

Enhancing High School Students' Sentence Structure Skills by Integrating Artificial Intelligence (AI) Application in English Learning Process

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Abstract

This study aims to investigate the significance of sentence structure in the acquisition of English language skills. It also seeks to identify the difficulties encountered by English learners in understanding sentence structure and propose effective solutions to assist them in overcoming these problems. The study employs a pre-experimental research design with a quantitative methodology. The research sample consisted of 30 respondents or students of English as a second language, who were separated into three separate classes. The AI intervention group demonstrated significantly higher levels of engagement (behavioural, emotional, and cognitive) than students in the no-AI equipment (NEAI) group. The results of this study suggest that AI may help students be more proficient writers.

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INTRODUCTION

The definition of AI-supported education has developed rapidly in educational materials, but this research only discusses the use of AI in sentence structure in foreign languages. CALL, MALL, CMC, e-learning, and online learning include AI-powered foreign language learning technologies. CALL will eventually become ICALL (Intelligent CALL), which will improve student-computer interaction (Kannan and Munday 2018). Recent improvements in natural language processing, deep and networked learning, and technology's ability to manage vast volumes of data have made AI useful in language studies and foreign language instruction. (Fredricks et al. 2004) define student involvement as three dynamically interrelated aspects. Participation in academic or extracurricular activities and learning tasks are examples of behavioral engagement. Student-computer interaction will alter dramatically when CALL becomes ICALL (Intelligent CALL) (Kannan and Munday 2018).

English language instruction using AI is tough and imaginative. (Bin and Mandal 2019) The importance of integrating curriculum and information technology has grown since its inception and growth. The study of artificial

intelligence, which is based on the premise of natural intelligence, aims to replicate, strengthen, and expand intelligence using artificial means. This includes the work of scientists and engineers. AI refers to automated machines that can learn, reason, and self-correct. (Popenici and Kerr 2017) AI provides educators and students with additional learning and teaching opportunities in evaluation, tutoring, material development, and feedback due to technology. Formative assessment and feedback drive digital writing tool contributions. In addition, recent advancements in AI technology offer extensive educational methods and tools for detecting plagiarism. These resources can greatly aid ESL learners in improving their research writing skills (Zawacki-Richter et al. 2019).

Although emerging technologies offer many learning opportunities regardless of technology-Supported innovation, effective learning depends on student engagement. (Nazari, Shabbir, and Setiawan 2021) The effectiveness of an AI-powered writing tool group format for high school students of English as a second language in an academic writing context was tested through a randomized controlled trial. We controlled for that AI intervention students showed significantly higher levels of engagement (behavioural, emotional, and cognitive) than students in the no-AI equipment (NEAI) group.

The Grammarly AI technology combines deep learning and natural language analysis. (Fitria 2021) In cases where educators want more resources for language acquisition but are unable to locate them in print or online, this method is employed. Grammar is one of them. The job of teachers is to facilitate students to advance their writing (Aneski 2022). This can be performed all through the writing process revision phase. Teachers may be quite helpful at this point in providing input, particularly when it comes to correcting grammar.

Learning a knowledge of sentence structure is an essential element in attaining fluency in the English language, since it allows learners to proficiently articulate their thoughts and concepts. Several efficacious ways have been proposed to improve the acquisition of sentence structure. In the beginning, unambiguous education is crucial (Nikouee 2024). However, English learners may encounter difficulty in attaining fluency in constructing English sentences because of its unique and divergent system, which distinguishes it from other languages. Examines the impact of learners' mother tongues on the process of acquiring new knowledge or skills (Han and Hiver 2018). The objective of this study is to investigate the significance of sentence structure in the acquisition of English language skills. Sentence structure knowledge positively correlates with reading comprehension abilities (Zhang et al. 2018). It also seeks to identify the difficulties encountered by English learners in understanding sentence structure and propose effective solutions to assist them in overcoming these problems.

The research will focus on the challenges faced by English language learners in acquiring sentence structure, taking into account the impact of their native language, the complexity of English sentence structure, and the effects of English proficiency.

This lesson will help understand sentence meaning structure in the acquisition of English language skills and offer insights for the advancement of more efficient language instruction techniques and approaches. The outcomes of this study may help English language teachers and curriculum designers improve English language training for learners. Students should write a grammar- and sentence-structured text per meeting. Every meeting, they must write a text for peer and professor approval (Rahman and Feriyadin 2022). It is expected that students will complete a final writing assignment that will be regarded as their portfolio's masterpiece for the paragraph writing class. It will be fascinating to analyze those works of art to see how well they adhere to Grammatical and sentence construction rules and writing quality. By discriminating sentence patterns, students may change their writing projects' tones and convey a variety of emotions and ideas via building excellent paragraph, composition, and essay writing abilities. (Demirezen 2019) After that, learning the four types of sentences gives students the structure they need to clearly communicate their thoughts in writing. Clear communication requires breaking the thoughts down into four different sorts of sentences and being explicit about the grammatical construction to sentences and paragraphs. The four types of sentences are simple, compound, complex, and compound-complex. Grammatical structure, punctuation, and connectors substantially influence sentence patterns. Simple sentences have one thought and one independent clause (Hendrawati 2018).

Based on the background above, Researchers identified many problematic variables that hinder students from developing or enhancing phrase structures in Artificial Intelligence (AI). These factors, derived from the background information provided, serve as the foundation for this research. As a result of IT's incorporation into ESL curricula, AI has become more widely used in the classroom, which has led to exciting new opportunities for improving ESL instruction and creating a smart and adaptable English teaching environment. Hypothesis evaluation is employed to address issues identified in the design. The alternative hypothesis (H_a) is affirmed, while the null hypothesis (H_0) is negated. Enact educational innovations in English lessons to enhance teaching methods and enhance the ways in which pupils learn. Improving intelligent robots' visual and aural perception abilities is the goal., enabling them to comprehend human written and spoken language in everyday

situations and facilitating interaction between humans and computers (Bin and Mandal 2019). Students at Al Ulum Terpadu Islamic High School Medan will be able to enhance their sentence constructions with the use of AI, provided that they possess intellectual aptitude.

RESEARCH METHODOLOGY

Method

A quantitative technique based on a pre-experimental research design was used in the investigation. An impartial and objective researcher chooses a study's subject, formulates clear and focused questions, collects participants' measurable data, and then uses statistical methods to analyze the numerical values. This type of research is used in educational settings (Creswell 2014). Quantitative studies use statistical methods to comprehend and elucidate phenomena. Experimental research entails the examination of how the deliberate alteration of one variable impacts another variable. The variable intentionally changed or altered in an experiment can refer to the experimental treatment or the independent variable (Ary et al. 2010). In order to test theories and find relationships between variables, researchers often resort to experimental methods. By far, the most important goal of experimental research is to determine whether a new approach is better than the current gold standard of more traditional approaches (Lodico et al. 2010).

Population and Sample

The investigation was conducted at SMA Islam Al Ulum Terpadu Medan, primarily within the Social Sciences department. The study population consisted of class XI students, who were separated into three separate classes. The act of choosing individuals who are willing to participate in research is referred to as sampling (Mackey and Gass 2015). Thirty social studies students from a single class participated in the research.

Instruments

In this study, students had an initial assessment in the form of essay writing to evaluate their writing abilities before receiving any kind of treatment. After receiving the students' pre-test results, the intervention involved utilizing artificial intelligence to modify the language in their essays. Subsequently, a post-test was conducted to evaluate the enhancement of pupils' writing abilities and compare it with the pre-test. The defining features of writing are fundamentally identical. In the scientific sector, it possesses a clear and precisely delineated structure. The data were utilized to assess the attributes of writing using the scoring rubric developed by (Morrison 2017), as presented in Table 2.1.

Table 2.1. Scoring rubric developed by Cohen et al. (2007: 327 - 328)

No.	Criteria	Score	Predicate
1.	The main idea is stated very clearly, and there is a clear statement of change of opinion. The essay is well organized and coherent. The choice of vocabulary is excellent. There are no major or minor grammatical errors. Spelling and punctuation are fine.	90-100	Excellent
2.	The main idea is fairly, and change of opinion is evident. The essay is moderately well organized and is relatively coherent. The vocabulary is good, and there are only minor grammatical errors. There are few spelling and punctuation errors.	80-90	Good
3.	The main idea and a change of opinion are indicated but no so clearly. The essay is not well organized and is somewhat lacking in coherence. The vocabulary is fair, and there are some major and minor grammatical errors. There are a fair number of spelling and punctuation errors.	70-80	Average
4.	The main idea and change of opinion are hard to identify in the essay. The essay is poorly organized and relatively in coherent. The use of vocabulary is weak and grammatical errors appear frequently. Spelling and punctuation errors are frequent.	60-70	Poor
5.	The main idea and change of opinion are absent in the essay. The essay is poorly organized and generally incoherent. The use of vocabulary is very weak, and grammatical errors appear very frequently. Spelling and punctuation errors are very frequent.	50≤	Very poor

Data analysis procedures

A pre-test was administered in the classroom on January 22, 2024 to gather data on students' writing proficiency before treatment. The essay written test serves as an introductory assessment. There are a total of ten treatment sessions available. The first meeting occurred on January 29, 2024. Students were instructed to utilize artificial intelligence (AI) to generate the identical content they had in the pre-test as part of the treatment. The researchers subsequently presented the students with a task requiring them to articulate their thoughts in written form and illustrate their ability to employ artificial intelligence in rephrasing their views. Finally, researchers highly motivate students to use artificial intelligence to compose their written tasks.

Hypothesis

Hypothesis evaluation is employed to resolve issues detected in the design. We reject the null hypothesis (H0) and accept the alternative hypothesis (Ha). No statistically significant improvement is shown, according to the results

of H_0 in student writing performance when utilizing AI. H_a achieved a notable enhancement in students writing proficiency by implementing AI technology. When making decisions, certain criteria are taken into account. The null hypothesis (H_0) is considered valid when the significance level (Sig.) is higher than 0.05 (>0.05), and it is rejected when the Sig. is lower than 0.05 (<0.05).

RESULT AND DISCUSSION

Result

The researchers used the t-test statistical approach to analyze the data and determine how AI affected the writing ability of the pupils. This necessitates comparing the total scores recorded in the tables for the pre- and post-tests.

Table 3.1. Pre-Test Score of Students' Writing

No.	Name	Score
1.	SN	65
2.	MH	75
3.	SF	70
4.	SB	65
5.	NA	70
6.	NK	75
7.	ZH	65
8.	TZ	65
9.	WA	70
10.	ZA	65
11.	AF	70
12.	AA	75
13.	IY	65
14.	AH	70
15.	AR	75

16.	ME	65
17.	MR	75
18.	MF	70
19.	MA	75
20.	MY	75
21.	FE	70
22.	RP	65
23.	SS	75
24.	MS	75
25.	NI	70
26.	RS	65
27.	MW	70
28.	LN	65
29.	MD	75
30.	CA	70
Total Scores		2.100

Based on the table provided, the analysis of the data reveals that the overall pre-test score is 2.100. This table illustrates the scores of students' writing assignments prior to implementing artificial intelligence. The table below displays the post-test scores, indicating that the cumulative post-test score is 2.940. This table presents the scores of the students' writing assignments following the implementation of AI-based treatment.

Table 3.2. Post-Test Score of Students' Writing

No.	Name	Score
1.	SN	97
2.	MH	99

3.	SF	97
4.	SB	97
5.	NA	98
6.	NK	99
7.	ZH	97
8.	TZ	99
9.	WA	97
10.	ZA	97
11.	AF	97
12.	AA	98
13.	IY	97
14.	AH	99
15.	AR	98
16.	ME	98
17.	MR	97
18.	MF	98
19.	MA	99
20.	MY	98
21.	FE	99
22.	RP	99
23.	SS	97
24.	MS	98
25.	NI	99
26.	RS	98

27.	MW	99
28.	LN	98
29.	MD	99
30.	CA	98
Total Scores		2.940

Paired Sample T-Test Results

We used paired sample t-tests to fix the design problems. We used SPSS version 25.0 to analyze the data. The table displays the results of a paired samples t-test that was used to find out whether AI has had a substantial impact on pupils' writing abilities.

Table 3.3. Paired Samples Statistics Test Results Pre-Test and Post-Test Students' Writing Enhancement by Integrating Artificial Intelligence (AI)

Name		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre Test	70.00	30	4.152	.758
	Post Test	98.00	30	.830	.152

The preceding output provides a synopsis of the descriptive statistical results for the two samples that were taken into account, namely the pre- and post-test scores. The mean, or average, score for the pretest was 70.00. As for the Post Test, the average score was 98.00. Thirty students or responders made up the research sample. In terms of benchmarks. The standard deviation after the test was 0.830, while it was 4.152 before. And last but not least, we have the usual value. Before the test, the mean error was 0.758, and after it, it dropped to 0.152. The average test score It's 70.00 on the pretest and 98.00 on the posttest. There is a noticeable disparity in the average test results of the two exams, as seen above.

Table 3.4. Paired Samples Correlations Pre-Test and Post-Test Students' Writing Enhancement by Integrating Artificial Intelligence (AI)

Name		N	Correlation	Sig.
Pair 1	Pre Test & Post Test	30	.250	.183

The findings of a correlation analysis, which looked for a connection between two data sets (the pre- and post-tests), are shown in the output. A value of 0.250 for the correlation coefficient (Correlation) indicates a low level of positive association in the results. This association does not appear to be statistically significant, since the significance value (Sig.) is 0.183. We may infer that the pre- and post-tests did not correlate significantly because the Sig value of 0.250 is greater than the probability of 0.05.

Table 3.5. Paired Samples Test Pre-Test and Post-Test Students' Writing Enhancement by Integrating Artificial Intelligence (AI)

		Paired Differences							
			Std.	Std. Error	95% Confidence Interval of the Difference				
					Mean	Lower			
Pair 1	Pre Test - Post Test	-28.000	4.026	.735	-29.503	-26.497	-38.095	29	.000

The Sig value can be determined using the "Paired Samples Test" output table. The utilization of AI technology has an effect on students' writing abilities, as suggested by a 2-tailed significance value of $0.000 < 0.050$, which suggests a mean difference between the pre- and post-test scores.

Discussion

The findings point to a promising future for artificial intelligence as a writing tool substitute. Research into cutting-edge techniques to lessen bias, As artificial intelligence (AI) evolves, it will be essential to improve interpretability and ensure the responsible use of these technologies. (Flowers and Flowers 2009) There has been a sea change in higher education due to the advent of AI, which opens up unprecedented opportunities for personalized learning and information acquisition. Intelligent tutoring systems, which can adjust to each student's needs, provide a sample of the benefits and drawbacks of using AI in the classroom (Littman et al. 2022). Important parts of this assessment include an examination of concerns regarding the potential unintended exacerbation of current educational inequities and an examination of the ways in which AI impacts educational equality.

Some are concerned that AI, despite its personalized learning experiences, could teach individuals to be prejudiced (Lazarus et al. 2024). There are other voices that share this concern. Anxieties and moral dilemmas have gripped the academic community in response to the sharp rise in instances of plagiarism, essay-writing software, and on-demand exam assistance (Tahir

and Tahir 2023). An example of the favorable relationship between technology and pedagogy is the development of intelligent tutoring systems and flexible learning platforms, both of which occurred during this time (Graf 2023). researched the effects of AI on classroom instruction and found that variables including excessive control, changing power relations, and privacy concerns can lead to conflicts between instructors and students (Popenici and Kerr 2017). Artificial intelligence tutoring systems can tailor their teaching methods and course materials to each student's specific needs, allowing them to provide tailored guidance and feedback (Hwang et al. 2020).

CONCLUSION

This study examines how AI may help students be more proficient writers. Based on these results, researchers employed statistical analysis (t-test) at a significance threshold of $\alpha = 0.05$. H_a is accepted, and H_0 is refused. The study samples consisted of thirty respondents, and the pre-test variance standard deviation was 4.152, whereas the post-test variance standard deviation was 0.830. These results indicate that the probability value for the data collected both before and after the test on students' writing abilities using AI is Sig (2-tailed) 0.000. H_0 is rejected when considering the probability (Sig.) $0.000 < 0.05$. Furthermore, these results strongly demonstrate that AI has enhanced students' writing abilities.

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