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To Type or To Write: The Effect of Writing Modes and Time Constraints on Students' Writing Quality

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ABSTRACT

Background: The incorporation of technology into English writing class has prompted the use of computer typing as an alternative writing mode to handwriting. However, previous studies investigating the effect of writing modes on writing quality have delivered conflicting results.

Purpose: Considering the increasing prevalence of computers in English writing classes and the time limitation commonly employed by teachers in writing courses, the present study attempts to identify the interaction effect of writing modes and time constraints on EFL students' writing quality.

Method: This study adopted a counterbalanced quantitative design; data were collected from 30 EFL undergraduate students majoring in English Education, using an adapted version of Jacobs' ESL Composition Profile. All participants were subjected to four writing conditions, based on the combination of typing using a computer or writing by hand and a 30-minute or 60-minute time allotment.

Results: The findings of the present study suggest that there is no interaction effect between writing modes and time constraints on writing quality $F(1, 116) = .086, p = .770$, and despite the higher scores obtained by the essays typed with computer, writing modes have no significant effect on writing quality $F(1, 116) = .820, p = .367$. The results also suggest that time constraints significantly affect writing quality $F(1, 116) = 14.308, p = <.001$.

Conclusion: Due to the absence of writing modes effect on writing quality, English teachers are recommended to permit both writing modes in writing essays and to provide more time for students to write, especially in a creative writing environment as opposed to an examination environment.

KEYWORDS

writing modes, time constraints, writing quality, computer typing, handwriting

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INTRODUCTION

The incorporation of technology into writing class has elevated the usage of technology as one of the factors that influence students' writing quality, including the effect of computer typing as an alternative writing mode to handwriting. The relationship between writing modes, i.e., computer typing and handwriting, on writing has been investigated by several studies. However, these studies' results are contradictory (Aberšek et al., 2018; Chen et al., 2011; Kimmons et al., 2017; Lee, 2004; Zhu et al., 2016).

Present English learning is taking place in a somewhat different setting than in the past which brought these two writing modes into a very unique rivalry. On the one hand, EFL students claim that writing by hand helps improve their concentration, especially in the drafting stage of the writing (Lund, 2016). Studies in general also suggest that students achieved better information retention, perform better in answering conceptual questions (Mueller & Oppenheimer, 2014); and able to recall more information (Aragón-Mendizábal et al., 2016; Mangen et al., 2015). On the other hand, govern-



ments as well as learning institutions started conducting paperless classrooms, in which all the books are digitalized and students use computers for their academic writing and even in answering exams (Meishar-Tal & Shonfeld, 2018; Siddiqui & Muntjir, 2017). This made an investigation into writing modes vital because a better understanding of the effect of writing modes will eventually contribute valuable empirical findings to the EFL writing body of knowledge.

Besides writing modes, other variables have also been investigated in relation to writing quality, such as writing apprehension (Daly, 1978), pre-writing planning (Amiryousefi, 2017), and time limitation (Caudery, 1990; Ghanbari et al., 2015; Kenworthy, 2006; Zare et al., 2016). In relation to writing modes, time limitation is also very important, because time limitation may influence students' writing quality. Despite the logic that more times means more chance for the students to perform, studies found that it is not always the case. A study on the effect of time pressure and peer feedback on Iranian EFL students taking Oxford Proficiency Test found that peer feedback affected students' writing while time pressure did not have any effect (Ghanbari et al., 2015), similar results were also reported by other researchers (Caudery, 1990; Knoch & Elder, 2010). These results contradict those from Zare, et al. who found that time pressure influences Iranian EFL students' writing coherence and cohesion. The study found that students exposed to time pressure, i.e., limited time to write, performed worse and applied more irrelevant sentences in their writing compared to those given normal time to write (Zare et al., 2016). This result is similar to the findings of Kenworthy, who studied Hong Kong university students and found that students with limited time produced more grammatical mistakes in their writing compared to students with normal time (Kenworthy, 2006). These results highlight the importance of time in writing, for adequate time appears to help students in producing better quality writings.

Considering the contradictory results of previous studies on the effect of writing modes and the effect of time constraints on writing quality, it is essential to conduct a study to investigate further if there is any interaction between writing modes and time constraints on students' writing quality. In particular, this study examines the following questions:

- RQ#1: Does the effect of writing modes on students' writing quality depend on time constraint and vice versa?
- RQ#2: Do writing modes affect students' writing quality?
- RQ#3: Do time constraints affect students' writing quality?
- RQ#4: Do the writing modes and time constraints affect the essay length?

LITERATURE REVIEW

Writing with Computer

The advancement of technology especially Information and Communication Technology, has elevated writing skill into a prominent place in human communication. Writing is not just an ordinary skill to be taken for granted but an essential one for life (Graham & Perin, 2007). Therefore, good writing skill must be fostered by the students and prompted by the teachers since writing is a skill that must be learned and can only be mastered under instruction (Brown, 2001). The teaching of writing develops hand in hand with the development of technology, as can be seen from the use of numerous technological tools, software, and applications in teaching writing ranging from the use of word processors (Bangert-Drowns, 1993; Michael Reed, 1996; Sullivan & Pratt, 1996), weblog or blog (Arslan & Şahin-Kizil, 2010; Drexler et al., 2007; Ducate & Lomicka, 2008), Facebook (Altakhaineh & Al-Jallad, 2018; Altunkaya & Topuzkanamış, 2018; Ibrahim et al., 2018) into the latest digital tools to help improve students writing quality (Ivanova et al., 2022; Kaur et al., 2023; Maghsoudi et al., 2022).

One of the most significant changes brought to writing by technology, however, is the use of computers as an alternative writing mode to handwriting. The development of computers has permeated all walks of life, including education. Computers are now a common sight in learning and are being used to replace writing by hand when taking notes, tests, and writing assignments. Governments started conducting paperless classrooms, in which all the books are digitalized and students use computers for their academic writing and even in answering exams (Meishar-Tal & Shonfeld, 2018).

The introduction of computers has enabled writers and students to produce writing in a considerably easier way. Computer permits more flexibility into the writing process compared to writing by hand. Across the phases of writing, prewriting, composing, and revising, computer enables the changing of structure and ideas. It also provides students with additional tools such as spelling-checker and grammar-checker (Ulusoy, 2006). Scholars has lauded the use of computer in writing, considering it to have changed the way people write which in turn changed the way English teacher teach writing (Ivanova et al., 2022; Williams & Beam, 2019).

Despite MacArthur's opinion on the strength of computer writing, studies on the effect of writing modes, i.e., handwriting and computer, are inconclusive. Some scholars found that computer helps improve students' writing; meanwhile, other scholars found that handwriting improves students' writing. Nineteen Norwegian EFL teacher training students were interviewed about their learning preferences in terms of writing modes. All of the students interviewed contended that they prefer to write by hand compared to

computers. The students claimed that writing by hand helps them concentrate and eventually affected their learning retention. Several students also claimed that writing prompts their creativity in learning, stating that their concentration during writing improves their flow of ideas, especially during the drafting stage of the writing (Lund, 2016). Lund concluded that handwriting is an essential tool in ELT learning, she also underlined the need to conduct further study in the affordances of different writing technology in ELT learning.

Typing vs Handwriting across Studies

A study on adults of 16 years and older in the United States of America who were taking functional writing assessments found that test takers who wrote by hand produced higher quality essays than test takers who typed with computers. Furthermore, the test takers who used computers also produced similar length of essays compared to the handwriting group. The study suggests that writing using computer may have given additional burden to the test takers considering that they took more time to answer a writing task compared to the handwriting group (Chen et al., 2011). Meanwhile, in a writing scientific texts study conducted on Slovenian six-grade students showed that despite the fact that typing produces more words than handwriting in the same amount of time, handwritten texts were found to have more information, more terminological accuracy, and, in general, more understanding of the interconnection between listed information in the text (Aberšek et al., 2018). Writing by hand is also found to produce better essays and obtain higher writing scores compared to typed essays. Students who wrote their essays by hand obtained higher writing scores in the dimensions of Ideas and Content, Linguistics expression, and Cohesion and coherence in writing (Zhu et al., 2016).

More interesting findings were reported by Wrigley (2017), who found that handwriting plays an important role in fostering students' creative paraphrasing of the information that they collected from the source text, as compared to students who type their assignments. His observation found that students who wrote their summaries produced more original content compared to those who typed their summaries due to a process of reconstructing a coherent text based on the source text. He observed that students who typed employed copy and paste technique and changed words and phrases here and there to produce his or her version of the text. On the other hand, students who write frequently stop halfway in writing a sentence and then ponder on how they best continue with the sentence. Wrigley contended that the students who write try to reformulate the information they have and create a fresh piece of writing (Wrigley, 2017).

Despite the results of studies that tend to champion handwriting as a better way to produce a piece of writing, other studies have found that writing using computer seems to produce better essay since students who type their es-

says using computers were found to have less grammatical mistakes, use more unique words, and eventually produce more advanced essays (Kimmons et al., 2017). In his study, Kimmons studied the essay written by students from 3 schools in the Northwestern states of the USA and found that students writing their essays with Chromebook produced higher grade-level of writing and less spelling errors, although the lower number of spelling errors may have to be attributed to the spelling checker feature of the Chromebook (Kimmons et al., 2017).

Writing using computer also seems to enable students to achieve higher writing scores in the dimensions of Ideas and Content, Linguistics expression, and Cohesion and coherence in writing (Zhu et al., 2016). In their study of 32 undergraduate students learning Chinese as a Foreign Language (CFL), they found that students who type their essay were more confident when writing using computer and that the computer assist them in writing their essay by providing alternative Chinese characters for the words they are looking for. Furthermore, students typing their essay also commented that their essay look more professional when typed rather than when written by hand. Nevertheless, we must take into account that some the results of this study were based on writing and typing essays in Chinese characters, not in English and using English alphabets (Zhu et al., 2016).

The results of a 2004 study on 42 international students taking ESL Placement Tests (EPT) at the University of Illinois at Urbana-Champaign showed the advantage of using computer in writing essay (Lee, 2004). When compared to students with handwritten essay, students with computer typed essays obtained higher scores in all the writing dimensions measured which includes organization, content, use of sources, and linguistic expressions (Lee, 2004). Another interesting finding of this study is that the raters of the essays awarded higher scores to the computer-transcribed version of an essay than the original handwritten version. The study also found that students who are accustomed to typing prefer to write using computer and cited the difficulty in editing and correcting their writing when writing by hand (Lee, 2004).

The above studies provide a picture of the conflicting landscape writing modes and writing quality. Today's writing environment tends to promote computer writing; people are more accustomed to typing than writing by hand. Instant messages, social media posts, and even letters in the form of emails are now typed. Official forms are also increasingly available in digital forms; exams are even held in a computerized environment. This situation tends to push people into computer typing, and young learners use computers from a very early age. Thus, knowing the effect of writing modes on writing quality is becoming more critical now than ever. A deeper and better understanding of this will allow English teachers to present a better learning environment for their students, especially in essay writing.

METHOD

Participants

This research involved 30 EFL university students from a state university in Indonesia who were selected based on their writing experience. The students have passed three writing courses in their undergraduate English Education program at their university and are currently enrolled in their fourth writing course. Based on their previous writing experience and a review of the previous courses' syllabuses, we assume that they are familiar with writing argumentative essays as warranted by the writing prompt used herein.

Instruments

The data on students' writing quality were obtained using an adapted version of Jacobs' ESL Composition Profile (Boardman & Frydenberg, 2008), composed of five dimensions: Content, Organization, Language Use, Vocabulary, and Mechanics. The writing prompt used in the present study instructed the participants to write a 300-word argumentative essay based on the topic provided. The prompts also guide the participants to write in at least three paragraphs. The first paragraph introduces the writer's view of the topic and mentions the participants' reasons in brief. The second paragraph should elaborate on the reasons supporting the writer's view as presented in the first paragraph. The third paragraph should restate the writer's view and summarize the supporting reasons. The prompts were first piloted and administered to a different class of 25 students from the

same university, department, and semester with the participants. The participants of the prompt pilot were asked to provide inputs to improve the prompt's clarity. 25 essays of the resulting essays from the pilot were taken in random, scored by the raters and said scores were used to establish the Inter-rater Correlation Coefficient

Data Collection Procedure

Using a counterbalanced design, every participant was instructed to write four 300-word argumentative essays using two different writing modes, computer and handwriting, under two different time constraints of 30 minutes and 60 minutes. Each participant wrote four argumentative essays on the topics of "E-mail vs Telephone", "The Impact of Instant Food", "Indonesians' Dependence on Motorcycle", and "Indoor or Outdoor Sports?". The data were obtained in two meetings, as presented in Table 1. In each meeting, the data were taken during their scheduled Scientific Writing class, and the participants were told beforehand that the result of their writing would not, in any way, affect their final grade for the Scientific Writing class.

The participants willingly and voluntarily agreed to participate in the study. The participants were first divided into two groups according to their ID number, as presented in Table 1. Each group then wrote an essay based on the data collection design, using one writing mode under one-time constraint. After completing the first part of the essay writing, the participants were given a 15-minute break and then continued to write the next essay. The second meeting was held the following week, following a similar design

Table 1

Data Collection Design

| | | Modes of Writing | | Essay Topic |
|-----------------|---------|-----------------------|-----------------------|-------------|
| | | Computer Mode | Handwriting Mode | |
| Time Constraint | 60 Mins | Students Number 01-17 | Students Number 18-34 | 1 |
| | 30 Mins | Students Number 18-34 | Students Number 01-17 | 2 |
| | 30 Mins | Students Number 01-17 | Students Number 18-34 | 3 |
| | 60 Mins | Students Number 18-34 | Students Number 01-17 | 4 |

Table 2

Descriptive Statistics of Each Writing Group

| Writing Group | N | Mean | Std. Deviation |
|---------------|----|-------|----------------|
| H60 | 30 | 76.30 | 7.22 |
| H30 | 30 | 71.93 | 7.25 |
| C60 | 30 | 77.80 | 6.09 |
| C30 | 30 | 72.70 | 6.77 |

but reversing the time and mode conditions to account for prompt and order. By the end of the second meeting, the participants were asked to fill out a form with their identity and other necessary contact information.

Data Analysis

The total number of essays collected from the participants was 120. These essays were then rated by two independent raters. Both raters were university English teachers, teaching in English Education Departments with at least ten years of teaching experience. Both raters were teachers of Writing courses and are familiar and proficient in rating with Jacobs' ESL Composition Profile, and with high Intraclass Correlation Coefficient of .883, $p=.000$. The data obtained from each writing modes and time constraints condition were analyzed using two-way ANOVA to determine the interaction effect of the variables under investigation as well identifying the effect of each independent variable on students' writing quality.

RESULTS

Before investigating the interaction effect of Writing Modes and Time Constraints on students' Writing Quality, the data were first analyzed descriptively, as presented in Table 2.

From the data in Table 2 we can identify that, descriptively speaking, the highest writing quality score mean is obtained by the Computer 60 minutes group ($M=77.80$, $SD= 6.09$), followed by Handwriting 60 Minutes ($M=76.30$, $SD=7.22$), and then Computer 30 Minutes ($M=72.70$, $SD=6.77$), and finally Handwriting 30 Minutes ($M=71.93$, $SD=7.25$). A further breakdown of the mean scores across the dimensions of writing quality is presented in Table 3.

After determining that the data were homogeneous (the P-value on the Levene's Test was .461), the data were tested to see if they fulfill the assumption of normality. It was found that the data were normally distributed for all groups, except for the Computer 30 Minutes the p-value of the Kolmogorov-Smirnov was 0.01. Nevertheless, since two-way

ANOVA is considered robust against violation of the assumption of normality especially when the sample sizes are equal (Barkaoui & Knouzi, 2018; Field, 2013; Tabachnick & Fidell, 2014)The data were analyzed using two-way ANOVA, and the results are presented in Table 4.

The statistical analysis shows that for the interaction effect of writing modes and time constraints on students' writing quality, the F-value is $F(1, 116) = .086$, $p = .770$. This result implies that there is no statistically significant interaction effect between writing modes and time constraints on students' writing quality. Meanwhile, the F-value for the main effect of writing modes on students' writing quality was $F(1, 116) = .820$, $p = .367$, this means that the F-value is not statistically significant. This result suggests that there is no statistically significant effect of writing modes on students' writing quality. As for the effect of time constraints on students' writing quality the F-value was $F(1, 116) = 14.308$, $p = <.001$ the F-value is statistically significant. This means time constraints have a statistically significant effect on students' writing quality.

The present study also found that the means of word count of the essay written in 30 minutes time in any writing modes were less than the required 300 words by the writing prompt. The means of word count were 219 and 272 for computer-typed essays and handwritten essays, respectively. Of the 30 handwritten essays written in 30 minutes, only three essays (10%) have more than 300 words, 15 (50%) have between 200 to 299 words, and 12 (40%) of these essays were even below 200 words. Meanwhile, from 30 of the computer-typed essays written in 30 minutes time, 12 (40%) essays had more than 300 words, 14 (46.67%) had between 200 to 299 words, and 4 (13%) were below 200 words. When compared to the number of words in the essay produced in 60 minutes time, the difference is clear. Of the 30 handwritten essays written in 60 minutes, 22 (73.33 %) essays had more than 300 words, with 8 (23.67%) essays had less than 300 words, but none of the essays fell below 200 words. Interestingly, from the 30 computer-typed essays written in 60 minutes time, 21 (70%) essays had more than 300 words, 7 (23.33%) had between 200 to 299 words, and 2 (6.67%) were below 200 words.

Table 3

Mean Scores Comparison Across Dimensions of Writing Quality

| No | Dimension | H60 | H30 | C60 | C30 |
|----|--------------|-------|-------|-------|-------|
| 1 | Content | 19.77 | 18.63 | 20.17 | 18.37 |
| 2 | Organization | 19.50 | 18.13 | 20.00 | 18.30 |
| 3 | Language Use | 18.60 | 17.70 | 19.23 | 18.07 |
| 4 | Vocabulary | 10.43 | 9.77 | 10.07 | 9.67 |
| 5 | Mechanics | 8.00 | 7.70 | 8.33 | 8.30 |
| 6 | Word Count | 329 | 220 | 342 | 272 |

Table 4
ANOVA Results

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared |
|-------------------------------|-------------------------|-----|-------------|-----------|------|---------------------|
| Corrected Model | 714.700 ^a | 3 | 238.233 | 5.071 | .002 | .116 |
| Intercept | 669312.033 | 1 | 669312.033 | 14247.825 | .000 | .992 |
| Writingmodes | 38.533 | 1 | 38.533 | .820 | .367 | .007 |
| TimeConstraint | 672.133 | 1 | 672.133 | 14.308 | .000 | .110 |
| Writingmodes * TimeConstraint | 4.033 | 1 | 4.033 | .086 | .770 | .001 |
| Error | 5449.267 | 116 | 46.976 | | | |
| Total | 675476.000 | 120 | | | | |
| Corrected Total | 6163.967 | 119 | | | | |

Table 5
Word Count Percentage Across Time and Writing Mode

| Mode and Time | Word Count Percentage | | | Word Count Average |
|---------------|-----------------------|---------|-------|--------------------|
| | <200 | 200-299 | >300 | |
| H60 | - | 26.67 | 73.33 | 329 |
| C60 | 6.67 | 23.33 | 70.00 | 342 |
| H30 | 40 | 50 | 10 | 220 |
| C30 | 13.33 | 46.67 | 40.00 | 272 |

DISCUSSION

The present study aimed to explore the effects of writing modes and time constraints on students' writing quality, both independently and in interaction. Previous research has yielded mixed findings on whether computer-typed writing offers advantages over handwriting, particularly in time-pressured environments. By analyzing various dimensions of writing, such as content, coherence, mechanics, and vocabulary, this study provides new insights into how these factors influence writing outcomes. In the following discussion, we examine the independent effects of writing modes and time constraints, delve into the specific areas where each has an impact, and consider the broader implications for teaching and assessment in EFL contexts.

Interaction between Writing Modes and Time Constraints

The study found no statistically significant interaction effect between writing modes and time constraints on students' writing quality. This suggests that the impact of writing modes and time constraints on students' performance operated independently, without reinforcing or diminishing each other's effect. This result aligns with Lovett et al. (2010), who

similarly found no interaction between time allocation and writing modes in writing performance despite differences in the time frames used. In our study, we compared 30 and 60 minutes, while Lovett explored shorter spans (10 and 15 minutes). Even with more significant time differences in this study, the lack of interaction remained consistent, reinforcing the conclusion that writing modes and time constraints independently shape writing outcomes.

Unlike earlier studies, our findings emphasize that increased time allocations do not create a dependency between writing mode and writing quality. This contradicts previous claims that technology might amplify performance under time pressure by increasing the speed and ease of writing (Kimmons et al., 2017). Thus, the general contribution of this study lies in confirming that while computer use and time matter independently, they do not interact synergistically.

Impact of Writing Modes on Writing Quality

The study found no significant main effect of writing modes on students' overall writing quality ($p = .367$). Although computer-typed essays achieved higher mean scores than handwritten essays in several writing dimensions (content, coherence, and mechanics), the differences were statistical-

ly insignificant. This outcome challenges the assumptions from earlier research, such as Zhu et al. (2016), which suggested that typing improves writing performance. The present results indicate that while computer typing offers specific advantages—such as ease of editing, rearranging ideas, and automatic correction tools—these advantages do not necessarily translate into significantly higher writing quality.

An interesting finding is the use of more varied vocabulary in handwritten essays. Students writing by hand tended to use a broader range of words and more creatively rephrased ideas. This contrasts with computer-written essays, where students frequently reused words, likely due to the ease of copy-paste functionality. This finding resonates with previous studies' findings, which found that writing by hand can deepen cognitive engagement, leading to better word choice and paraphrasing (Mueller & Oppenheimer, 2014; Wrigley, 2017).

In contrast to previous studies that argue for the superior benefits of one mode i.e. handwriting (Aberšek et al., 2018; Aragón-Mendizábal et al., 2016; Chen et al., 2011; Lund, 2016; Mueller & Oppenheimer, 2014; Zhu et al., 2016) and computer typing (Kimmons et al., 2017; Lee, 2004; MacArthur, 1988), the present study shows that both modes offer unique advantages and limitations. Computer-based writing improves speed and structure but may encourage word repetition, while handwriting enhances creativity but is more time-consuming. Therefore, it is important for educators to balance these benefits by allowing students the freedom to choose their preferred writing mode.

The Role of Time Constraints on Writing Quality

The study further revealed that time constraints significantly affected writing quality, regardless of the writing mode. Students produced better quality essays when given more time (60 minutes) compared to shorter periods (30 minutes). This finding is consistent with earlier studies (Kenworthy, 2006; Powers & Fowles, 1996; Zare et al., 2016), which emphasized that extended writing time allows students to plan, revise, and improve their essays, resulting in fewer grammatical errors and higher overall scores (Na & Yoon, 2016).

Interestingly, the findings indicate that time pressure negatively impacts students' strategies. Participants given 30 minutes were more likely to write without planning, leading to stalled progress midway through the task. On the other hand, students given 60 minutes exhibited more deliberate writing behaviors, including time for reflection and revision. These observations align with Wrigley (2017), who reported that students tend to pause and mentally organize ideas before starting their writing under relaxed time constraints.

Our results further highlight the importance of providing sufficient time for students to demonstrate their full writing

potential. While timed assessments are useful for evaluating writing under pressure, ample writing time fosters creativity and allows students to engage more deeply with the writing process.

Impact of Time Constraints on Essay Length

The study also examined the relationship between time constraints and the length of essays. The findings show that students produced longer essays with higher word counts when given more time, regardless of the writing mode. In 60-minute sessions, students produced longer essays, with fewer short essays under 200 words. This finding contrasts with Lovett et al. (2010), who suggested that increased time allocation benefits students using computers more than those writing by hand. In the present study, students with handwritten essays also benefited significantly from additional time, suggesting that both writing modes require adequate time to achieve optimal results.

The findings further suggest that in terms of vocabulary, computer writing consistently yields lower scores than handwriting under the same time constraints. The vocabulary assessment focuses on range, word choice, idiom usage, appropriate register, and mastery of word forms (Boardman & Frydenberg, 2008; Winke & Lim, 2015). Repeated use of the same phrases is penalized, which might explain why handwriting students, who find it harder to rewrite sentences, were forced to be more creative and express their ideas in different ways. While computer users may write more words in less time, this does not always correlate with better essay quality. Therefore, strict word count requirements may be unfair to handwriting students, and time should be allocated to allow creative expression. Alternatively, assessments might focus more on quality rather than quantity.

In the EFL context, the results indicate that computers offer no significant advantage over handwriting. Providing students the choice of writing mode does not give them an unfair edge. As we move toward a digital age (Meishar-Tal & Shonfeld, 2018; Siddiqui & Muntjir, 2017), these findings suggest that EFL classes should allow flexibility in writing modes and offer ample time for students to develop their writing skills, especially in learning rather than testing environments.

CONCLUSION

The present study demonstrates that while writing modes do not have a statistically significant effect on students' overall writing quality, a deeper analysis of individual dimensions reveals that computer-typed essays scored higher than handwritten ones in four out of five dimensions. This suggests that computers can play a supporting role in enhancing students' writing quality. However, the results also show that neither mode offers an unfair advantage over the

other. This confirms that students, whether writing by hand or typing, perform comparably, reinforcing the notion that writing mode alone does not determine writing outcomes.

The study emphasizes the importance of time allocation in writing performance, showing that more time improves both the quality and quantity of writing, regardless of the mode. Sufficient time allows students to develop ideas more fully, enhancing their performance. EFL teachers should integrate technology, like computers, to support writing, rather than restrict students to handwriting. Allowing students to choose their preferred writing mode promotes engagement and fairness in assessment. Students must be given enough time to write to truly develop their writing and showcase their writing ability. Time allocation should also be considered wisely in writing assessment setting based on the same reason.

The present study's limitations, including specific time frames and a small sample size, suggest that future research should consider broader time constraints, additional dimensions like creativity, and larger sample sizes for more generalizable results.

Future research should explore additional variables that may moderate the effect of writing modes on performance, such as gender, essay genres, and specific writing conditions. The current study showed that time constraints have

a significant impact on writing performance, but more research is needed to determine how these effects vary under different contexts. Furthermore, investigating students' writing mode preferences and their impact on performance could yield insights into whether allowing students to use their preferred methods improves writing quality.

DECLARATION OF COMPETING INTEREST

None declared.

AUTHOR CONTRIBUTIONS

I Gusti Ngurah Agung Wijaya Mahardika: conceptualization; data curation; formal analysis; funding acquisition; investigation; methodology; project administration; resources; software; supervision; validation; visualization; writing – original draft; writing – review & editing.

IGA Lokita Purnamika Utami: conceptualization; data curation; formal analysis; funding acquisition; investigation; methodology; project administration; resources; software; validation; visualization; writing – original draft.

REFERENCES

- Aberšek, M. K., Aberšek, B., & Flogie, A. (2018). Writing versus typing during science teaching: Case study in Slovenia. *Journal of Baltic Science Education*, 17, 84–96. <http://dx.doi.org/10.33225/jbse/18.17.84>
- Altakhaineh, A. R. M., & Al-Jallad, M. Z. (2018). The use of twitter and facebook in teaching mechanics of writing to Arabic-speaking EFL learners. *International Journal of Emerging Technologies in Learning*, 13(9), 4–14. <https://doi.org/10.3991/ijet.v13i09.8457>
- Altunkaya, H., & Topuzkanamış, E. (2018). The effect of using facebook in writing education on writing achievement, attitude, anxiety and self-efficacy perception. *Universal Journal of Educational Research*, 6(10), 2133–2142. <https://doi.org/10.13189/ujer.2018.061010>
- Amiryousefi, M. (2017). The differential effects of collaborative vs. individual prewriting planning on computer-mediated L2 writing: transferability of task-based linguistic skills in focus. *Computer Assisted Language Learning*, 30(8), 766–786. <https://doi.org/10.1080/09588221.2017.1360361>
- Aragón-Mendizábal, E., Delgado-Casas, C., Navarro-Guzmán, J. I., Menacho-Jiménez, I., & Romero-Oliva, M. F. (2016). A comparative study of handwriting and computer typing in note-taking by university students [Análisis comparativo entre escritura manual y electrónica en la toma de apuntes de estudiantes universitarios]. *Comunicar*, 24(48), 101–107. <https://doi.org/10.3916/C48-2016-10>
- Arslan, R. Ş., & Şahin-Kizil, A. (2010). How can the use of blog software facilitate the writing process of English language learners? *Computer Assisted Language Learning*, 23(3), 183–197. <https://doi.org/10.1080/09588221.2010.486575>
- Bangert-Drowns, R. L. (1993). The word processor as an instructional tool: a meta-analysis of word processing in writing instruction. *Review of Educational Research*, 63(1), 69–93. <https://doi.org/10.3102/00346543063001069>
- Barkaoui, K., & Knouzi, I. (2018). The effects of writing mode and computer ability on L2 test-takers' essay characteristics and scores. *Assessing Writing*, September 2017, 0–1. <https://doi.org/10.1016/j.asw.2018.02.005>
- Boardman, C. A., & Frydenberg, J. (2008). *Writing to communicate 2: Paragraphs and essays* (3rd ed.). Pearson Longman. <https://doi.org/10.1097/00005721-199203000-00001>

- Brown, H. D. (2001). *Teaching by principles* (2nd ed.). Longman.
- Caudery, T. (1990). The validity of timed essay tests in the assessment of writing skills. *ELT Journal*, 44(2), 122–131. <https://doi.org/10.1093/elt/44.2.122>
- Chen, J., White, S., McCloskey, M., Soroui, J., & Chun, Y. (2011). Effects of computer versus paper administration of an adult functional writing assessment. *Assessing Writing*, 16(1), 49–71. <https://doi.org/10.1016/j.asw.2010.11.001>
- Daly, J. A. (1978). Writing apprehension and writing competency. *The Journal of Educational Research*, 72(1), 10–14. <https://doi.org/10.1080/00220671.1978.10885110>
- Drexler, W., Dawson, K., & Ferdig, R. E. (2007). Collaborative blogging as a means to develop elementary expository writing skills. *View Publication Stats Electronic Journal for the Integration of Technology in Education*, 6, 140–160.
- Ducate, L. C., & Lomicka, L. L. (2008). Adventures in the blogosphere: From blog readers to blog writers. *Computer Assisted Language Learning*, 21(1), 9–28. <https://doi.org/10.1080/09588220701865474>
- Field, A. (2013). *Discovering statistics using IBM SPSS Statistics* (4th ed.). Sage.
- Ghanbari, N., Karampourchangi, A., & Shamsaddini, M. R. (2015). An exploration of the effect of time pressure and peer feedback on the Iranian EFL students' writing performance. *Theory and Practice in Language Studies*, 5(11), 2251. <https://doi.org/10.17507/tpls.0511.08>
- Graham, S., & Perin, D. (2007). Effective strategies to improve writing of adolescents in middle and high schools. In *A report to Carnegie corporation of New York*. Alliance for Excellent Education.
- Ibrahim, S., Sharina, S., Md Tahir, N., & Primsuwan, P. (2018). Promoting learners' autonomy by using facebook to enhance students' writing skill. *Journal of Creative Practices in Language Learning and Teaching*, 6, 56–68.
- Ivanova, M., Arupova, N., & Mekeko, N. (2022). Digital support for teaching punctuation in academic writing in English. *Journal of Language and Education*, 8(3), 81–96. <https://doi.org/10.17323/jle.2022.13608>
- Kaur, D. J., Saraswat, N., & Alvi, I. (2023). Technology-enabled language learning: Mediating role of collaborative learning. *Journal of Language and Education*, 9(1), 89–101. <https://doi.org/10.17323/JLE.2023.12359>
- Kenworthy, R. (2006). Timed versus at-home assessment tests: Does time affect the quality of second language learners' written compositions? *Tesl-Ej*, 10(1), 1–10.
- Kimmons, R., Darragh, J. J., Haruch, A., & Clark, B. (2017). Essay composition across media: A quantitative comparison of 8th grade student essays composed with paper vs. chromebooks. *Computers and Composition*, 44, 13–26. <https://doi.org/10.1016/j.compcom.2017.03.001>
- Knoch, U., & Elder, C. (2010). Validity and fairness implications of varying time conditions on a diagnostic test of academic English writing proficiency. *System*, 38(1), 63–74. <https://doi.org/10.1016/j.system.2009.12.006>
- Lee, H. K. (2004). A comparative study of ESL writers' performance in a paper-based and a computer-delivered writing test. *Assessing Writing*, 9(1), 4–26. <https://doi.org/10.1016/j.asw.2004.01.001>
- Lovett, B. J., Lewandowski, L. J., Berger, C., & Gathje, R. A. (2010). Effects of response mode and time allotment on college students' writing. *Journal of College Reading and Learning*, 40(2), 64–79. <https://doi.org/10.1080/10790195.2010.10850331>
- Lund, R. E. (2016). Handwriting as a tool for learning in ELT. *ELT Journal*, 70(1), 48–56. <https://doi.org/10.1093/elt/ccv048>
- MacArthur, C. A. (1988). The impact of computer on the writing process. *Exceptional Children*, 54(6), 536–542. <https://doi.org/10.2307/2552790>
- Maghsoudi, N., Golshan, M., & Naeimi, A. (2022). Integrating digital multimodal composition into EFL writing instruction. *Journal of Language and Education*, 8(1), 84–99. <https://doi.org/10.17323/jle.2022.12021>
- Mangen, A., Andal, L. G., Oxborough, G. H., & Bronnick, K. (2015). Handwriting versus keyboard writing: Effect on word recall. *Journal of Writing Research*, 7(2), 227–247. <https://doi.org/10.17239/jowr-2015.07.02.1>
- Meishar-Tal, H., & Shonfeld, M. (2018). Students' writing and reading preferences in a paperless classroom. *Interactive Learning Environments*, 27(7), 908–918. <https://doi.org/10.1080/10494820.2018.1504306>
- Michael Reed, W. (1996). Assessing the Impact of Computer-Based Writing Instruction. *Journal of Research on Computing in Education*, 28(4), 418–437. <https://doi.org/10.1080/08886504.1996.10782176>
- Mueller, P. A., & Oppenheimer, D. M. (2014). The pen is mightier than the keyboard: Advantages of longhand over laptop note taking. *Psychological Science*, 25(6), 1159–1168. <https://doi.org/10.1177/0956797614524581>
- Na, S., & Yoon, H. (2016). Effects of in-class and out-of-class writing assignments on L2 writing strategy use and writing quality. *The Asia-Pacific Education Researcher*, 25(2), 195–205. <https://doi.org/10.1007/s40299-015-0250-5>

- Powers, D. E., & Fowles, M. E. (1996). Effects of applying different time limits to a proposed GRE writing test. *Journal of Educational Measurement*, 33(4), 433–452. <https://doi.org/10.1111/j.1745-3984.1996.tb00500.x>
- Siddiqui, A. T., & Muntjir, M. (2017). An approach to smart study using pen and paper learning. *International Journal of Emerging Technologies in Learning*, 12(05), 117. <https://doi.org/10.3991/ijet.v12i05.6798>
- Sullivan, N., & Pratt, E. (1996). A comparative study of two ESL writing environments: A computer-assisted classroom and a traditional oral classroom. *Science*, 29(4), 491–501. [https://doi.org/10.1016/S0346-251X\(96\)00044-9](https://doi.org/10.1016/S0346-251X(96)00044-9)
- Tabachnick, B. G., & Fidell, L. S. (2014). *Using multivariate statistics* (6th ed.). Pearson.
- Ulusoy, M. (2006). The role of computers in writing process. *The Turkish Online Journal of Educational Technology*, 5(4), 58–66. [https://doi.org/10.1016/S0924-9338\(97\)80221-0](https://doi.org/10.1016/S0924-9338(97)80221-0)
- Williams, C., & Beam, S. (2019). Technology and writing: Review of research. *Computers and Education*, 128, 227–242. <https://doi.org/10.1016/j.compedu.2018.09.024>
- Winke, P., & Lim, H. (2015). ESL essay raters' cognitive processes in applying the Jacobs et al. rubric: An eye-movement study. *Assessing Writing*, 25, 37–53. <https://doi.org/10.1016/j.asw.2015.05.002>
- Wrigley, S. (2017). Avoiding 'de-plagiarism': Exploring the affordances of handwriting in the essay-writing process. *Active Learning in Higher Education*, 1(13), 146978741773561. <https://doi.org/10.1177/1469787417735611>
- Zare, M., Mohazabieh, S., & Kamali, Z. (2016). The effects of time constraints on the unity and coherence of IELTS candidates' writing skills. *ELT Voices - International Journal for Teachers of English*, 31(6), 24–31.
- Zhu, Y., Mark Shum, S.-K., Brian Tse, S.-K., & Liu, J. J. (2016). Word-processor or pencil-and-paper? A comparison of students' writing in Chinese as a foreign language. *Computer Assisted Language Learning*, 29(3), 596–617. <https://doi.org/10.1080/09588221.2014.1000932>