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Regular Article

Enhancing multimodal text composition through process-genre approach: A quasi-experimental study in L1 teacher education

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ABSTRACT

This study investigates the impact of a process-genre writing approach on the multimodal writing performance and literacy levels of prospective native language teachers. The research involved 48 teacher candidates enrolled in the Turkish Language Teaching programme at a state university in Türkiye, using an embedded mixed-methods design to evaluate development through quantitative performance criteria and participant experiences. Quantitative data were collected using a pre-test–post-test control-group quasi-experimental design; the experimental group received instruction based on the process-genre approach, while the control group was taught through traditional, product-focused methods. An analytical rubric for multimodal texts and the Multimodal Literacy Scale served as quantitative data-collection tools; qualitative insights were gathered through semi-structured interviews with 16 experimental group participants. Results indicate that the process-genre approach produced significant effects favouring the experimental group, particularly in reflecting genre features and multimodal design skills. A significant increase was observed in the experimental group's multimodal text production scores, whereas no significante change occurred in the control group. Regarding multimodal literacy levels, moderate effects favouring the experimental group were observed in the “Meaning-Making” sub-dimension; however, no significant differences emerged in other sub-dimensions. Qualitative findings suggest that model text analysis, planning, peer feedback, revision, and publishing stages enhanced multimodal meaning-making, genre awareness, collaborative writing experiences, and intention to incorporate multimodal texts into future teaching. The findings demonstrate that the process-genre approach provides an effective pedagogical framework for developing prospective teachers' digitally design-oriented writing skills and transforming traditional writing instruction into multimodal, design-centred, and technology-integrated practices suitable for the digital age.

1. Introduction

The advancement of technology has profoundly affected every aspect of human life, driving fundamental innovations across our daily routines, professional tasks, and educational practices. Multimodal theories show that people communicate with words and also with things like pictures and gestures. According to this approach, each form of communication has its own strengths and limitations in creating meaning (Jewitt, 2014). Pictures are not just extra parts of a text anymore. They are now considered essential communication tools that can convey meaning independently, sometimes contradicting or reinforcing what is said verbally (Archer, 2011). Especially in digital environments and education, the combination of visual, auditory, and written elements captures more attention, helps people better understand topics, and enhances communication by engaging different learning styles (Al-Muttairi & Al-Alusi, 2025). In recent years, smart devices and online applications have shaped literacy, giving it a renewed significance (Gutiérrez-Ángel et al., 2022; Soufghalem, 2024). Today, it is no longer feasible to speak of a single type of literacy; rather, we must acknowledge multiple types that vary by culture, language, and context. Also, the move from paper to digital screens changed how people read and write (Baron, 2021).

With technological advances, the notion of text has broadened to encompass multiple layers and dimensions. In real life, students often

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use many types of literacy outside school for fun by mixing words, pictures, sounds, and videos with digital tools like social media (Lim & Toh, 2020). However, in educational contexts, writing instruction remains mainly print-focused, monolingual, and centred on standard genres, with limited incorporation of multimodal or digital formats into the classroom (Kustini et al., 2020; Si et al., 2025). This creates a persistent gap between the rich, multimodal literacy experiences students access outside school and the traditional, print-centric writing education they receive within school (Dahlström, 2022; Marissa & Hamid, 2022).

The process of writing multimodal texts demands sophisticated skills, such as reflecting on content and creating links between layers. Even though future teachers are called "digital natives" because they are young, they do not have enough digital skills to make or grade these texts for school (Tour & Barnes, 2021). These results show that future teachers need good training to turn their digital skills into teaching skills (Çebi et al., 2022; Tomczyk, 2024). The content and pedagogical approach of this training offered to teacher candidates are also important. The product-oriented approach traditionally used in writing education has been criticised for focusing only on the resulting text and neglecting the process (Kadmiry, 2021; Özdemir, 2019). The process-oriented approach, on the other hand, focuses on students' cognitive processes but may leave the social context and genre characteristics of the produced text in the background. The theoretical foundations underlying these approaches and their synthesis within the context of multimodal teacher education are elaborated in the following section.

Despite the growing body of evidence supporting the process-genre approach in writing pedagogy, notable limitations remain in its application to multimodal text production. Reviewing studies using this approach shows it is mainly employed in foreign language teaching (EFL/ESL) to enhance writing skills (Gu et al., 2025; Peungcharoenkun & Waluyo, 2023). Reviews show that almost all studies on this topic are in English or for people learning English as a second language (Zhai & Razali, 2023). Experimental research on the effects of the process-genre approach within native language education and multimodal text production contexts remains limited (Nugraha et al., 2024). Also, in the current literature, multimodal literacy research in teacher education primarily focuses on "multimodal text analysis," while studies in which teacher candidates actively "produce multimodal texts" are limited (Li, 2020). Surveys of writing instructors further indicate that digital multimodal genres remain rare in classroom practice, with most instruction still centred on traditional monomodal formats (Kessler & Casal, 2024). Although teacher educators recognise the importance of multimodal texts, their utilisation in writing activities remains limited due to factors such as resources, time, and preparation (Farías & Véliz, 2019; Yunus et al., 2022). Most studies involving teacher candidates tend to be small-scale case studies, narrative research, or action research, highlighting the ongoing need for larger, systematic intervention studies (Li & Dell-Jones, 2023). Because of this, there are not many experiments on the process-genre method in L1 teacher training, especially outside of English speaking countries.

This study aims to investigate the impact of a process-genre writing approach on the multimodal text writing performance and literacy levels of prospective native language teachers. The research was conducted with Turkish teacher candidates within the context of native language (L1) education. Accordingly, the following research questions were addressed:

- Is there a significant difference between the multimodal text writing achievement scores of Turkish teacher candidates in the experimental group, who were taught using the process-genre approach, and those in the control group, who received instruction through traditional teaching methods?
- Is there a significant difference in the multimodal literacy levels of Turkish teacher candidates between the experimental and control groups?
- What are the experiences and opinions of Turkish teacher candidates regarding the teaching process carried out with the process-genre approach?

2. Theoretical framework

The theoretical foundation of this study rests on three interconnected frameworks: the Pedagogy of Multiliteracies, the Process-Genre Approach to writing, and Technological Pedagogical Content Knowledge (TPACK). Together, these frameworks provide a basis for understanding how prospective native language teachers can develop multimodal text composition skills through structured, genre-informed, and technologically integrated instruction.

The concept of multiliteracies, introduced by the New London Group (1996), challenged the traditional view that literacy education should centre exclusively on standard, print-based language. The group said that because the world is more diverse and uses more technology, we need a better way to teach that includes all the ways we make meaning. Building on this foundation, Kress (2010) proposed a social semiotic approach to multimodal communication in which each mode (written language, image, sound, gesture, and spatial arrangement) carries distinct meaning-making potential. In this idea, people are not just reading; they are active designers who pick and mix different parts to share a message (Kress, 2010). *Multimodal texts*, in this sense, integrate linguistic components such as vocabulary and grammar, visual elements such as colour and illustration, auditory features such as sound and music, and spatial arrangements such as position and layout (Anstey & Bull, 2020). For training teachers, this means they must learn how to make these texts well, not just look at them (Rajendram et al., 2022; Andriyati et al., 2025).

The Process-Genre Approach, developed by Badger and White (2000), provides the instructional framework through which these multiliteracy competencies are developed in the present study. The approach emerged as a synthesis of three previously distinct writing pedagogies: the product-oriented approach, which prioritises the formal features of the final text; the process-oriented approach, which foregrounds the cognitive stages of writing such as planning, drafting, and revision; and the genre-based approach, which situates writing within specific social contexts and communicative purposes. Badger and White (2000) argued that each of these approaches, when applied in isolation, offers an incomplete account of writing development. Accordingly, their model proposes a cyclical instructional structure comprising the stages of situation identification, goal setting, genre analysis, planning, drafting, and publication. This circle of steps is very good for making multimodal texts because it helps students see how words, pictures, and layouts work together to make meaning (Hafner & Ho, 2020; Jiang et al., 2022). Research has demonstrated that this integrated approach enhances writing quality, genre awareness, and multimodal design skills more effectively than single-approach methods (Gu et al., 2025; Rahimi & Zhang, 2021).

The third framework, Mishra and Koehler's (2006) Technological Pedagogical Content Knowledge (TPACK), contextualises the study within teacher education. TPACK shows how a teacher's knowledge of technology, teaching methods, and the subject work together. In the context of multimodal text production, this distinction is particularly relevant. Although teacher candidates are frequently characterised as "digital natives" by virtue of their generational familiarity with technology, research indicates that personal digital consumption skills do not automatically translate into the ability to design or evaluate multimodal content for instructional purposes (Nabhan, 2021; Zhang et al., 2026). Developing TPACK-informed competencies in multimodal design therefore requires structured, discipline-specific training (Tan et al., 2023; Ye et al., 2024). In this study, the process-genre cycle

helps future Turkish teachers combine their technology and teaching skills to write multimodal travel texts.

3. Method

3.1. Research design

This study employed an embedded mixed-methods design, specifically a QUAN (qual) embedded design in which quantitative data were dominant and qualitative data played a supportive role (Creswell & Plano Clark, 2017). This approach was selected because it enables a more comprehensive understanding of the research problem by quantitatively identifying the effects of process-genre–based multimodal writing instruction while qualitatively examining participants' experiences, challenges, and perceptions in depth. In the quantitative phase, a pretest–posttest control-group quasi-experimental design was utilised due to the impossibility of randomly assigning classes within the institutional context. In the qualitative phase, the multimodal text-production experiences of the participants were investigated through semi-structured interviews conducted with individuals purposively selected from the experimental group. Qualitative data were collected after the completion of the quantitative procedures and were used to support the interpretation of the quantitative findings.

The quantitative and qualitative data sets were integrated during the post-analysis interpretation stage. The levels of change revealed through the quantitative results were compared with the participant perspectives drawn from the qualitative data. The qualitative findings illuminated the processes underlying the quantitative outcomes and provided experiential explanations offered by the participants. This integration process constitutes a form of data triangulation, in which quantitative outcomes and qualitative insights were cross-examined to develop a more comprehensive understanding of the research problem (Creswell & Plano Clark, 2017). In this way, both sets of data were interpreted together to generate a more comprehensive and holistic response to the research questions.

3.2. Participants

The participants in the study were determined using a combination of appropriate sampling and criterion sampling methods. Prospective teachers enrolled in the Turkish Language Teaching Bachelor's Program at the Faculty of Education of a state university in Türkiye were included in the study based on accessibility and voluntariness (Gravetter & Forzano, 2018). The inclusion criteria for participants were completion of the "*Turkish Language I*" course and possession of basic digital literacy skills (such as text processing and internet use). The exclusion criteria were defined as failing the "*Turkish Language I*" course and having previously received professional-level digital design training (such as web design or graphic design certificate programmes). These criteria aimed to ensure that participants possessed the necessary basic knowledge for the multimodal text production process and to maintain homogeneity among the groups.

During the spring semester of 2022, 48 prospective teachers who met the inclusion criteria participated in the study. Of the 51 students enrolled in the Turkish Language II course, three were excluded because two had failed Turkish Language I and one could not attend regularly. The final sample consisted of 24 females and 24 males, with a mean age of 19.3 (SD = .85). The equal gender distribution was an incidental outcome of the enrolment structure of the two existing classes rather than a deliberate sampling criterion; both classes happened to consist of equal numbers of female and male students. Since the quasi-experimental design did not allow for random assignment, the two available classes were designated as the experimental group (n = 24) and the control group (n = 24).

To check for possible baseline differences between the groups, participants' demographic characteristics, digital device ownership, daily internet use, and pre-test performance were compared. Independent-samples t-tests and chi-square analyses showed no statistically significant differences between the groups on these variables ($p > .05$). Participants' demographic characteristics are summarised below. The experimental and control groups each comprised 12 female and 12 male students. Regarding digital device ownership, 18 participants in each group owned a personal computer or tablet, while six did not. Daily internet use was comparable across groups: eight and seven participants in the experimental and control groups, respectively, reported 1–3 h of daily use; ten and eleven reported 4–5 h; and six in each group reported six or more hours of daily internet use.

For the qualitative aspect of the study, 16 participants were selected from the experimental group using maximum variation sampling (Patton, 2014). In the selection process, criteria such as gender, post-intervention performance level (high, medium, low), and experience with digital tools were considered to ensure diversity in experiences and perspectives. Consistent with the 9–17 interview range recommended by Hennink and Kaiser (2022) for reaching data saturation, it was concluded that no new themes emerged after conducting semi-structured interviews with 16 participants, indicating that data saturation had been achieved.

3.3. Data collection

Three primary data collection tools were employed in the study to gather both quantitative and qualitative data: the Graded Scoring Key for Multimodal Texts, the Multimodal Literacy Scale, and the Semi-Structured Interview Form.

3.3.1. Graded Scoring Key for Multimodal Texts (travelogue)

The researcher developed an analytical graded scoring key (rubric) to evaluate the multimodal travelogues produced by the participants. Goodrich's (1997) four-step approach was adopted in developing the rubric, drawing on studies of the travel essay genre and the characteristics of multimodal texts (Aktaş & Gündüz, 2007; Batur & Gözlet, 2020; Mishra, 2014). The rubric consists of three main dimensions: (a) Text Production (basic writing skills such as grammar, expression, and consistency), (b) Reflecting Travel Writing Characteristics (genre-specific structure and content features), and (c) Creating a Multimodal Structure (effective integration of visual, auditory, and spatial elements). The rubric includes 15 criteria, each rated on a 4-point scale (1 = Insufficient, 2 = Needs Improvement, 3 = Good, 4 = Very Good), with a total possible score ranging from 15 to 60.

To ensure the content validity of the rubric, opinions from 10 experts were consulted, including 2 in measurement and evaluation, 5 in Turkish language education, 1 academic in educational programmes, and 2 Turkish language teachers. The content validity ratio (CVR), calculated using the Lawshe method, was .91; this exceeds the critical value of .62 for 10 experts (Ayre & Scally, 2014). Regarding inter-rater reliability, Kendall's W concordance coefficient, derived from two independent raters—the researcher and an expert with a doctorate in Turkish education—assessing the same texts, was calculated as .82. This indicates a high level of agreement between raters (O'Connor & Joffe, 2020). The three dimensions of the rubric are structured around a theoretical framework encompassing the linguistic, typological, and visual-spatial aspects of multimodal texts. As a result, the rubric's dimensions offer a comprehensive analytical framework for content and establish a measurement area that aligns with content validity, as supported by expert opinions.

3.3.2. Multimodal literacy scale

The scale developed by Bulut et al. (2015) was employed to assess participants' multimodal literacy levels. Designed for teacher candidates, the scale exhibited a three-dimensional structure based on validity and reliability studies conducted with 392 participants: (a) self-expression using a multimodal approach (7 items), (b)

understanding content presented in a multimodal manner (6 items), and (c) preference for a multimodal approach (4 items). The 17-item scale, using a five-point Likert scale, was reported in the original study with a total variance explained of 52.63% and a Cronbach's alpha of .87. Additionally, confirmatory factor analysis results indicate that the scale's three-dimensional structure fits the data well (χ^2/df = 1.51, RMSEA = .036, GFI = .95, CFI = .99).

In this study, the internal consistency of the scale was reassessed, and the overall Cronbach's alpha was .89; the subscale reliability coefficients were .84, .82, and .79, respectively. These values indicate high internal consistency. Given that the theoretical structure of the scale has been previously validated with a substantially larger sample and that the reliability coefficients obtained in this study are strong, the scale can be considered a valid and appropriate instrument for assessing participants' multimodal literacy levels and suitable for the study's purposes.

3.3.3. Semi-structured interview form

A semi-structured interview form was created by the researcher to explore participants' experiences of the multimodal text writing process, based on the process-genre approach. The eight open-ended questions in the form were designed to address general experiences related to the process, challenges faced, new knowledge and skills acquired, awareness of the multimodal design elements involved, peer feedback, and the influence of self-assessment practices, as well as how these experiences impacted professional life. The draft form was reviewed by five experts; their feedback improved the clarity and scope of the questions. Subsequently, a pilot study was carried out with three teacher candidates, and based on the pilot results, some questions were simplified to enhance understanding. In its final version, the form was used to gain an in-depth understanding of participants' perceptions and experiences within the qualitative aspect of the research.

3.4. Procedure

The study's implementation process was carried out over eight weeks (a total of 24 class hours) during the spring semester of 2022, in accordance with the quasi-experimental design described in Section 3.1. Ethical approval was obtained from the institutional ethics committee prior to data collection. Classes were scheduled for 3 h per week in both groups; applications were initiated in the fifth week of the semester.

Before implementation, all participants were informed about the purpose and process of the study, voluntary consent to participate was obtained, and pre-test measurements were conducted using the Multimodal Text Writing Achievement Test and the Multimodal Literacy Scale. During the eight-week intervention period, the experimental group received instruction based on the process-genre approach implemented across four stages (Preparation and Modeling, Collaborative Construction, Independent Construction, and Review and Publication), while the control group received traditional product-oriented writing instruction. Following the completion of the intervention, post-test measurements were administered to both groups using the same instruments. Additionally, semi-structured interviews were conducted with 16 purposefully selected participants from the experimental group to explore their experiences and perceptions regarding the process-genre approach.

3.4.1. Control group implementation

In the control group, standard writing instruction was implemented within the scope of the "*Turkish Language II*" course included in the Turkish Language Teaching Bachelor's Program curriculum. In this group, teacher candidates worked on the travel writing genre using traditional teaching methods (product-oriented approach). The process was carried out as follows: In the first weeks, the travel writing genre was introduced and sample texts were read. Then, class discussions were held to determine the genre's characteristics, and students were asked to write travel pieces individually. In the final weeks, the completed texts were presented in class and evaluated. The control group did not receive any specific intervention regarding multimodality, the use of digital tools, or the process-genre cycle.

3.4.2. Experimental group implementation

In the experimental group, an educational programme based on the Process-Genre-Focused Writing Approach developed by Badger and White (2000) was implemented. This approach offers a cyclical structure that includes the stages of situation identification, goal setting, genre analysis, planning, drafting, and publication. The implementation was carried out in four main phases:

Preparation and Modeling (Weeks 1-2): At this stage, participants were provided with theoretical information about the structure of multimodal texts, theories of multimodality (Kress, 2010), and the characteristics of the travel writing genre. Examples of high-quality multimodal travel writing (literary texts from print magazines, blog posts from digital platforms) were examined in class; detailed analyses examined how text, visual, and design elements work together to create meaning. Participants were asked to identify the linguistic, visual, spatial, and typographic elements in these texts and discuss their communicative functions.

Collaborative Construction (Weeks 3-4): In this phase, cooperative learning activities were carried out under the teacher's guidance. Working in small groups, participants chose a common travel writing topic and generated content through brainstorming. Both paper-based (collage, drawing) and digital design experiments (using tools such as Canva, Blogger, and Padlet) were undertaken. The teacher demonstrated the basic use of digital tools and provided examples of visual-text integration. During the planning stage, participants decided which images, colours, and layout elements would appear in their texts and shared these decisions with their groupmates. The drafting process was supported by group work, with each group sharing their work with the class to gather feedback.

Independent Construction (Weeks 5-6): Participants were asked to individually produce original, multimodal texts inspired by their own travel experiences. At this stage, students gathered photos, videos, and audio recordings related to the places they visited and worked on merging visual, auditory, and linguistic elements into their texts in a coherent way. The teacher offered individual guidance and posed questions about design choices (e.g., "Why did you use this image here?", "Does your colour choice match the emotional tone of the text?"). Peer review activities were organised at the end of the week; participants paired up, read each other's draft texts, and gave structured feedback using feedback forms.

Review and Publication (Weeks 7-8). In this final stage, participants used the "*Multimodal Text Assessment Rubric*" to first evaluate their own texts and then the texts of their matched peers. The rubric provided participants with concrete criteria for text creation, reflecting travel writing characteristics, and for developing a multimodal structure. Final revisions were made based on the feedback received; grammar errors were corrected, images were rearranged, and the page design was improved. The completed multimodal travel essays were published digitally (Blogger, Padlet, etc.) and a presentation day was organised in class. Participants shared their work with the class and made reflective evaluations regarding the design processes. At the end of the implementation, final test measurements were conducted and qualitative interviews were held.

3.4.3. Reliability

In both groups, the lessons were delivered by the same instructor (researcher). In the experimental group, reflective notes were taken at the end of each session, and weekly application checklists were used to monitor whether the process-oriented approach-based teaching was implemented as planned. These records indicated that the activities were carried out according to the planned stages. In the control group, lesson plans were prepared in advance to ensure curriculum fidelity,

standard teaching materials were used, and the lesson flow was maintained within the framework of the programme.

3.5. Data analysis

In this study, both quantitative and qualitative data were assessed using analysis methods suitable for each data type. The goal was to interpret numerical results and participant opinions within a comprehensive and meaningful context.

3.5.1. Quantitative data analysis

Before analysing quantitative data, the suitability of the measurements for parametric test assumptions was examined using the Shapiro–Wilk normality test. This test was especially preferred for assessing normality due to the relatively small sample size. Since deviations from normality were detected in some sub-dimensions ($p < .05$), both parametric and non-parametric methods were employed in the analyses (Morgan, 2017). Parametric tests were used for variables that met normality assumptions, while nonparametric tests were applied to those that did not, based on the distributional characteristics of the dataset. Specifically, parametric tests were applied to variables that satisfied normality assumptions, while non-parametric equivalents were used for those that did not, in line with the recommendation that test selection should be driven by the distributional characteristics of each variable rather than by a uniform approach across the dataset (Field, 2024; Morgan, 2017). Furthermore, given that the study employed a convenience sample within a quasi-experimental design, the use of both parametric and non-parametric tests is consistent with methodological guidance for non-probability sampling contexts (Gravetter & Forzano, 2018).

In this context, the Independent Samples *t*-Test and Mann–Whitney ***U*** test were employed for intergroup comparisons, while the Dependent Samples *t*-Test and Wilcoxon Signed-Rank test were used for intragroup comparisons. The significance level was set at $p < .05$ for all analyses. Additionally, Cohen's *d* effect size was calculated to evaluate the practical significance of the results, with Cohen's (1988) classification used for interpretation ($d = .2$: small effect, $d = .5$: moderate effect, $d = .8$ and above: large effect).

3.5.2. Qualitative data analysis

The qualitative data collected from the semi-structured interviews were analysed using content conventional analysis in accordance with the purpose of the study (Lindgren et al., 2020). In the coding process, an inductive approach was employed to uncover relationships within the data while maintaining the original meaning of participants' statements. In the initial stage of the analysis, the interview recordings were transcribed, then the data were reread, divided into meaningful units, and initial codes were generated. Sub-themes were identified by examining similarities and differences between the codes; in the final stage, the sub-themes were grouped under main themes.

To ensure the reliability of the analysis, the coding process was carried out separately by both the researcher and an expert with a PhD in Turkish education. The level of inter-coder agreement was calculated using the formula proposed by Miles and Huberman (1994) [Reliability = Agreement/(Agreement + Disagreement)] and was 82%. This value exceeds the reliability thresholds accepted in qualitative research (70-80%) and indicates that the coding process was carried out consistently (Miles & Huberman, 1994; O'Connor & Joffe, 2020).

To enhance the credibility and transferability of the qualitative findings, the themes developed were supported by direct quotes from participants, enabling readers to evaluate the conclusions of their own words. In accordance with ethical principles, the participants' identities were protected, and each was assigned a code number such as TC1, TC2.

4. Results

This section presents quantitative findings on the effects of the process-genre writing approach on multimodal text writing success and multimodal literacy levels, along with qualitative findings on teacher candidates' experiences with the process. The findings are organised according to the sequence of the research questions, and qualitative data support quantitative results, and where relevant, quantitative and qualitative findings are interpreted together to provide a more comprehensive and triangulated account of the intervention's effects.

4.1. The effect of the process-genre approach on multimodal text writing success

Within the scope of the first sub-problem of the research, the multimodal text writing success scores of the experimental and control groups were compared. The data obtained from the pre-tests administered before the intervention were analysed using the Independent Samples *t*-Test and Mann-Whitney *U* Test, and it was found that the groups were statistically equivalent in terms of their sub-scales of "Text Creation," "Reflecting Travel Writing Features," and "Creating a Multimodal Structure," as well as their total scores ($p > .05$). This finding revealed that there was no significant difference between the groups in initial performance; thus, the necessary precondition for a more reliable evaluation of the intervention's effect was established.

Descriptive statistics for both groups across measurement points are presented in Table 1.

The final test scores obtained after the eight-week programme revealed significant differences between the experimental group, which received process-genre writing instruction, and the control group, which was taught using traditional methods. Post-test comparison results are presented in Table 2.

The findings in Table 2 reveal an increase in favour of the experimental group on the "Text Creation" sub-scale; however, this difference did not reach statistical significance ($t = 1.951$, $p = .057$). Nonetheless, strong and statistically significant differences favouring the experimental group were identified in the "Reflecting Travel Writing Characteristics" ($t = 5.860$, $p < .001$, $d = 1.69$) and "Creating a Multimodal Structure" ($U = 19.50$, $p < .001$, $d = 2.34$) sub-scales. Notably, the effect size for the overall score in multimodal text writing was particularly substantial (Cohen's $d = 2.74$), which is classified as a "very large" effect according to Cohen's (1988) criteria. These results demonstrate that the process-genre writing approach is appears to be highly effective in enhancing teacher candidates' ability to produce multimodal texts, both statistically and practically. Findings related to the pre-test and post-test changes for the groups are detailed in Table 3.

The within-group change analysis shown in Table 3 demonstrated a significant rise in performance scores within the experimental group before the intervention ($M = 34.00$, $SD = 2.52$) and after the intervention ($M = 42.83$, $SD = 2.46$), with statistical significance ($t = -15.234$, $p < .001$, $d = 3.52$). Conversely, no significant difference was found

Table 1
Descriptive statistics for multimodal text writing scores by group and measurement point.

Sub-Scale	Group	*n*	Pre-test *M*	Pre-test *SD*	Post-test *M*	Post-test *SD*
Text Creation	Experiment	24	9.54	1.98	10.95	1.37
	Control	24	9.58	1.53	10.04	1.85
Travel Writing Features	Experiment	24	14.79	2.70	19.45	1.96
	Control	24	15.50	2.64	15.95	2.18
Multimodal Structure	Experiment	24	9.67	1.31	12.41	1.56
	Control	24	9.63	1.66	9.33	.87
Total Score	Experiment	24	34.00	3.92	42.83	2.46
	Control	24	34.71	4.45	35.33	2.99

Note. M = mean; SD = standard deviation.

Table 2
Comparison of the post-test scores for multimodal text writing between the experimental and control groups.

Sub-Scales	Group	*n*	*M*	*SD*	*t/U*	*p*	Cohen's *d*
Text Creation	Experiment	24	10.95	1.36	1.951[a]	.057	.56
	Control	24	10.04	1.85			
Travel Article Features	Experiment	24	19.45	1.95	5.860[a]	<.001	1.69
	Control	24	15.95	2.17			
Multimodal Structure	Experiment	24	12.41	1.55	19.50[b]	<.001	2.34
	Control	24	9.33	.86			
Total Score	Experiment	24	42.83	2.46	9.544[a]	<.001	2.74
	Control	24	35.33	2.98			

Note. M = mean; SD = standard deviation. [a] Independent Samples t-Test, [b] Mann-Whitney U Test.

Table 3
Pre-test-post-test comparison of experimental and control groups in multimodal text writing.

Group	Test	*n*	*M*	*SD*	*t*	*p*	Cohen's *d*
Experiment	Pre-test	24	34.00	2.52	−15.234	<.001	3.52
	Post-test	24	42.83	2.46			
Control	Pre-test	24	34.54	2.98	−1.732	.097	.26
	Post-test	24	35.33	2.98			

Note. M = mean; SD = standard deviation. Dependent Samples t-Test.

between the control group's pre-test (M = 34.54, SD = 2.98) and post-test (M = 35.33, SD = 2.98) scores (t = −1.732, p = .097, d = .26). Notably, the effect size in the experimental group (d = 3.52) exceeds the threshold value of .80, which is classified as "very large" in the literature. Overall, these findings suggest that instruction based on the process-genre approach significantly enhanced success in multimodal text writing, whereas the traditional approach had a limited impact.

4.2. Findings regarding multimodal literacy levels

Within the scope of the second sub-problem of the study, the multimodal literacy levels of the experimental and control groups were compared. Pre-tests administered prior to the intervention indicated that the groups were statistically equivalent in multimodal literacy (p > .05).

Descriptive statistics for both groups across measurement points are presented in Table 4.

The results of the post-test comparative analysis are shown in Table 5.

As shown in Table 5, statistically significant differences favouring the experimental group were found in the "Meaning-Making" sub-scale (U = 170, p = .014, d = .71) and in the overall multimodal literacy score (U = 185, p = .033, d = .62). The effect sizes indicate a "medium" effect

Table 4
Descriptive statistics for multimodal literacy scale scores by group and measurement point.

Sub-Scale	Group	*n*	Pre-test *M*	Pre-test *SD*	Post-test *M*	Post-test *SD*
Self-Expression	Experiment	24	19.21	4.02	20.25	2.54
	Control	24	19.25	4.75	18.88	3.69
Meaning-Making	Experiment	24	26.42	4.02	30.13	3.25
	Control	24	25.75	4.79	27.46	3.36
Preference	Experiment	24	20.67	2.75	20.25	2.82
	Control	24	19.50	3.18	19.17	3.56
Total Score	Experiment	24	66.29	7.53	70.63	5.31
	Control	24	64.50	8.31	65.50	7.27

Note. M = mean; SD = standard deviation.

according to Cohen's (1988) classification, showing that the process-genre approach to multimodal text writing instruction enhances teacher candidates' ability to interpret complex content. However, no significant differences were observed between the groups in the "Self-Expression" (t = 1.245, p = .219) and "Preference" (t = .892, p = .377) sub-scales. This suggests that the eight-week intervention mainly improved comprehension skills, but longer-term interventions might be necessary to influence overall attitudes and preferences towards multimodal texts.

Findings related to within-group comparisons are presented in Table 6.

Table 6 shows that the experimental group's total multimodal literacy score increased significantly from pre-test to post-test (t = −2.456, p = .022, d = .57). No significant change was found in the control group (t = −.765, p = .451, d = .10). These results indicate that the process-genre approach had a positive impact not only on multimodal text writing success but also on multimodal literacy levels. However, it is essential to note that the effect size on literacy level (d = .57) was somewhat smaller than that on writing performance (d = 3.52). This difference suggests that the intervention exerted a stronger influence on the writing skills it directly targeted, while indirect benefits such as literacy perception experienced moderate development.

4.3. Qualitative findings related to the process-genre approach

Content analysis of semi-structured interviews with teacher candidates in the experimental group identified five main themes related to the process-oriented, multimodal text writing experience: (a) Contributions of the process, (b) Impact on the writing process, (c) Easy and difficult aspects, (d) Impact on the learning environment, (e) Potential implications for future writing experiences. These themes and their associated sub-components are illustrated in Fig. 1.

Participant feedback clarifies the reasons behind the rise in success observed in quantitative data. Specifically, the high effect size (d = 2.74) for the overall score in multimodal text writing is directly linked to participants' experiences in genre awareness, planning skills, and inter-layer integration. The key points emerging from the findings are as follows:

Contributions of the Process: One notable benefit participants gained from the process was the ability to enhance narration by establishing consistent links between text and visual and auditory elements. Teacher candidates recognised and understood that visuals are not merely decorative elements for aesthetic purposes, but components that play a fundamental role in constructing meaning. TC9 expressed this awareness with the following words: *"I was able to easily convey a situation that could not be described in writing using different layers. Visuals were not just decoration, but pieces that completed the meaning."* This demonstrates that participants began to see the elements in multimodal texts not as decorative but as semantic resources that carry communicative functions.

Impact on the Writing Process: Participants highlighted that the process-oriented approach supports the writing process, especially emphasising how the analysis of model texts and planning stages

Table 5
Comparison of the final multimodal literacy scale scores of the experimental and control groups.

Subscale	Group	*n*	*M*	*SD*	*t/U*	*p*	Cohen's *d*
Self-Expression	Experiment	24	20.25	2.54	1.245[a]	.219	.36
	Control	24	18.88	3.69			
Meaning-Making	Experiment	24	30.13	3.25	170.00[b]	.014	.71
	Control	24	27.46	3.36			
Preference	Experiment	24	20.25	2.82	0.892[a]	.377	.26
	Control	24	19.17	3.56			
Total Score	Experiment	24	70.63	5.31	185.00[b]	.033	.62
	Control	24	65.50	7.27			

Note. M = mean; SD = standard deviation. [a] Independent Samples t-Test, [b] Mann-Whitney U Test.

Table 6
Pre-test–post-test comparison of multimodal literacy scores in the experimental and control groups.

Group	Test	n	M	SD	t	p	Cohen's *d*
Experiment	Pre-test	24	66.29	7.53	−2.456	.022	.57
	Post-test	24	70.63	5.31			
Control	Pre-test	24	64.50	8.31	−.765	.451	.10
	Post-test	24	65.50	7.27			

Note. M = mean; SD = standard deviation. Dependent Samples t-Test.

organise the writing task. The step-by-step structure provided by the process-oriented approach helped teacher candidates grasp the unique aspects of travel writing and intentionally incorporate these features into their own work. For instance, TC5 described the reassurance offered by the planning phase with the words: "*A planned writing process was very comforting for me. I started to develop this habit … I realised the parts that beautify travel writing, namely the blending of objective and subjective information.*" This perspective shows that the structured approach enhanced both genre knowledge and systematic writing habits among the participants.

Easy and Difficult Aspects: While the process-genre approach offers a structured framework for the writing process, participants reported facing challenges at certain stages. Specifically, they found that the technical use of digital design tools and the balanced integration of objective information and subjective interpretations were difficult in the initial phases. TC14 summed up this experience as follows: "*Learning tools like Canva took time at first, but it was very useful later on. The hardest part was blending my personal thoughts with the information.*" This suggests that digital literacy levels could influence performance in multimodal text production, and that the nature of travel writing, which demands an objective-subjective balance, presents a cognitive challenge for participants. Nevertheless, it is clear that participants adapted to these tools over time and gained benefits from the process.

Impact on the Learning Environment: Participants noted that the process-oriented approach fosters a collaborative, interactive learning culture in the classroom. Specifically, group work and peer assessment activities conducted during the co-construction phase contributed to both improving writing skills and enriching social learning experiences. TC7 described this experience as follows: "*Seeing my friends' different perspectives while working in groups taught me a lot. During peer assessment, I had the opportunity to see my text through different eyes.*" Similarly, TC12 articulated the sharing and mutual learning aspect of the process with the following words: "*Sharing what we wrote in class and seeing everyone's work was both motivating and instructive. We learned a lot from each other.*" These perspectives demonstrate that the process-based approach not only enhances individual writing skills but also fosters a classroom environment grounded in collaborative learning and peer interaction.

Reflection on Future Practice: Teacher candidates expressed that the experience of writing multimodal texts using the process-oriented

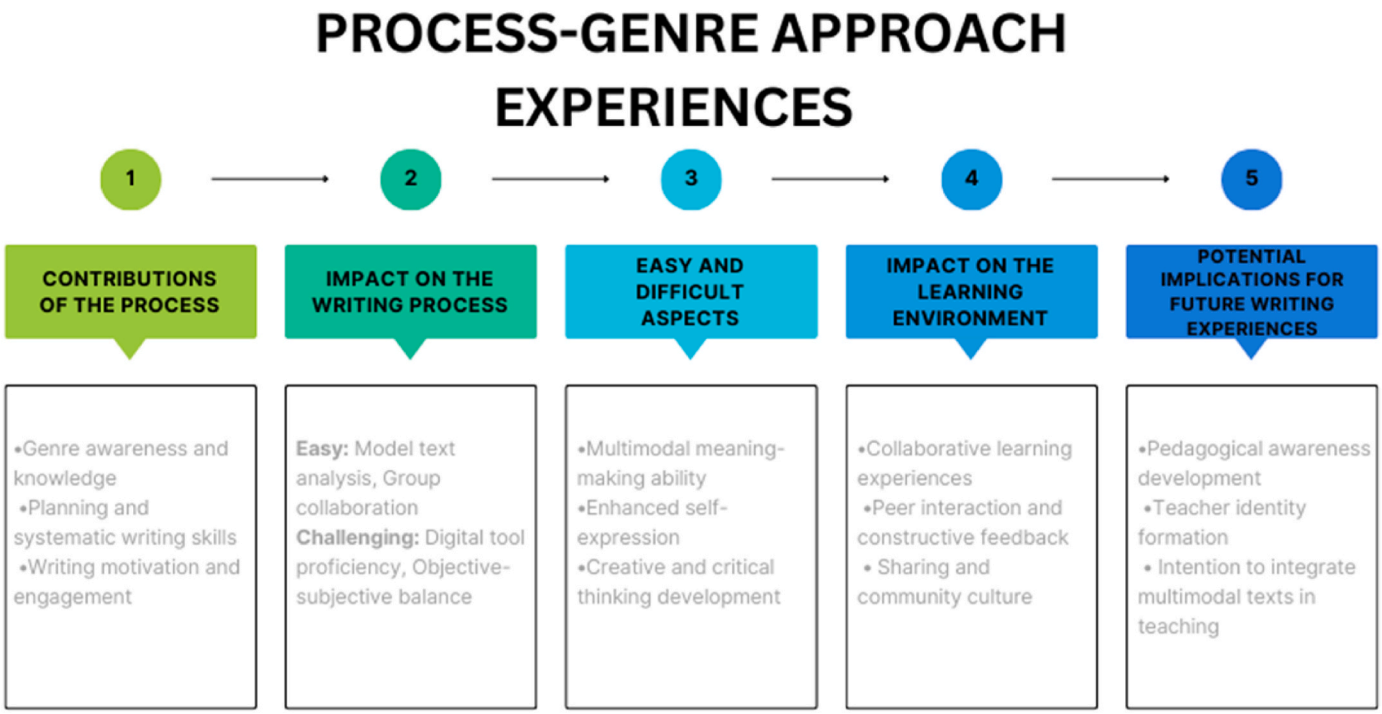


Fig. 1. Thematic Map related to the multimodal text writing process.

approach not only enhanced their writing skills but also influenced their pedagogical views for future teaching. Participants noted that they developed specific instructional ideas for integrating multimodal texts into their own classrooms and became aware that such texts can boost student motivation and deepen conceptual understanding. TC16 articulated this pedagogical shift with the words: "*Multimodal texts catch even my attention. I will use them in the future to capture my students' attention and facilitate understanding.*" This perspective indicates that the experience gained by the participants contributed to shaping their teacher identities and professional competence beyond just their own learning process.

The findings above demonstrate that the process-oriented writing approach positively influences the success of composing multimodal texts and enhances literacy levels.

5. Discussion and conclusion

5.1. Discussion

This study aimed to examine the effect of the process-oriented writing approach on the multimodal text writing performance of native language teacher candidates. Findings from the eight-week quasi-experimental implementation revealed that the experimental group, which received process-oriented education, showed statistically and practically significant improvements in their multimodal text writing performance, especially in the areas of "Reflecting Travel Writing Features" and "Creating a Multimodal Structure" showed substantially greater improvement in the experimental group compared to the control group (Cohen's d = 2.74). Similarly, Graham and Perin (2007) observed that structured writing interventions often produced strong effect sizes, particularly among learners whose initial writing proficiency was relatively low, which helps contextualise the magnitude of the gains found in the present study. This aligns with studies emphasising the effectiveness of the process-oriented approach in developing writing skills (Badger & White, 2000; Gu et al., 2025; Peungcharoenkun & Waluyo, 2023). The current research contributes to the literature by suggesting that this approach may offer a promising pedagogical framework not only for linguistic texts but also for multimodal texts that incorporate visual, auditory, and spatial elements. The limited availability of experimental studies investigating multiliteracies text production using the process-oriented approach, particularly within the context of the first language (L1) and teacher education (Nugraha et al., 2024), underscores the importance of these findings. The qualitative findings corroborate this pattern: participants specifically attributed their gains in genre awareness and multimodal design to the model text analysis and planning stages, which aligns with the high effect sizes observed in the corresponding sub-scales.

Examining the findings related to multimodal literacy levels, the experimental group showed a significant improvement with a medium effect size (d = .71) in the "*Meaning-Making*" sub-scale; however, no significant differences were found between the groups in the "*Self-Expression*" and "*Choice*" sub-scales. This pattern of findings suggests that the intervention, which focused on eight weeks of writing practice, primarily developed skills in understanding and interpreting multimodal content; nonetheless, longer-term interventions may be necessary to change general attitudes and preferences towards multimodal texts. Indeed, Anstey and Bull (2020) emphasise that developing multimodal literacy skills requires not only technical knowledge and skills but also the integration and internalisation of these literacy practices into daily life. For teacher candidates to adopt multimodal texts as a primary means of communication and learning, a shift in habits and preferences is needed, which is more achievable through continuous and interdisciplinary exposure than through short-term interventions. This finding aligns with studies (Andriyati et al., 2025; Yunus et al., 2022). The qualitative data offer a partial explanation for this pattern: participants noted that adapting to digital design tools required considerable time, which likely constrained the development of broader attitudinal dispositions towards multimodal texts. This is also consistent with the New London Group's (1996) view that students learn multimodal literacy by actively designing texts, not just reading them.

The qualitative aspect of the research uncovers the mechanisms behind the significant rise in success with multimodal text writing. Participants indicated that the structured stages offered by the process-genre approach, especially the model text analysis and planning stages, made the complex cognitive and design tasks involved in producing multimodal texts manageable. The model introduced by Badger and White (2000) presents teacher candidates with the social context and structural features (genre-focused aspect) of a specific genre (in this case, travel writing) while also guiding them through systematic cognitive and collaborative steps (process-oriented aspect) such as planning, drafting, peer review, and publishing. This cyclical and step-by-step structure allowed teacher candidates to effectively handle both the genre's demands (a balanced use of objective information and subjective commentary) and the technical and aesthetic challenges of multimodal design (visual-text harmony, colour-typography choices, spatial layout). This finding aligns with research indicating that the process-genre approach promotes genre awareness and creative design abilities in students (Rahimi & Zhang, 2021). These qualitative insights are also consistent with broader evidence suggesting that writing instructors' continued reliance on monomodal genres leaves students without adequate scaffolding for multimodal composition (Kessler & Casal, 2024), underscoring the value of the structured genre analysis stages implemented in the present study.

Another noteworthy point among the qualitative findings is that some participants reported difficulty using digital design tools and achieving semantic coherence across layers. This finding supports studies showing that although teacher candidates can be classified as "digital natives" based on their age group, their personal digital experiences are not sufficient for producing multimodal content for pedagogical purposes (Galindo-Domínguez & Bezanilla, 2021; Zhang et al., 2026). Prospective teachers are primarily consumers of digital content; however, they need systematic training in designing, creating, and evaluating this content for teaching purposes (Tan et al., 2023; Tour & Barnes, 2021). This situation highlights the need for intervention programmes in teacher education that go beyond focusing on "*technology use*" and aim to develop "*designing with technology*" and "*digital pedagogical competence*." Mishra and Koehler's (2006) Technological Pedagogical Content Knowledge (TPACK) framework is important in this context because teacher candidates need to integrate their technological, pedagogical, and content knowledge to create effective instructional designs (Ye et al., 2024). Notably, the "Creating a Multimodal Structure" sub-scale yielded the largest effect size in the study (d = 2.34), suggesting that the structured process-genre cycle provided the kind of scaffolded technology integration that personal digital experience alone does not appear to replicate. The findings of this research show that the process-genre approach offers a structured framework that supports this integration.

One of the key findings of the study is that preservice teachers' experience with writing process-genre-focused, multimodal texts not only enhanced their own writing skills but also increased their pedagogical awareness for future teaching practices. Participants reported that they developed concrete instructional ideas for incorporating multimodal texts into their own classrooms and gained understanding that such texts can boost student motivation. This finding aligns with studies highlighting that *"learning to teach"* in teacher education involves more than just acquiring technical skills; it also encompasses the formation of teacher identity and the development of pedagogical decision-making capacity (Tomczyk, 2024).). Preservice teachers' awareness of applying their experiences to future teaching underscores that teacher education programmes aim to develop "*reflective practitioners*" rather than "*model teachers*" (Schön, 1992). In this context, the structured stages provided by the process-genre approach enabled

preservice teachers to gain experience not only in teaching writing but also in instructional design and supporting student learning.

5.2. Conclusion

This study employed a quasi-experimental design to investigate the effect of a process-genre-focused writing approach on the multimodal text writing success of preservice native language teachers. Results from an eight-week implementation period showed that the process-genre approach-structured curriculum significantly and statistically enhanced preservice Turkish teachers' multimodal text writing performance (Cohen's d = 2.74), organised the writing process, improved their ability to interpret multimodal content (d = .71), and appeared to increase their pedagogical awareness.

The most significant contribution of the study is that it provides empirical indications that the process-genre approach may offer a promising pedagogical framework not only for linguistic texts but also for multimodal texts that incorporate visual, auditory, and spatial elements. The cyclical process, involving model text analysis, collaborative construction, and peer review, appeared to support participants in recognising the genre features of travel writing and incorporating them into their multimodal compositions. Results related to multimodal literacy levels indicated that the experimental group made notable improvements in the "Making Sense of Content" subscale with a medium effect size (d = .71), while no significant differences emerged in the "Self-Expression" and "Preference" dimensions. This suggests that the intervention primarily supported writing practice and comprehension, whereas longer-term implementations may be required to influence attitudinal dimensions. The qualitative findings further suggested that this experience supported preservice teachers in developing initial pedagogical ideas for their future teaching and may have contributed to the early formation of their teacher identities.

5.3. Delimitations

The study was intentionally confined to a single text type (travel writing) within a single institution, involving prospective Turkish language teachers at the undergraduate level. These decisions were made to ensure contextual depth and internal coherence; accordingly, the findings should be interpreted within these boundaries.

5.4. Limitations

The eight-week implementation period might not be sufficient to produce lasting changes in participants' multimodal literacy perceptions; future research should adopt longitudinal designs spanning an entire academic year to examine the sustainability of gains and transfer to actual classroom teaching. The quasi-experimental design without random assignment introduces potential threats to internal validity; future research should employ randomised controlled trials with adequate sample sizes and incorporate delayed post-tests to assess long-term retention. Multi-site studies involving diverse universities and cultural contexts would enhance generalisability and reveal how institutional factors mediate intervention effectiveness. The study did not systematically examine participants' pre-existing digital literacy competencies; given that multimodal text production relies heavily on technological proficiency, future studies should systematically assess participants' technological competence at baseline and investigate how digital literacy levels influence learning trajectories. Moreover, the multimodal literacy scale measures perceptions and preferences, whereas the rubric assesses actual writing performance; because these constructs are not identical, improvements in perceived multimodal literacy may not fully correspond to gains in performance, which represents an additional limitation. Finally, although the effect sizes observed in the study (d = 2.74 and d = 3.52) were notably high according to Cohen's (1988) classification, they should be interpreted within the particular context of the intervention. These values are likely influenced by participants' low initial levels of multimodal text writing, the three-dimensional structure of the rubric and its high reliability (CVR = .914), and the structured nature of the process-genre approach, which simultaneously supports cognitive and conceptual development. Similar trends have been noted in previous research, where structured writing interventions yielded strong effects, especially among learners with low initial abilities (Graham & Perin, 2007).

5.5. Recommendations

The findings indicate that teacher education programmes should include more activities based on multimodal texts and incorporate process-genre approaches into the curriculum. Additionally, practical courses should be designed in accordance with the TPACK framework to integrate teacher candidates' technological knowledge with their pedagogical content knowledge. In summary, this research has shown that the process-genre-focused writing approach provides an effective pedagogical framework for transforming traditional "paper-and-pencil"-focused writing instruction into the "design-focused" production processes needed in the digital age. The limited number of empirical studies on multimodal text production, especially in native language education and teacher training, underscores the contribution of this research to the literature.

CRediT authorship contribution statement

Serdar Akbulut: Writing – original draft, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Bekir Direkci:** Writing – review & editing, Validation, Supervision, Methodology, Conceptualization.

Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request, subject to ethical approval and participant consent.

Ethical approval

This research was approved by the Akdeniz University Social and Human Sciences Ethics Committee (Date: 03.03.2022, Decision No: 04/86). Written informed consent was obtained from all participants after they were informed about the purpose and process of the study. Participation was entirely voluntary, and participants were informed of their right to withdraw from the study at any time. Personal information was coded in accordance with confidentiality principles.

Ethical statement

This study was approved by the Ethics Committee for Scientific Research and Publication in Social and Human Sciences of Akdeniz University (Decision No: 86, dated 3 March 2022). Written informed consent was obtained from all participants prior to data collection, and participation was entirely voluntary. The research was conducted in accordance with the principles of the Declaration of Helsinki. The authors declare no conflicts of interest.

Declaration on the use of artificial intelligence

During the preparation of this work the authors used AI-assisted tools (Deeply) in order to support language editing and grammatical checking. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the content of the published article.

Declaration of competing interest

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

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