

Designing Digital Writing Pedagogy: An SFL-Informed Genre-Based Framework for Higher Education

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Abstract: Digital communication has changed what counts as writing in higher education. Students compose across word processors, collaborative platforms, websites, presentations, infographics, video, and generative artificial intelligence (GenAI) environments, yet writing pedagogy often remains organized around monomodal print genres and sentence-level correctness. This conceptual article develops an integrated framework that connects Systemic Functional Linguistics (SFL), the Genre-Based Approach (GBA), and digital multimodal composing (DMC). Using an integrative, theory-building design (Jabareen, 2009; Torraco, 2016) and a transparent literature procedure reported with reference to PRISMA 2020 principles (Page et al., 2021), the article synthesizes foundational works and 2021–2026 research in L2 writing, English for Academic Purposes, multimodality, and GenAI-mediated composition. Five research gaps are identified: limited integration of SFL genre pedagogy and DMC, weak alignment between multimodal tasks and assessment, an under-specified linguistic dimension of digital composing, limited transfer evidence, and misalignment between GenAI-supported composing and conventional assessment. In response, the article proposes an eight-phase SFL-Informed Digital Genre Pedagogy framework and a six-dimension assessment architecture. Its novelty lies in aligning field–tenor–mode analysis, genre staging, and multimodal orchestration within one teaching–learning cycle; deriving assessment dimensions from the same phases; treating GenAI output as an object of functional-genre evaluation and verification; and adding a functional-sufficiency principle for metalanguage. Theoretical validity is argued through a traceability matrix and internal-consistency checks, and a staged protocol for empirical validation (expert review with content validity indices, rubric reliability, and argument-based validation) is specified. The framework is offered as a testable design architecture rather than an empirically validated model.

Keywords: Digital Writing; Systemic Functional Linguistics; Genre-Based Pedagogy; Multimodality; Digital Multimodal Composing; Higher Education; L2 Writing; Assessment.

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I. INTRODUCTION

Writing in higher education is no longer confined to the production of print-oriented essays, reports, and research papers. Students now compose in environments where language is combined with images, diagrams, typography, layout, sound, hyperlinking, animation, and interactive features. Their academic work may involve collaborative documents, digital presentations, infographics, websites,

video essays, podcasts accompanied by scripts, learning-management-system posts, and public-facing knowledge products. The rapid normalization of generative artificial intelligence (GenAI) has added another layer: digital composing may now include prompting, evaluating generated language, comparing alternative versions, verifying evidence, and redesigning human-machine output. These changes challenge writing pedagogy to explain not only how students should write sentences and paragraphs,

but how meaning is designed across modes, audiences, platforms, and genres.

The key problem is that technology can change the surface of an assignment without changing its pedagogy. Typing an essay in a cloud-based document is digital in a technical sense, but the rhetorical work may remain identical to that of a printed essay. By contrast, translating a research argument into an infographic or interactive web article requires the writer to redistribute meaning across verbal and non-verbal resources. It involves choices concerning information hierarchy, audience, image-text relations, navigation, evidence density, visual salience, accessibility, and platform affordances. Digital writing is therefore better conceptualized as situated meaning-making in digitally mediated environments than as conventional writing performed on a computer.

Research on digital multimodal composing (DMC) has expanded substantially. Reviews document a growing body of tertiary L2 research exploring learner experience, identity, multimodal design, language development, and technology-supported composing (Li & Akoto, 2021; Zhang, Akoto, & Li, 2021). Empirical studies suggest that DMC can support aspects of writing development and engagement, although benefits vary by task, measure, and context (Xu, 2021; Kim & Belcher, 2020; Xu et al., 2025). Research on university assignments also shows that multimodal tasks are already present across disciplines, making digital multimodal competence an authentic target for English for Academic Purposes (EAP) and academic literacy instruction (Lim & Polio, 2020). Scholars have also begun to conceptualize and measure DMC competence, including dimensions such as genre awareness, language use, and cohesion of modes (Zhang & Yu, 2023a, 2023b, 2025).

At the same time, a different research tradition has developed a sophisticated theory and pedagogy for making valued academic genres visible. Systemic Functional Linguistics (SFL) conceptualizes language as a social semiotic resource for making meaning in context (Halliday & Matthiessen, 2014). The SFL Genre-Based Approach (GBA), especially the Sydney School tradition, treats genres as staged, goal-oriented social processes and makes the relationships among context, purpose, discourse structure, and linguistic choices explicit to learners (Martin & Rose, 2008; Rose & Martin, 2012). In tertiary L2 writing, research has shown how SFL-informed genre teaching can support genre awareness, linguistic knowledge, and control of disciplinary or academic genres (Yasuda, 2011, 2017; Emilia & Hamied, 2015; Nagao, 2018, 2019, 2022). Indonesian research has also examined genre-based teaching cycles within mandated curricula and in school writing (Triastuti et al., 2022; Yusuf & Rofiawati, 2024).

A 2026 systematic review of SFL genre-based writing research in university EAP identified 70 studies across 20 countries published from 1995 to 2024, demonstrating that the approach has a substantial international research base while also documenting diverse adaptations and continuing

needs for context-sensitive investigation (Liardet et al., 2026). A complementary review of 38 studies on genre-based approaches and ESL/EFL writing (2003–2023) likewise identified recurring research themes in research-article, thesis, and argumentative writing (Liu et al., 2024). Yet the SFL-GBA and digital multimodal writing literatures have often developed in parallel. The first has tended to foreground genre, disciplinary language, explicit metalanguage, and linguistic development; the second has foregrounded multiple modes, technological affordances, identity, authenticity, and expanded composition. The resulting conceptual gap is consequential. Digital writing pedagogy needs a robust account of language and genre, while SFL-informed genre pedagogy needs a more systematic response to the multimodal and platform-mediated conditions of contemporary composing.

This article develops such a response. Its purpose is not to claim that SFL alone can explain all multimodal semiosis, nor that genre pedagogy should prescribe fixed digital templates. Rather, the article argues that SFL provides a strong linguistic and contextual foundation, GBA provides an explicit scaffolded pedagogy, and multimodal writing research provides the conceptual expansion needed to account for digital composing. The article therefore asks: (1) What theoretical resources do SFL and GBA contribute to digital writing pedagogy? (2) What gaps emerge when current SFL-GBA and DMC research are considered together? (3) How can these traditions be integrated into a practical, testable framework for higher-education writing instruction and assessment? (4) How defensible is the resulting framework in terms of method, theoretical validity, and novelty relative to existing models?

The proposed SFL-Informed Digital Genre Pedagogy framework is conceptual. It synthesizes established principles and empirical findings into a design architecture that can guide curriculum development and future research. It is not presented as a validated developmental sequence. Section 2 describes the conceptual method, Section 12 positions the novelty of the contribution, and Section 13 sets out the validity argument and a protocol for empirical validation. Its value should ultimately be judged by empirical studies examining whether it improves learner control of genre, language, multimodal design, transfer, and reflective decision-making across higher-education contexts.

II. METHOD: CONCEPTUAL DESIGN AND PROCEDURE

➤ Research Design

This study is a conceptual, theory-building article rather than an empirical study. Conceptual articles are appropriate when the aim is to synthesize dispersed literatures and propose new relationships among constructs (Jaakkola, 2020). The design follows Jabareen's (2009) procedure for building conceptual frameworks and Torraco's (2016) guidance for integrative reviews, in which existing literatures are critiqued and then reconceptualized into a new configuration. The article reports no participant data and makes no claim of empirical effectiveness. Its

claims are of three kinds: descriptive claims about the state of the literature, which are traceable to cited sources; interpretive claims about relationships among theories, which are justified by explicit argument; and design claims about the framework, which are formulated as testable propositions (Section 14).

➤ *Literature Identification and Selection*

Sources were identified through iterative, purposive searches of Google Scholar, publisher platforms, and open-access directories, complemented by backward and forward citation tracing from key reviews (Liardet et al., 2026; Zhang et al., 2021). Search strings combined terms for SFL and genre (for example, “systemic functional linguistics,” “genre-based approach,” “teaching-learning cycle”), multimodality (“digital multimodal composing,” “multimodal writing,” “multiliteracies”), and GenAI (“ChatGPT,” “generative AI”) with “L2 writing,” “EAP,” or “higher education.” The final search was run in October 2026. Inclusion criteria were: (a) peer-reviewed journal articles, scholarly books, or institutional reports; (b) a focus on tertiary or adult L2 and EAP writing, or on theory directly relevant to such contexts; (c) publication in English; and (d) for empirical and review studies, publication between 2021 and 2026, so that the synthesis reflects the post-pandemic and GenAI period. Foundational theoretical works were included regardless of date. Non-peer-reviewed commentary, studies without a writing focus, and sources whose bibliographic details could not be confirmed in a publisher or indexing record were excluded.

Each included source was recorded with its bibliographic data, theoretical orientation, context, design, and main findings, and each reference was checked against its publisher or indexing record. In line with the transparency principles of PRISMA 2020 (Page et al., 2021) and recommendations for rigorous narrative reviews (Sukhera, 2022; Snyder, 2019), the search is reported. Because the aim is conceptual integration rather than exhaustive aggregation, no meta-analytic or quantitative synthesis is claimed, and the search is not presented as a registered systematic review.

➤ *Framework-Building Procedure*

The framework was developed through four analytic moves that correspond to Jabareen’s (2009) phases of mapping, categorizing, integrating, and validating. First, constructs were extracted from three bodies of literature: SFL (context, register, and metafunctions), GBA (the teaching-learning cycle), and DMC (modes, orchestration, and assessment). Second, the constructs were compared to identify overlaps (for example, SFL mode versus multimodal mode), tensions (for example, language dilution in multimodal tasks), and absences, which produced the five gaps reported in Section 6. Third, each gap was matched with a design principle, one or more framework phases, and one or more assessment dimensions (Sections 7–9). Fourth, the resulting configuration was checked for internal consistency and traceability (Section 13) and reformulated as testable propositions (Section 14).

➤ *Quality Criteria*

The contribution is judged against criteria for theoretical contributions: what is new, why the logic is plausible, and what the boundary conditions are (Whetten, 1989). The first is addressed in Section 12, the second and third in Section 13 and in the limitations reported in Section 15. Validity is treated as an argument that is built in stages (Kane, 2013; Messick, 1995), and Section 13 states which stages are completed and which remain future work.

➤ *Digital Writing as Multimodal, Situated Meaning-Making*

Digital writing is sometimes defined too broadly, as any written production created through a digital device, or too narrowly, as technologically sophisticated multimedia production. Neither definition is pedagogically adequate. A useful definition must focus on what digital mediation changes in composing. Four dimensions are particularly important: mediation, multimodality, audience and circulation, and revisability. Case studies of L2 writers who remediate essays into digital video or multimodal texts illustrate how such composing redistributes meaning across modes (Cimasko & Shin, 2017; Shin & Cimasko, 2008).

First, digital mediation alters the material and social conditions of writing. Cloud platforms make synchronous and asynchronous co-authoring routine; learning management systems embed writing in threaded interaction; websites and social platforms affect text length, navigation, visibility, and feedback; and authoring applications provide templates that shape design choices. Technologies therefore do not merely deliver texts after they have been written. They participate in the composing environment by enabling, constraining, and foregrounding particular actions. This view is consistent with research on the “digital turn” in literacy studies, which treats technologies as part of the social practices through which meaning is made (Mills, 2010).

Second, digital writing is frequently multimodal. Writers may coordinate written language with image, diagram, typography, color, spatial arrangement, voice, music, movement, and interactive navigation. Multimodality does not mean that language becomes unimportant. Rather, the distribution of meaning changes. A chart may represent a comparison more efficiently than prose; a caption may anchor the interpretation of an image; a heading may organize information spatially and rhetorically; a narrated explanation may combine spoken language with moving visuals. The critical issue is orchestration: which mode should carry which part of the message, and how should the modes interact? Social-semiotic accounts treat such choices as designs for learning rather than decoration (Bezemer & Kress, 2008; Kress, 2010).

Third, digital environments expand audience and circulation. Much traditional student writing has a hidden rhetorical condition: it is nominally an essay or report but is actually written for a teacher who already knows the content and evaluates performance. Digital genres can enable more authentic audience design because products may be

addressed to students in another course, disciplinary communities, professional stakeholders, or public audiences. This creates real pressure to calibrate terminology, explanation, evidence, interpersonal stance, accessibility, and navigation. Research on digital video projects, for example, documents how authentic audiences and multimodal ensembles shape learners' design decisions (Hafner, 2014; Jiang, 2017).

Fourth, digital texts are highly revisable and traceable. Collaborative platforms preserve versions, comments, and histories. Multimodal tools permit redesign at multiple levels: wording, sequence, visual hierarchy, image selection, and interaction. This creates pedagogical opportunities to assess process and decision-making rather than only the final artifact.

These features explain why DMC has received increasing attention in L2 writing. Zhang et al. (2021), reviewing 60 empirical studies in post-secondary L2 settings from 2005 to 2020, found a field characterized by substantial qualitative work, emerging intervention studies, frequent use of video projects, and strong interest in learner perspectives. Li and Akoto (2021), reviewing 26 studies published between 2010 and 2020, reported benefits such as audience and genre awareness, learner autonomy, language learning investment, identity development, and multimodal communicative competence. More recent work has conceptualized DMC competence and developed validated measurement instruments (Zhang & Yu, 2023a, 2023b, 2025), and has begun to examine the integration of generative AI into DMC (Jiang, 2024; Smith et al., 2025).

However, the evidence also cautions against assuming that multimodality automatically improves writing. Xu (2021) reported significant gains for a DMC group on several L2 writing measures, including content and comprehensibility. By contrast, Kim and Belcher (2020) found that traditional essays elicited greater syntactic complexity on some measures than multimodal compositions, although students valued DMC for meaning-making. These findings are compatible rather than contradictory: different tasks recruit different semiotic and linguistic resources. A multimodal task that reduces extended prose may provide fewer opportunities to practice complex syntax, while offering stronger opportunities for audience design, selection, condensation, and intermodal coordination. Qualitative work further suggests that DMC can reshape learners' investment in writing (Jiang, 2018), and a recent quasi-experimental study found that a DMC assignment strengthened EFL writers' strategy knowledge, which the authors attributed to the additional decision-making opportunities the task created (Xu et al., 2025).

Therefore, the pedagogical aim should not be to replace academic writing with multimodal products. It should be to expand students' communicative repertoire and to design principled movement between modes and genres. Students may compose an evidence-based academic argument and then redesign it for a public digital audience. They may first explore a concept through an infographic and

later reconstruct the same knowledge in sustained prose. Such transformations make visible the relationship between meaning, audience, genre, language, and medium.

GenAI now adds a further layer to DMC. Studies report that GenAI tools can be integrated into multimodal composing workflows and can change how students plan, draft, and revise (Jiang, 2024; Smith et al., 2025), while concerns about authorship, intellectual property, and academic integrity remain prominent (Cotton et al., 2024; Perkins, 2023). Digital writing pedagogy therefore needs a principled account of what students must still decide, verify, and justify when a tool can generate language and images.

➤ *Systemic Functional Linguistics as a Theory of Meaning for Digital Writing*

Systemic Functional Linguistics is particularly relevant to digital writing because it treats language as a resource for social meaning rather than a set of isolated formal rules. In Hallidayan theory, linguistic choices are functional: speakers and writers select from systems of meaning possibilities in relation to the context in which communication occurs (Halliday & Matthiessen, 2014). For pedagogy, this shifts the central question from "Is this sentence correct?" to "What meaning does this choice make here, for this purpose and audience?"

Three metafunctions are especially productive. Ideational meaning concerns the representation of experience and logical relations. Writers construct participants, processes, circumstances, classifications, causal relations, and abstractions. Interpersonal meaning concerns stance, evaluation, commitment, alignment, and relationships among writers, readers, and propositions. Textual meaning organizes discourse into coherent messages through information flow, thematic development, reference, cohesion, and other resources. These metafunctions are simultaneous: every clause represents experience, positions participants, and organizes information at the same time.

For digital writing, the metafunctional perspective offers a disciplined way to discuss how linguistic choices contribute to multimodal design. Consider an infographic about climate adaptation. Ideationally, the writer must decide whether to represent adaptation as actions performed by communities, policies enacted by governments, or abstract processes such as resilience building. Interpersonally, the text may present claims cautiously or urgently, invite reader action, or establish institutional authority. Textually, the writer must determine what information appears first, what becomes a heading or callout, and how linguistic cohesion interacts with spatial grouping.

SFL also relates text to context through field, tenor, and mode. Field concerns the activity and subject matter; tenor concerns participant relations; mode concerns the role of language and the channel of communication. These variables provide a powerful pre-writing heuristic for digital tasks. Students can ask what knowledge is being

represented, who is communicating with whom, how much shared knowledge can be assumed, what relationship the writer should enact, and what the digital medium enables or requires.

The concept of mode is particularly important but must be handled carefully. In register theory, mode is not equivalent to “modality” in the multimodal sense of image, sound, and gesture. Nevertheless, digital communication makes the role of language within the communicative event highly visible. Written language may carry the primary propositional content while visuals elaborate it; spoken narration may replace some written explanation; hyperlinks may distribute information across a site. SFL therefore provides an entry point for examining how language participates in a larger semiotic ensemble.

SFL-informed scholarship has also extended functional analysis beyond language. Social-semiotic work on visual grammar and multimodality has shown how representational, interactive, and compositional meanings can be examined in images and page design (Kress & van Leeuwen, 2006; Jewitt, Bezemer, & O'Halloran, 2016). These traditions are not identical to SFL grammar, but they share the principle that semiotic choices are socially motivated and functionally interpretable. Unsworth and Mills (2020), for example, demonstrated how an SFL-informed account of attitudinal meaning could be extended into digital multimodal authoring pedagogy, allowing learners to develop evaluative repertoires across verbal and visual modes.

For writing teachers, the practical advantage is an explicit metalanguage. Advice such as “make it more academic,” “improve flow,” or “use visuals effectively” is difficult for students to act on unless these judgments are decomposed. Functional metalanguage can identify the relevant meaning problem: weak causal relations, unsupported evaluation, abrupt thematic progression, excessive certainty, unclear participant reference, or a mismatch between image and claim. In digital texts, teachers can similarly ask whether a visual extends a proposition, merely duplicates it, introduces an unsupported interpretation, or creates a different interpersonal stance.

The risk is excessive theoretical complexity. A digital writing course should not become a survey of SFL terminology. The pedagogical principle should be functional sufficiency: teach only the metalanguage required to solve the communicative problems at hand. Introductory courses may focus on purpose, audience, stages, participants, actions, stance, evidence, and information flow. Advanced academic writing courses can introduce transitivity, modality, appraisal, nominalization, Theme-Rheme patterns, grammatical metaphor, and intersemiotic relations. Metalanguage is valuable only when it helps learners notice, discuss, revise, and transfer meaning-making choices.

➤ *Genre-Based Pedagogy: From Social Purpose to Explicit Scaffolding*

SFL-based genre theory adds a meso-level account between individual linguistic choices and broad social context. Genres are recurrent, staged social processes through which communities accomplish recognizable purposes (Martin & Rose, 2008). A genre is therefore not simply a formal template. Its stages are functional because they organize meaning toward a social goal.

This distinction matters in digital writing. If genre is reduced to surface format, students may learn rules such as “an infographic has six boxes” or “a discussion essay has four paragraphs” without understanding why information is staged in a particular way. A functional account asks what the text is trying to accomplish, what stages are needed to accomplish it, how each stage contributes, and what linguistic and multimodal resources realize those functions.

Genre awareness is especially important when students move across academic, professional, and public contexts. The same knowledge cannot simply be copied from a research paper into a public website. A literature review assumes different background knowledge, evidence density, citation practices, and interpersonal relations from a public explainer. A policy brief prioritizes decision-relevant information and recommendations, while a research article foregrounds methodology and disciplinary evidence. A social-media carousel may need highly compressed claims supported by accessible visuals and links to further evidence. These are not merely differences in length; they are differences in social purpose, staging, register, and mode.

Genre-based pedagogy translates this theory into explicit teaching. Although implementations vary, the Teaching-Learning Cycle typically includes building knowledge, modeling or deconstruction, joint construction, independent construction, and reflection or linking to related texts (Rose & Martin, 2012). Its core pedagogical principle is guided participation: learners first encounter the valued patterns explicitly and then assume increasing responsibility for producing them. Genre pedagogies differ across traditions (Hyland, 2007), but the SFL tradition is distinctive in linking social purpose, staging, and lexicogrammar in a single teachable account.

In tertiary writing, this explicitness can be particularly important for students who are unfamiliar with implicit disciplinary expectations or who are writing in an additional language. Yasuda (2011) found that genre-based tasks could develop genre awareness, linguistic knowledge, and writing competence by connecting socially situated purposes with language choices. Yasuda (2017) subsequently proposed an integration of SFL-based genre pedagogy and task-based language teaching so that genre, content, task, and language could develop concurrently. In Indonesia, Emilia and Hamied (2015) reported that tertiary EFL students participating in SFL genre pedagogy improved their control of schematic structure and relevant linguistic features. Nagao (2018) similarly documented developing genre and

lexicogrammatical awareness in a university EFL context. Nagao (2019) reported improved understanding of interpersonal meaning, such as modal verbs, among low-proficiency learners after a 15-week genre-based course. Experimental work has also examined genre-based instruction and genre-focused feedback: a semester-long study reported improved mastery of the target genre, although the type of genre-focused feedback made no measurable difference (Uzun & Topkaya, 2020), and a quasi-experiment in Norwegian upper secondary schools reported a significant positive effect of SFL-informed genre pedagogy on argumentative writing (Horverak, 2016). Indonesian research has examined genre-based teaching cycles in relation to mandated curriculum content (Triastuti et al., 2022) and school writing (Yusuf & Rofiawati, 2024).

The evidence base is now broad enough to support a more differentiated assessment of the approach. Liardet et al. (2026) reviewed 70 university EAP studies across 20 countries and documented extensive recontextualization of SFL-GBA to different student populations, disciplines, and writing needs. The important implication is not that one fixed teaching cycle has been proven universally effective. Rather, SFL-GBA is a mature pedagogical tradition with a strong record of contextual adaptation, making it suitable for principled extension to digital genres. Process-genre approaches have also been combined with feedback and technology in higher-education L2 writing (Peungcharoenkun & Waluyo, 2023).

Such an extension must preserve the reason genre pedagogy is valuable: it makes expectations visible. In a digital context, modeling and deconstruction should therefore include multimodal as well as linguistic resources. Students can compare two web explainers, identify their social purposes and stages, and then analyze how headings, images, captions, links, modality, evidence attribution, and layout contribute to those purposes. Joint construction can involve designing a digital section collectively, with the teacher verbalizing why one image, clause pattern, sequence, or layout is more appropriate than another. Independent construction then asks students to make and justify their own choices. Early studies already show how genre-based instruction can be combined with GenAI, for example in ChatGPT-supported argumentative writing (Tai et al., 2025) and in a tertiary Indonesian EFL course that integrated GenAI feedback into the teaching of written exposition (Zainurrahman et al., 2026).

➤ *Research Gap: Why an Integrated SFL-GBA-Digital Writing Framework is Needed*

The literature reviewed above reveals a productive but fragmented research landscape. Five gaps are particularly important for higher-education writing pedagogy.

The first gap is conceptual separation between SFL genre pedagogy and digital multimodal composing. SFL-GBA research has developed detailed accounts of genre, register, disciplinary language, and explicit scaffolding, whereas DMC research has emphasized expanded semiotic resources, technology, identity, engagement, and

authenticity. There are important intersections, including SFL-informed multimodal studies, but an integrated higher-education framework that systematically links field-tenor-mode, genre staging, lexicogrammatical choice, multimodal orchestration, and a teaching-learning cycle remains underdeveloped. The consequence is that digital writing pedagogy may lack linguistic specificity, while genre pedagogy may remain too print-centered. Recent genre-based assessment models for DMC (Jiang et al., 2022) and competence scales (Zhang & Yu, 2023b) address part of this gap, but they are assessment-oriented and do not specify a full teaching-learning cycle (see Section 12).

The second gap concerns assessment alignment. Hafner and Ho (2020) identify assessment of DMC as an underresearched area and propose a process-based model that attends to the orchestration of multimodal affordances. Jiang et al. (2022) subsequently proposed a genre-based model that treats DMC as purpose-directed social action realized through layers of base units, layout, navigation, and rhetoric, and Zhang and Yu (2023b) developed a validated competence scale that includes genre awareness, language use, and cohesion of modes. Burnett et al. (2014) likewise argued for a common rubric that evaluates multimodal processes as well as artifacts. Lim and Polio (2020) show that multimodal assignments in higher education vary in disciplinary purpose, linguistic mode, and collaboration. Yet many educational rubrics still assess digital products using categories inherited from monomodal essays or, at the opposite extreme, emphasize aesthetics and technical sophistication without sufficient attention to language and genre. This produces a constructive-alignment problem: learning activities become multimodal while assessment remains predominantly monomodal.

The third gap is insufficient specification of the linguistic dimension of digital composing. DMC scholarship rightly expands literacy beyond alphabetic language, but multimodal enthusiasm can inadvertently obscure the continuing importance of sustained linguistic development. Kim and Belcher's (2020) comparison illustrates that different composing conditions can elicit different levels of syntactic complexity. Digital writing frameworks therefore need to explain when language should remain the dominant mode, when meaning should be redistributed, and how students can develop multimodal competence without reducing opportunities for sophisticated academic language.

The fourth gap concerns transfer across genres, media, and disciplines. Research often investigates performance within a single course or project. Higher education, however, requires students to repurpose knowledge across contexts: from report to presentation, research article to policy brief, essay to public explainer, or laboratory findings to infographic. Genre awareness should therefore include the ability to recognize what must change when purpose, audience, and platform change. More longitudinal and cross-disciplinary evidence is needed to determine whether explicit SFL-GBA instruction supports this kind of rhetorical transfer.

The fifth gap is emerging from GenAI. Reviews of ChatGPT in ESL/EFL and higher education show rapid growth in empirical work, mainly on writing quality, feedback, and learner perceptions, alongside continuing concerns about accuracy, integrity, and learning (Baig & Yadegaridehkordi, 2024; Lo et al., 2024). Studies compare ChatGPT and human feedback (Steiss et al., 2024) and examine ChatGPT combined with teacher feedback (Asadi et al., 2025; Guo & Wang, 2024), while assessment scholars argue that learning activities and judgments of quality must be redesigned for a world with AI (Bearman & Ajjawi, 2023; Lodge et al., 2023). Genre-based scholars are beginning to explore AI-generated mentor texts (de Oliveira & dos Santos, 2025) and GenAI feedback within genre cycles (Tai et al., 2025; Zainurrahman et al., 2026), and SFL analysis has been used to caution that AI-generated samples can reproduce dominant language norms (Stewart & Zheng, 2024). The problem is not merely whether students use AI.

The deeper issue is what counts as evidence of writing knowledge when language can be generated externally. A functional genre framework can reposition assessment around decision-making: identifying communicative purpose, evaluating genre staging, calibrating stance, checking evidence, redesigning generated text, and explaining why particular choices were retained or rejected.

Together, these gaps justify an integrated framework. Such a framework should preserve explicit language instruction, extend genre pedagogy to multimodal digital texts, align learning activities with assessment, and make process and reflective judgment visible. It should also remain adaptable because digital genres and technologies change more rapidly than stable theoretical principles. Table 1 summarizes the five gaps and the framework's response to each.

Table 1 Explicit Research Gaps and Corresponding Framework Responses

Gap	Problem	Framework response
Parallel literatures	SFL-GBA and DMC often develop separately.	Integrates contextual-functional language analysis with multimodal genre design.
Assessment lag	Multimodal tasks may be assessed with monomodal or aesthetics-heavy rubrics.	Uses six analytic dimensions and process evidence.
Language dilution	DMC can reduce opportunities for sustained linguistic practice.	Builds targeted language-resource development into the cycle.
Limited transfer evidence	Many studies examine one course, task, or genre.	Prioritizes genre transformation and cross-context transfer studies.
GenAI misalignment	AI-supported composing transforms activity faster than outcomes and assessment.	Assesses judgment, verification, redesign, and reflective articulation.

➤ *The SFL-Informed Digital Genre Pedagogy Framework*

The proposed framework consists of eight phases. The phases are sequential enough to guide planning but recursive enough to support real composing. Students may return to genre analysis after drafting, revisit contextual assumptions following peer feedback, or change modal distribution during redesign. The aim is not rigid procedural compliance but increasing control over communicative choices.

Five design principles, derived from the gaps in Section 6, constrain the framework. First, context before medium: tasks begin with purpose, audience, and circulation, and only then select a mode or tool. Second, functional sufficiency: only the metalanguage needed to solve the current communicative problem is taught. Third, orchestration over accumulation: modes are selected for complementary functions rather than for maximal multimodality. Fourth, transformation for transfer: content is repurposed across genres, audiences, and media so that learners notice what must change. Fifth, verified judgment: evidence of learning includes decisions, verification, and reflection, which remain assessable when GenAI contributes to drafting.

• *Contextual Orientation*

The first phase establishes the communicative situation before students select tools or begin drafting. Students identify the field, intended audience, writer-reader relationship, purpose, platform, and expected circulation.

The teacher can provide contrasting scenarios using the same content. For example, students might explain a research finding to a disciplinary lecturer, first-year students, and a public audience. They compare how terminology, evidence, visual support, modality, and assumed knowledge must change.

This phase counters a common weakness in digital assignments: beginning with the medium (“make a video”) rather than the communicative problem. A stronger task begins with purpose and audience, then asks students to select or justify a medium. Contextual orientation makes technology subordinate to rhetorical need.

• *Genre Mapping*

Students next identify the target genre or genre combination and map its functional stages. For conventional genres, this may involve a discussion, explanation, report, proposal, review, or research-based argument. Digital texts may be hybrid. A public research explainer can combine classification, explanation, exemplification, and recommendation. A video essay can integrate narrative orientation with argument and evidence.

Genre mapping should allow variation. Students compare multiple examples to identify recurrent functions rather than memorize a single template. Teachers can ask what would happen if a stage were removed, reordered, or expanded. Such questions reveal why staging matters.

- *Multimodal Deconstruction*

Students analyze model digital texts across linguistic and non-linguistic modes. They identify what meaning each mode contributes, where the central claim appears, how evidence is represented, how readers are guided, and whether modes complement, elaborate, or unnecessarily duplicate one another.

An SFL-informed deconstruction can organize attention around three questions. Ideationally: What people, things, processes, causes, and classifications are represented, and by which modes? Interpersonally: How are readers addressed, how certain are claims, and how do image, typography, or voice create evaluation? Textually: How are elements sequenced, grouped, foregrounded, connected, and navigated?

- *Language and Semiotic Resource Building*

At this point, students practice resources that are functionally relevant to the target genre. Argumentative digital writing may require calibrated modality, concession, counterargument, attribution, causal relations, and evaluative language. An explanation may require technical participants, causal processes, logical relations, and effective shifts between everyday and specialized language. Public communication may require unpacking nominalizations and replacing dense disciplinary expressions with accessible explanations.

Semiotic resource building includes visual hierarchy, captioning, image selection, chart choice, layout, audio scripting, navigation, and accessibility. The goal is not generic “design skills” but resources tied to meaning. For example, students learn that a chart is appropriate when the relationship among values is itself important, whereas a photograph may be better for illustrating a concrete case or establishing contextual relevance.

- *Joint Digital Construction*

Teachers and students collaboratively construct part of a digital text. This is where expert reasoning becomes observable. A class might decide whether a research result should be expressed as a sentence, quotation, graph, or numerical callout; how to title a section; what degree of certainty is justified; or how to pair an image with a caption.

Joint construction is particularly important in digital pedagogy because many design choices are tacit. Students frequently see finished digital products without seeing the decisions that produced them. Collaborative construction turns invisible design judgment into discussable knowledge.

- *Independent Digital Composing*

Students produce their own text for a specified rhetorical situation. Independence should involve meaningful choice. A task that dictates the number of slides, images, colors, and sentences may produce compliant

artifacts but offers little evidence of rhetorical judgment. Better assignments constrain purpose, evidence, audience, and ethical requirements while allowing students to make consequential decisions about staging, language, and mode.

- *Feedback and Redesign*

Feedback should address multiple layers: context, genre, discourse, language, multimodal relations, digital functionality, and accessibility. Peer review can be structured around specific questions rather than general impressions. For example: Does the opening make the social purpose clear? Is the strongest evidence represented in the most effective mode? Where is the writer's certainty stronger than the evidence warrants? Does the visual add information or merely decorate the page?

The term redesign is preferable to correction because meaningful revision may require changes across modes. A paragraph may become a diagram; an image may be removed because it distracts from the argument; a heading may be revised to signal a new genre stage; or an AI-generated passage may be rewritten to restore authorial stance and evidence discipline. Feedback activities mediated by ChatGPT can be designed dialogically rather than as one-way correction (Zhang & Liu, 2025), and comparisons suggest that human and ChatGPT feedback differ in focus and quality (Steiss et al., 2024).

- *Reflective Articulation*

Finally, students explain selected choices and revisions. Reflection should not be limited to affective responses such as whether students enjoyed the task. It should elicit evidence of design knowledge: what changed, why it changed, what audience problem was addressed, which linguistic resource mattered, what feedback was accepted or rejected, and how the writer balanced language with other modes.

This phase is increasingly important in AI-rich environments. A student may be permitted to use GenAI for brainstorming or language alternatives, but must demonstrate responsibility for the resulting communicative decisions. Reflective articulation creates assessable evidence of judgment that cannot be inferred from a polished artifact alone. Reflection of this kind operationalizes evaluative judgement for a time of generative AI (Bearman et al., 2024).

➤ *Framework Matrix for Curriculum Design*

The framework can be operationalized through a matrix linking pedagogical phases, guiding questions, typical activities, and evidence of learning. Table 2 is intended as a planning tool rather than a fixed syllabus. Instructors can compress, repeat, or reorder phases depending on discipline, proficiency, and task complexity. Table 4 (Section 13) traces each phase to its theoretical anchor, empirical support, and assessment dimension.

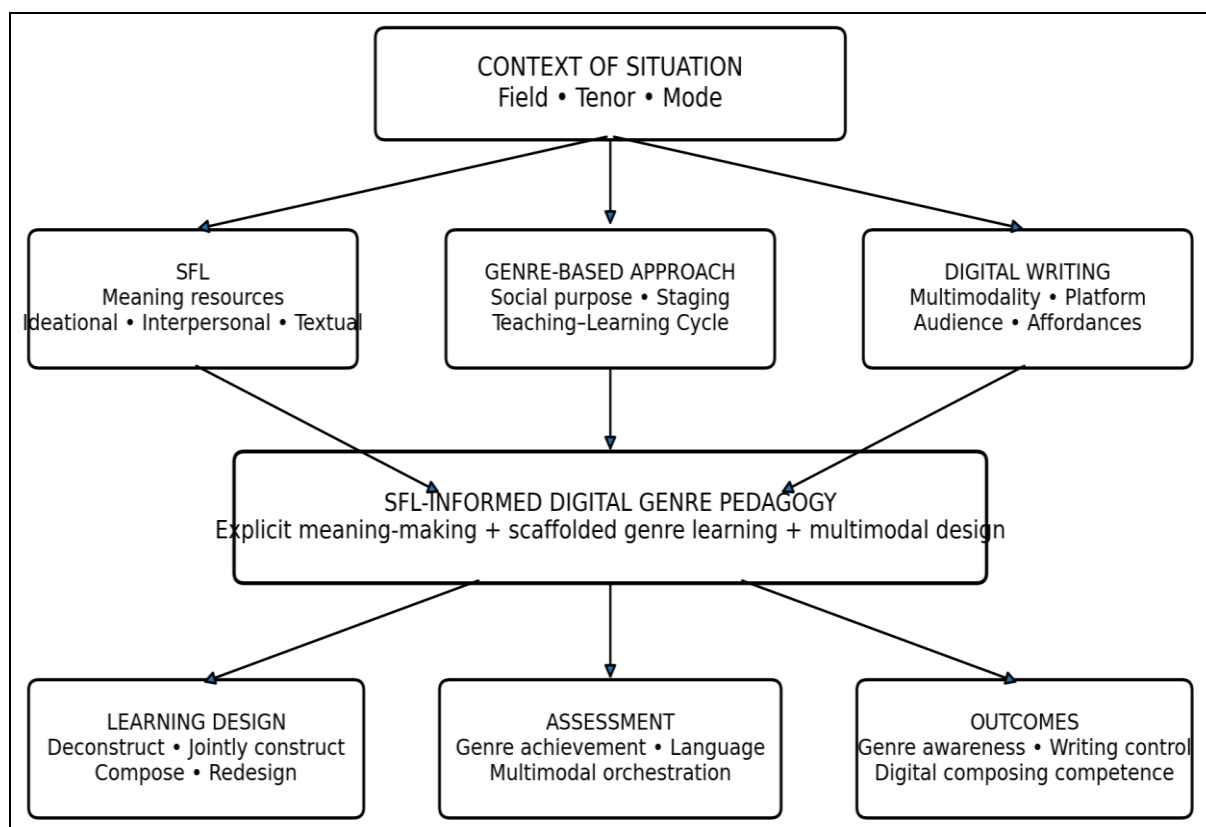


Fig 1 Conceptual Architecture of the Proposed SFL–GBA–Digital Writing Framework.

Table 2 SFL-Informed Digital Genre Pedagogy Framework

Phase	Guiding question	Illustrative activities	Evidence of learning
1. Contextual orientation	What is the purpose, audience, field, tenor, platform, and circulation?	Compare rhetorical scenarios; audience profiling; task reframing	Context analysis / design brief
2. Genre mapping	What social purpose is being achieved and through what stages?	Compare models; label stages; identify variation and hybridity	Genre map with functional rationale
3. Multimodal deconstruction	How do language, image, layout, audio, and navigation distribute meaning?	Model-text analysis; mode-function annotation	Annotated model analysis
4. Resource building	Which linguistic and semiotic resources are needed?	Targeted language practice; captioning; visual hierarchy; source integration	Micro-tasks and controlled transformations
5. Joint digital construction	How would experts make choices while composing?	Teacher-student co-design; think-aloud decisions; collaborative drafting	Jointly constructed text + reasoning record
6. Independent composing	Can students make justified choices in a new rhetorical situation?	Individual/group digital genre project	Draft and final digital artifact
7. Feedback and redesign	What should be revised across context, genre, language, and modes?	Peer review; teacher feedback; version comparison	Revised artifact + change log
8. Reflective articulation	Can students explain why their choices are appropriate?	Design commentary; oral defense; AI-use reflection	Reflective rationale / portfolio note

➤ Assessment Architecture for Digital Genre Writing

Assessment is the point at which pedagogical intentions become consequential. If students are taught to analyze audience, genre, language, and multimodal design but receive grades primarily for grammatical accuracy, the curriculum communicates that these wider competencies are optional. Conversely, if assessment rewards visual polish without evaluating reasoning, language, and evidence, the course risks substituting design spectacle for writing development. This is the logic of constructive alignment:

intended outcomes, teaching activities, and assessment tasks should point to the same competences (Biggs, 1996).

An integrated rubric should therefore separate dimensions that may develop differently. Six dimensions are proposed.

Contextual appropriateness evaluates the fit among purpose, audience, field, tenor, platform, and register. The central question is whether the text behaves appropriately in

its communicative situation. A highly technical explanation may be accurate but unsuitable for a public audience; an informal second-person style may be engaging but inappropriate for a formal policy document.

Genre achievement evaluates whether the composition realizes its social purpose through sufficient and functionally organized stages. This criterion should not reward mechanical templates. Variation is acceptable when it can be justified by context and purpose.

Linguistic meaning-making evaluates ideational precision, interpersonal calibration, and textual coherence. Grammar and vocabulary remain important, but they are interpreted functionally. An error matters because it distorts meaning, weakens credibility, obscures relations, or disrupts reading. Advanced criteria can include stance, cohesion, nominalization, thematic progression, and source integration.

Multimodal orchestration evaluates how modes work together. Hafner and Ho (2020) emphasize semiotic harmony as a key assessment concern. In the present framework, strong orchestration means that visual, spatial, auditory, and linguistic resources contribute complementary functions, with minimal redundancy and no contradiction. This does not require maximal multimodality. A restrained design can outperform a complex one if the selected modes are better aligned with purpose. Jiang et al. (2022) similarly locate multimodal evaluation in layers such as layout, navigation, and rhetoric; the present criterion extends this by requiring a functional rationale for each mode choice.

Digital functionality and accessibility evaluate whether the composition works as a digital object. Navigation, link functionality, readability, captioning, alternative text where appropriate, contrast, and platform compatibility are communicative rather than merely technical concerns. Accessibility should be taught as audience design.

Reflective design knowledge evaluates the writer's ability to explain and justify choices. A short design commentary can document why information was moved between modes, how feedback changed the product, how AI output was evaluated, or how audience analysis affected language. This criterion helps distinguish superficial tool use from transferable writing knowledge.

Assessment should combine product and process evidence. Version histories, planning documents, peer feedback, design rationales, and selected drafts can complement the final artifact. This is especially valuable where collaborative tools or AI systems make authorship distributed. Process evidence should not become surveillance; it should be proportionate, transparent, and aligned with learning outcomes.

Each dimension is described on a four-level scale (emerging, developing, proficient, advanced) with descriptors anchored in the functional questions of the corresponding phase. Results are reported as a profile rather

than a single composite, because the dimensions can develop at different rates and a composite would obscure the distinctions the architecture is designed to reveal. Weighting is left to course designers; in language-focused EAP courses, linguistic meaning-making and genre achievement may carry greater weight than digital functionality. Rater training with anchor texts is recommended, and reliability and validity evidence should be gathered before high-stakes use (Section 13).

➤ *GenAI as a New Test of Constructive Alignment*

Generative AI intensifies questions that digital writing pedagogy was already facing. Writing has never been only transcription: writers select content, formulate claims, organize discourse, position readers, evaluate sources, and revise. GenAI can now perform portions of these processes at high speed, especially brainstorming, reformulation, summarization, drafting, translation, and stylistic editing. If a course defines writing ability primarily as the production of a polished final text, AI makes the assessment construct unstable.

A genre-functional approach offers a more durable construct. Students can be held responsible for specifying purpose and audience, evaluating whether a generated draft matches genre expectations, identifying unsupported certainty, checking source relationships, revising interpersonal stance, improving information flow, and deciding what should be represented through language or another mode. AI-generated language becomes an object for analysis rather than automatic evidence of learning.

Genre pedagogy can also use AI as a controlled instructional resource. Recent work has explored AI-generated mentor texts for SFL-informed genre teaching (de Oliveira & dos Santos, 2025), showing how generated examples can be analyzed for typical stages and linguistic features. The pedagogical opportunity is significant because teachers can generate contrasting examples quickly: a weak explanation, an overconfident discussion, a public version of an academic passage, or alternative openings with different interpersonal effects. Yet generated mentor texts must be treated critically. They may fabricate evidence, reproduce generic patterns mechanically, or create plausible but contextually inappropriate language.

The framework therefore recommends three principles for AI integration. First, AI use should be declared at the level required by institutional policy and task design. Second, students should be assessed on decisions and verification, not merely on whether a tool was used. Third, AI should not eliminate the phases in which students build field knowledge, analyze models, jointly construct texts, and develop linguistic resources. Used well, AI can increase the number of examples and revision possibilities; used poorly, it can bypass precisely the learning the pedagogy is designed to support. Institutional policy frameworks for university teaching and learning offer further guidance on declaring and governing such use (Chan, 2023), and concerns about academic integrity make transparent task design essential (Cotton et al., 2024; Perkins, 2023).

Current research suggests that AI use in L2 writing is concentrated strongly in feedback, revision, and polishing (Barrot, 2023; Kohnke et al., 2023; Su et al., 2023; Yan, 2023), creating a risk that activities transform faster than learning objectives and assessment. This makes constructive alignment a central future research problem. Studies should compare not just AI and non-AI products but the knowledge students can demonstrate, transfer, and explain under different forms of human-AI collaboration. Reviews of ChatGPT in language education and education more broadly report both potential and pitfalls for writing (Godwin-Jones, 2022; Ibrahim & Kirkpatrick, 2024; Kasneci et al., 2023).

➤ *Equity, Accessibility, and Teacher Knowledge*

Digital writing pedagogies can widen participation, but they can also reproduce inequalities. Students differ in access to devices, paid software, stable connectivity, prior design experience, and familiarity with academic technologies. Assignments that reward production value may inadvertently assess socioeconomic access or extracurricular design experience rather than writing.

Equitable assessment should therefore focus on communicative effectiveness and purposeful orchestration rather than expensive technical features. Institutions should provide access to required platforms or permit functionally equivalent alternatives. Low-technology solutions should not be penalized when they accomplish the same rhetorical purpose.

Accessibility is similarly central. Digital writers should understand legibility, captioning, alternative text, navigational clarity, contrast, and information redundancy for access. These practices can be integrated into audience analysis rather than taught as compliance checklists. Accessibility asks writers to anticipate diverse users and is therefore fully compatible with a functional view of communication.

Teacher knowledge is another constraint. SFL can appear technically demanding, while multimodal design and rapidly changing technologies can create additional workload. Professional development should therefore prioritize a small set of high-leverage concepts: social purpose, field-tenor-mode, genre stages, ideational/interpersonal/textual meaning, image-text relations, and feedback for redesign. Teachers do not need to become software experts. They need enough technological fluency to judge whether a tool supports the intended meaning and enough functional language knowledge to make linguistic expectations explicit.

Research on teacher education suggests that SFL genre pedagogy requires sustained professional learning, as documented in work on SFL-informed teacher education and on one teacher's trajectory through genre-pedagogy professional development (Brisk et al., 2021; Gebhard et al., 2013). Adaptation to mandated curricula also shapes uptake (Triastuti et al., 2022), and facilitating multimodal composing demands new teacher roles (Belcher, 2017). Context-sensitive investigation of L2 writing instruction, for example by combining genre analysis with ethnographic methods (Zhang & Pramoolsook, 2022), is therefore needed. The proposed framework requires implementation research that attends to teacher cognition, workload, institutional support, and disciplinary variation.

➤ *Novelty and Positioning of the Framework*

A theoretical contribution is judged by what it adds, why its logic is plausible, and where it applies (Whetten, 1989). Applied to the present framework, the question is not whether any component is new in isolation. The teaching-learning cycle, register analysis, multimodal design, and GenAI-supported feedback are all established. The question is whether their configuration answers the five gaps in Section 6 in a way that existing models do not. Table 3 positions the framework against four neighboring lines of work.

Table 3 Positioning of the Framework Against Existing Lines of Work

Line of work	Representative sources	What it contributes	What remains unaddressed
Multiliteracies and Learning by Design	New London Group (1996); Cope & Kalantzis (2015)	General design pedagogy for diverse modes, including situated practice, overt instruction, critical framing, and transformed practice	Not tied to a functional description of language, genre staging, or lexicogrammatical metalanguage; no assessment architecture specific to digital genre writing
SFL genre pedagogy (Teaching-Learning Cycle)	Rose & Martin (2012); Martin & Rose (2008); Liardet et al. (2026)	Explicit, staged scaffolding linking context, genre, and language; a large tertiary research base	Developed mainly around print genres; limited treatment of platform, mode distribution, accessibility, and GenAI
DMC pedagogy and assessment models	Hafner & Ho (2020); Jiang et al. (2022); Zhang & Yu (2023b); Li & Akoto (2021)	Process-based and genre-based assessment models; a validated competence scale; evidence on engagement and development	Assessment-oriented; no full teaching cycle combining register analysis and metafunctional metalanguage; the language-dilution problem is not specified
GenAI in genre-based and multimodal writing	de Oliveira & dos Santos (2025); Tai et al. (2025); Zainurrahman et al. (2026); Jiang (2024); Smith et al. (2025)	AI-generated mentor texts, GenAI feedback within genre cycles, and GenAI-assisted multimodal workflows	Mostly concerned with text quality, feedback, or process; GenAI not yet integrated into a functional-genre assessment of judgment and verification

Relative to these lines, the framework makes five specific claims of novelty. First, it aligns three analytic resources that are usually used separately, namely field–tenor–mode analysis, genre staging, and multimodal orchestration, within one eight-phase cycle (Sections 7–8). Second, it derives a six-dimension assessment architecture from the same phases, so that every instructional phase has an assessable outcome and every dimension has a corresponding phase (Table 4). Third, it positions GenAI not only as a tool or policy problem but as an object of functional-genre evaluation, in which students are assessed on decisions, verification, and reflection. Fourth, it adds two design principles that address recurring weaknesses in the literature: functional sufficiency for metalanguage, and transformation across genres and media as a mechanism for transfer. Fifth, it is stated as a set of falsifiable propositions with a staged validation protocol (Sections 13–14) rather than as a descriptive model.

These claims are bounded. The novelty is integrative and design-oriented rather than a new linguistic theory: the framework reuses the Teaching-Learning Cycle and relies on social-semiotic scholarship for non-linguistic modes. The comparison is also limited to the sources identified through the procedure in Section 2, so the statement that no existing model combines these elements holds only to the authors' knowledge. The timing matters as well. The convergence of mature SFL genre research, expanding DMC scholarship, and widespread GenAI use in L2 writing is recent, which is why an integrated account is needed now.

➤ *Validity and Trustworthiness of the Framework*

• *What Validity can be Claimed*

Because the framework is conceptual, validity cannot be established by statistical analysis of learner data at this stage. Following Messick's (1995) unified view of validity and Kane's (2013) argument-based approach, validity is treated as the plausibility of an argument that the framework's interpretations and uses are justified, with different evidence available at different stages. At present the article can claim theoretical (content and substantive) validity and internal coherence. It does not claim empirical, structural, or consequential validity, which require the studies described in Section 13.3.

• *Theoretical Validity Procedures*

Four procedures were applied. First, theoretical grounding: each phase is anchored in at least one established theoretical construct and in empirical or review evidence from the sources identified in Section 2 (Table 4). Second, theory triangulation: each phase is supported by at least two of the three traditions (SFL, GBA, and DMC or social semiotics), which reduces dependence on a single paradigm. Third, internal consistency: the chain from gap (Table 1) to design principle (Section 7) to phase (Table 2) to assessment dimension (Section 9) was checked so that no phase lacks an assessable outcome and no dimension lacks a corresponding phase. Fourth, falsifiability and source verification: the framework is expressed as testable propositions (Section 14), and every cited source was checked against its publisher or indexing record.

Table 4 Traceability Matrix: Phases, Theoretical Anchors, Evidence, and Assessment Dimensions

Phase	Theoretical anchor	Empirical or review support	Assessment dimension
1. Contextual orientation	Register: field, tenor, mode (Halliday & Matthiessen, 2014); situated practice (New London Group, 1996)	Authentic audiences in DMC (Jiang, 2017; Li & Akoto, 2021)	Contextual appropriateness
2. Genre mapping	Genre as staged social process (Martin & Rose, 2008)	Genre awareness gains (Yasuda, 2011; Nagao, 2019; Uzun & Topkaya, 2020); genre in DMC (Jiang et al., 2022)	Genre achievement
3. Multimodal deconstruction	Social semiotics (Kress & van Leeuwen, 2006; Jewitt et al., 2016); modeling stage (Rose & Martin, 2012)	SFL-informed DMC pedagogy (Unsworth & Mills, 2020)	Multimodal orchestration
4. Language and semiotic resource building	Metafunctions (Halliday & Matthiessen, 2014)	Interpersonal resources in genre instruction (Nagao, 2019); syntactic complexity in DMC versus essays (Kim & Belcher, 2020)	Linguistic meaning-making
5. Joint digital construction	Joint construction and guided participation (Rose & Martin, 2012)	Video projects as multimodal ensembles (Hafner, 2014)	Genre achievement; multimodal orchestration
6. Independent digital composing	Independent construction (Rose & Martin, 2012); design (Kress, 2010)	Writing gains and strategy knowledge in DMC (Xu, 2021; Xu et al., 2025)	All dimensions
7. Feedback and redesign	Writing as redesign (Bezemer & Kress, 2008)	Genre-focused feedback (Uzun & Topkaya, 2020); ChatGPT-mediated feedback (Steiss et al., 2024; Zhang & Liu, 2025)	Digital functionality and accessibility; linguistic meaning-making
8. Reflective	Constructive alignment (Biggs,	Reflection stage in genre courses	Reflective design

articulation	1996); evaluative judgement (Bearman et al., 2024)	(Nagao, 2019); decision-making and metacognition in DMC (Xu et al., 2025)	knowledge
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- *Protocol for Empirical Validation*

Empirical validation is planned in four stages. Stage 1 is content validation through a modified Delphi panel (Hsu & Sandford, 2007; Okoli & Pawlowski, 2004) of 8–12 experts in SFL and genre pedagogy, DMC, and L2 assessment. Over two rounds, experts rate the relevance and clarity of each phase, guiding question, and rubric descriptor on a four-point scale. Item-level and scale-level content validity indices are then computed, with item-level values of at least .78 and a scale-level average of at least .90 as common benchmarks (Lynn, 1986; Polit & Beck, 2006; Polit et al., 2007). Items below the threshold are revised or removed.

Stage 2 examines rubric reliability and structural validity. Two trained raters score a sample of student compositions, and inter-rater agreement is reported with intraclass correlation coefficients or weighted kappa, interpreted against published guidelines (Koo & Li, 2016). The dimensional structure of the six criteria can be tested with exploratory and confirmatory factor analysis, following scale-validation practice in DMC research (Zhang & Yu, 2023b). AI-assisted scoring (Mizumoto & Eguchi, 2023) may be examined as a supplementary calibration check but not as a replacement for human judgment on the contextual and reflective dimensions.

Stage 3 is a quasi-experimental or design-based evaluation of the framework against conventional genre instruction and unguided DMC, using the outcomes and propositions in Section 14 and including transfer tasks. Stage 4 synthesizes the evidence in an argument-based validation report (Kane, 2013) that also examines consequential validity, including students' and teachers' perceptions, workload, and equity of access (Messick, 1995).

- *Threats and Boundary Conditions*

Several threats remain. Selection bias is possible because the purposive search may favor English-language, journal-indexed work. Interpretive bias is possible because the synthesis reflects the authors' SFL orientation; the expert audit in Stage 1 is designed to mitigate this. The evidence base is concentrated in East Asian and Anglophone tertiary contexts, with growing Indonesian evidence (Emilia & Hamied, 2015; Triastuti et al., 2022; Zainurrahman et al., 2026), so boundary conditions for other contexts are untested. Finally, GenAI evidence is changing quickly, and the framework's GenAI principles should be revisited as new studies accumulate.

- *Research Agenda and Testable Propositions*

A conceptual framework becomes valuable only when it generates researchable questions. The present model suggests at least seven priorities.

First, controlled and quasi-experimental studies should examine whether SFL-informed digital genre pedagogy produces gains beyond either conventional genre instruction or unguided DMC. Outcomes should be multidimensional: genre awareness, linguistic control, multimodal orchestration, audience adaptation, and revision quality.

Second, longitudinal research should test transfer. Students might learn one genre in a writing course and later be asked to communicate the same disciplinary knowledge in a new genre or medium. Transfer tasks can reveal whether students have learned fixed forms or adaptable functional principles.

Third, assessment studies should investigate the reliability and validity of analytic criteria for digital genre writing. Particular attention is needed to the relationship among linguistic proficiency, multimodal competence, and overall communicative quality. Recent work conceptualizing DMC competence provides an important foundation, but more validation across disciplines and proficiency levels is required. Section 13.3 specifies a staged validation protocol for such studies.

Fourth, comparative research should examine the balance between monomodal and multimodal composing. Rather than asking whether DMC is “better,” researchers can test which sequences best support both extended language development and multimodal competence. For example, one group might move from essay to digital redesign, another from multimodal exploration to essay, and a third complete only one mode.

Fifth, disciplinary research should investigate how the framework changes across fields. Engineering, business, humanities, teacher education, and health sciences value different evidence, genres, visual conventions, and audience relationships. The framework predicts that the core contextual-functional principles will remain stable while genre staging and semiotic resources vary.

Sixth, AI research should examine human-AI co-composing as a genre-learning process. Key outcomes include the quality of students' evaluations of generated texts, ability to detect genre mismatch, accuracy of evidence verification, control of stance, and capacity to explain revisions.

Seventh, teacher-development research should investigate how much SFL and multimodal metalanguage instructors need for effective implementation. A parsimonious pedagogical metalanguage may produce better uptake than a theoretically comprehensive one.

These priorities can be expressed as five testable propositions. P1: explicit contextual and genre analysis will improve audience adaptation. P2: joint multimodal

construction will improve design justification. P3: functionally targeted language instruction will preserve linguistic development within multimodal tasks. P4: assessment that includes reflection and process evidence will better distinguish design knowledge from production polish. P5: repeated cross-genre transformation will produce stronger transfer than single-genre practice. Each proposition requires empirical testing rather than assumption, and each could be falsified by the designs outlined above.

III. DISCUSSION

The central contribution of the framework is theoretical alignment. Digital writing research establishes that contemporary composing is distributed across modes, tools, and audiences. SFL explains how language realizes meaning in relation to context. Genre theory explains how recurring social purposes are organized into staged texts. Genre pedagogy provides an explicit mechanism for making those patterns teachable. When these components are integrated, digital writing can be taught without collapsing into either technology training or decontextualized grammar instruction.

The framework also offers a response to a recurring false choice in writing pedagogy: language versus multimodality. Digital writing does not make language obsolete, and linguistic instruction does not require print-only pedagogy. What changes is the question teachers ask. Instead of maximizing either prose or visual design, pedagogy should ask which semiotic resources best realize the purpose while ensuring that learners continue developing the linguistic repertoires required by academic and professional life.

A second contribution is the distinction between product complexity and communicative quality. Digital assignments can tempt instructors and students to equate sophisticated tools with sophisticated writing. The framework rejects that assumption. A simple web page with clear staging, accurate evidence, controlled stance, effective visuals, and accessible navigation may demonstrate stronger digital writing than an elaborate video whose rhetorical logic is weak.

A third contribution is the emphasis on transformation. Higher-education writing is increasingly characterized by repurposing knowledge: researchers write abstracts, posters, public summaries, presentations, and social-media explanations in addition to articles. Teaching students to transform a text from one genre and audience to another provides a powerful environment for learning. Differences in wording, staging, evidence, mode, and design become visible because content is partially held constant while context changes.

A fourth contribution concerns assessment in the GenAI era. If assessment targets only the polished surface of a text, AI will continue to destabilize authorship judgments. If assessment includes contextual analysis, genre reasoning,

source verification, multimodal orchestration, revision history, and reflective explanation, it targets competencies that remain educationally meaningful whether or not AI participates in drafting.

For Indonesian tertiary EFL, where SFL genre pedagogy already has an established research base (Emilia & Hamied, 2015; Triastuti et al., 2022) and GenAI-supported genre teaching is beginning to be documented (Zainurrahman et al., 2026), the framework offers a way to extend existing genre cycles to multimodal and GenAI-mediated tasks without discarding them.

The framework has limitations. It is a conceptual synthesis rather than a validated model, and the validity argument in Section 13 remains theoretical until the planned expert review, reliability, and quasi-experimental studies are completed. The literature search was purposive and iterative rather than a registered systematic review, so relevant studies may have been missed, and the recent GenAI literature is changing quickly. Its eight phases may require simplification in short courses. Its SFL foundation may be unfamiliar to instructors and students. The framework also does not provide a complete grammar of visual, auditory, or interactive modes; it relies on broader social-semiotic work for those dimensions. Finally, digital platforms change rapidly, so any framework tied too closely to specific tools would become obsolete. For that reason, the model deliberately emphasizes stable functional questions (purpose, audience, genre, meaning, mode, evidence, and redesign) rather than particular software.

IV. CONCLUSION

Digital communication has expanded writing, but pedagogical frameworks have not always expanded with it. Higher-education students are expected to move among academic, professional, and public genres; coordinate verbal and non-verbal modes; collaborate through digital platforms; and increasingly evaluate or transform AI-generated language. Teaching them simply to produce grammatically accurate essays is insufficient, but replacing essays with visually engaging projects is equally insufficient.

A stronger approach requires theoretical and pedagogical integration. SFL contributes an account of language as contextualized meaning-making. Genre theory connects patterns of meaning to recurring social purposes. Genre-based pedagogy makes those relationships explicit through scaffolded cycles of deconstruction, joint construction, independent composing, and reflection. Digital multimodal research expands the object of instruction to the orchestration of modes and technologies. Together, these traditions support an SFL-Informed Digital Genre Pedagogy that treats digital writing as purposeful, staged, linguistically informed, multimodal design.

The proposed framework organizes instruction around eight recursive phases: contextual orientation, genre mapping, multimodal deconstruction, language and semiotic

resource building, joint digital construction, independent composing, feedback and redesign, and reflective articulation. Its assessment architecture separates contextual fit, genre achievement, linguistic meaning-making, multimodal orchestration, digital functionality and accessibility, and reflective design knowledge.

The framework is deliberately positioned as a design architecture rather than a validated theory. Recent reviews show substantial research on SFL-GBA in university writing and rapid expansion of DMC research, but the integration of these traditions remains incomplete. The next step is empirical, beginning with expert review and rubric validation (Section 13): test whether explicit functional genre knowledge improves students' ability to design, transform, assess, and explain digital texts across contexts.

The most durable goal is not mastery of any particular platform. Platforms will change. The durable capacity is rhetorical and semiotic adaptability: knowing what one is trying to accomplish, for whom, through which genre, with which linguistic and multimodal resources, and being able to justify and revise those choices. That is the point at which digital writing becomes more than technology use and becomes a teachable form of advanced meaning-making.

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