intake; the rapid pace, multimodal distractions, and informal style of social media may inhibit such noticing, especially when learners are not guided to attend to linguistic features. Similarly, Krashen's [23] Input Hypothesis emphasises the importance of comprehensible input at $i + 1$. If much of the social media content encountered by learners involved slang, idiomatic language, or rapid speech beyond their comprehension threshold, frequent exposure would be less likely to contribute to acquisition. Thus, while Gen Z learners may be immersed in English-rich digital environments, the quality and comprehensibility of input—and the depth of processing it receives—may not consistently meet the conditions necessary for proficiency growth.

The Indonesian EFL context may also be relevant. With limited classroom exposure (approximately 100 min of English per week), many learners may rely on social media as a major source of English contact. However, this informal exposure may contribute more readily to affective outcomes—such as motivation, confidence, cultural familiarity, or digital literacies—than to the formal listening, vocabulary, and grammar knowledge targeted by curriculum-aligned tests. Prior research has noted that students often perceive social media as helpful

for their language learning [4,10]. Consistent with that possibility, our null association suggests that perceived usefulness or enjoyment does not necessarily translate into measurable gains in formal proficiency, although this interpretation remains tentative because we did not measure learners' perceptions directly. Future research that assesses perceived usefulness alongside motives, mindsets, and objective engagement indicators would help clarify when and how social media encounters contribute to proficiency outcomes.

Pedagogical implication

The findings carry important pedagogical implications. First, they indicate that, in this sample, the frequency of incidental social-media encounters was not associated with higher proficiency scores, and taken together with prior studies, this suggests that mere frequency of exposure may be insufficient to drive measurable gains. Teachers and curriculum designers should therefore consider how to transform incidental encounters into intentional learning opportunities. For example, learners could be asked to summarize a TikTok video in writing, discuss the content of a YouTube clip in class, or keep a digital vocabulary journal of unfamiliar words encountered online. Such strategies could prompt deeper processing and support the noticing of linguistic features. Second, incidental and intentional learning should not be treated as separate domains; rather, they can complement each other. By blending informal input with guided tasks, educators can harness learners' enthusiasm for social media while steering it toward measurable outcomes.

Limitations and future directions

Several limitations should be acknowledged. First, the reliance on self-report questionnaires may not fully capture learners' actual engagement or the quality of their input. Future studies could employ more objective indicators such as screen-time tracking, clickstream/log data, or discourse analysis of online interactions. Second, the cross-sectional design precludes conclusions about causality or long-term effects. We cannot determine whether incidental engagement influences proficiency, whether proficiency shapes social-media choices, or whether both are driven by other factors. Our estimates should therefore be interpreted as non-causal associations at a single time point. Longitudinal or experimental studies could determine whether sustained, scaffolded engagement with social media leads to cumulative gains over time. Third, while reliability indices for most subscales were strong, the listening component's borderline reliability may have attenuated potential associations. Fourth, the context-specific nature of the study—Indonesian secondary students with relatively limited classroom exposure—limits generalisability, and replication in other socio-educational settings is needed. Fifth, the analytic models are intentionally simple: we examined only zero-order relationships between IL and proficiency and did not include potential control variables such as learners' perceptions of social media usefulness, motives for using social media (e.g., entertainment vs. information seeking), habitual use, or socio-demographic characteristics.

Beyond these design constraints, the study is also theoretically constrained in that it only operationalises "how much" incidental engagement occurs, not "how" or "why" learners use social media. Future work should therefore incorporate validated scales for social media motives (Uses & Gratifications), habitual use, and social media mindsets, alongside IL measures and proficiency outcomes. Such designs would allow researchers to test whether these constructs mediate or moderate the relationship between digital exposure and language development, moving from simple correlations to more explanatory models.

Conclusion

In conclusion, while Gen Z students inhabit digitally saturated environments that immerse them in English through social media, this study found no significant correlation between incidental learning

frequency and English ability. This finding may appear unexpected, but it offers a critical contribution by clarifying the boundaries of incidental learning and underscoring the conditions under which exposure fails to produce tangible gains. From a theoretical perspective, the results suggest that incidental learning through unstructured social media exposure does not automatically translate into intake. Frameworks such as Krashen's Input Hypothesis, Schmidt's Noticing Hypothesis, and Craik and Lockhart's Depth of Processing model help to explain why. Exposure that is either incomprehensible, fleeting, or processed only at a surface level cannot consolidate into durable linguistic knowledge. This interpretation resonates with prior cautions in the SLA literature that frequency alone is insufficient; meaningful repetition, comprehensibility, and learner attention are required for effective incidental acquisition.

Pedagogical implications of the findings point to the need for integrating incidental encounters into structured learning frameworks. Social media platforms are not devoid of potential—they provide abundant, authentic, and motivating English input. Yet, left unguided, they risk remaining peripheral to learners' linguistic development. Teachers and curriculum designers can play a central role by bridging the gap between informal input and formal learning outcomes. For example, students may be encouraged to analyze captions in YouTube videos, create reflective summaries of TikTok clips, or use Instagram posts as prompts for classroom discussion. These strategies ensure that exposure moves beyond entertainment toward deliberate noticing and deeper processing. By embedding reflective, task-based approaches, educators can transform passive encounters into active opportunities for vocabulary enrichment, grammar consolidation, and listening development. At the level of applied linguistics, this present study contributes to ongoing debates on the role of out-of-class learning in second language development. It suggests that while informal digital practices may foster motivation, confidence, and digital literacies, their contribution to proficiency is conditional. Researchers should therefore avoid over-generalizing the benefits of incidental learning and instead attend to the interaction between context, learner agency, and pedagogical mediation.

Future research should explore longitudinal designs that track whether scaffolded digital engagement yields cumulative effects, employ mixed-methods approaches to capture learners' perceptions alongside performance data, and extend investigations to other socio-cultural settings for broader generalizability. Such work will help determine when and how incidental encounters can be harnessed most effectively. Future studies should also move beyond frequency-only measures by integrating validated scales of social media motives (Uses & Gratifications), habitual use, and social media mindsets as predictors and moderators in multivariate models, alongside IL and proficiency measures. Together, these developments would allow researchers to move from simple zero-order associations toward more explanatory models of how digital practices contribute to language development. As a preliminary, correlational study, our work should be read as opening a line of inquiry rather than closing it: it indicates where future longitudinal and theory-rich studies need to focus and which additional constructs (e.g., motives, habits, mindsets) are likely to be crucial.

In sum, our findings do not provide evidence that exposure alone is associated with higher proficiency; taken together with prior work, this suggests that exposure alone may often be insufficient. For educators and researchers, the key task is to explore how ubiquitous digital English input can be turned into more structured, pedagogically meaningful opportunities for learning.

Declaration of generative AI and AI-assisted technologies in the manuscript preparation process

During the preparation of this work the author used ChatGPT in order to polish the language and Grammarly in order to check grammar use. After using this tools/services, the author reviewed and edited the content as needed and takes full responsibility for the content of the

published article.

Funding

Research Centre, Universitas Bung Hatta.

Ethics approval & consent

Not applicable.

Data availability

Data available on request.

CRediT authorship contribution statement

Fitrina Harmaini: Writing – original draft, Methodology, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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