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# The Metaphor of AI in Writing in English: A Reflection on EFL Learners' Motivation to Write, Enjoyment of Writing, Academic Buoyancy, and Academic Success in Writing

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Article abstract

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# The Metaphor of AI in Writing in English: A Reflection on EFL Learners' Motivation to Write, Enjoyment of Writing, Academic Buoyancy, and Academic Success in Writing

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## Abstract

Several barriers hinder students from producing clear and impactful written work. Writing assignments are often given on an individual basis, similar to homework, and without any assistance. Students in a classroom context have access to both their classmates and the teacher while they are working in groups or pairs as part of their assignments. The majority of students, however, are clueless about how to begin their homework assignments. The introduction of artificial intelligence in education may help solve this problem. The current research intended to demonstrate the effects of employing automated writing evaluation (AWE) in fostering learners' writing skills, motivation to write, enjoyment of writing, and academic buoyancy in open and distributed English as a foreign language (EFL) learning. The participants were 86 intermediate EFL students from China. The participants in the experimental group ($n = 44$) received instruction and feedback from their teachers only; participants in the control group ($n = 42$) were exposed to their teachers' instruction as well as AWE. The results of data analysis via one-way multivariate analysis of variance indicated that the participants in the experimental group outperformed their peers in the control group in motivation to write, enjoyment in writing, academic buoyancy, and academic success in writing. Further in-depth discussions proceed regarding the implications of the study.

*Keywords*: artificial intelligence, motivation to write, enjoyment in writing, academic buoyancy, academic success in writing, automated writing evaluation, open and distributed learning

# Introduction

Learning a language and expressing oneself in writing are two of the most important aspects of education (Jin, 2023; Sun & Wang, 2020). Students' intellectual and personal development are both aided by efforts to improve their writing skills. Teaching students to feel positive emotions while they write is an excellent way to improve their writing abilities (Richards, 2022; White & Arndt, 1991). Therefore, more research is needed on students' positive emotions in second- and first-language writing courses, along with the development of innovative methods to assess students' positive emotions, such as enthusiasm, toward writing.

In the field of artificial intelligence (AI)-integrated writing, AI generates automated writing using a variety of techniques, such as machine learning, deep learning, and neural networks. AI is specifically engineered to use these identified habits and frameworks to produce new content that adheres to a particular approach or tone. Regretfully, not much research has been done on AI in language instruction, and studies that have been done have only just started to pinpoint important areas that need more focus. Consequently, it is critical to investigate the potential applications of AI further to determine how it may be used in the teaching of practical language skills. It is also critical to consider how students may benefit from the real-time feedback provided by AI algorithms in achieving their language learning goals, as well as how various forms of feedback might enhance students' computer and mobile self-study. The advantages of using AI to improve writing skills in language learning environments are examined in this study.

Automated writing evaluation (AWE) uses a Web-based platform to offer rapid evaluation and constructive feedback on student-submitted written assignments (Tang & Wu, 2017). When teachers include AWE in their writing instruction, they have the potential to speed up the evaluation process without increasing their workload. An AWE system allows students to submit their written work and receive comments, anytime and anywhere, without human assistance (Liao, 2016). However, the successful implementation of any technological system depends on a thorough understanding of the user approval processes (Davis, 1989). An analysis of the literature revealed that previous studies on AWE primarily focused on its inter-rater reliability as evaluated by human graders (Cao, 2020; Mohsen & Abdulaziz, 2019; Zhai & Ma, 2022) and validation frameworks (Chapelle et al., 2015; Lang et al., 2019). To our knowledge, only one empirical study has specifically examined the individual traits that influence learners' inclination to use AWE (R. Li et al., 2019; Zhai & Ma, 2022). Using AWE may impact the way students think and feel.

Motivation is essential for a student's psychological health and is acknowledged as a key aspect that impacts their success in learning a second or foreign language. This concept focuses on how learners are drawn to academic subjects, influencing their behavior, attitudes toward learning, and responses to challenges. In this regard, Mo (2012) discovered that English writing issues may be remedied by increasing students' interest in and participation in writing courses that emphasize writing exercises. It is worth highlighting that the major hypothesis in understanding motivation is self-determination theory (SDT), developed by Ryan and Deci (2000). SDT posited three fundamental elements of motivation: (a) inherent motivation, (b) external motivation, and (c) lack of motivation.

Within the field of motivation, it was shown that students' ability to write improved when they were allowed to pursue their own intrinsic desires in the context of academic writing classes (LaSalle, 2015). Lo and

Hyland (2007) looked at how students' writing improved when they were motivated to write. Students' interest in the subjects being written about increases motivation, which in turn enhances writing success, particularly for students who were previously performing inadequately. Other studies examined the influence of motivation on the usage of writing methods (e.g., Lee & Wong, 2014; Nasihah & Cahyono, 2017). However, research has not specifically focused on motivation in writing. Therefore, the goal of this research was to look at the link between EFL learners' motivation to write and their writing skills, particularly when they use AI in their writing.

Additionally, this study focuses on academic buoyancy, which is another student-related issue. Academic buoyancy originates from the field of positive psychology (Xu & Wang, 2022). According to positive psychology, it is important to emphasize positive and self-help qualities in the field of language instruction and learning to speed up learners' progress (Jin & Dewaele, 2018). MacIntyre and Mercer (2014) asserted that positive psychology provides significance and reinforcement for the process of language acquisition and teaching. More recently, Jahedizadeh et al. (2019) developed and verified a specialized tool to evaluate academic buoyancy in the unique context of English as a second language/foreign language.

According to Xu and Wang (2022), academic buoyancy is being linked to thoughts, feelings, and actions that are good for learning and academic success. Academic buoyancy has been found to be constructively correlated with involvement, proficiency, dedication, self-efficacy, organizing, tenacity, and pleasant achievement emotions (Ding & He, 2022; Jahedizadeh et al., 2019; Xu & Wang, 2022). On the other hand, academic buoyancy is unfavorably correlated with nervousness, uncertain control, and undesirable accomplishment (Martin, 2013, 2014). More frequent usage of learning techniques is associated with greater levels of academic buoyancy, according to studies (e.g., Martin et al., 2013). This finding is based on the premise that a student who is self-assured in their ability to handle difficulties may focus less on obstacles and be more likely to use effective learning practices. From an empirical point of view, Martin and Marsh (2006, 2008) discovered that academic buoyancy predicted class engagement, general self-worth, and school fulfillment among high school students in Australia. Additionally, they established that academic buoyancy predicted educational participation and nonacademic repercussions. Heydarnejad et al. (2022) and Nurjamin et al. (2023) found that EFL students' psychological and mental involvement was directly impacted by their academic buoyancy. Yun et al. (2018) discovered that among South Korean college students, academic buoyancy was a strong predictor of second-language proficiency and grade point average. Therefore, our hypothesis was that academic buoyancy would be a good predictor of self-regulated learning writing methods when used in a second-language writing setting.

## Purpose of the Current Research

There is a deficiency in the amount of in-depth research that has been conducted on the fundamental factors that influence students' adoption of AWE. According to the best of the researcher's knowledge, no study has previously investigated how AWE affects the psychological well-being of students or their academic progress in open and distributed learning. That is, EFL learners' motivation to write, enjoyment in writing, academic buoyancy, and academic success in writing have not been evaluated in any single study. As a result, the following research question and null hypothesis were developed, taking into account the background of the study as well as the review of previous research that was comparable to it:

Research question: Does applying AWE foster EFL learners' motivation to write, enjoyment in writing, academic buoyancy, and academic success in open and distributed learning?

Null hypothesis: Applying AWE does not foster EFL learners' motivation to write, enjoyment in writing, academic buoyancy, or academic success in open and distributed learning.

# Methods

This study employed a quasi-experimental design that includes both a pretest and a posttest. The acts that were performed are elaborated upon in further detail in the subsequent paragraphs.

## Participants and Procedures

A random sample of 86 participants was chosen from a larger group of 147 first-year EFL students who were enrolled at the Ningbo University of Finance and Economics, China. Based on the results of the Oxford Quick Placement Test, the participants' level of English-language proficiency was concluded to be intermediate. As an extra point of interest, over the course of the study, participants did not take part in any additional English classes. As a result, participants' English-language competence was assumed to be roughly equivalent. The ages of the participants ranged from 19 to 25, and they hailed from a wide spectrum of socioeconomic and cultural backgrounds. The control group (CG) consisted of 44 students, while the experimental group (EG) consisted of 42 individuals. Throughout the first semester of the academic year, students were obliged to attend 16 sessions of an English writing class.

A preliminary assessment was conducted before administering the treatment. After the pretest, a researcher, who was also the instructor for all the courses attended by both the EG and the CG, was responsible for delivering instruction. The study was carried out throughout a single academic semester in 2022 (16 sessions). The CG students received online instruction via the use of webinar software (Adobe Connect). Conversely, the EG acquired and was exposed to online instruction through Adobe Connect, and their writing skills were reinforced with AWE.

A posttest was conducted at the end of the semester after all instructional sessions were completed. The objective of the examination was to assess the achievement of both CG and EG students, as well as to ascertain the degree to which the program had been effective. Both the pretest and the posttest were evaluated by four EFL teachers to ensure that the findings were accurate. Data collection was concluded by taking into account the pretest scores of each student in addition to their posttest averages. The questionnaire was in English since all respondents fulfilled the standards required to grasp English.

## Measures

### Oxford Quick Placement Test

The Oxford Quick Placement Test (OQPT) was used to assess the participants' English proficiency. OQPT results range from 0.1 to 0.9, with 0.4–0.6 indicating an intermediate level of English proficiency. A reliability of 0.91 was recorded for the OQPT in this study.

### *Learners' Writing Skills Assessments*

Two assessments requiring students to produce two different kinds of essays were used to gauge the students' writing ability. Students were to produce a written piece on process evaluation for the initial test and a written work on causality and impact for the subsequent exam. The mean results of the two essays were used to calculate the students' writing competence. The ESL Composition Profile scoring rubric, created by Hartfiel et al. (1985), was employed. Content accounts for 30% of the components, followed by structure, vocabulary, language used, and mechanics. The content component concentrated on the students' subject-matter knowledge as well as the coherent development of the thesis statement and its supporting information. The arrangement focuses on the degree to which learners put their thoughts for each sort of writing.

### *Learners' Motivation to Write Scale*

To assess the students' motivation in writing, the questionnaire designed and validated by Cahyono and Rahayu (2020) was applied. This is a 6-point Likert scale including 23 items in 7 subsections. In the present investigation, the reliability of this scale was assessed and the result was considered sufficient (r = 0.89).

### *Enjoyment of Writing Scale*

To gauge the learners' enjoyment of writing, the scale developed by Jin (2023) was used. This scale includes nine items rated on a 5-point Likert scale. Participants were expected to share their sentiments on writing. The dependability of this scale was assessed, and the outcome was reasonable ($a$ = 0.911).

### *Academic Buoyancy Scale*

The participants' academic buoyancy was measured using the academic buoyancy scale (ABS) created and verified by Jahedizadeh et al. (2019). The 27 questions that made up this test assessed four aspects of second-language buoyancy: sustainability, regulation adaptability, positive personal eligibility, and acceptance of academic life. In addition, the ABS uses a 5-point Likert scale, where 1 indicates strong disagreement and 5 indicates strong agreement. Cronbach's alpha ranged from 0.824 to 0.876: the ABS dependability in this study was satisfactory.

### *Statistical Analysis*

To examine the data, a one-way multivariate analysis of variance (MANOVA) was performed. Before calculating the MANOVA, it was necessary to conduct analyses of the related hypotheses. Several parameters were considered, including data normality, sample size, outlier presence or absence, data linearity, and regression homogeneity.

# Findings

A one-way MANOVA was used to compare the pretest and posttest scores of EG and CG learners in terms of their English writing abilities. This statistical test is used when there is a single independent variable (in this instance, the implementation of AI in both the EG and CG) and two or more interconnected dependent variables, which are the subcomponents of writing in this study (motivation to write, enjoyment in writing,

academic buoyancy, and academic success in writing). It is standard practice to verify that all MANOVA's assumptions (e.g., normality, sample size, outliers, linearity, regression homogeneity) are true before running the analysis. Tables 1 and 2 compare the English writing pretest scores of EG and CG students.

**Table 1**

*Descriptive Statistics Results Comparing EG and CG on Pretest English Writing Scores*

| Pretest subsection | Group | *M* | *SD* | *n* |
|---|---|---|---|---|
| ASW | EG | 27.09 | 7.78 | 44 |
| | CG | 28.02 | 8.04 | 42 |
| | Total | 27.54 | 7.87 | 86 |
| LMW | EG | 43.50 | 26.23 | 44 |
| | CG | 53.69 | 25.76 | 42 |
| | Total | 48.47 | 26.35 | 86 |
| EW | EG | 29.65 | 6.65 | 44 |
| | CG | 28.80 | 6.47 | 42 |
| | Total | 29.24 | 6.54 | 86 |
| AB | EG | 34.97 | 18.27 | 44 |
| | CG | 40.73 | 19.02 | 42 |
| | Total | 37.79 | 18.76 | 86 |

*Note.* EG = experimental group; CG = control group; ASW = academic success in writing; LMW = learners' motivation to write; EW = enjoyment in writing; AB = academic buoyancy.

Table 1 displays the mean scores of the EG and CG for the learners' motivation to write, enjoyment in writing, academic buoyancy, and academic success in writing in the pretest. There was some disparity between the two groups' mean scores on each subcomponent of writing in English, but the discrepancies were not significant. To determine whether the differences under consideration were statistically significant, the researcher consulted the MANOVA table (Table 2).

**Table 2**

*MANOVA Results Comparing EG and CG on Pretest English Writing Scores*

| Effect | | Value | *F* | Hypothesis *df* | Error *df* | *p* | Partial eta² |
|---|---|---|---|---|---|---|---|
| Groups | Pillai's trace | .05 | 1.23 | 4.00 | 81.00 | .30 | .05 |
| | Wilks's lambda | .94 | 1.23 | 4.00 | 81.00 | .30 | .05 |
| | Hotelling's trace | .06 | 1.23 | 4.00 | 81.00 | .30 | .05 |
| | Roy's largest root | .06 | 1.23 | 4.00 | 81.00 | .30 | .05 |

*Note.* EG = experimental group; CG = control group.

Wilk's lambda is the most commonly reported statistic; hence, its value is stated here (.94). The related Wilk's lambda significance value was discovered to be .30, which is more than the significance threshold (.30 >.05). This demonstrates that the two groups, EG and CG, did not vary substantially on their pretest scores in terms of (the four subcomponents of) writing in English. Table 3 displays the findings of a similar data analysis approach used for the EG's and CG's writing in English posttest scores. Any posttest changes might be traced to the EG treatment (i.e., employing the AI).

**Table 3**

*Descriptive Statistics Results Comparing EG and CG on Posttest English Writing Scores*

| Posttest subsection | Group | *M* | *SD* | *n* |
|---|---|---|---|---|
| ASW | EG | 36.61 | 5.77 | 44 |
| | CG | 35.42 | 17.59 | 42 |
| | Total | 36.03 | 12.90 | 86 |
| LMW | EG | 97.31 | 21.57 | 44 |
| | CG | 63.14 | 22.14 | 42 |
| | Total | 80.62 | 27.69 | 86 |
| EW | EG | 38.11 | 5.31 | 44 |
| | CG | 37.47 | 15.94 | 42 |
| | Total | 37.80 | 11.70 | 86 |
| AB | EG | 88.31 | 28.87 | 44 |
| | CG | 70.07 | 60.14 | 42 |
| | Total | 79.40 | 47.44 | 86 |

*Note.* EG = experimental group; CG = control group; ASW = academic success in writing; LMW = learners' motivation to write; EW = enjoyment in writing; AB = academic buoyancy.

According to Table 3, there was a discrepancy between the EG and CG posttest mean scores for academic success in writing, motivation to write, enjoyment in writing, and academic buoyancy. Nevertheless, the researcher referred to the MANOVA table (Table 4) to determine whether these differences were statistically significant.

**Table 4**

*MANOVA Results Comparing EG and CG on Posttest English Writing Scores*

| Effect | | Value | *F* | Hypothesis *df* | Error *df* | *p* | Partial eta² |
|---|---|---|---|---|---|---|---|
| Groups | Pillai's trace | .41 | 14.49 | 4.00 | 81.00 | .00 | .41 |
| | Wilks's lambda | .58 | 14.49 | 4.00 | 81.00 | .00 | .41 |
| | Hotelling's trace | .71 | 14.49 | 4.00 | 81.00 | .00 | .41 |
| | Roy's largest root | .71 | 14.49 | 4.00 | 81.00 | .00 | .41 |

*Note.* EG = experimental group; CG = control group.

When compared to the significance level (.00 < .05), the related significance value of Wilks's Lambda was .00, which is higher than the significance threshold. The presence of a *p* value that is either lower than or equal to the significance threshold indicates a meaningful difference between the two groups. As a result, the EG and the CG scored substantially differently on their posttests concerning the composite dependent variable of writing in English. Table 5 indicates which of the four subcomponents of wring in English was responsible for the difference between the two groups.

**Table 5**

*Test of Between-Subjects Effects on Writing in English*

| Dependent variable | Type III sum of squares | *df* | *M* square | *F* | *p* | Partial eta² |
|---|---|---|---|---|---|---|
| ASW | 30.17 | 1 | 30.178 | 0.179 | .67 | .00 |
| LMW | 25,097.40 | 1 | 25,097.40 | 52.55 | .00 | .38 |
| EW | 8.73 | 1 | 8.732 | 0.06 | .80 | .00 |
| AB | 7,154.42 | 1 | 7,154.42 | 3.26 | .07 | .03 |

*Note.* ASW = academic success in writing; LMW = learners' motivation to write; EW = enjoyment in writing; AB = academic buoyancy.

A more rigorous significance threshold was recommended to prevent type I errors, given that we examined many independent studies in this case. Bonferroni's adjustment, which involves dividing the number of analyses by the significance level (i.e., .05), is the most used method for this. The original significance level of .052 was divided by 4 since there were four dependent variables in this example. If the significance level (*p*) was less than .012, the findings would be considered significant. Learners' desire to write had a *p* value of .00 (< .012; Table 5). On the other hand, every *p* value examined was higher than the threshold of significance. This indicates that the treatment given to the EG learners had a substantial impact on their desire to write when compared with the CG learners. That is, the disparity between the EG and the CG on the academic writing posttest was caused by the learners' motivation to write.

# Discussion

The primary goal of this study was to demonstrate the utility of appropriate AI applications in the context of English-language acquisition, focusing specifically on the development of writing skills through possibilities derived from AWE. The results obtained from this research provide insight into the potential benefits of incorporating AI feed-based tasks into writing training. More precisely, the outcomes underscore the encouraging prospects of AWE as a platform for English writing, proof writing, and editing in open and distributed learning (ODL). The EG students' performance was superior to that of their peers in the CG; therefore, the null hypothesis was rejected: Applying AWE does not foster EFL learners' motivation to write, enjoyment in writing, academic buoyancy, and academic success in ODL.

This study aimed to determine whether EFL students' motivation to write improved by applying AI in ODL. The data analysis demonstrated a positive correlation between EFL students' writing ability and motivation to write. This indicates that offering an effective tool for feedback and reinforcement in writing enhances the motivation of learners in writing. Students who want to excel in writing should consistently increase their drive to attend writing classes and complete course tasks. The present study's findings align with prior research by Brown (2001) and Alves-Wold et al. (2023), indicating that intrinsic motivation plays a crucial role in the effectiveness of language learning. According to Ryan and Deci (2000), intrinsic drive, rather than extrinsic rewards, plays a significant role in determining the success of a language learner. In the same line of inquiry, Ryan and Deci (2009) and Dougherty et al. (2015) emphasized the significance of intrinsic motivation in enhancing language learners' success.

Incorporating motivating elements into writing education is crucial according to this study's findings. This is particularly true when it comes to engaging students, making effective use of instructional material, and fostering positive relationships between students and instructors. All students should have enough feedback and interesting exercises so they can take pleasure in writing instruction and ultimately become better writers. Establishing rapport may be achieved via teacher–student conferences and the occasional use of icebreakers during writing time. To engage EFL learners, students should participate in activities centered on topic selection and writing tasks before starting to complete writing projects, as well as having conversations on interesting themes they are already familiar with.

Based on the findings of Zumbrunn et al. (2019) as well as Myhill et al. (2023), instructors may improve their students' enjoyment of and satisfaction in writing by adjusting writing tasks' level of difficulty. Such obstacles were overcome with the use of AI in the current study. Academic buoyancy may have a crucial role in eliciting positive emotional responses, as seen by its impact on second-language writing. This study's findings suggest that students' beliefs about their ability to control their English writing processes and results are important in English writing. This supports and broadens the control-value theory in the context of second-language writing.

Students find AI-based learning tools beneficial for academic studies, drafting, and other aspects of the writing process (Sumakul et al., 2022a, 2022b; Utami et al., 2023). Although these tools may not have all the capabilities writers need, they are easy to use and adaptable. Some students think that AI may be a fun way to spice up their writing lessons. The results suggest that college students are more likely to regard the AWE system as beneficial and use it for writing instruction when they discover it is simple to manage.

Conversely, college students prioritize the practicality of AWE over its user-friendliness. The efficacy of AWE feedback has emerged as a critical determinant in convincing college students to embrace it. Previous studies on AWE have shown similar results (e.g., Li et al., 2015; Li et al., 2023; Zhai & Ma, 2022). The effectiveness of AWE feedback has emerged as a critical determinant in persuading EFL students to adopt it. Previous research on the technology acceptance model has demonstrated similar results (e.g., Z. Li, 2021; Tian & Zhou, 2020).

# Conclusion and Implications

Implementing AI is advisable for its ability to create an engaging and intriguing technical setting, particularly in open and dispersed language learning. This will enhance language learners' ability to effectively practice writing skills, resulting in overall enhancement of their proficiency in self-evaluation and of their writing output. The findings of this research indicate that options and feedback aided by AI led to enhancements in EFL learners' writing skills, motivation to write, enjoyment in writing, academic buoyancy, and academic success in writing. AI technology may therefore help learners oversee and regulate their educational processes. These technologies may assist in establishing objectives, monitoring accomplishments, and implementing any necessary adjustments. AI-driven training empowers learners to take control of their educational process and enhance their oral communication skills by offering personalized coaching and adaptive tasks that promote the development of meta-cognitive strategies.

# Limitations and Suggestions for Future Research

In addition to the implications of this study, a number of limitations need to be addressed. Chinese students with an intermediate level of English proficiency participated in this research, which focused on ODL. This study may be replicated in other educational environments in the future to provide a comparative analysis of the current results. Research on the potential effects of employing AI to improve writing abilities on motivation, pleasure, academic achievement, and other aspects of academic success in various fields of study is strongly encouraged. Future studies may also consider other language skills, such as listening, reading, and writing, to evaluate the psychological and academic benefits that may be achieved via the use of AI in ODL environments.

The findings of this study are limited in their relevance since the subjects were picked for a quasi-experimental procedure. There is an acute need for extensive study to be conducted on the effects of using a variety of applications on the levels of motivation, pleasure, academic achievement, and academic success in writing. In addition, little consideration was given to the demographics of the participants. The students' demographic data will be important to gather data in similar future studies. Though this study used a quantitative methodology, a mixed-methods examination might provide more accurate findings.

In conclusion, future studies may investigate the connection between motivation, pleasure, academic buoyancy, and other learner-attributed variables, as well as other fundamental abilities.

# Acknowledgments

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