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Self Directed Learning Scale at University Context

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A B S T R A C T

This research was carried out to investigate a relationship between self-directedness, self-involvement, expressive language, self-assessment, language varieties, metacognitive skills, editing and problem solving, text processing, knowledge rehearsal, idea planning, goal oriented monitoring and evaluating, peer learning, feedback handling, interest enhancement, motivational self-talk, and emotional control and the main and forming factors of self-directedness, self-involvement, expressive language, self-assessment, language varieties, metacognitive skills, editing and problem solving, text processing, knowledge rehearsal, idea planning, goal oriented monitoring and evaluating, peer learning, feedback handling, interest enhancing, motivational self-talk, and emotional control of self directed learning. A convenience sample approach was used to recruit English majors from a range of State University of Yogyakarta. All participants were recruited intentionally, and that they were informed that they might leave the study at any moment either during collecting data. The participant criteria include second-year English major students from various State Universities of Yogyakarta. As the result of pearson correlation in this research, it was found that there was a substantial relationship between the variables examined in this research. Moreover, as the result of factor analysis in this research was found that from the 11 variables included in the research namely self involvement, expressive language, self assessment, language varieties, metacognitive skills, editing and problem solving, Cognition, Metacognition, Social Behavior, and Motivational Regulation, they can be grouped into two main factors. The implications of these findings lie in a deeper understanding of the underlying conceptual structure of self-directed learning in a university context. With the identification of the key factors emerging from these variables, a more focused approach can be developed to enhance students' self-directed learning. This can also aid in the development of more precise and measurable assessment instruments to gauge progress in crucial aspects of self-directed learning. Thus, the implications of these findings can enrich teaching and learning practices in higher education settings.

Introduction

In the context of Indonesia, it is obvious that university students have difficulty to express themselves well in writing, and this problem is commonly attributed to the educational system. Further, none particular instrument exists which provide a comprehensive insight into the power of self-directed writing throughout educational environments. By analyzing the level of self-writing, an instrument was devised to fill in the gaps in this research. In this research, the instrument and results of the procedure are explained, and it has been advised that a self-directed writing instrument be employed to inform teaching approaches.

A conceptual framework regarding the major research on self-directed learning and works on self-directed writing will be examined. Beyond that, the creation of the individual and collaborative writing survey, the participants, the context, data collecting, and ethical considerations will all be discussed. As identified criteria from the questionnaire, the aspects of self-directed writing will be discussed. Following that, the statistical analysis and findings will be given, followed by some closing remarks.

Self-directed learning

Self-directed learning (SDL) is the knowledge that do when they choose to teach ourselves (Jarvis, 2010). It's feasible that such learning takes place in a formal setting (in this instance, higher education), but it is much more probable that it takes place in an informal setting. Ramadhanty et al. (2023) said that self-directed learning is "a strategy in which learners, even without the involvement of so many others, diagnose their educational objectives, create instructional techniques, find human and other learning resources, pick and implement successful learning strategies, and attempt to measure learning outcomes."

Self-directed learning has been defined as "a technique wherein understudies direct their own learning are encouraged to accept personal responsibility for something and collaborative regulation of information processing (self-monitoring) and open to interpretation (self-management) procedures in the building projects and acknowledgement of meaningful and significant learning outcomes" by Loeng (2020). Self-directed learners could perhaps consists of the following such as a desire to learn consistently, a sense of accountability for their own learning, the ability to learn how to know and understand, trying to read for conceptual understanding, basic arithmetic skills, communication skills, understanding of and competence related to information technology solutions, a diversified inventory of pedagogical approaches, self-development skills, and high-level analytical thinking, including such critical thinking such as applying concepts (for instance, not experiencing troubles developing and maintaining intimate communication, being able to work in a team and learn cooperatively, etc.) argued by Adams (2006).

It is critical to assist students in reflecting on what, how, what why they have been learning in order to facilitate the process of competitive and individualistic learners (Kim et al., 2022). As a result, adult learners' education must go beyond imparting knowledge to assisting them in becoming self-directed learners. Students' interest and sense of accomplishment can be boosted by engagement in self-directed study in some kind of a second language school (Du, 2013). Furthermore, recognizing difficulties in an educational setting include externally managing (contextual supervision), respect to the parameters (intelligent accountability), and motivational (admission and task)"as according to Loeng (2020). As a result, learning can be geared toward encouraging self-directed learning using external control while also admitting that this is an emotional procedure that takes particular facility by the learner who is appropriately motivated to learn. On the other hand, considerable research have linked self-directed learning to language development. For the sake of this research, the definition of writing also should be clarified. According to Olivier (2016), a capacity to participate to writing and scaffolding can support learners with self-directed learning along with writing.

The shift in writing education such as "a teaching assistant, qualifications curriculum" to increased "student-centeredness," as according to Tremblay et al. (2013). While self-directed learning entails this same formation of learning objectives and standards, self-directed writing presents different struggles. "Effective writing is a primary aim, hierarchically organized, ongoing operation that needs a comprehension of the relationship among subject, purpose, and audience" as according Deane et al. (2008). Furthermore, the goal-setting and cognitive

strategies awareness of effective writers creates a strong relation among self-directed writing theory and writing. As a consequence, the self-directed writing (especially students) should have been able to identify priorities immediately in the process of writing and then choose appropriate instruments to attain those goals.

In the same approach as self-directed learners should have been able to perceive people and material resources, self-directed writings should have been able to identify resources needed for the writing process. According to Lovejoy (2009), learners could use self-directed writing to "draw on their own strengths, not just what they deeply care about, as well as how they choose to portray it." The resources discussed in this article ranged from these other people to conventional paper and digital materials, which are all essential to the process of writing.

Self-directed writers must be able to use specific tactics that have been discovered. Despite the fact that writing artefacts may be recognized in regards of a strategy as according to Flower & Hayes (1977), "writers are continually planning (pre-writing) and rewriting (re-writing) while they compose (write), not in clean-cut phases". Moreover, the aspects of self-directed learning (Knowles, 1975) as well as the forces involved in the writing process (Flower & Hayes, 1977) make up the autonomography process, which may be summarized such as writing relationships (independent or interdependent initiative), writing purposes (diagnose learning needs), writing exigencies (formulate learning goals), writing language (identify human and materials resources), writing itself (implement learning strategies), and reflection on writing (evaluate learning outcomes).

The factor analysis revealed that various statements in the developed self-directed writing self-rating scale would also provide information about the research participants' perceptions of writer's self-directedness, self-involvement, expressive language, self-assessment, language varieties, metacognitive skills, editing and problem solving, text processing, knowledge rehearsal, idea planning, goal oriented monitoring and evaluating, peer learning, feedback handling, interest enhancement, motivational self-talk, and emotional control.

The novelty of this research lies in the development of an assessment instrument focused on self-directed writing proficiency in the higher education context in Indonesia. Within this context, there is a lack of specific instruments providing a comprehensive insight into the power of self-directed writing across educational environments. By analyzing the level of self-directed writing, an instrument was devised to fill this gap in research. The study also presents a conceptual framework integrating major research on self-directed learning with works on self-directed writing. Furthermore, the factors emerging from the factor analysis provide new insights into participants' perceptions of their self-directedness in writing, encompassing aspects such as self-involvement, expressive language, self-assessment, language varieties, metacognitive skills, editing and problem-solving, as well as text processing and evaluation. Implications of these findings are also discussed, suggesting the use of self-directed writing assessment instruments to inform teaching approaches. Thus, this research offers a significant contribution to understanding and developing self-directed writing abilities in the higher education context in Indonesia.

Research Question

In this research, the researcher was asked about developing the self-directed writing self-rating measure. The research questions for this research are of significant interest to the researchers:

1. Is there a relationship between self-directedness, self-involvement, expressive language, self-assessment, language varieties, metacognitive skills, editing and problem solving, text

processing, knowledge rehearsal, idea planning, goal oriented monitoring and evaluating, peer learning, feedback handling, interest enhancement, motivational self-talk, and emotional control?
2. What are the main and forming factors of self-directedness, self-involvement, expressive language, self-assessment, language varieties, metacognitive skills, editing and problem solving, text processing, knowledge rehearsal, idea planning, goal oriented monitoring and evaluating, peer learning, feedback handling, interest enhancing, motivational self-talk, and emotional control of self-directed writing?

Research Method

Intruments

This is indeed a constructivist research method of the analysis quantitative research methodology. Quantitative research is an approach that prioritizes the utilization of numerical or numeric data in the collection, analysis, and interpretation of information. However, in some cases, quantitative research may also involve interviews as part of the data collection process (Indrawan et al., 2023). The purpose of this research would have been to find out into quantifiable results of self-directed writing variables. The first step in creating the self-directed writing survey would have been to do an analysis in order to develop a list of major characteristics of self-directed writing (Ayyildiz & Tarhan (2015) consulted a wide range of different literature on self-directed learning along with self-directed learning tools during this process. Since individual items in the questionnaire would have to have been identified from either the writing and writing pedagogical materials in efforts to answer all of the major causal and practical elements, which neither one of those instruments established uniquely related to writing. The list items of self-directed learning was decreased to 16 items. The items namely self-directedness, self-involvement, expressive language, self-assessment, language varieties, metacognitive skills, editing and problem solving, text processing, knowledge rehearsal, idea planning, goal oriented monitoring and evaluating, peer learning, feedback handling, interest enhancement, motivational self-talk, and emotional control.

Participants

English majors from a diversity of State University of Yogyakarta were gathered using a convenience sample technique. The invitation was sent to nine entire second-year undergraduate courses, and half of them (N = 80) accepted. All participants were recruited willingly, and they were instructed that they might leave the study at any moment either during data collection. They were told that participants academic achievement would not be reviewed, and that their participation in or absence from the research would have no influence on their grades.

Analysis and evaluation

The data for this study was gathered using a group-administered questionnaire. Additionally, ethical factors were taken into account. All participants gave their informed agreement to participate in this study, which was fully voluntary. At any point during the study, participants can opt out. Since the author of this research was also an instructor to the chosen participants, informed written consent was obtained from a third party (another classmate from outside of the Faculty), and data was collected by a student assistant outside of standard class hours. Throughout the study, participants' privacy was protected, and confidentiality was preserved. The participants were informed that their participation, whether positive or negative

would have no consequence on their results as well as the fact that the research will indeed only get access to the data at the end of the session.

Self-directed learning elements as recognized factors

An analysis of current literature as well as the ongoing process of building the self-directed writing assessment scale, as well as a discussion of the literature survey and the subsequent factor analysis, generated a considerable amount of data related to self-learning. Despite the fact that no controlled randomly was utilized in this investigation, p-values are presented for completeness' sake because a sample group has been used. On the other hand, Cohen's d regression analyses were interpreted. The factors are: self-directedness, self-involvement, expressive language, self-assessment, language varieties, metacognitive skills, editing and problem solving, text processing, knowledge rehearsal, idea planning, goal oriented monitoring and evaluating, peer learning, feedback handling, interest enhancement, motivational self-talk, and emotional control.

Reliability of measuring instrument

The first analysis was used in this research are descriptive statistic which is a preliminary data analysis technique used to offer a comprehensive overview of the measured variables. Analysis in descriptive statistics of this research in the form of data concentration (Mean) and data distribution (standard deviation) to know the value of pre test, post test and delayed test. Pearson Correlation, an analytical statistical method utilized by researchers, serves to ascertain the degree of closeness in the relationship between variables within this study. Furthermore, factor analysis was also used in this research which is a series of tests on a series of independent variables as factors is used to determine the major factors that most affect the dependent variable.

There are various correlation tests that could be employed, including Bonferroni Test which is a test used to analyze the same or different samples (equal and unequal) in each treatment. The Bonferroni test enables comparisons among treatments, between treatments and treatment groups, or among treatment groups within the research context. Regression Analysis which is to determine how much influence the main factors have on the lesson strategy variable and the influence between groups (Pre test, Post test, Delayed test). The Kruskal-Wallis test is a nonparametric statistical test based on ranking. Its objective is to assess if there exist statistically significant variances among two or more independent variable groups concerning the dependent variable, which may be measured on a numerical data scale (interval/ratio) or an ordinal scale.

Result and Discussion

Descriptive statistics

Descriptive statistics serves as an initial approach in analyzing data, offering a comprehensive summary of the measured variables. This analysis encompasses examining data concentration through measures like Mean, Mode, Median, and exploring data distribution using metrics such as standard deviation and variance. Table 1 shows the overall frequency as well as measure of dispersion of all variables in this research.

Table 1. Research variables of descriptive statistics

No	Item	Pre Test		Post Test		Delayed Test	
		Mean	SD	Mean	SD	Mean	SD
1	self directedness	8.14	1.24	3.04	1.14	8.32	1.03

2	self involvement	7.89	1.23	3.16	1.23	8.01	1.15
3	expressive language	7.96	1.16	2.67	1.14	8.30	1.19
4	self assessment	8.00	1.24	2.51	1.05	7.70	1.19
5	language varieties	7.86	1.21	2.69	1.13	7.80	1.23
6	metacognitive skills	7.66	1.14	2.65	1.14	7.68	1.13
7	editing and problem solving	7.85	1.17	2.65	1.13	7.74	1.29
8	text processing	7.87	1.09	2.79	1.12	7.69	1.09
9	knowledge rehearsal	8.07	1.23	3.12	1.13	7.94	1.09
10	ide planning	7.79	1.12	3.05	1.08	7.98	1.15
11	goal oriented monitoring and evaluating	7.94	1.07	3.20	1.22	7.83	1.05
12	peer learning	8.04	1.13	3.14	1.31	7.83	1.17
13	feedback handling	3.15	1.13	3.15	1.13	7.79	1.12
14	interest enhancem	7.77	1.12	3.09	1.22	7.75	1.19
15	motivtion self talk	7.90	1.28	2.93	1.16	7.96	1.16
16	emotional control	8.10	1.14	3.07	1.21	7.79	1.22

Table 1 presents the mean and standard deviation descriptions for all variables examined in this research. The highest average value in the Pre Test category is in the Self Directedness variable with an average value of 8.14. While the lowest average is in the feedback handling variable with an average value of 3.15. Furthermore, in the Post Test category, the highest average value is found in the goal oriented monitoring and evaluating variable with an average value of 3.20. While the lowest average is in the self-assessment variable with an average value of 2.51. Then in the Delayed Test category, the highest average value is found in the self-directedness variable with an average value of 8.32. While the lowest average is in the metacognitive skills variable with an average value of 7.68.

Pearson correlation

Correlation analysis is a statistical technique employed by researchers to assess the degree of association between variables in a study. The outcomes of the correlation examination utilizing the Pearson method are presented in Table 2.

Table 2. Pearson correlation test results between variables

No	Item	R 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	self directedness		0.804**	0.832**	0.840**	0.810**	0.842**	0.821**	0.834**	0.817**	0.825**	0.786**	0.822**	0.426**	0.808**	0.810**	0.795**
2	self involvement	0.804**		0.827**	0.778**	0.809**	0.798**	0.793**	0.817**	0.794**	0.796**	0.778**	0.801**	0.411**	0.799**	0.762**	0.805**
3	expressive language	0.832**	0.827**		0.807**	0.803**	0.823**	0.821**	0.830**	0.816**	0.798**	0.827**	0.817**	0.446**	0.803**	0.821**	0.790**
4	self assessment	0.840**	0.778**	0.807**		0.809**	0.830**	0.803**	0.815**	0.822**	0.812**	0.815**	0.790**	0.370**	0.810**	0.814**	0.812**
5	language varieties	0.810**	0.809**	0.803**	0.809**		0.821**	0.822**	0.827**	0.817**	0.808**	0.799**	0.807**	0.393**	0.795**	0.789**	0.804**
6	metacognitive skills	0.842**	0.798**	0.823**	0.830**	0.821**		0.829**	0.801**	0.821**	0.822**	0.802**	0.791**	0.414**	0.785**	0.802**	0.795**
7	editing and problem solving	0.821**	0.793**	0.821**	0.803**	0.822**	0.829**		0.817**	0.813**	0.802**	0.793**	0.791**	0.390**	0.810**	0.789**	0.816**
8	text processing	0.834**	0.817**	0.830**	0.815**	0.827**	0.801**	0.817**		0.799**	0.806**	0.796**	0.798**	0.366**	0.788**	0.791**	0.805**
9	knowledge rehearsal	0.817**	0.794**	0.816**	0.822**	0.817**	0.821**	0.813**	0.799**		0.822**	0.818**	0.803**	0.389**	0.810**	0.803**	0.818**
10	ide planning	0.825**	0.796**	0.798**	0.812**	0.808**	0.822**	0.802**	0.806**	0.822**		0.804**	0.798**	0.453**	0.788**	0.787**	0.797**
11	goal oriented monitoring and evaluating	0.786**	0.778**	0.827**	0.815**	0.799**	0.802**	0.793**	0.796**	0.818**	0.804**		0.794**	0.392**	0.799**	0.804**	0.781**
12	peer learning	0.822**	0.801**	0.817**	0.790**	0.807**	0.791**	0.791**	0.798**	0.803**	0.798**	0.794**		0.383**	0.785**	0.779**	0.789**

13	feedback handling	0.426**	0.411**	0.446**	0.370**	0.393**	0.414**	0.390**	0.366**	0.389**	0.453**	0.392**	0.383**		0.396**	0.418**	0.359**
14	interest enhancem	0.808**	0.799**	0.803**	0.810**	0.795**	0.785**	0.810**	0.788**	0.810**	0.788**	0.799**	0.785**	0.396**		0.794**	0.786**
15	motivtion self talk	0.810**	0.762**	0.821**	0.814**	0.789**	0.802**	0.789**	0.791**	0.803**	0.787**	0.804**	0.779**	0.418**	0.794**		0.765**
16	emotional control	0.795**	0.805**	0.790**	0.812**	0.804**	0.795**	0.816**	0.805**	0.818**	0.797**	0.781**	0.789**	0.359**	0.786**	0.765**	

Table 2 shows that the variables measured in the study have a significant correlation. The self_directedness variable has a value of r > 0.75 for all variables ranging from self involvement to Emotional Control except for the feedback handling variable. This indicates that the self-directedness variable has a fairly strong relationship with all variables in the study, namely self involvement, expressive language, self assessment, language varieties, metacognitive skills, editing and problem solving, text processing, knowledge rehearsal, idea planning, goal oriented monitoring. and evaluating, peer learning, feedback handling, interest enhancing, motivation self talk, and emotional control.

Factor Analysis

A series of tests on a series of independent variables as factors is used to determine the major factors that most affect the dependent variable in factor analysis. The following table shows the results of factor analysis in this research. The results of factor analysis in this research are presented in the following table:

Table 3. Results of factor analysis

Construct	N	Number of factors	% Variance Explained	Communalities Vary Between
Self directedness	100	1	78.04	0.84
Self involvement	100	2	5.05	0.80
Expressive language	100	2	1.77	0.84
Self assessment	100	2	1.56	0.83
Language varieties	100	2	1.49	0.82
Metacognitive skills	100	2	1.40	0.83
Editing and problem solving	100	2	1.32	0.82
Cognition	100	2	2.47	1.65
Metacognition	100	2	2.35	1.63
Social Behaviour	100	2	2.12	1.03
Motivational Regulation	100	2	2.45	2.40

Based on the results of factor analysis, from the 11 variables included in the study, namely self involvement, expressive language, self assessment, language varieties, metacognitive skills, editing and problem solving, Cognition, Metacognition, Social Behavior, and Motivational Regulation, they can be grouped into two main factors.

The value of Communalities vary between shows the value of the variable whether it is able to explain the factors that have been formed or not. A variable is considered capable of explaining a factor if its value is greater than 0.05. This can be shown from of the results in the table that perhaps the variables of self involvement, expressive language, self assessment, language varieties, metacognitive skills, editing and problem solving, Cognition, Metacognition, Social Behavior, and Motivational Regulation all get a value greater than 0.05. This means that self involvement, expressive language, self-assessment, language varieties, metacognitive skills, editing and problem solving, Cognition, Metacognition, Social Behavior, and Motivational Regulation are able to explain the 2 formed factors.

Furthermore, the variance explained value shows the contribution of each variable in explaining the variability of the 2 factors that have been formed. The self_directedness

variable contributed greatly to the formation of factor 1. The value reached 78.04%. Meanwhile, the variables of self involvement, expressive language, self assessment, language varieties, metacognitive skills, editing and problem solving, Cognition, Metacognition, Social Behavior, and Motivational Regulation have contributed 21.96% to the formation of factor 2.

Table 4. Table of matrix components

	Component
	1
self_directedness	.918
self_involvement	.896
expressive_language	.916
self_assessment	.909
language_varieties	.907
metacognitive_skills	.911
editing_and_problem_solving	.907
Cognition	.909
Metacognition	.902
Social Behaviour	.684
Motivational Regulation	.894

Extraction Method: Principal Component Analysis.

Table 4 shows how much a variable is correlated with the factor to be formed. It can be seen that the variables of self-directedness, self-involvement, expressive language, self-assessment, language varieties, metacognitive skills, editing and problem solving, Cognition, Metacognition, and Motivational Regulation are very closely correlated with factor 1. 0.89 (89%). Meanwhile, Social behavior variable has a correlation of 0.684 (68.4%) to the formation of Factor 1.

Bonferroni Test

The Bonferroni test is employed for analyzing similar or dissimilar samples (equal and unequal) within each treatment. This test facilitates comparisons among treatments, between treatments and treatment groups, as well as among treatment groups. The Bonferroni test designed his method to correct for increasing error rates in hypothesis testing that has multiple comparisons. The results of the Bonferroni test in this research can be seen in the following table.

Table 5. Bonferroni test results

Multiple Comparisons

Dependent Variable: Lesson_Strategy

						95% Confidence Interval	
	(I) Kat	(J) Kat	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Bonferroni	Pre Test	Post Test	4.66580*	.04514	.000	4.5571	4.7745
		Delayed Test	-.26270*	.04514	.000	-.3714	-.1540
	Post Test	Pre Test	-4.66580*	.04514	.000	-4.7745	-4.5571
		Delayed Test	-4.92850*	.04514	.000	-5.0372	-4.8198
	Delayed Test	Pre Test	.26270*	.04514	.000	.1540	.3714
		Post Test	4.92850*	.04514	.000	4.8198	5.0372

*. The mean difference is significant at the 0.05 level.

Based on the Bonferroni test, it can be seen that the difference in the average score for the overall lesson strategy in the Pre-test and Post-test categories is 4,665 with a range of differences reaching between 0.557 (Lower Bound) to 4.774 (Upper Bound). The average difference is significant. This can be seen by looking at the Sig value of 0.000 (less than 0.05). Furthermore, the average score for Lesson Strategy in the Pre Test and Delayed Test categories is -0.262 with a range of differences between -0.371 (Lower Bound) to -0.154 (Upper Bound). The average difference is included in the significant category. This can be seen by looking at the Sig value of 0.000 (less than 0.05). Then the average score for Lesson Strategy in the Post Test and Delayed test categories is -4.928 with a range of differences between -5.037 (Lower Bound) to -4.819 (Upper Bound). The average difference is significant. This can be seen by looking at the Sig value of 0.000 (less than 0.05).

Regression Analysis

After the main factors are formed, a regression test will be carried out to determine how much influence the main factors have on the lesson strategy variable and the influence between groups (Pre test, Post test, Delayed test). Here are the results of the regression test.

Table 6. Results of regression test

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1566.007	2	783.004	123770.197	.000[b]
	Residual	1.879	297	.006		
	Total	1567.886	299			

a. Dependent Variable: Lesson_Strategy
b. Predictors: (Constant), Kat, REGR factor score 1 for analysis 1

The Sig value in the F test shows how significant the influence of the main factor variables and the test category (Pre Test, Post Test, and Delayed test) together is on the dependent variable of Lesson Stratgey. The result is that the Sig value is 0.000 (<0.05). This means that together the main factors and the type of test have a significant effect on the variability of Lesson Strategy values.

Table 7. Coefficient of determination

Model Summary

Model	R	R Square	Adjusted Square	R Std. Error of the Estimate
1	.999[a]	.999	.999	.07954

a. Predictors: (Constant), Kat, REGR factor score 1 for analysis 1

The value of the coefficient of determination (R-Square) shows as good as the regression model that has been obtained. The R-Square value ranges from 0 – 1 (-100%). Table 8 shows that the resulting R-Square value is 0.999 (99.9%). This means that the main factor variable and the type of test can explain 99.9% of the variability of Lesson Strategy values. The remaining 0.01% is explained by other variables that have not been included in this study.

Kruskall Wallis test

The Kruskal-Wallis test, a nonparametric method based on ranking, aims to ascertain if there are significant differences among two or more groups of independent variables concerning the dependent variable, measured either on a numerical data scale (interval/ratio) or an ordinal scale. It serves as an alternative to the One-Way ANOVA test when assumptions like normality are not met. In this study, the outcomes of the Kruskal-Wallis test are outlined as follows:

Table 8. Mean rank results

Ranks

	Kat	N	Mean Rank
Lesson_Strategy	Pre Test	100	178.44
	Post Test	100	50.50
	Delayed Test	100	222.56
	Total	300	

Table 9. Kruskal wallis test results

Test Statistics[a,b]

	Lesson_Strategy
Chi-Square	212.284
Df	2
Asymp. Sig.	.000

a. Kruskal Wallis Test

b. Grouping Variable: Kat

The results of the Krusskall Wallis test show the asymp sig value of 0.000. This value is less than 0.05 so it can be concluded that the treatment in the study (Pre-test, Post-Test, and Delayed test) has a significant effect on Lesson Strategy.

Due to its omnibus nature, the Kruskal-Wallis test can solely determine the presence of a statistically significant difference without specifying which treatments exhibit variance. Consequently, a Post Hoc test, also known as a follow-up test, becomes necessary. As previously discussed, following the Kruskal-Wallis test, the Post Hoc analysis may employ the Mann-Whitney U Test. This test aims to evaluate discrepancies in means between individual groups or treatments. The outcomes of the Mann-Whitney test in this study are outlined as follows:

Table 10. Mann whitney test results

Item	**Lesson Strategy**		
	Pre Test x Post Test	**Pre Test x Delayed Test**	**Post Test x Delayed Test**
Mann-Whitney U	0.000	2794.000	0.000
Wilcoxon W	5050.000	7844.000	5050.000
Z	-12.218	-5.391	-12.218
Asymp. Sig. (2-tailed)	.000	.000	.000

Table 10 shows the Mann-Whitney U value between the Pre test and Post Test treatments of 0.000 and the Wilcoxon W value of 5050,000. When converted to a Z value, the amount is -12,218. Sig value or P Value of 0.000 <0.05. If the p value < the critical

limit of 0.05, then there is a significant difference between the Pre Test and Post Test groups. Furthermore, the Mann-Whitney U value between the Pre test and Delayed Test treatments was 2794,000 and the Wilcoxon W value was 7844,000. When converted to a Z value, the amount is -5.391. Sig value or P Value of 0.000 <0.05. If the p value < the critical limit of 0.05, then there is a significant difference between the Pre Test and Delayed Test groups. Then the Mann-Whitney U value between the Post test and Delayed Test treatments was 0.000 and the Wilcoxon W value was 5050.000. When converted to a Z value, the amount is -12,218. Sig value or P Value of 0.000 <0.05. If the p value < the critical limit of 0.05, then there is a significant difference between the Post Test and Delayed Test groups.

Discussion

There were two research question in this research. The first research question was investigated how a relationship between each indicators in this research namely self-directedness, self-involvement, expressive language, self-assessment, language varieties, metacognitive skills, editing and problem solving, text processing, knowledge rehearsal, idea planning, goal oriented monitoring and evaluating, peer learning, feedback handling, interest enhancement, motivational self-talk, and emotional control. As the result of pearson correlation in this research, it was found that there was a substantial relationship between the variables examined in this research. The self directedness variable has a value of r > 0.75 for all variables ranging from self involvement to Emotional Control except for the feedback handling variable. This indicates that the self-directedness variable has a fairly strong relationship with all variables in this research, namely self involvement, expressive language, self assessment, language varieties, metacognitive skills, editing and problem solving, text processing, knowledge rehearsal, idea planning, goal oriented monitoring. and evaluating, peer learning, feedback handling, interest enhancing, motivation self talk, and emotional control.

The report outlines the findings of a study that looked into how a group of students felt about their self-directed learning throughout a university semester was carried out by Ryan (1993). Significant increases in their judgments of the value of self-directed learning, as well as highly substantial changes in students opinions of overall skill as self-directed learners, were found as a result of the study. The outcomes are most likely attributable to the impact of the educational environment, as according to investigators. A research in a higher education classroom context, addresses instructional challenges in supporting self-directed learning (an adult education concept) as conducted by Wilcox (1996). The findings have consequences for how self-directed learning is framed in adult learning literature and how it is promoted in higher education. The emphasis is on identifying and exploring the impediments to effective self-directed learning instructional support in today's university.

A research was carried out by Aghayani & Janfeshan (2020). The goal of this review was to see how self-directed learning affected Iranian EFL students' writing achievement at two different language levels (pre-intermediate and intermediate). According with findings of this research, the selfdirected learning approach used to have a considerable impact on pre-intermediate and intermediate students' English writing abilities. The findings also revealed that there was a substantial difference in the development of English writing skill between the two groups of students in each level. Furthermore, a research was carried out by Ayyildiz & Tarhan (2015). The focus of this research was to create a valid and reliable measure for evaluating self-directed learning

ability in high school students. The CFA results backed up the nine-factor solution. The scale's final form features a nine-factor structure with a total of 40 components. The Self-Directed Learning Skills Scale is a five-point Likert-type scale used in this instrument (SDLSS).

The other research was investigated by Rashid & Asghar (2016). The findings revealed that Students' engagement and self-direction are directly related to their usage of technology. However, no substantial direct relationship among technological use and academic achievement was discovered. The findings suggest to a complex interplay of linkages between students' use of technology and their engagement, self-directed learning, and academic success. The repercussions directions for future research are highlighted as well.

The second research question was investigated how the main factors and forming factors of self-directedness, self-involvement, expressive language, self-assessment, language varieties, metacognitive skills, editing and problem solving, text processing, knowledge rehearsal, idea planning, goal oriented monitoring and evaluating, peer learning, feedback handling, interest enhancing, motivational self-talk, and emotional control of learning strategies-based writing instruction. As the result of factor analysis in this research, it was found that from the 11 variables included in the research namely self involvement, expressive language, self assessment, language varieties, metacognitive skills, editing and problem solving, Cognition, Metacognition, Social Behavior, and Motivational Regulation, they can be grouped into two main factors. Moreover, the variance explained value shows the contribution of each variable in explaining the variability of the 2 factors that have been formed. The self_directedness variable contributed greatly to the formation of factor 1. The value reached 78.04%. Meanwhile, the variables of self involvement, expressive language, self assessment, language varieties, metacognitive skills, editing and problem solving, Cognition, Metacognition, Social Behavior, and Motivational Regulation have contributed 21.96% to the formation of factor 2.

It can be seen that the variables of self-directedness, self-involvement, expressive language, self-assessment, language varieties, metacognitive skills, editing and problem solving, Cognition, Metacognition, and Motivational Regulation are very closely correlated with factor 1. 0.89 (89%). Meanwhile, Social behavior variable has a correlation of 0.684 (68.4%) to the formation of Factor 1.

Conclusion

In the findings of this research, it was showed that there was a substantial relationship between the variables examined in this research. This indicates that the self-directedness variable has a fairly strong relationship with all variables in this research. In addition, it was found that from the 11 variables included in the research namely self involvement, expressive language, self assessment, language varieties, metacognitive skills, editing and problem solving, Cognition, Metacognition, Social Behavior, and Motivational Regulation, they can be grouped into two main factors. The variance explained value shows the contribution of each variable in explaining the variability of the 2 factors that have been formed. As the result it can be seen that the variables of self-directedness, self-involvement, expressive language, self-assessment, language varieties, metacognitive skills, editing and problem solving, Cognition, Metacognition, and Motivational Regulation are very closely correlated with factor 1. 0.89 (89%).

Meanwhile, Social behavior variable has a correlation of 0.684 (68.4%) to the formation of Factor 1.

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Appendix
Indicators of Self Directed Learning

No	Item
1	self directedness
2	self involvement
3	expressive language
4	self assessment
5	language varieties
6	metacognitive skills
7	editing and problem solving
8	text processing
9	knowledge rehearsal
10	ide planning
11	goal oriented monitoring and evaluating
12	peer learning
13	feedback handling
14	interest enhancem
15	motivtion self talk
16	emotional control