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Motivation in Writing Using Automated Writing Evaluation at Higher Education Level in Pakistan

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Abstract

Artificial Intelligence (AI) has permeated every aspect of life, including education, and significant developments in applied linguistics and natural language processing have been major in developing AI-based Automated Writing Evaluation (AWE) technology over the past three decades. This experimental study hypothesised that ESL students in the experimental group would be more motivated to use AI AWE technologies to write better essays. This experimental study is significant as it addresses the gap in research on examining the students' motivation in essay writing, utilising the AI-based writing evaluation tool My Access tool. The present study divides undergraduate learners into two groups, experimental and control, employing a purposive sampling strategy. The Self-Determination Theory (SDT) provides a basis for the study. The Academic Writing Motivation Questionnaire (AWMQ), having 37 measures, was modified according to the need and utilised for evaluating the writing motivation of participants. The Likert scale of the questionnaire objectively assessed students' motivation levels prior to and following the intervention. The tool evaluated the five primary constructs: self-efficacy, perceived writing value, intrinsic motivation, extrinsic incentive, and overall writing motivation. A statistical analysis of the pre- and post-tests for both the experimental and control groups was conducted using SPSS software. The findings corroborate the hypothesis that AI technologies enhance students' motivation to compose essays.

Keywords

Artificial Intelligence (AI)
Automated writing evaluation
Higher Education
Motivation in writing

INTRODUCTION

The technology we use daily has changed our lives in many ways. It transformed our relationships, career, and life. AI has improved greatly in recent years. AI and machine learning are used in Google Maps, Apple Face Navigation, 3D photography, face recognition, smart assistants (Alexa, Google Assistant, Siri), predictive text, Google predictive searches, and email filters (Khan, et al., 2025; Gangavarapu, et al., 2020). AI has permeated practically every aspect of life, and education is no exception. Education in the twenty-first century aims to equip students with the knowledge and abilities they need to thrive in this rapidly changing technological environment while fostering the confidence they need to put those skills into practice. In every field of educational content, the definition of AI-powered education has been expanding quickly (Jian, 2023).

A subset of Computer-Assisted Language Learning (CALL) includes Mobile-Assisted Language Learning (MALL), Computer-Mediated Communication (CMC), e-learning, web learning, and AI-powered tools in second and foreign language learning (Chatterjee, 2022; Rasekh Eslami & Zohoor, 2023). Today, AI has important applications for language studies in general and second and foreign language education, recent advancements in natural language processing, deep and networked learning, and expanding technology's capacity to handle massive amounts of data. The quality of student-computer interaction has significantly changed due to the unavoidable switch from CALL to ICALL (Intelligent CALL) (Kannan & Munday, 2018). The current study defines AI as using AI systems for English instruction and learning to improve the methods for selecting and organising scientific material. Additionally, it is used to create instructional strategies and assessment techniques that personalise self-study procedures and simulate them through intelligent and skilled systems.

Higher education pedagogical frameworks in Pakistan and instructional strategies based on AI technologies can assist English as Second Language (ESL) students in writing more effectively, enhancing their essay-writing performance, boosting their motivation, and encouraging their learning and growth. AI-based writing assistants and predictive text technologies can support students by offering them tailored formative feedback throughout and after the writing process, fostering learner autonomy, empowering them to take control of their education, and inspiring them to write better essays.

LITERATURE REVIEW

Writing is crucial to students' learning, and its proficiency is seen as a sign that students have the

cognitive abilities, such as reasoning and critical thinking, needed for higher education. Writing is thought to be closely related to higher-order skills (Weigle, 2002; Youn, et al., 2025). Internationally, the Graduate Management Admission Test (GMAT), the Test of English as a Foreign Language (TOEFL), and the Graduate Record Examination (GRE) are all extensive, high-stakes language proficiency assessment programs that now include a performance-based writing component (Gui, 2024). Significant developments in applied linguistics, artificial intelligence, and natural language processing have been major in developing AI-based Automated Writing Evaluation (AWE) technology over the past three decades.

The software that evaluates and grades written compositions is called Automated Essay Scoring (AES) or AWE (Shermis & Burstein, 2003; Shermis & Burstein, 2013). Natural Language Processing (NLP) and machine learning-based AI writing assistants guide users through different stages of the writing process (augmented writing). With the aid of AI systems, students can fix grammatical mistakes in written texts (by performing a continuous error analysis), offer suggestions for future enhancements, and supply extra materials for additional research. These systems assist students in writing independently, self-correcting, and reflecting on the writing process in second and foreign-language classrooms. Using AI technology to learn a language helps learners become more autonomous, self-reliant, and motivated to learn. Since students are expected to be able to make their own decisions and take greater responsibility for their work on their own, teaching becomes more learner-centred. Education 4.0 is introduced in response to the evolving needs of today's students (Puncreobutr, 2016).

Motivation is a critical issue in education, and it serves a comparable function in language acquisition and learning. Lisá et al. (2023) assert that even the most skilled students cannot achieve long-term goals without adequate motivation; thus, suitable curricula and effective instruction alone may not ensure student success. Intrinsic and extrinsic motivation are the two categories. Griffiths and Özgür (2013) define intrinsic motivation as a concept related to learners' internal feelings, considering their task engagement and degree of involvement, and Extrinsic motivation refers to engaging in activities for external objectives, such as acquiring a degree or employment or evading punishment (Ryan & Deci, 2000). The present study's limitations are that only essay writing skills (explanatory essays) are covered, and students at the undergraduate level are selected as study participants.

The primary assertion posited by companies that develop and advocate for AWE programs in educational settings is that the feedback and scores will incentivise students to revise their papers more frequently, thus fostering an iterative writing process. Warschauer and Grimes (2008) tested Criterion and *My Access*, finding this claim partially true. AI is increasingly needed in academic writing. Khalifa and Albadawy (2024) examined 24 research studies to identify key areas where AI improves academic writing content and structure. Fan and Ma (2022) found that AWE feedback may improve student writing when given to an individual student group and compared to those who did not. The findings also underscore the potential of AI-based writing tasks to facilitate L2 learners' linguistic proficiency and metacognitive skills. Previous research indicates that, when augmented by human feedback, AWE can improve writing quality and educational results (Benali, 2021). The study is significant as several studies have been conducted using AWE software for the summative assessment of writings, and the focus is on a product-centred approach to writing (Attali, 2004; Li et al., 2015; Lu X, 2019). On the other hand, the study is significant as it addresses the gap in research on examining the student's motivation in essay writing utilising AI-based writing assistant technology *My Access* tool.

Theoretical Framework

Ryan and Deci (2000) formulated the Self-Determination Theory (SDT), which has since been further elaborated upon by other scholars (Niemiec & Ryan, 2009; Noels et al., 2000). Self-determination theory posits that students are more inclined to internalise their motivation for learning and engage autonomously in their studies when their fundamental psychological needs for competence, autonomy, and relatedness are satisfied in the classroom (Niemiec & Ryan, 2009). According to the Self-Determination Theory, intrinsic motivation represents the most autonomous form. It differentiates it from extrinsic motivation. According to the SDT, transitioning from extrinsic to intrinsic motivation necessitates fulfilling three

fundamental psychological needs (Muñoz & Ramirez, 2015). The SDT provides theoretical basis for the present study.

Hypothesis

The study hypothesised that ESL students in the experimental group are more motivated to use AI AWE technologies to write better essays.

METHODOLOGY

This investigation employed an experimental study utilising quantitative research methods to analyse quantitative data in test scores (pre-test and post-test) to assess students' motivation levels. Statistical analysis of the pre-and post-tests for experimental and control groups was used by applying SPSS statistical software. The present study employed an experimental research design, dividing undergraduate learners into two groups, including experimental and control. The experimental group underwent treatment involving essay writing with the aid of an AI writing assistant, *My Access*; however, one of the experimental groups additionally received facilitation, feedback, and support from the instructor alongside the software treatment. The control group received no treatment and instead was instructed to use conventional face-to-face classroom methods to teach essay writing skills. The research site for the current experimental study was a research university in Islamabad, Pakistan. A purposive sampling strategy was employed to select study participants. Undergraduate ESL learners possessing intermediate language proficiency and fundamental computing skills were regarded as the study participants. Upon selecting the participants, they were randomly assigned to the experimental groups.

The study participants comprised 60 students divided into three groups, including two experimental groups of 15 students each and one control group of 30 students. The experimental group A received instruction via AI technologies, such as AWE Tool *My Access*, without instructor facilitation or feedback during the writing process. The experimental group B received instruction via AI technologies AWE Tool *My Access* supplemented by supervised guidance and feedback from the instructor. The control group received instruction exclusively through conventional face-to-face teaching methods (Figure 1).

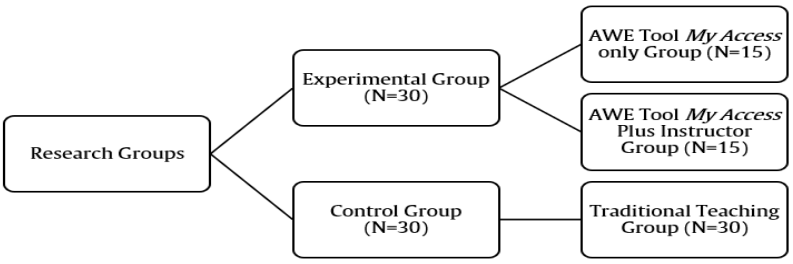

Fig. 1. Research Groups Participated in the Study

The 'My Student Groups' section of the *My Access* AWE software dashboard is depicted in Figure 2. The current study assesses whether AI technologies can increase essay writing motivation. The artificial intelligence (AI) tool *My Access* is employed as the independent variable. The dependent variable includes students' motivation (e.g., motivation scale) in the essay writing.

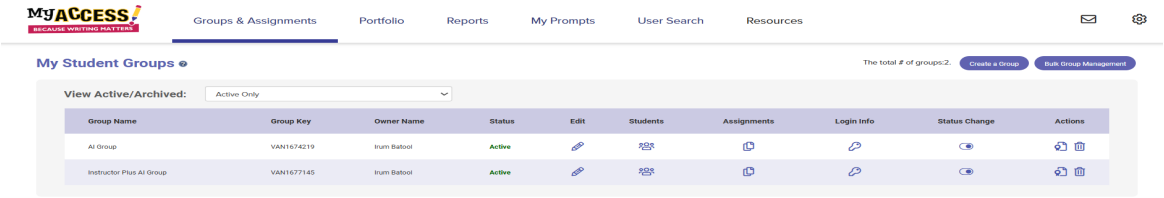

Fig. 2. AI Group and Instructor plus AI group on the dashboard of *My Access*

The research tool for this experimental study was *My Access* AWE software. The motivation scale was, a motivational questionnaire modified from the study conducted by Payne (2012), consisting of 37 items, with four representing strongly agree and zero representing strongly disagree. The study is conducted in three phases, including pre, experimental and post experimental. *My Access* software was used as a research intervention during ESL essay writing sessions with experimental groups. The pre-test and post-test results were loaded into SPSS for statistical analysis after they were collected. Descriptive statistics were used to calculate each group's mean scores and standard deviations, and the significance of improvements within each group was assessed. Statistical tables presented the results. A modified structured questionnaire by Payne (2012) assessed the students' writing motivation. It contained 37 items that assessed various facets of motivation for writing. The questionnaire's Likert scale quantitatively evaluated students' motivation levels before and after the intervention.

The instrument assessed the five main constructs. Intrinsic motivation assessed the participating student satisfaction with writing assignments and interest; extrinsic motivation examines how grades, teacher comments, and academic recognition affect students' writing. Students' writing confidence was tested by self-efficacy in writing; the Perceived Value of Writing construct assessed students' perspectives of writing as a skill, and writing motivation assessed students' eagerness to write, their persistence in improving, and their response to feedback-driven learning. The questionnaire was given to students in the AI-Only, Instructor plus AI, and Control Groups before and after the intervention to determine if their motivation levels had changed.

RESULTS & FINDINGS

The results provide crucial insight into how different feedback formats influenced students' writing motivation. It was anticipated that students in the instructor plus AI Feedback Group would show the biggest increase in motivation since the combination of instructor guidance and AI-generated feedback provided a more individualised learning experience. The following techniques guarantee the current study's validity and reliability. The research tools used in this study have the same validity as those used in earlier studies. Table 1 shows the demographic information of the participants. From this perspective, the table 1 for demographic information has two divisions; a) describes their ages in years and b) their gender-wise frequency distribution. The mean age of the participants from the Traditional Group (n=30) was 21.5 having 1.3 as standard deviation, the mean age of the participants from the AWE Tool *My Access* (AI) Group (n=15) was 21.6 having 0.9 as standard deviation, and the AWE Tool *My Access* Group (n=15) was 21.4 having 1.5 as standard deviation. The number of female participants from the Traditional Group was n=14 having 46.7 percentage and the number of male participants from the Traditional Group was n=16 having 53.3 percentage. The number of female participants from the AWE Tool *My Access* Group was n=5 having 33.3 percentage and the number of male participants from the AWE Tool *My Access* Group was n=16 having 66.7 percentage. The number of female participants from the AWE Tool *My Access* Plus Instructor Group was n=5 having 33.3 percentage and the number of male participants from the AWE Tool *My Access* Plus Instructor Group was n=16 having 66.7 percentage.

Table 1
Demographic Information

Age in years	N	Minimum	Maximum	Mean	Std. Deviation
Traditional Group	30	18	24	21.5	1.3
AWE Tool My Access Group	15	20	23	21.6	0.9
AWE Tool My Access (AI) Plus Instructor Group	15	19	24	21.4	1.5
Frequency Distribution		**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
Traditional Group	Female	14	46.7	46.7	46.7
	Male	16	53.3	53.3	100
AWE Tool My Access Group	Female	5	33.3	33.3	33.3
	Male	10	66.7	66.7	100
AWE Tool My Access (AI) Plus Instructor Group	Female	5	33.3	33.3	33.3
	Male	10	66.7	66.7	100

Descriptive Statistics of Pre-writing responses of the traditional group are presented in Table 2. The five main constructs of a traditional group that the instrument assessed were self-efficacy, perceived value of writing, intrinsic motivation, extrinsic motivation, and overall writing motivation.

Table 2
Descriptive Statistics for Pre-writing Responses from Traditional Group

	N	Minimum	Maximum	Mean	Std. Deviation
Intrinsic Motivation	30	1.08	3.92	2.5778	.71817
Extrinsic Motivation	30	2.00	3.80	2.9033	.53271
Self-efficacy	30	1.20	3.90	2.5633	.63761
Perceived Value of Writing	30	1.40	3.80	2.6333	.71067
Motivation In Writing	30	1.57	3.84	2.6694	.59591

After the intervention (traditional teaching method), the descriptive statistics of post-writing responses of the traditional group are presented in Table 3. The empirical data shows improvement in all five constructs of motivation. Intrinsic motivation means scores improved (from 2.5778 to 2.6222), extrinsic motivation (from 2.9033 to 2.9600), self-efficacy (from 2.5633 to 2.6133), perceived value of writing (from 2.6333 to 2.7200), and overall writing motivation improve (from 2.6694 to 2.7243).

Table 3
Descriptive Statistics Post-Writing Responses from Traditional Group

	N	Minimum	Maximum	Mean	Std. Deviation
Intrinsic Motivation	30	1.08	3.92	2.6222	.68814
Extrinsic Motivation	30	2.00	3.80	2.9600	.50556
Self-efficacy	30	1.20	3.90	2.6133	.59058
Perceived Value of Writing	30	1.40	3.80	2.7200	.62939
Motivation In Writing	30	1.65	3.84	2.7243	.56571

Descriptive statistics prewriting experimental AWE tool *My Access* (AI only) group are presented in Table 4.

Table 4
Descriptive Statistics Prewriting Experimental AWE Tool *My Access* Group

	N	Minimum	Maximum	Mean	Std. Deviation
Intrinsic Motivation	15	2.08	3.67	2.8056	.47105
Extrinsic Motivation	15	2.70	4.00	3.1733	.41484
Self-efficacy	15	1.40	3.80	2.3600	.62313
Perceived Value of Writing	15	1.80	3.80	2.6933	.57504
Motivation In Writing	15	2.22	3.81	2.7694	.42707

After the AWE Tool *My Access* intervention, the descriptive statistics of post-writing responses of the Experimental AWE Tool *My Access* (AI only) Group are presented in Table 5. The empirical data illustrates improvement in all five constructs of motivation. Intrinsic motivation means scores improved (from 2.8056 to 3.0722), extrinsic motivation (from 3.1733 to 3.3667), self-efficacy (from 2.3600 to 2.9667), perceived value of writing (from 2.6933 to 3.2533), and overall writing motivation improve (from 2.7694 to 3.1477). It is pertinent to mention that these improvements are only due to the intervention of AWE Tool *My Access* because there was no instructor in this group, and students only relied on the AI tool's feedback.

Table 5
Descriptive Statistics Post Writing Experimental AWE Tool *My Access* Group

	N	Minimum	Maximum	Mean	Std. Deviation
Intrinsic Motivation	15	2.67	3.67	3.0722	.30516
Extrinsic Motivation	15	3.00	4.00	3.3667	.31320
Self-efficacy	15	2.50	4.00	2.9667	.36384
Perceived Value of Writing	15	2.80	4.00	3.2533	.31593
Motivation In Writing	15	2.86	3.89	3.1477	.27767

Descriptive statistics prewriting experimental AWE tool *My Access* plus Instructor (AI plus Instructor) group are presented in Table 6.

Table 6
Descriptive Statistics pre-writing Experimental (AI plus Instructor) Group

	N	Minimum	Maximum	Mean	Std. Deviation
Intrinsic Motivation	15	1.92	3.67	2.8944	.57517
Extrinsic Motivation	15	2.30	4.00	3.0867	.43567
Self-efficacy	15	1.80	3.60	2.7600	.48226
Perceived Value of Writing	15	2.20	4.00	3.0533	.52081
Motivation In Writing	15	2.30	3.78	2.9315	.42768

After the intervention of AWE Tool *My Access* plus personalised feedback on student written tasks, the descriptive statistics of post-writing responses of experimental AWE tool *My Access* plus Instructor (AI plus Instructor) Group are presented in Table 7. The empirical data demonstrates improvement in all five constructs of motivation. Intrinsic motivation means scores improved (from 2.8944 to 3.1222), extrinsic motivation (from 3.0867 to 3.4000), self-efficacy (from 2.7600 to 3.1667), perceived value of writing (from 3.0533 to 3.3200), and overall writing motivation improve (from 2.9315 to 3.2360). These improvements are due to the AWE Tool *My Access* plus Instructor intervention because students benefited from the instructor's feedback.

Table 7
Descriptive Statistics Post Writing Experimental (AI plus Instructor) Group

	N	Minimum	Maximum	Mean	Std. Deviation
Intrinsic Motivation	15	2.33	3.67	3.1222	.41888
Extrinsic Motivation	15	3.00	4.00	3.4000	.24495
Self-efficacy	15	2.70	3.70	3.1667	.23503
Perceived Value of Writing	15	2.80	4.00	3.3200	.34476
Motivation In Writing	15	2.89	3.81	3.2360	.23704

Discussion

The data strongly support the hypothesis that students in experimental groups are motivated to use AI technologies to improve their essay-writing abilities. According to the study, the AI plus Instructor group's mean Motivation in Writing score is 3.2360 (SD = 0.23704), indicating moderate to high engagement and a desire to improve writing abilities. The low SD suggests consistent levels of student motivation, which are impacted by the benefits of both timely AI feedback and the supportive role of a teacher. Continuous learning and improvement depend on motivation, and it shows that the intervention successfully reduced motivational barriers for most students. As Mohammed and Khalid (2025) also noted that "AI feedback data can enhance teaching strategies and assist educators in addressing specific learner needs while fostering a positive classroom environment" (p. 21).

The AI-only group shows lower motivation levels than the AI Plus Instructor group, with a mean motivation score of 3.1477 (SD = 0.27767). This results from a lack of instructor feedback. AI tools may lack contextual and emotional support compared to human instructors. The higher SD in the AI-only group suggests that students' motivation levels vary more. The results show how AI tools and human educators can work together effectively. AI tools effectively deliver real-time, data-driven feedback that helps students identify and address their weaknesses. Instructors improve the learning environment by providing contextualised feedback, clearing up misunderstandings, and fostering a sense of community and belonging. The results are supported by the reviewed literature (Griffiths & Özgür, 2013; Mohammed & Khalid, 2025).

CONCLUSION

The results support the hypothesis that AI tools improve students' motivation when writing essays, also highlighting the limitations of AI when used alone. The AI plus Instructor group continuously outperformed the AI-only group in motivation, demonstrating lower results variability. Both experimental groups (AI only and AI plus Instructor) exhibit significant improvements in several aspects of motivation during the pre- and post-writing stages, including intrinsic motivation, extrinsic motivation, self-efficacy, and the perceived value of writing.

Limitations

This study highlights positive trends in students' use of *My Access* feedback, but it also considers the limitations; students may encounter difficulties with feedback that is excessively technical, lacks context, or does not align with their writing preferences. Feedback from instructors is crucial, especially in writing.

Future Directions

Future studies may examine the balance between AI-generated feedback and human interaction in various academic contexts to determine the best learning environment for students. Future studies could also examine how different skill levels affect how students interact with AI feedback.

Competing Interest

The authors declare no conflict of interest.

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