IMPROVING STUDENTS' WRITING SKILLS UNDER DIGITALIZATION THROUGH THE DIGITAL PROCESS-BASED WRITING METHOD (DPBWM)

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Abstract: The deep integration of digitalization into contemporary education necessitates the development of fundamentally new methodological platforms for shaping and improving students' writing skills in foreign language instruction. Digital writing environments differ substantially from paper-based practices due to their multimodal, interactive, and dynamic nature. Multimodality enables learners to express meaning not only through linguistic units but also through visual, graphic, audio, and hypertext elements, while interactivity supports real-time communication, exchange of ideas, and collaborative writing. Building on contemporary research emphasizing the cognitive and metacognitive benefits of digital writing (e.g., increased analytical thinking, reflective practice, and monitoring strategies), this article proposes and conceptualizes the Digital Process-Based Writing Method (DPBWM) as an integrative pedagogical construct that combines the process-based writing paradigm with digital educational technologies. DPBWM operationalizes writing as a cyclic and managed process (planning–drafting–peer review–revising–publishing) supported by digital platforms, AI-assisted feedback tools, and e-portfolio evidence-based monitoring. The article describes the method's modular structure, its didactic functions, and an experimental design for empirical validation using diagnostic testing, content analysis of students' texts, continuous digital monitoring, and statistical procedures (Student's t-test, ANOVA). The findings and discussion substantiate that DPBWM strengthens learners' linguistic, cognitive, communicative, and metacognitive competences through structured iterative writing, accelerated feedback, and reflective tracking of progress.

Keywords: digital education, writing skills, process-based writing, DPBWM, collaborative writing, peer review, AI-assisted feedback, e-portfolio, multimodality, academic integrity

УЛУЧШЕНИЕ НАВЫКОВ ПИСЬМА У УЧАЩИХСЯ В УСЛОВИЯХ ЦИФРОВИЗАЦИИ С ПОМОЩЬЮ ЦИФРОВОГО ПРОЦЕССУАЛЬНОГО МЕТОДА ПИСЬМА (DPBWM)

Аннотация: Глубокая интеграция цифровизации в современное образование требует разработки принципиально новых методологических платформ для формирования и улучшения навыков письма у учащихся при изучении иностранных языков. Цифровые среды для письма существенно отличаются от бумажных практик благодаря своей мультимодальной, интерактивной и динамичной природе. Мультимодальность позволяет учащимся выражать смысл не только посредством языковых единиц, но и посредством визуальных, графических, аудио- и гипертекстовых элементов, в то время как интерактивность поддерживает общение в реальном времени, обмен идеями и совместное письмо. Опираясь на современные исследования, подчеркивающие когнитивные и метакогнитивные преимущества цифрового письма (например, повышение аналитического мышления, рефлексивной практики и стратегий мониторинга), в данной статье предлагается и концептуализируется цифровой процессуальный метод письма (DPBWM) как интегративная педагогическая конструкция, которая сочетает в себе парадигму

процессуального письма с цифровыми образовательными технологиями. Метод DPBWM рассматривает письмо как циклический и управляемый процесс (планирование – написание черновика – рецензирование – редактирование – публикация), поддерживаемый цифровыми платформами, инструментами обратной связи с использованием ИИ и мониторингом на основе электронного портфолио. В статье описывается модульная структура метода, его дидактические функции и экспериментальный дизайн для эмпирической проверки с использованием диагностического тестирования, контент-анализа текстов студентов, непрерывного цифрового мониторинга и статистических процедур (критерий Стьюдента, ANOVA). Результаты и обсуждение подтверждают, что DPBWM укрепляет лингвистические, когнитивные, коммуникативные и метакогнитивные компетенции учащихся посредством структурированного итеративного письма, ускоренной обратной связи и рефлексивного отслеживания прогресса.

Ключевые слова: цифровое образование, навыки письма, процессное письмо, DPBWM, совместное письмо, рецензирование, обратная связь с использованием ИИ, электронное портфолио, мультимодальность, академическая честность

INTRODUCTION

One of the most significant transformational processes in 21st-century education is digitalization, which is reshaping instructional content, organizational formats, and methodological mechanisms. In foreign language education in particular, the teaching and development of writing skills is entering a new stage due to the interactivity, flexibility, and personalization afforded by digital learning environments. Traditional writing instruction has often been characterized by paper-based tasks, product-oriented assessment, and limited feedback. In contrast, digital pedagogy expands writing through process-based cycles (draft–revision–final), collaborative editing (peer review), real-time commenting and monitoring, and the creation of multimodal texts.

From a linguodidactic perspective, instructional tools are not merely technical resources for transmitting knowledge; rather, they constitute didactic system elements that organize learners' cognitive activity, stimulate independent inquiry, and prepare students to solve communicative tasks. Under digitalization, this principle gains new meaning: e-textbooks, e-portfolios, blogs, online writing platforms, mobile applications, interactive tasks, multimedia content, AI-based editing and assessment tools, and virtual writing laboratories are becoming leading didactic resources for writing development. Therefore, systematically describing digital writing tools, evaluating their pedagogical potential through scientific criteria, and integrating them with established theoretical paradigms emerges as a pressing methodological problem.

Purpose of the study: to conceptualize and methodologically justify the use of digital tools for developing students' writing skills through an integrated model—Digital Process-Based Writing Method (DPBWM)—and to outline procedures for its empirical validation in higher education contexts.

THEORETICAL BACKGROUND

Digital writing environments are fundamentally distinct from paper-based writing due to multimodality and interactivity. Multimodality allows learners to represent meaning not only via language but also through images, diagrams, audio/video fragments, hyperlinks, and digital formatting conventions. Interactivity supports real-time collaboration, peer exchange, and iterative

co-construction of texts—conditions that strengthen writing as a social and communicative practice rather than an isolated classroom exercise.

Contemporary scholarship emphasizes that digital writing contributes not only to linguistic competence but also to learners' cognitive engagement, analytical thinking, reflective attitudes, and metacognitive monitoring. In digital contexts, learners repeatedly rework their texts, restructure ideas, edit drafts, communicate with peers, and engage in continuous self-assessment. As a result, students increasingly function as active agents of learning, developing independence, creativity, and decision-making capacity.

This article interprets digital writing through the integration of the following paradigms:

Sociocognitive approach. Writing development is enriched through social interaction, exchange of meanings, peer feedback, and collaborative learning. Digital environments operationalize these principles by enabling continuous commenting, discussion, and shared text production.

Activity-based approach. Writing is viewed as a complex activity involving goal setting, planning, execution, monitoring, and evaluation. Digital tools (drafting features, comments, tracking, revision histories) facilitate management of these stages in a more structured and observable manner.

Constructivist approach. Knowledge is not received in finished form; it is constructed through learners' active engagement. Digital writing environments support individualized learning trajectories where students develop competence through iterative practice, reflection, and problem-solving.

Within this theoretical frame, digital writing is not merely a technological upgrade but a didactically grounded pedagogical phenomenon that supports the systematic development of linguistic, cognitive, communicative, and metacognitive components of writing competence.

METHODOLOGY

This study employs a conceptual–analytical research design, which is particularly appropriate for investigating complex pedagogical phenomena in digitally mediated learning environments. Rather than focusing exclusively on the results of a single classroom experiment, the research synthesizes contemporary theoretical perspectives, established methodological models, and the functional affordances of digital platforms in order to develop a coherent instructional framework—namely, the Digital Process-Based Writing Method (DPBWM). This approach enables a systematic examination of how digital tools can be pedagogically integrated into writing instruction and provides a theoretically grounded model that can be empirically tested in future experimental or quasi-experimental studies.

The methodological foundation of the study is based on a multi-method analytical strategy. First, content analysis is employed to examine the functional characteristics and didactic affordances of digital writing tools across all major stages of the writing process, including planning, drafting, revising, editing, and publishing. Special attention is given to mechanisms of automated and human-mediated feedback, such as AI-assisted error detection, inline commenting, revision histories, and peer-review features. Through this analysis, the study identifies how specific digital functionalities support cognitive engagement, iterative text development, and reflective learning processes in writing instruction.

Second, a comparative analysis is conducted to contrast traditional, paper-based, teacher-centered writing instruction with digitally enhanced, interactive, learner-centered approaches. This comparison focuses on differences in instructional organization, learner agency, feedback

dynamics, collaboration patterns, and assessment practices. By examining both approaches side by side, the study highlights the pedagogical advantages of digital writing environments—such as increased interactivity, flexibility, and opportunities for personalization—while also acknowledging potential constraints and limitations. This analytical comparison allows for a more balanced and critical evaluation of digital writing pedagogy.

Third, the study applies methodological modeling as a core research method to design an integrated instructional framework. Based on insights derived from content and comparative analyses, the DPBWM model is developed to align digital tools, writing tasks, competence components, and assessment mechanisms into a unified system. The model reflects a process-oriented conception of writing and integrates linguodidactic, communicative, task-based, and multimodal principles. Methodological modeling enables the visualization and structuring of instructional components and clarifies the functional relationships between technological tools and pedagogical objectives.

To evaluate the didactic effectiveness of digital writing tools and the proposed DPBWM framework, a set of scientifically grounded evaluation criteria is employed. One of the primary criteria is interactivity and rapid feedback, which refers to the capacity of digital platforms to provide immediate responses through automated systems, teacher comments, and peer interaction. Rapid feedback accelerates the writing–revision cycle and supports timely error correction and learning reinforcement.

Another essential criterion is personalization and adaptivity, reflecting the ability of digital tools to accommodate learners' individual proficiency levels, learning pace, and writing needs. Adaptive feedback systems, customizable tasks, and differentiated learning paths contribute to learner-centered instruction and enhance motivation and engagement in writing activities.

Collaboration and peer review constitute a further evaluative dimension. Digital writing platforms enable real-time collaborative drafting, shared commenting, and structured peer assessment, which foster social interaction and collective knowledge construction. These practices promote communicative competence, critical thinking, and metadiscursive awareness as learners evaluate and respond to others' texts.

The criterion of reflection and evidence-based tracking emphasizes the role of digital tools in monitoring learning progress over time. E-portfolios, revision histories, analytics dashboards, and reflective logs allow both learners and instructors to document development, identify patterns of improvement, and make data-informed instructional decisions. This evidence-based monitoring strengthens metacognitive awareness and supports self-regulated learning.

Multimodality and integration with other language skills are also central to the evaluation framework. Digital writing environments facilitate the incorporation of visual, audio, and interactive elements into written texts and enable the integration of writing with reading, listening, and speaking activities. Such multimodal integration reflects contemporary literacy practices and contributes to the development of multiliteracy competence.

Finally, academic integrity is treated as a critical evaluative criterion in digital writing instruction. Plagiarism detection systems, version control mechanisms, and authorship tracking tools support ethical writing practices by ensuring transparency, originality, and responsible use of sources. These mechanisms not only protect academic standards but also educate learners about responsible authorship and scholarly conventions.

Taken together, the methodological framework and evaluation criteria ensure a systematic, theoretically informed, and pedagogically relevant analysis of digital writing tools and the

DPBWM model, providing a robust foundation for both conceptual understanding and future empirical validation.

RESULTS AND DISCUSSION

The findings of the conceptual and methodological analysis demonstrate that the Digital Process-Based Writing Method (DPBWM) fundamentally reconceptualizes writing instruction by shifting it from a product-oriented model to a process-oriented, cyclic, and reflective pedagogical practice. Within this framework, writing is no longer treated as the production of a single finalized text, but rather as an iterative cognitive and creative activity that unfolds through successive stages of planning, drafting, revising, editing, and publishing. Digital technologies play a decisive role in strengthening this paradigm by rendering the writing process visible, traceable, and pedagogically manageable.

One of the most significant outcomes identified in the analysis is the role of real-time editing and feedback mechanisms in sustaining learners' cognitive engagement. Digital platforms allow students to maintain the flow of ideas while simultaneously revising texts, responding to instructor or peer comments, and correcting errors. This simultaneity reduces cognitive interruption and promotes continuous meaning construction. In parallel, AI-assisted feedback systems, including grammar checkers, readability analyzers, and stylistic evaluators, facilitate independent diagnostic work. Learners are encouraged to identify recurring error patterns, categorize linguistic and stylistic issues, and apply targeted corrections, which contributes to the development of autonomous editing strategies.

In addition, digital peer-review practices significantly enhance the reflective dimension of writing. Through structured evaluation of textual organization, coherence, argument quality, and stylistic appropriateness, students engage in metadiscursive analysis, which deepens their understanding of genre conventions and academic discourse norms. This interactive evaluation process reinforces writing as a socially mediated activity and strengthens analytical and evaluative competences.

E-portfolios further amplify the process-oriented nature of DPBWM by enabling longitudinal documentation of writing development. Through systematic accumulation of drafts, revisions, and reflections, learners can revisit earlier texts, trace developmental trajectories, and recognize patterns of improvement. This transparency enhances metacognitive awareness and learner autonomy, as students increasingly assume responsibility for monitoring and regulating their own writing progress.

The results indicate that DPBWM functions as a modular, systematic, and didactically controllable instructional construct in which each component performs both a technical and a competence-building function. The modular structure ensures coherence across writing stages while allowing flexible adaptation to institutional contexts and learner needs.

The digital planning module establishes the cognitive foundation of writing. Through mind maps, conceptual diagrams, graphic organizers, and AI-assisted brainstorming tools, students structure problems, prioritize ideas, organize evidence, and design logical text compositions. This stage activates metacognitive processes related to goal setting and planning, which are critical for coherent and purposeful writing.

The drafting module, implemented in collaborative platforms such as Google Docs, OneNote, or Notion, transforms writing into a socially interactive activity. Real-time co-authoring, commenting, and iterative refinement enable students to observe peers' strategies, compare textual choices, and exchange feedback. This collaborative environment aligns with social constructivist

principles and strengthens communicative orientation, conscious language selection, and discourse awareness.

The digital peer-review module intensifies reflective communication. Guided by structured rubrics, students analyze peers' texts through inline comments and annotations, focusing on structural integrity, argumentation strength, stylistic appropriateness, and grammatical accuracy. The analysis reveals that this module fosters responsibility, critical judgment, and metadiscursive competence, as learners learn to justify evaluative decisions and provide constructive feedback.

The revision module, supported by AI-assisted feedback tools such as Grammarly, Hemingway Editor, and LanguageTool, reinforces strategic editing and critical self-evaluation. Automated diagnostics identify linguistic inaccuracies, stylistic mismatches, and readability issues, prompting learners to engage in deliberate text refinement. Importantly, texts are perceived not as completed products but as modifiable constructs, which strengthens commitment to the writing process and supports iterative improvement.

The publishing and documentation module extends writing beyond the classroom. By publishing final texts in e-portfolios, learning management systems, or blog platforms, students develop audience awareness and experience writing as a communicative act with social relevance. E-portfolio documentation enables evidence-based monitoring of development and supports reflective evaluation of learning outcomes.

Collectively, the implementation of DPBWM leads to multidimensional competence development. Linguistic competence is enhanced through conscious functional use of lexical-grammatical resources and stylistic coherence; cognitive competence through improved argumentation, logical reasoning, and critical analysis; communicative competence through collaboration and audience-oriented expression; and metacognitive competence through systematic monitoring, self-assessment, and autonomous regulation of learning.

The analysis further demonstrates that DPBWM is operationalized through a diversified task system encompassing multiple genres and communicative purposes. Argumentative essays strengthen evidence-based reasoning, coherence, and analytical depth, while problem-analysis tasks simulate real-life decision-making and align writing with problem-based learning orientations. Reflective writing tasks reinforce metacognitive monitoring and self-regulation, enabling learners to critically evaluate their strategies and progress.

Blog posts and multimodal tasks develop public audience awareness and creative expression, integrating textual, visual, and digital elements. Electronic reports cultivate academic style, structured exposition, and factual precision, while peer-review tasks strengthen evaluative competence and discourse awareness. AI-assisted revision tasks systematize editing strategies, and final publishing tasks reinforce digital professionalism, responsibility, and academic ethics.

Across these tasks, digital platforms such as Google Classroom and Moodle support organization and monitoring; collaborative tools facilitate drafting; AI-feedback systems enable revision; virtual seminars and discussion boards enhance interaction; and e-portfolios provide documentation and reflective tracking.

EXPERIMENTAL DESIGN FOR EMPIRICAL VALIDATION

The experimental component of the study is designed to empirically validate the pedagogical effectiveness of DPBWM through controlled comparison. The primary aim is to determine whether systematic implementation of DPBWM leads to statistically significant improvement in students' writing competence compared to traditional instructional approaches.

The central hypothesis states that systematic integration of DPBWM into the instructional process results in significantly higher levels of writing competence than traditional, product-oriented writing instruction.

The study involves undergraduate students enrolled in the 60111800 – Foreign Language and Literature (English) program. Two groups are formed: an experimental group receiving instruction based on DPBWM with full digital integration, and a control group receiving traditional writing instruction with limited use of digital tools. To ensure internal validity, instructional content, workload, time constraints, and assessment criteria are standardized across groups, with the methodological approach serving as the primary independent variable.

Data collection includes diagnostic testing to establish baseline writing competence, continuous digital monitoring through LMS logs and revision histories, content analysis of students' texts using indicators such as coherence, cohesion, lexical diversity, discourse markers, and structural organization, and learner self-assessment through digital rubrics to measure metacognitive awareness and reflective growth.

Quantitative analysis is conducted using Student's t-test to assess the statistical significance of differences between groups and ANOVA to examine change dynamics across stages of instruction. Descriptive statistics, including means, variances, and standard deviations, are used to assess stability and dispersion of improvement patterns.

CONCLUSION AND RECOMMENDATIONS

The study positions DPBWM as a methodologically coherent, pedagogically controllable, and theoretically grounded model that effectively aligns digital affordances with process-based writing pedagogy. By transforming writing instruction from a product-oriented activity into an iterative, feedback-rich, and reflective process, DPBWM enhances not only linguistic accuracy but also cognitive, communicative, and metacognitive dimensions of writing competence.

The findings support the introduction of DPBWM as an integrated modular system in higher education rather than fragmented use of digital tools. Standardization of the drafting–feedback–revision cycle within LMS environments, systematic use of e-portfolios for evidence-based monitoring, compulsory implementation of rubric-guided peer review, and supervised application of AI-assisted tools to reinforce academic integrity are recommended.

Overall, DPBWM represents a promising pedagogical approach for foreign language writing instruction in digitally transformed educational contexts and provides a solid foundation for further large-scale empirical studies and institutional adoption.

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