Assessing the Effect of Using Artificial Intelligence on the Writing Skill of Indonesian Learners of English

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Abstract---Electronic device with artificial intelligence application facilitates the process of learning-teaching in Higher School. This research integrates the use of artificial intelligence in teaching reading and giving feedback as independent variables to improve students' writing skill as dependent variable. Students' attitude on such teaching is the intervening variable. The research was conducted in Higher Schools in Makassar City. Research instrument was questionnaire distributed to 100 students' of Higher Schools, but only 83 were processed. The data were analyzed by path analysis. The research findings: 1) teaching reading with artificial intelligence application has no direct but indirect effect through attitude on students' writing. 2) Lecturer's feedback virtually has direct and indirect effect through attitude on students' writing. 3) Reading and feedback through attitude contributes 34.8% to students' writing skill improvement.

Keywords---artificial intelligence, attitude writing, feedback, reading.

Introduction

The outbreak of COVID-19 pandemic is a global calamity disrupting various aspects of human life. However, we must wisely deal with this problem. In educational field, it imposes the use of technology in learning-teaching virtually. a thing many lecturers don't think to apply optimally. It is undeniable that before this COVID-19 outbreak came about, the learning-teaching process was still dominated by traditional face-to-face learning models in the classroom without utilizing the facilities provided by technology. On the other hand, technological advances should be responded by utilizing the various vi+rtual facilities provided fon learning-teaching process. Therefore, the researchers view this virtual learning-teaching as government necessitates it through policy may posively or negatively affect the learning teaching in particularly Higher Schools in Makassar

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City. In fact lecturers and students are busy to learn to apply the appropriate software application provided by technology product in learning-teaching virtually.

Utilizing technology as a learning medium is the only option so as to call online learning, or virtual learning or e-learning. "Technology is facilitating the lecturer's pedagogical approach" Tsui & Tavares (2021), and "creating new ways of teaching" (Zhao et al., 2006). Therefore, teachers using electronic device with artificial intellihence make possible to pull out the best results from students. In other words, the interaction between technology and pedagogy can bring changes to the way the lecturers teaching and the way the students learning. In the process, artificial intelligence of technology is integrated to help smoothing the learning process (Kaharuddin, 2020). Many artificial intelligence applications are useable in learning teaching process. For example, google translation provides translation facilities for students to translate from English into Indonesian or vice verse to understand lecturer's teaching materials. Artificial intelligence shows its effect in automatic translation and language processing, and even "in a 2015 Google report, a new computer model called D-Wave 2X is capable of performing complex Artificial Intelligence operations" (Caplar et al., 2017).

This paper does not discuss the extent technology contributes to improving the quality of education, but limited to the process of English learning teaching in Higher Schools as Fahimirad & Kotamjani (2018), state "the effective application of artificial intelligence methods is considered as a means of improving the quality of teaching and learning." One of the English skills highlighted in this research is writing which require mastery of grammar and abundant vocabulary that students may get from reading and feedback. The fact shows that the students' ability to write in English is still low, even though this skill which needs good mastery on grammar and rich of vocabulary has been taught using traditional model since elementary school (Arafah, 2019). This paper discusses Higher School students' perceptions of the use of artificial intelligence applications in English learning teaching process. The use of this application is particularly intended to spur the improvement of students' ability in writing skill (Mohan & Kumar, 2018; Astawa et al., 2017).

Since writing skill needs students to enrich themselves with new vocabularies and mastery of grammar, reading practices could also facilitate them to get many new vocabularies.Their efforts to understand the reading passage is a way to improve grammar, because getting the message in reading passage perfectly needs understanding on grammar. Therefore, reading comprehension is used as an independent variable to analyze its effect on students' writing skill. Reading lesson in learning teaching is given to students by using of artificial intelligence application. In addition, every learning requires feedback from tecturers and technology has basic features to make lecturers and students communicating virtually. This application is useful for delivering feedback to students and in verse. With this feedback from lecturers, students can find out their mistakes and the accuracy of vocabulary they use. Therefore, feedback is the second independent variable. It is assumed therefore that reading and feedback using artificial intelligence have effect on students' writing skills (Absatova et al., 2021; Asri et al., 2021).

To accelerate students' English mastery, positive attitude is necessary by which learning motivation is boosted. A research by Kaharuddin et al. (2021), stated that "attitude effected significantly students' motivation".   In this research, students' learning attitude is an intervening variable to explain the effect of reading comprehension and feedback on writing skill where in the learning process the use of artificial intelligence applications is integrated. Students' perception on digital-based learning of English during COVID-19 was analyzed in relation to improving their writing skill in English as dependent variable. Learning reading and providing feedback as independent variables with artificial intelligence in learning teaching process are highlighted with their effects on students' writing skill both directly or indirectly through students' learning attitudes as an intervening variable (Widana et al., 2020).

Literature review

Artificial intelligence for learning-teaching

In educational contex during the outbreak of COVID-19 pandemic, especially in learning teaching of English in Higher Schools, lecturers use the software facility of artificial intelligence application to carry out the English learning process. This application helps students improving English language skills and important to students developing their skills in writing English. Artificial intelligence is "a simulation of human intelligence on machine programmed to think like a human and imitate its actions" (Vasiljeva et al., 2021). Hence, artificial intelligence is a software program specifically made to do a certain job. Students learn grammar, spelling, word matching and sentences construction by this artificial intelligence application. It can detect students' mistakes in writing and give them feedback. Mozgovoy (2011), states that "grammar examination is important in text writing and language learning".

Artificial intelligence provides feedback on students' assignments that they can make improvements. This can affect student learning activities. They will be motivated to learn if the mistakes they made in grammar, diction or sentence construction are corrected and the corrections are returned to students. Mistakes in writing can also be traced by the application of artificial intelligence. Cotos (2011), said that students get feedback from artificial intelligence, then reread and improve their writing and practice to become independent learners (Boden, 1998; Miller, 2019).

Reading on writing improvement

Reading is one of the four language skills whose purpose is to get messages from reading passage. The message can only be obtained if we understand what is being read which of course requires mastery of vocabulary. It means that by reading a lot and understanding the text, students can enrich themselves with a lot of new vocabulary. Having a lot of vocabulary is important for students learning languages, because vocabulary is an element of language that contains meaning and through vocabulary messages can be conveyed both orally and in writing (Ruslan et al., 2020).

"New vocabulary is mostly learned through reading" (Renandya, 2007). In relation learning teaching of English in Higher Schools, most English lecturers teach reading separately from writing (Kroll, 1993). In almost all writing classes students are not involved in reading as much as expected" (Jolliffe, 2007). Even in composition classrooms, reading is largely overlooked by both students and teachers (Hirvela, 2004). However, because vocabulary, in addition to mastery of grammar, is needed in writing, it can be said that there is a relationship between reading skill and writing skill. A theory by Horning, & Kraemer (2013), stated that "reading can or should be used as an effective method to teach/learn writing effectively in high schools and colleges". Durukan (2011), stated that among the four language skills, reading and writing are the first to be learned by students and that there is a high correlation between reading comprehension and writing achievement. Even, Esmaeili (2002), affirmed that if reading and writing can be used together, then there is a positive influence on students' academic success. Related to the effect of reading on writing skills, this research uses artificial intelligence of technology to facilitate the communication between lecturers and students in virtual learning teaching process. This research discussed the effect of reading on writing directly and indirectly through students' attitude toward the learning teaching process using artificial intellegence (Bench-Capon & Dunne, 2007; Graham et al., 2007).

Feedback on writing improvement

A number of questions may arise in students' minds: have the lecturer checked my assignment?, whether the assignment I have done is correct?, is there anything I need to improve?, and so on. To answer this question, feedback is the answer. Feedback is an important part that cannot be separated from the learning process, but the majority of lecturers do not receive much training on how to provide feedback, resulting in ineffective feedback which will affect student learning outcomes (Corwin, 1976). In addition, there are still many misconceptions about feedback which is understood only as information or comments given by lecturer on the assignments students have done (Boud & Molloy, 2013).

In general, feedback is understood as information or comments given by lecturer regarding the results of student work. Hattie & Timperley (2007), stated that "feedback is information provided by teacher related to students' works or understanding." It is clarified by Henderson et al. (2019), that "feedback is the process students understanding information or comments about their assignments, then students using the information or comments to improve their learning process". Feedback is basically student centered and not the final part of a learning process. In feedback, lecturer's comments are only information Boud & Molloy (2013), that must be followed up by students. Therefore, effective feedback is to fulfill the principles of being timely, clear, educative, proportional to assessment rubric, communicate through feedback, and motivating students (Henderson & Phillips, 2014). Research by Boggs (2019), stated that providing students with corrective feedback would help them improving their writing skills. The same study by Chandler (2003), found that error feedback reduces grammatical and lexical errors in students' writings over time. Khadawardi (2021), said that the lecturer implicit written feedback had a significant effect in

helping students improve their writing for a short time (Crosthwaite et al., 2017; Kwakernaak, 1969).

As learning teaching process during the COVID-19 pandemic takes place virtually, feedback can be done through technological mediation where artificial intelligence application is provided. In this case, feedback can be given in written form through the use of comments feature in Microsoft Word or Google Docs. Another innovation is audio feedback to make students feeling invited to communicate by lecturer and the feedback given can be felt more personal (Cavanaugh & Song, 2014). Some examples of audio feedback are Vocaroo and Mote. Vocaroo is a website-based application that can be directly accessed at (https://vocaroo.com/) then start the recording process or download the recording file. Mote is an extension from Google that can be integrated with Google features such as Classroom, Google Docs, Google Slides, and Google Sheets. In addition, Screencast-O-Matic, software, can be used to record activities and sounds on a laptop and can be saved in video format (Lunze & Lehmann, 2010; Price & Mechelli, 2005).

Learning attitude on writing improvement

Before the COVID-19 pandemic, students studied offline with traditional methods and sometimes lecturers used electronic devices to mediate the learning-teaching proses. However, during this pandemic, they must study virtually by utilizing technology as a learning medium. Newton (2003), revealed "the online learning has 3 main areas: develop access to education and training, developing the quality of learning, and maintaining competitiveness in university. However, it does not mean that the three objectives cannot be built with an offline learning process. The social aspect among students must also be built and that can only be done by having face-to-face meetings. Regarding online learning by utilizing artificial intelligence application of technology, questions arise regarding student learning attitudes. In this case, whether students show a positive or negative attitude towards the online learning process. A research by Male et al. (2020), stated that "the students tend to be bored learning from home." This means students prefer to study in class rather than virtual learning. This research is in line with the research by Farooq & Javid (2012), which stated that "the students realized the importance of technology even though the use of technology was not encouraging." Govindasamy (2001), further emphasized that the students have negative attitudes towards online learning. In contrary, Guven Ozdemir & Sonmez (2021), found that The nursing students had mildly positive attitudes toward e-learning. In this research students' learning attitude with artificial intelligence application of technology and its effect on students' writing improvement is also studied (Duncan et al., 1997; Küçükoglu, 2013).

Methodology

This research was a descriptive quantitative research by highlighting students' perceptions of the use of artificial intelligence in online English learning. The focus of the research was the effect of independent variables (X) on dependent variable (Y_2) through intervening variable (Y_1). The independent variables were reading comprehension (X_1) and feedback (X_2). The dependent variable was

writing (Y$_2$), and the intervening variable was learning attitude (Y$_1$). The respondents were 100 Higher School students in Makassar City to whom the questionnaires were distributed directly. The research variables were measured using the five scales of Likert (strongly agree, agree, neutral, less agree, and disagree).

Test of research instrument

The research instrument was tested for its validity and reliability. A good research instrument must satisfy the criretia of validity and reliability (Kaharuddin, 2021).

- Validity Test: In this test of vaility, the value of each item and the total value of a variable were correleted by using *Pearson Correlation Product Moment* (r) with significant degree of 5% or 0.05. If the value of r$_{calculation}$ of each item of questionnaire is bigger than the value r$_{-table}$, the instrument is called valid and useable in this research.
- Reliability Test: In this test of reliability, the consistency of students in answering the questionnaire is tested. The criteria to determine the reliability of students' answer is by using *Cronbach Alpha. It* is said reliable if the value of *Cronbach Coefficient Alpha* is above 0,6. Otherwise, it is not reliable.

Test of classical assumption

- Normality Test: This test is intended to test the distribution of residual values in the model by using the test of Kolmogorv-Smirnov. A good regression model is one that has a normal distribution of residual values. the basis for making the decision is if the value of asymp. sig. (2-tailed) greater than 0.05 means the residual value is normally distributed.
- Multiclinearity test: This multicollinearity test is intended to determine the existence of a linear relationship between the independent variables. A good regression model is free from the assumption of multicollinearity. The basis for making decision is that if the value of vif is less than 10 or the tolerance value is bigger than 0.10, it means there is no multicollinearity.
- Heterocedastisity Test: This heterocedasticity test is intended to determine whether in the regression model there is an inequality of variance from the residuals of one observation to another (heteroscedasticity). The basis for making decision is if the value of Sig>0.05, then there is no heteroscedasticity.
- Linearity Test: This linearity test is intended to determine whether the two variables have a significant linear relationship or not. the basis for making decision is the sign value > 0.05 then there is a significant linear relationship between the independent variable and the dependent variable.

Inferential statistical analysis

This iinferential statistical analysis was conducted by path analysis with software of SPSS verse 21.

Hypothesis testing

In this hypothesis test, the direct and indirect effects of independent variables on dependent variable were tested. The hypothesis is:

- H_0 : variable X_1 and X_2, have no direct effect on variable Y_2
- H_1 : variable X_1 and X_2, have direct effect on variable Y_2.

Research Result

Research instrument is questionnaire distributed directly to 100 students of Higher School in Makassar City Indonesia. 90 questionnaires were retuned and among them 7 were flawed. Therefore, there are only 83 questionnaires processed in this research. The data are analyzed by software SPSS verse 21. The outputs are studied for the validity and reliability of the instrument. The criteria used to determine the validity of the instrument is that if the value r-calculation > the value of r-table, each item of the instrument is considered valid. For this purpose, the significant level 5% or 0.05 is used from which the value of r-table, 0.213 is got. This value is smaller than the value of r-calculation or r-calculation > r-table, that all items of questionnaires show r-calculation above 0.30. In means that the questionnaire has satisfied the criteria of validity. In reliability test, the output of SPSS shows the value of crombach alpha 0.778 which is above the value of r-table of 0.213. It means that the questionnaire has satisfied the criteria of reliability.

Table 1
The output of SPSS for test reliability
Reliability statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,778	,768	16

The classical assumption tests conducted in this research are normality test, multicollinearity test, linearity test, and heterocedasticity test. For the normality test, the test is conducted on the residual value. The output of the test using SPSS version 21 shows the value of Asymp. Sig. (2-tailed) of Kolmogorov Smirnov 0.200 which is bigger that 0.05 (0.200 > 0.05). It means that the residual variable is normally distributed.

Table 2
The output of SPSS for normality test
One-sample Kolmogorov-Smirnov test

		Unstandardized Residual
N		83
Normal Parameters[a,b]	Mean	,0000000
	Std. Deviation	,35598364
Most Extreme	Absolute	,080

Differences	Positive	,080
	Negative	-,069
Test Statistic		,080
Asymp. Sig. (2-tailed)		,200[c,d]

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.
d. This is a lower bound of the true significance.

To identify whether there is linear relationship between independent variables, multicolinearity test is applied. The independent variables are Reading (X_1) and Feedback (X_2). To make conclusion, the tolerance value of each variable is compared with 0.10 and the value of VIF is compared with 10.00. The output of SPSS indicated that tolerance value of each variable (X_1: 0.871, X_2: 0.595) is bigger than 0.10 and the value of VIF (X_1: 1,148, X_2: 1,681) is smaller than 10.00. The conclusion is that there is no linear relationship between independent variables and therefore there is no multicolinearity problem in the regression equation model.

Table 3
The output of SPSS for multicolinearity test

	Coefficients[a]						
	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1 (Constant)	1,454	,541		2,686	,009		
RD	,084	,150	,055	,562	,576	,871	1,148
FB	,399	,116	,405	3,438	,001	,595	1,681
ATT	,159	,086	,218	1,841	,069	,586	1,706
a. Dependent Variable: WR							

Heterocedasticity test is intended to know whether there is in regression model variance insimilarity from residual of one research to another research. A good model does not show heterocedasticity problem. The basis to make conclusion is:

- Value of Sig> 0.05 = no heterocedasticity
- Value of Sig<0.05 = there is heterocedasticity

The coefficient table column sig. denotes the value of sign. Of X_1 0.785 for, X_2 0.328 and Y_1 0.062. These values of sign. Are bigger than 0.05 which means that there is no heterocedasticity in the regression model.

Table 4
The output of SPSS for heterocedasticity test

		Unstandardized Coefficients		Coefficientsa Standardized Coefficients			Collinearity Statistics	
Model	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1 (Constant)	,464	,342		1,357	,179		
RD	-,026	,095	-,032	-,274	,785	,871	1,148
FB	,072	,073	,140	,984	,328	,595	1,681
ATT	-,103	,055	-,271	-1,890	,062	,586	1,706
a. Dependent Variable: RES2							

Linearity test is intended to know whether the independent variable and dependent variable show significant linear correlation. Criteria to determine the correlation is if the value of sign. Is bigger than 0.05, there is then significant linear correlation. Otherwise, there is no linear correlation. The output of SPSS as donoted by Anova table shows that the value of sign. In deviation from linearity is 0.099 bigger than 0.05. It means that there is significant linear correlation between independent variables and dependent variable.

Table 5
The output of SPSS for linearity test

			ANOVA Table				
			Sum of Squares	Df	Mean Square	F	Sig.
WR * FB	Between Groups	(Combined)	6,577	8	,822	6,505	,000
		Linearity	4,983	1	4,983	39,420	,000
		Deviation from Linearity	1,595	7	,228	1,802	,099
	Within Groups		9,353	74	,126		
	Total		15,931	82			

As this research uses intervening variable (Y1), the path analysis is conducted twice and two models are produced: model 1 and model 2. The independent variables are Reading (X_1) and Feedback (X_2). The dependent variable is Writing (Y_2) and the intervening variable is Attitude (Y_1).

Model 1

This model is constructed by X_1 and X_2 as independent variables and Y_1 as dependent variable. The output of SPSS is shown in table below.

Table 6
The output of SPSS for model 1

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	T	Sig.
1	(Constant)	-,507	,699		-,725	,471
	RD	,321	,191	,152	1,684	,096
	FB	,785	,122	,579	6,428	,000

Coefficients[a]

a. Dependent Variable: ATT

The table 6 shows the value of standardized coefficient of the independent variables as path coefficient of X_1 and X_2. The path coefficient matrix is:

$$\begin{pmatrix} \rho y1x1 \\ \rho y1x2 \end{pmatrix} = \begin{pmatrix} 0.152 \\ 0.579 \end{pmatrix}$$

The value of determinant coefficient or the value of R square is denoted in the model summary below:

Table 7
Output of SPSS for determinant coefficient (R^2) of model 1

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,643[a]	,414	,399	,46982

Model Summary

a. Predictors: (Constant), FB, RD
b. Dependent variable: Attitude

The R square value is 0.414. To calculate manually the R square value, the path coefficient matrix X_1 and X_2 is changed into row matrix and multiplied them with the Y_1 column matrix. From the R square, the path coefficient of other variables outside the model is calculated, $pY_{1\varepsilon}$.

$$\rho Y1\varepsilon = \sqrt{1 - 0.414} = 0,586$$

- Path coefficient of $\rho Y_1 X_1$
  For the path coefficient of pY_1X_1, namely from the path X_1 to Y_1, the column sig. in table 6 is 0.096 bigger than 0.05. However, the value of $t_{\text{-calculation}}$ 1.684 is bigger than the $t_{\text{-table}}$ 1.663. It is decided therefore that Ho is rejected and Hi received which means the path coefficient of X_1 to Y_1 is statistically significant.
- Path coefficient of $\rho Y_1 X_2$

For this path coefficient of pY_1X_2, the column sig. is 0.000 smaller than 0.05 and the value of $t_{\text{-calculation}}$ 6,428 is bigger than the $t_{\text{-table}}$ 1.663. It means therefore that Ho is rejected and Hi is accepted and so the path coefficient X_2 to Y_1 is statistically significant.

Model 2

In model 2, the students' Writing skill (Y_2) is dependent variable. Reading (X_1), Feedback (X_2), and Attitude (Y_1) are independent variables. Below is the output of SPSS for this model 2.

Table 8
The output of SPSS for model 2

| | Coefficients[a] | | | | | |
| | | Unstandardized Coefficients | | Standardized Coefficients | | |
Model		B	Std. Error	Beta	T	Sig.
1	(Constant)	1,454	,541		2,686	,009
	RD	,084	,150	,055	,562	,576
	FB	,399	,116	,405	3,438	,001
	ATT	,159	,086	,218	1,841	,049
a. Dependent Variable: WR						

The value of *standardized coefficients* as path coefficient for X_1 is 0.055, X_2 is 0.406 and Y_1 is 0.218. The matrix path coefficient is:

$$\begin{pmatrix} \rho y2x1 \\ \rho y2x2 \\ \rho y2y1 \end{pmatrix} = \begin{pmatrix} 0.055 \\ 0.406 \\ 0.218 \end{pmatrix}$$

Table 9
Determinant coefficient (R^2) of model 2

| | Model Summary | | | |
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,590[a]	,348	,323	,36268
a. Predictors: (Constant), ATT, RD, FB4				
b. Dependent Variable: WR				

The value of R Square is 0.348 calculated manually by altering the path coefficient matrix X_1, X_2 and Y_1 to path matrix and multiplied by the column matrix Y_2. The path coefficient of other variables outside the model $\rho Y_{2\varepsilon}$ is calculated:

$$\rho Y2\epsilon = \sqrt{1 - 0.348 = 0,652}$$

- Path Coefficient $\rho Y_2 X_1$
  For the path coefficient from the path X_1 to Y_2, the column sig. in table 8 is 0.576 bigger than 0.05 and the value of t-calculation 0,562 is smaller than the t-table 1.663. Therefore, Ho is accepted and Hi rejected means the path coefficient of X_1 to Y_2 is statistically not significant.
- Path Coefficient $\rho Y_2 X_2$
  For the path coefficient from the path X_2 to Y_2, the column sig. in table 8 is 0.001 smaller than 0.05 and the value of t-calculation 3,438 is bigger than the t-table 1.663. Therefore, Hi is accepted and Ho rejected means the path coefficient of X_2 to Y_2 is statistically significant.
- Path Coefficient $\rho Y_2 Y_1$
  For the path coefficient from the path Y_1 to Y_2, the column sig. in table 8 is 0.049 bigger than 0.05 and the value of t-calculation 1,841 is bigger than the t-table 1.663. Therefore, Ho is rejected and Hi accepted means the path coefficient of X_2 to Y_2 is statistically significant.

Hypothesis testing

The effect of Reading Comprehension (X1) on Students' Learning Attitude (Y1) is tested. The analysis of path coefficient of $\rho Y_2 X_1$ indicated that the significant value of X_1 is 0.576 is bigger than 0.05, and the value of t-calculation (0,562) is smaller than the value of t-table (1.663) or t-calculation<t-table. It proves Reading Comprehension has not effect on Students' Learning Attitude. Hence:
Hypothesis 1: "Reading has significant effect on Attitude" is rejected.

With regard to the effect of Reading Comprehension (X1) on students' Writing Improvement (Y2), the analysis denoted that the significant value of X_1 is 0.576 bigger than 0.05 and the value of t-calculation (0,562) is smaller than the value of t-table (1.663) or t-calculation > t-table. The conclusion is Reading Comprehension (X1) has no direct effect on students' Writing Improvement (Y2). Hence, the hypothesis:
Hypothesis 2: "Reading has direct effect on Writing" is rejected.

The indirect effect of Reading Comprehension (X1) through Attitude (Y1) on students' Writing Improvement (Y2) is tested. The indirect effect of X_1 through Y_1 on Y_2 is the multiplication between β values of X_1 on Y1 with β value of Y_1 on Y_2. As shown in table 6, the β value of X_1 on Y1 is 0,152 and β value of Y_1 on Y_2 is 0,218. Thus, 0,152 x 0,218 = 0,033. The total effect of X_1 on Y_2 is direct effect plus indirect effect: 0,055+0,033= 0,088. It means that the indirect effect is bigger than the direct effect of Reading Comprehension on the students' Writing Improvement. Hence, the hypothesis:
Hypothesis 3: "Reading has indirect effect through Attitude on Writing" is accepted.

The analysis of the effect of Feedback (X2) on Students' Attitude in learning writing with artificial intelligence (Y1), the significant value of X_2 is 0.000 smaller than 0.05 and the value of t-calculation is 6,428 is bigger than the value of t-table (1.663) or t-calculation > t-table. It satisfied the criteria of concluding that Feedback has effect on Attitude. Hence, the hypothesis:
Hypothesis 4: "Feedback has effect on Attitude" is accepted.

Regarding the direct effect of Feedback (X_2) on the Students' Writing Improvement (Y_2), the analysis shows the significant value of X_2 is 0,001 smaller than 0.05 and the value of t-$_{calculation}$ (3,438) is bigger than the value of t-$_{table}$ (1.663) or t-$_{calculation}$ < t-$_{table}$. It also fulfills the criteria of saying that Feedback has direct effect on students' Writing Improvement. Hence, the hypothesis:
*Hypothesis 5: "*Feedback *has direct significant effect on* Writing" *is accepted.*

The indirect effect of X_2 through Y_1 on Y_2 is calculated by multiplying the β value of X_2 on Y_1 with the β value of Y_1 on Y_2. The result is 0,579 x 0,218 = 0,126. The total effect of X_2 on Y_2 is the direct effect plus the indirect effect, 0.405+0,126= 0,531. The result is that the value of indirect effect (0,531) is bigger than the value of the direct effect (0.405). It means that X_2 has indirect effect through Y_1 on Y_2 or Feedback has indirect effect through Attitude on Students' Writing Improvement. Therefore, the hypothesis:
Hypothesis 6: "Feedback has indirect effect through Attitude on Writing" is accepted.

Effect of Attitude (Y_1) on Writing (Y_2) is tested. The criteria is if the significance value of Y_1 is bigger than 0.05 or T   t-$_{calculation}$ > t-$_{table}$, Y_1 is considered to have effect on Y_2. The result of the analysis shows that the significant value of Y_1 is 0.049 smaller than 0.05 and the value of t-$_{calculation}$ (1,841) is bigger than the value of t-$_{table}$ (1.663) or t-$_{calculation}$ < t-$_{table}$. It means that Attitude has effect on Writing. Hence, the hypothesis:
Hypothesis 7: "Attitude has effect on Writing" is accepted.

Discussion

During COVID-19, the process of learning-teaching of English is forced to be conducted virtually by using electronic devices such as computer, laptop or mobile phone. Selecting the appropriate Microsoft application is then important to run well the learning-teaching process. This paper studies the use of artificial intelligence in teaching reading and giving feedback for students' work to improve their writing skill. Students' attitude to the use of artificial intelligence is also studied to explain the effect of reading and feedback on writing skill. The benefit of using this artificial intelligence in learning-teaching is that it can do the automated tasks assigned to students. However, it is not imaginable that they can do the more complicated tasks of higher learning (Soto et al., 2012). Therefore, technological progress will be a common solution Bengio et al. (2013), for the problems of learning teaching in Higher Schools.

In teaching reading virtually, the reading passage can be uploaded on google classroom in form of PowerPoint. Pence (2019), said that meetings are held online as presentations on a slide show presentation program like PowerPoint. Students can also be given assignment through the google classroom and send it back to lecturers after working out the assignment. Here is lecturer's feedback applied for informing students about mistaken they have done both in diction and grammar. Students' understanding on the reading passage sent virtually by google classroom is a progress to boost writing competence, because their understanding must supported by good grammar and vocabulary, especially those used in the reading passage. Of course the students' progress in learning virtually must

supported by their positive attitude toward the use of artificial intelligence in learning-teaching process.

This research proves teaching reading online using the artificial intelligence with students' positive attitude has significant effect on their writing skill improvement. It proves by the total effect, 0,088, of Reading on Writing through attitude which is bigger than the direct effect 0,055. Without the students' positive attitude, the teaching of reading virtually does not contribute significant effect on students' writing skill. Therefore, the improvement of students' writing skill must be boosted by their positive attitude on the learning teaching of writing using artifical intelligence. Furthermore, feedback has direct effect on writing. In this case, feedback contributes significant effect on students' writing skill, even with the absence of students' positive attitude. This research proves that virtual teaching of reading and feedback using artificial intelligence with the intervening of positive attitude contributes 34.8% on students' writing skill improvemnts. The rest, 65,2% are contributed by variables outside this model. Therefore, improving students' writing skill requires good mastery on grammar and rich of vocabulary which can be developed by learning teaching of reading and feedback from lecturer and of course supported by students positive attitude. Electronic device with application of artificial intelligence could facilitate the process.

Conclusion

The global problem of COVID-19 outbreak is actually enforcing educators to effort using electronic devices with artificial intelligence application in learning teaching process. Teaching reading virtually with artificial intelligence application boosted by students' positive attitude is proved contributing significant effect on students' writing skill improvement. Teachers' feedback of students' works has also direct and indirect effect through attitude on students' writing skill improvement. This research proves that the virtual teaching of reading and feedback boosted by positive attitude contributes 34.8% to students' writing skill improvements.

References

Absatova, M., Aituarova, A., Ospanbekova, M., Azhgaliyev, M., Uanbayev, E., & Doshybekov, A. (2021). Experimental research of motivational and reflexive components of students' reading culture. *Linguistics and Culture Review*, *5*(S1), 670-683.

Arafah, B. (2019). The Idol: A Model for Incorporating Literature in Elt. *KnE Social Sciences*, 43-59.

Asri, D. N., Cahyono, B. E. H., & Trisnani, R. P. (2021). Early reading learning for special needs students: challenges on inclusive primary school during COVID-19 pandemic. *Linguistics and Culture Review, 5*(S1), 1062-1074.

Astawa, I. N., Handayani, N. D., Mantra, I. B. N., & Wardana, I. K. (2017). Writing English language test items as a learning device: a principle of habit formation rules. *International Journal of Social Sciences and Humanities*, *1*(3), 135-144.

Bench-Capon, T. J., & Dunne, P. E. (2007). Argumentation in artificial intelligence. *Artificial intelligence, 171*(10-15), 619-641. https://doi.org/10.1016/j.artint.2007.05.001

Bengio, Y., Courville, A., & Vincent, P. (2013). Representation learning: A review and new perspectives. *IEEE transactions on pattern analysis and machine intelligence*, *35*(8), 1798-1828.

Boden, M. A. (1998). Creativity and artificial intelligence. *Artificial intelligence*, *103*(1-2), 347-356. https://doi.org/10.1016/S0004-3702(98)00055-1

Boggs, J. A. (2019). Effects of teacher-scaffolded and self-scaffolded corrective feedback compared to direct corrective feedback on grammatical accuracy in English L2 writing. *Journal of Second Language Writing*, *46*, 100671.

Boud, D., & Molloy, E. (2013). Rethinking models of feedback for learning: the challenge of design. *Assessment & Evaluation in higher education*, *38*(6), 698-712.

Caplar, N., Tacchella, S., & Birrer, S. (2017). Quantitative evaluation of gender bias in astronomical publications from citation counts. *Nature Astronomy*, *1*(6), 1-5.

Cavanaugh, A. J., & Song, L. (2014). Audio feedback versus written feedback: Instructors' and students' perspectives. *Journal of Online Learning and Teaching*, *10*(1), 122.

Chandler, J. (2003). The efficacy of various kinds of error feedback for improvement in the accuracy and fluency of L2 student writing. *Journal of second language writing*, *12*(3), 267-296.

Corwin, R. G. (1976). "Dan C. Lortie": SCHOOL TEACHER (Book Review). *Social Forces*, *54*(4), 948.

Cotos, E. (2011). Potential of automated writing evaluation feedback. *Calico Journal*, *28*(2), 420-459.

Crosthwaite, P., Cheung, L., & Jiang, F. K. (2017). Writing with attitude: Stance expression in learner and professional dentistry research reports. *English for specific purposes*, *46*, 107-123. https://doi.org/10.1016/j.esp.2017.02.001

Duncan, L. G., Seymour, P. H., & Hill, S. (1997). How important are rhyme and analogy in beginning reading?. *Cognition*, *63*(2), 171-208. https://doi.org/10.1016/S0010-0277(97)00001-2

Durukan, E. (2011). Effects of cooperative integrated reading and composition (CIRC) technique on reading-writing skills. *Educational Research and Reviews*, *6*(1), 102-109.

Esmaeili, H. (2002). Integrated reading and writing tasks and ESL students' reading and writing performance in an English language test. *Canadian Modern Language Review*, *58*(4), 599-620.

Fahimirad, M., & Kotamjani, S. S. (2018). A review on application of artificial intelligence in teaching and learning in educational contexts. *International Journal of Learning and Development*, *8*(4), 106-118.

Farooq, M. U., & Javid, C. Z. (2012). Attitude of students towards E-learning: A study of English language learners at Taif University English Language Centre. *NUML Journal of Critical Inquiry*, *10*(2), 17-28.

Govindasamy, T. (2001). Successful implementation of e-learning: Pedagogical considerations. *The internet and higher education*, *4*(3-4), 287-299.

Graham, S., Berninger, V., & Fan, W. (2007). The structural relationship between writing attitude and writing achievement in first and third grade students. *Contemporary educational psychology*, *32*(3), 516-536. https://doi.org/10.1016/j.cedpsych.2007.01.002

Guven Ozdemir, N., & Sonmez, M. (2021). The relationship between nursing students' technology addiction levels and attitudes toward e-learning during the COVID-19 pandemic: A cross-sectional study. *Perspectives in Psychiatric Care*, *57*(3), 1442-1448.

Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of educational research*, *77*(1), 81-112.

Henderson, M., & Phillips, M. (2014, September). Technology enhanced feedback on assessment. In *Australian Computers in Education Conference*.

Henderson, M., Phillips, M., Ryan, T., Boud, D., Dawson, P., Molloy, E., & Mahoney, P. (2019). Conditions that enable effective feedback. *Higher Education Research & Development*, *38*(7), 1401-1416.

Hirvela, A. (2004). *Connecting reading & writing in second language writing instruction*. University of Michigan Press.

Horning, A. S., & Kraemer, E. W. (Eds.). (2013). *Reconnecting reading and writing*. Parlor Press LLC.

Jolliffe, W. (2007). *Cooperative learning in the classroom: Putting it into practice*. Sage..

Kaharuddin, A. (2020). Principles Behind Semantic Relation between Common Abbreviations and their Expansions on Instagram. *International Journal of Criminology and Sociology*, *9*.

Kaharuddin, A. (2021). Analysis Of Syariah Credit Cardfrom Islamic Economic Perspective: Evidence From Bni Bank In Indonesia. *Academy of Strategic Management Journal*, *20*(4).

Kaharuddin, K., Ahmad, D., Mardiana, M., & Rusni, R. (2021). Contributions of Technology, Culture, and Attitude to English Learning Motivation During Covid-19 Outbreaks. *Systematic Reviews in Pharmacy*, *12*(3).

Khadawardi, H. A. (2021). The Effect of Implicit Corrective Feedback on English Writing of International Second Language Learners. *English Language Teaching*, *14*(1), 123-139.

Kroll, J. F. (1993). Accessing conceptual representations for words in a second language. *The bilingual lexicon*, *53*, 481.

Küçükoğlu, H. (2013). Improving reading skills through effective reading strategies. *Procedia-Social and Behavioral Sciences*, *70*, 709-714. https://doi.org/10.1016/j.sbspro.2013.01.113

Kwakernaak, H. (1969). Optimal low-sensitivity linear feedback systems. *Automatica*, *5*(3), 279-285. https://doi.org/10.1016/0005-1098(69)90070-3

Lunze, J., & Lehmann, D. (2010). A state-feedback approach to event-based control. *Automatica*, *46*(1), 211-215. https://doi.org/10.1016/j.automatica.2009.10.035

Male, H., Murniarti, E., Simatupang, M. S., Siregar, J., Sihotang, H., & Gunawan, R. (2020). Atittude Of Undergraduate Student's Towards Online Learning During Covid-19 Pandemic. *PalArch's Journal of Archaeology of Egypt/Egyptology*, *17*(4), 1628-1637.

Miller, T. (2019). Explanation in artificial intelligence: Insights from the social sciences. *Artificial intelligence*, *267*, 1-38. https://doi.org/10.1016/j.artint.2018.07.007

Mohan, N., & Kumar, S. S. (2018). From the individual to the historical: a commentary on amitav ghosh as a writer of historical fiction with reference to

the glass palace. *International Journal of Social Sciences and Humanities*, *2*(3), 79-85.

Mozgovoy, M. (2011, September). Dependency-based rules for grammar checking with LanguageTool. In *2011 Federated Conference on Computer Science and Information Systems (FedCSIS)* (pp. 209-212). IEEE.

Newton, R. (2003). Staff attitudes to the development and delivery of e-learning. *New library world*.

Pence, H. E. (2019). Artificial Intelligence in Higher Education: New Wine in Old Wineskins?. *Journal of Educational Technology Systems*, *48*(1), 5-13.

Price, C. J., & Mechelli, A. (2005). Reading and reading disturbance. *Current opinion in neurobiology*, *15*(2), 231-238. https://doi.org/10.1016/j.conb.2005.03.003

Renandya, W. A. (2007). The power of extensive reading. *RELC Journal*, *38*(2), 133-149.

Ruslan, I., Sunubi, A. H., Halidin, A., & Kaharuddin, A. (2020). Paraphrasing Technique To Develop Skill for English Writing Among Indonesian College Students of English. *Sys Rev Pharm*, *11*(11), 291-297.

Soto, J. A., Armenta, B. E., Perez, C. R., Zamboanga, B. L., Umaña-Taylor, A. J., Lee, R. M., ... & Ham, L. S. (2012). Strength in numbers? Cognitive reappraisal tendencies and psychological functioning among Latinos in the context of oppression. *Cultural Diversity and Ethnic Minority Psychology*, *18*(4), 384.

Tsui, A. B., & Tavares, N. J. (2021). The Technology Cart and the Pedagogy Horse in Online Teaching. *English Teaching & Learning*, *45*(1), 109-118.

Vasiļjeva, T., Kreituss, I., & Lulle, I. (2021). Artificial Intelligence: The Attitude of the Public and Representatives of Various Industries. *Journal of Risk and Financial Management*, *14*(8), 339.

Widana, I.K., Dewi, G.A.O.C., Suryasa, W. (2020). Ergonomics approach to improve student concentration on learning process of professional ethics. Journal of Advanced Research in Dynamical and Control Systems, 12(7), 429-445.

Zhao, Y., Frank, K. A., & Ellefson, N. C. (2006). Fostering meaningful teaching and learning with technology: Characteristics of effective professional development. *Meaningful learning using technology: What educators need to know and do*, *161*, 179.