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The Applicability of a Scale on Self-Regulated Writing Strategies in English for High School Students

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ABSTRACT

Abstract: Writing appeared to be crucial in learning foreign languages. This study aimed at examining the applicability of a measure on self-regulated writing strategies in terms of its psychometric properties. The scale items were designed from theoretical foundations and previous relevant studies. Questionnaires were distributed online to high school students, collected and analyzed as many as 106. Correlation, confirmatory factor analyses, and calculating Cronbach's alpha were carried out to make sure the applicability of the scale. The findings showed five main constructs to be applicable. They were self-initiating, planning, text-generating, revising, and acting on feedback.

Self-Regulated Learning (SRL) is one of the important factors determining the success of student learning. It is a learner's belief in their ability to engage in appropriate actions, thoughts, and behaviors to achieve meaningful learning goals, by conducting self-monitoring and self-reflecting on their own progress (Zimmerman, 2000). Language learning that is currently carried out online increases the relevance of SRL for students (Mahmud & German, 2021), because they need to control their thoughts, behaviour, and emotions independently to support the achievement of their learning success (Cahyanto & Afifulloh, 2021). Therefore, future foreign language learning, whether conducted online or offline, requires the students' good use of SRL strategies.

Writing, in comparison to the other language skills, is one of the most difficult skills for Indonesian students (Pratama & Astuti, 2021). This is because writing requires the ability to compile appropriate vocabulary, grammar, pronunciation, expressions, and sentences by considering concepts and ideas that are understandable for the reader (Pratama & Astuti, 2021). The level of difficulty increases when students write in a foreign language, for example in English for English as a Foreign Language (EFL) students in Indonesia (Pratama & Astuti, 2021). Students need the right strategy to reduce the obstacles and difficulties they encounter while writing. Self-Regulated Writing (SRW) is the use of SRL strategies in writing skills.

Several scholars have conducted SRL research related to writing skills as well as the research in SRW in the last few years. Some of them discuss SRL in writing for elementary school students (Bai, Hu, & Gu, 2014; Bai & Guo, 2018, 2021), junior high school students (Bai & Wang, 2021) and college students (Umamah & Cahyono, 2020). Some of the scales that have been used to describe the writing strategy are as follows.

First, the Writing Strategy Questionnaire (Bai, Hu, & Gu, 2014) which contains 46 questions, each containing a 5-point Likert-scale. There are 3 strategic dimensions with 7 subscales, namely metacognitive strategies (containing the self-initiation, planning, monitoring & evaluating sub-scale), cognitive strategies (containing the sub-scale revising, text generating, resourcing), and social/affective strategies (containing the help-seeking & affect managing sub-scale). Internal reliability of this scale, according to Bai, Hu, & Gu (2014) ranges from 0.53 to 0.75 for elementary school students in Singapore.

Second, Writing Strategies for Self-Regulated Learning Questionnaire (WSSRLQ) (Teng & Zhang, 2016) which contains 40 questions with a 7-point Likert-scale. This scale contains 4 dimensions, namely cognitive strategies (consisting of text processing/TP, and course memory/CM), metacognitive strategies (consisting of goal-oriented monitoring and evaluating/GME, and idea planning/IP), social behaviour strategies (containing feedback handling/FH, and peer learning/PL), and motivational regulation strategies (containing motivational self-talk/MST, interest enhancement/IE, and emotional control/EC). The internal reliability of this scale, according to Teng & Zhang (2016), is 0.70 for college students aged 18-22 years old in China.

Third, the Self-Regulated Learning Strategy Questionnaire (SRLSQ) (Abadikhah et al., 2018) which contains 60 items with a 5-point Likert-scale. It consists of 6 dimensions, namely motive, method, time, performance, physical environment, and social environment. The reliability of this scale, according to Abadikhah et al. (2018) is 0.95 for Persian speakers who learn English. Even though it has a high reliability, giving 60 questions to participants certainly takes a long time, and to improve the practicality of this questionnaire, it is necessary to reduce the questions item.

Fourth, the Questionnaire of English Writing Self-Regulated Learning Strategies (QEWSRLS) (Sun & Wang, 2020) which contains 26 questions with a 4-point Likert-scale (from 0 which means 'never' to 3 which means 'often'). This questionnaire is based on an adaptation of the Questionnaire of English Self-Regulated Learning Strategies (Wang & Bai, 2017). The QEWSRLS scale consists of 3 categories, namely environmental SRL strategies, behavioural SRL strategies, and personal SRL strategies. The internal reliability of this scale ranges from 0.65 to 0.88 (Sun & Wang, 2020).

Based on searches from the internet, the authors did not find many studies that examine the use of SRW strategies in Indonesia. So far, only one has mentioned the use of SRW by university students (Umamah & Cahyono, 2020). The authors, however, had not been able to find literature that discusses SRW strategies by high school students in Indonesia. The study conducted by Umamah & Cahyono (2020) only used the SRL questionnaire, so it did not use the SRW questionnaire. High school is an important level of education for preparing students to enter higher degree of education. This shows that even though it is needed, there is still no SRW instrument developed for research purposes in Indonesia. Therefore, this study aimed to examine the applicability of Writing Strategy Scale (WSS) that we have developed based on the adaptation from the previous research instruments. It is hoped that this study instrument would be valid and applicable for the SRW research in Indonesia. To that end, the researcher poses the following research questions: Is the SRW instrument developed in this study valid, meaningful, and reliable?

This study aimed at examining the applicability of a scale that we developed by adapting based on constructs from previous studies. Adaptations from the previous literature were mainly carried out on the number of questions and the Likert scale range. The results of the adaptation were then tested in order to determine the validity and reliability of the new scale when applied in other countries. The applicability of a scale can refer to validity and reliability (Cipora, Szczygieł, Willmes, & Nuerk, 2015; Halse, Bjørkløf Engedal, Rokstad, Persson, Eldholm, Selbaek, & Barca, 2020; Morgado, Meireles, Neves, Amaral, & Ferreira, 2017); performance, safety, time and cost efficiency (Al-Bahlani & Babadagli, 2011; Guida, 2021); and sharing the same philosophical orientation or cultural values towards scale items (Yu, de Maria, Barbaranelli, Vellone, Matarese, Ausili, Rejane, Osokpo, & Riegel, 2021). This present study used the very basic and widely used terms, i.e finding the appropriate validity, meaningfulness, and reliability known as psychometric properties. This scale was written in Indonesian language to solve the cultural and linguistic matters as stressed by Yu et al. (2021). However, the meaningfulness, validity and reliability of the scale needed to be assessed before the scale can be used.

Based on the four kinds of questionnaires that have been developed in previous research, this study used 7 constructs, namely: self-initiating, planning, text generating, self-monitoring, and management, revising, acting on feedback, and resourcing. The seven constructs express the writing skills. In addition, self-initiating, and self-monitoring and management are related to self-regulation. The other five constructs (planning, text generating, revising, acting on feedback, and resourcing) are often used in writing for various educational levels.

METHODS

This type of research is quantitative in nature by applying the idea of item-response-theory (IRT) which has long been applied in psychometric in which the characteristics of the items as a data source determine the meaning of groups which are called latent variables (De Ayala, 2013; Bock & Gibbons, 2021; Gorsuch, 2015; McDonald, 2014; Nering & Ostini, 2011). The applicability of items and constructs was traced in stages by taking into account the self-regulated writing scale grid, research samples, and the following analytical strategies.

This study was conducted at SMA Kolese St. Yusuf Malang or popularly called Kosayu High-School in the city of Malang, Indonesia. According to the school website (https://www.smakkosayu.sch.id/v3/about-us/), Kosayu High-School is one of the largest private schools in Malang with a population of 1,293 students originating from all provinces throughout Indonesia with equal distributions between male and female students. The education is coeducational which is almost balanced the students' gender. As in general, most high schools in Indonesia consist of three major streams namely science, social studies, and language. Two dominant majors in this school are science and social studies. The language major, on the other hand, has only one class in grades 11 and 12 with student number ranging from 10 to around 20 people. The sample of this study was 57.5% from science and 42.5% from social studies majoring students. As part of the study, on the problem of sample adequacy, the Kaiser-Meyer-Olkin (KMO) analysis was performed to solve the problem of sample adequacy. The results can be seen in Table 1. The instrument was arranged based on the grid outline, as many as 7 dimensions with 38 items. A questionnaire was composed several questions about the respondent's background and all the statements from the grid in Google Form (GF). The GF link was distributed via mobile phone to a random sample of respondents through the subject teacher after obtaining

permission from the School Principal. After 2 weeks of distributing the online questionnaire, 107 filled it out but one student was not willing his data to be used in this research. Thus, this study analyzed data from a sample of 106 with details of 42.1% males and 57.9% females, born in the years of 2003—2006. The respondents came from 14 different classes all of whom had experienced doing writing assignments (ranging from 5—24 times) given from their English teacher.

Data analysis was carried out by using two software, namely IBM-SPSS and LISREL respectively. In guaranteing the meaningful of the scale and its dimensions, we used the Indonesian language and the grid outline for scale development to make sure everything was clear with no misconception, then followed by the next three processes. First, item analysis with IBM-SPSS was conducted to sort valid items (represented in the item-total correlation) and reliability contribution (alpha criteria not exceeding 0.65 if the item is deleted). Second, confirmation of constructs and items was done through confirmatory factor analysis (CFA) embedded in LISREL, includes considering goodness of fit and inter-correlation between factors. CFA was chosen because the SRW scale has been arranged using a grid so that the number of dimensions and related items can already be seen. Third, ensuring the reliability of the results of the last selection was done by calculating Cronbach's alpha from the results of the CFA. In addition to the criteria for forming a dimension, there was a minimum of 3 items with a minimum loading (λ) $\geq$ 0.3 and t value $\geq$ 1.96 which being indicated by a black line (not red) (see Figure 1).

Table 1. KMO for Sampling Adequacy

Dimension (no. item)	KMO	Bartlett's Test of Sphericity		
		Approx. χ^2	Df	Sig.
1. Self-initiating (5)	0.747	108.693	10	.000
2. Planning (8)	0.607	118.163	28	.000
3. Text-generating (4)	0.550	53.214	6	.000
4. Self-monitoring (5)	0.748	155.257	10	.000
5. Revising (4)	0.676	83.878	6	.000
6. Acting on feedback (6)	0.678	82.515	15	.000
7. Resourcing (6)	0.596	56.098	15	.000

Regarding sample size, usually factor analysis requires a big number ideally 1,000 or at least 300 subjects (Tabachnick & Fidell, 2013). However, Table 1 showed that the results of the KMO calculation proved significant on Barlett's test of sphericity, meaning that a sample of 106 was sufficient for further analysis for the seven dimensions with all item contents in it.

FINDINGS AND DISCUSSION

The applicability assessment of the scale under study was conducted through three stages that had been mentioned, namely item analysis, confirmation of the validity of the dimensions and model fit, and reliability testing. Everything was presented and discussed promptly. First, the item analysis considered the item-total correlation and Cronbach's alpha value if the item was discarded, to decide whether the item should be retained or discarded. In Table 2 it was shown that of the 38 items formulated, eleven did not meet the specified criteria and thus fell out. The dropped items were 5, 6, 11. 13, 18, 19, 22, 32. 33, 35, 38, because the item-total correlation or alpha coefficient if the item deleted did not meet the predetermined criteria. Two dimensions also removed because they failed to have a minimum number of items, namely self-monitoring, and resourcing. The deletion of these two dimensions did not mean that they were not important, but the possibility that the meaning of these items and dimensions had not been commonly realized or done by high school students so that they responded to them in a very varied manner. Because of this, they were not consistent with each other. In addition, the reversed items were still used but researchers need to be aware of those items that had an inverse meaning (unfavorable items). For such remained items, the values were recoded backwards (4 changed to 3, 3 to 2, 2 to 3, and 1 to 4) before being factor-analyzed (CFA) in the second stage. By recoded such items, the results of the CFA need to be observed and interpreted in reverse from their meaning so as not to cause misunderstandings for users in the future.

Table 2. Item Analysis

No	Item Statement	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Decision	Construct
1	I try to figure out how to write a good English essay.	0.043	0.567	Used	Self-initiating
*2	I am reluctant to learn to write regularly.	-0.617	0.496	Used	
3	Besides doing my homework, I also practice writing English essays.	0.329	0.547	Used	
4	I read good English essays.	0.302	0.492	Used	
5	I write English essays at home to improve my writing skills.	0.204	0.747	Removed	
*6	I make essays without drafting beforehand.	-0.168	0.697	Removed	Planning
7	I think of some ideas to write about.	0.321	0.090	Used	
8	I think of vocabulary or sentences to be used in the essay.	0.468	0.106	Used	
9	I think of how to organize my ideas when writing an essay.	0.386	0.046	Used	
*10	I make a different essay from the samples the teacher gave in class.	-0.471	0.430	Used	
11	I discuss with others before starting to write.	0.069	0.632	Removed	
12	I pay attention to the provisions given by the teacher when writing an essay.	0.326	0.046	Used	
13	I also consider what the readers will think when they read my essays.	0.069	0.628	Removed	
*14	I am reluctant to re-read what I have written to develop new ideas.	-0.404	0.493	Used	Text-generating
15	I remember the format of my previous essays to be reused in my next essay.	0.340	0.653	Used	
16	I remember vocabulary or sentences from other books/other essays to be used in my essay.	0.310	0.103	Used	
17	I re-read what the teacher asked, for gaining new ideas.	0.323	0.068	Used	
*18	I let the initial plan of writing changing while I am writing my essay.	-0.281	0.550	Removed	Self-monitoring
19	I continue to read my essays to check for any errors.	0.207	0.088	Removed	
20	I try to use correct grammar in my sentences.	0.546	0.170	Used	
21	I put effort for my essays to be marked well by the teacher.	0.462	0.144	Used	
22	I always set a work target for myself when learning to write essays.	0.213	0.770	Removed	
23	I make a grammar change while checking my essay.	0.345	0.224	Used	Revising
24	I make a vocabulary change while checking my essay.	0.385	0.183	Used	
*25	I preserve my essay's original idea as I check my	-0.327	0.700	Used	
26	essay. I always revise my writing before submitting it.	0.488	0.063	Used	
27	I use helpful suggestions from my classmates in my essay.	0.311	0.469	Used	Acting on feedback
*28	I ignore my parents' useful advice for my essay.	-0.403	0.772	Used	
29	I incorporate useful feedback from my teachers into my essay.	0.441	0.398	Used	
30	I like to get critique/feedback about the ideas I use in my essay.	0.620	0.311	Used	
31	I try to improve my writing based on feedback/suggestions from others.	0.659	0.298	Used	
32	I asked the adviser why they asked me to make changes.	0.287	0.661	Removed	
33	I use digital dictionary when I have some difficulties inn vocabulary while writing.	0.228	0.164	Removed	

*34	I avoid dictionaries when I have difficulty in vocabulary while doing writing.	-0.221	0.424	Used	Resourcing
35	I look back over my previous essays for some useful vocabularies when writing.	0.254	0.453	removed	
*36	I avoid my previous essays when looking for useful phrases in writing.	-0.063	0.676	Removed	
37	I go back and forth between my previous essays for some useful ideas to be used for my current essay.	0.369	0.555	Used	
38	I search the Internet for some ideas to help myself produce an essay.	0.208	0.696	Removed	

Notes: * Reversed item.

The findings shown in Figure 1 were the results of all items that preserved and were analyzed through the CFA. All items were significantly charged (t value was greater than the criterion 1.96). The correlations between various factors in Table 3, some were high and low in addition to being significant and some were not (appears in red in Figure 1). This confirmed that the selection of the maximum likelihood extraction on CFA was correct.

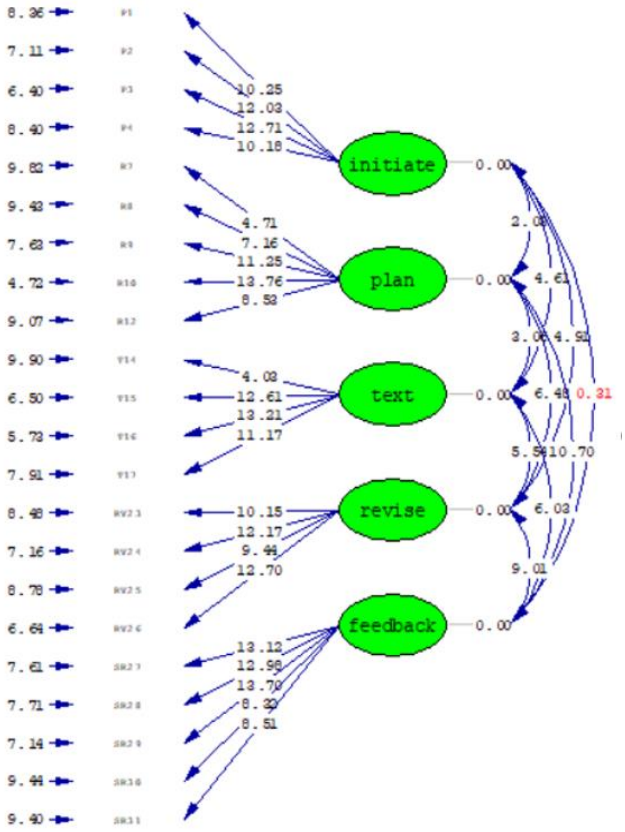

Figure 1. CFA from LISREL

Table 3. Factor Inter-Correlation Matrix from CFA

	Self- initiating	planning	Text- generating	Revising	Acting on feedback
1 self-initiating	1.000				
2 planning	0.70	1.000			
3 text-generating	0.40	0.72	1.000		
4 revising	0.33	0.34	0.65	1.000	
5 acting on feedback	0.15	0.37	0.69	0.37	1.000

Notes: All the correlation coefficients were significant, p = 0.00.

In terms of goodness of fit, Table 4 provided an interesting illustration. Not all coefficients from the analysis (actual value) satisfied the required criteria, for example Chi-square, GFI, NFI, CFI, IFI, and RFI. However, as a rule of thumb, if one of the criteria was met, then the resulting model was considered to have fulfilled the requirements (Brown, 2015; McNeish &Wolf, 2020). Because the other three criteria RMSEA, AGFI, and RMR met the fitness requirements, it was concluded that the CFA model was considered fit and deserved to be considered applicable.

Table 4. Testing the Goodness of Fit for CFA

	Eligibility measure	Expected value	Actual value	Description
1.	χ^2	(small) p >0. 05	0.000	Not fit
2.	RMSEA	$\leq$ 0.08	0.89	Fit
3.	GFI	$\geq$ 0.90	0.83	Not fit
4.	AGFI	$\geq$ 0.80	0.80	Fit
5.	RMR	$\leq$ 0.05	0.086	Fit
6.	NFI	$\geq$ 0.90	0.78	Not fit
7.	CFI	$\geq$ 0.90	0.86	Not fit
8.	IFI	$\geq$ 0.90	0.86	Not fit
9.	RFI	$\geq$ 0.90	0.74	Not fit

As previously mentioned, a construct needed at least three items to provide the minimum coverage (Hair, Black, Babin, & Anderson, 2019; McDonald, 2014) although it could be argued that one or two valid items should be kept if valid. Due to the meaningfulness, a construct is considered under identified if it is consisted of less than three indicators. In addition, with two or less indicators, the analysis would jump into deficit situations since negative degree of freedom, limited bivariate correlation, poor identification in meaning, and lack of appropriate analysis particularly in CFA (Bonifay & Cai, 2017; Brown, 2015; Mair, 2018; Heninger & Meiser, 2020; Tachnick & Fidel, 2013). Thus, the two constructs (self-monitoring and resourcing) that only had two items each were aborted. In general, Table 5 revealed that of the seven dimensions of WSS compiled, in the end only five met the requirements so that they could be applied to high school students. The five dimensions were self-initiating, planning, text-generating, revising, and acting on feedback. Cronbach's alpha ranged between 0.654 and 0.835 means reliable. It should be borne in mind that this instrument was not intended to be used as a diagnostic measuring tool to find weaknesses, but to reveal strategies commonly used by high school students when working on writing assignments in a foreign language. Teachers could take advantage of information by using this scale for teaching purposes by starting from what is commonly practiced by students. The final result of the WSS were attached as in the Appendix.

Tabel 5. Summary of Final Results Reliability

No	Dimension	No. of items			α	Note
		Initial	removed	final		
1	Self-initiating	5	1	4	0.835	
2	Planning	8	3	5	0.708	
3	Text-generating	4	-	4	0.654	Not enough items, aborted
4	Self-monitoring	5	3	-	-	
5	Revising	4	-	4	0.770	
6	Acting on feedback	7	2	5	0.702	Not enough items, aborted
7	Resourcing	5	3	-	-	
Total		38	12	22		

This study aimed to test the application of the self-regulated writing scale of students in senior high schools in Indonesia. The results of the study agreed that the overall scale could be applied in terms of the validity and reliability of the items and their dimensions as well. This result confirmed the earlier ideas adapted during the initial preparation which supposedly described the general school context in this country. The load (λ) of the results of the factor analysis showed that all constructs were proven to be valid. There were five constructs related to self-regulated writing expressed by students, namely self-initiative, planning, text generation, self-monitoring, acting on feedback, and resources.

The authors recognized that there were methodological limitations that deserve to be discussed here. Item response theory (De Ayala, 2013; Nering & Ostini, 2011) adopted in this study was indeed popular but still raises doubts and is currently being developed both in concept form and in software form. Three limitations were recognized in this study. First, related to the emergence of the idea of hierarchical factor analysis. The data of this research was not possible to be analysed due to the absence of level indicator variables so that the analysis of flat data still suffers from doubts. The second weakness relates to local cultural values. Human behaviour varies due to different cultural backgrounds, thus allowing for different interpretations

of each statement in the instrument (Rahman, 2020). Unfortunately, this consideration was overlooked early on in tool preparation. Third, due to the outbreak of the corona virus, educational practices around the world have changed from traditional patterns to heutagogy and cybergogy, although the data had been collected during this pandemic. Therefore, it is very possible that the applicability of the instrument is questioned when the pattern of educational practice changes and there are many variations in society.

Despite the limitations available, the WSS developed in this study is a valid instrument to use for future studies. The strength of this scale is the limited number of items (22), in comparison to 60 items in Abadikhah et al. (2018). Researchers could implement the scale to measure student's strategies in writing, specifically in Indonesian context.

CONCLUSION

From the findings of this study, it becomes clear that the WSS is applicable because it is a valid and reliable scale after going through the process of item analysis and factor confirmation. The gauge maintains the previous structure which remains the same as the original seven dimensions. These results indicate that this scale can be applied to high school students in Indonesia. Dimensions appear valid and reliable; although the indicator structure has changed because it does not meet the criteria. This experience explains the meaning of application in different educational environments, and locations, that have unique cultural contexts, and systematic structure.

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