Assessing the relationship between self-regulated strategies in digital writing and L2 grit for EFL learners

Yinqing Li*

School of Humanities & Foreign Languages, Zhejiang Shuren University, Hangzhou, China

Abstract. The development of digital tools has been reshaping students' writing experiences in their second language (L2). However, writing can be a challenging task for English as foreign language (EFL) learners and more study needs to investigate how this highly effort-demanding experience is related to their grit. This study investigates the relationship between self-regulated strategies in digital writing and L2 grit for EFL learners. A total of 128 undergraduate students from China participated in this study. Drawing on the self-regulated learning theory with data from Writing Strategies for Self-Regulated Learning Questionnaires, stimulated recall methods, and semi-structured interviews (n=8), this study revealed that one aspect of grit, perseverance of effort, was a positive predicator for self-regulated writing strategies. Moreover, students perceived this relation while also noted other influencers (e.g., demands for high scores). Pedagogical implications regarding L2 writing in this digital age will be discussed.

1 Introduction

The trend of technology-enhanced education has attracted scholars' attention in second language (L2) learning. In writing, students are constantly involved in digital tasks (e.g., writing in shared documents) and digital tools (e.g., Chatgpt). However, writing is often regarded a difficult skill for English as foreign language (EFL) learners, as evidenced by the challenges consistently reported in previous research (e.g., [1]). Some challenges are common in writing (e.g., errors in vocabulary), and some are specialized in digital context such as internet distractions [2]. In response to these challenges, scholars have explored the function of self-regulated strategies and the role of positive psychology (e.g., grit) in L2 writing in order to help learners overcome difficulties (e.g., [3,4]). Studies on self-regulated writing have yielded insights into the contribution of students' strategic behavior to their writing outcomes [5]. Meanwhile, studies on grit also reported possible predictions on students' writing performance [4]. However, limited attention has been given to assessing the relationship between self-regulated learning strategies and grit, and there is a scarcity of research investigating self-regulated writing in the digital context. To address these gaps, two questions were proposed: 1. What is the relationship between digital self-regulated writing strategies and L2 grit in EFL writing? 2. How do students perceive the function of L2 grit in relation to their strategic behavior in EFL digital writing?

2 Literature Review

2.1 Self-regulated writing strategies in digital contexts

Extensive research has explored learners' writing process, with a particular emphasis on self-regulation (e.g.,[6]). Self-regulation is defined as learners' self-directive process and self-belief to change their thoughts, feelings, and actions into academic skills [7,8]. Previous researchers have identified SRL strategies across four domains, including cognitive strategies, metacognitive strategies, motivational strategies, and social behavioral strategies. In the field of writing, studies have highlighted the advantages of employing SRL strategies, including improving learners' critical thinking skills [9], achieving better autonomy [10], increasing motivation and self-efficacy [11], and ultimately beneficial to learners' writing skills [12]. Although studies have confirmed the essential role of self-regulated writing strategies in language learning (e.g., [3]), less attention has been paid to digital contexts.

As digital components are now prevalent in education, writing encompasses different means of technology involvement (e.g., writing on shared documents, using online translator, etc.). Among the few studies on technology-enhanced learning connected to self-regulated writing strategies, Bai et al.[13] conducted an intervention study to improve students' SRL strategies use in writing with e-learning. Their findings revealed that with intervention, students used more SRL strategies in writing and demonstrated greater acceptance

* Corresponding author: yinqingli@zjsru.edu.cn

of e-learning. This indicates the possible correlation between self-regulated writing and digital learning, suggesting the need for further investigation, especially from the relatively unexplored positive psychology perspective.

2.2 The relationship between self-regulated strategies and grit

The concept of grit entails two components, perseverance of effort and consistency of interest [14]. In the field of language learning, grit has attracted scholars' attention in recent years (e.g., [15]). The majority of research shed light on the role of grit in students' academic achievement. It has been documented that these two components of grit are positively associated with academic achievement [16] and can play a predictive role in academic success [17].

In the field of self-regulated learning, many scholars have found the predictive function of grit, which may be attributed to its connection with emotional control, coordinating efforts, and achieving tasks. These elements are in accordance with the metacognitive and motivational factors in self-regulated learning. Wolters and Hussain [18] combined grit with SRL strategy and found out that gritty students tend to use more SRL strategies. In EFL contexts, Guo et al. [19] conducted a study on gender differences in primary students' motivation, grit, SRL strategy use, and English proficiency. These findings inform the hypothesis of this paper: grit can predict the self-regulated writing strategy use in L2 digital writing. Considering that SRL strategies and grit influence students' writing performance (e.g., [4,20]), more research is needed with wider learning contexts and participants.

3 Methodology

Equations should be centered and should be numbered with the number on the right-hand side. This study used a sequential explanatory mixed method [21] to identify the self-regulated learning strategy and the relationship with L2 grit. This methodological approach was selected because quantitative study (i.e., questionnaire) and qualitative study (i.e., stimulated recall interview) were designed sequentially with close connections, which could allow the researcher to refine quantitative results in detail and explore deeper ideas.

The research site was a university in eastern China. This study selected participants from English majors to ensure a certain degree of English writing competence. A total of 128 students in third year participated in the research. They had a strong need for English writing due to their major and many tasks are required to complete in digital platforms.

The data was measured in two forms, quantitative data in questionnaires and quantitative data in stimulated recall interviews. To assess students' self-regulated writing strategy, the Writing Strategies for Self-Regulated Learning Questionnaire (WSSRLQ) [22] was adapted with digital components to explore digital self-regulated learning. The grit scale questionnaire was modified from Teimouri et al.'s [15] by adding the digital contexts in some items. The two questionnaires are translated from English into Chinese to reduce the misunderstanding caused by language.

In terms of qualitative data, eight students who reported high-level strategy used in the questionnaire were chosen to participate in stimulated recall interviews after completing the questionnaire. They were required to complete an English writing task selected from IELTS and video record their whole writing process. After they completed the writing task, the researcher and the students watched the video together, identifying students' challenges, coping strategies, and understanding of the strategy use. Questions about self-regulated writing strategy and grit were also asked, (e.g., To what extent do you think grit would influence your writing strategies?).

To analyze the collected data, questionnaires were computed by using SPSS to examine the self-regulated writing strategy use. The correlation with L2 grit was assessed by Pearson correlation analysis. In order to explore students' understanding and perceptions, interviews data followed content analysis [23].

4 Results

The means and standard deviations for grit and self-regulated writing strategies are presented in Table 1.

Table 1 Means and standard deviations for grit and self-regulated writing

	n	Mean	Standard Deviation
Grit	128	3.02	0.55
Consistency of interest	128	3.35	0.63
Perseverance of effort	128	2.77	0.73
Cognitive strategies	128	3.47	0.59
Metacognitive strategies	128	3.48	0.55
Motivational strategies	128	3.52	0.52
Behavioral strategies	128	3.43	0.58

The correlations among grit and self-regulated learning strategies are presented in Table 2. The results show that perseverance of effort was positively related to four aspects of self-regulated learning strategies (all the figures are $\leqslant 0.001$). Consistency of interest showed little correlation with self-regulated strategies.

Table 2 Correlation for self-regulated strategies and grit variables

	1	2	3	4	5	6
1. Cognitive strategies		.521***	.612***	.458***	-0.054	.283**
2. Metacognitive strategy			.552***	.776***	-.234**	.567***
3. Behavioral strategy				.653***	-0.121	.362***
4. Motivational strategy					-.226*	.617***
5. Consistency of interest						-.225*
6. Perseverance of effort						

Note. **p<0.01, *** p<0.001.

Simple linear regression was conducted between perseverance of effort and self-regulated strategies. As shown in Table 3, perseverance of effort was a significant individual positive predictor for cognitive strategies, β=.283, t(128) =3.309, $p\leqslant$.001, metacognitive strategies, β=.542, t(128) =7.225, p<.001 motivational strategies, β=.596, t(128) =8.311, p<.001, and social behavioral strategies, β=.068, t(128) =352, p<.001. These findings indicate that students who reported that they had a determined mind on L2 learning tend to use more strategies in digital writing. However, consistency of interest had no significant prediction on strategy use.

Table 3 Results of regression analyses predicting perseverance of effort and self-regulated strategies

Predictor	Cognitive strategy		
	B	*β*	*Sig.*
Perseverance of effort	.231	.283	.001
	Metacognitive strategy		
Perseverance of effort	.408	.542	<.001
	Behavioral strategy		
Perseverance of effort	.278	.352	<.001
	Motivational strategy		
Perseverance of effort	.421	.596	<.001

Stimulated recall interviews (N=8) explored the participants' deep understanding on L2 grit and the correlation with strategy use in digital writing. From the interview data, they widely reported the convenience of digital environment in self-regulated strategy use:

When I type words on my phone, I don't have to type the whole word, because the mobile keyboard will automatically associate the words I want (S6, S8).

Despite the convenience, they often encountered problems in writing process, especially at the sentence level, which were largely attributed to their lack of English language proficiency:

When I try to write a sentence, I usually don't know how to write in English (S1).

Although writing difficulties existed, they still persisted in writing. One major factor was their understanding of their major, as described by S4:

I feel it is very hard for me to write in English and I know I'm not good at it. But I'm in English major, I have to learn it well. So usually, I would try my best. Also, there is not much chance for us to practice writing, so if there is a chance, I would make efforts. (S4)

Regarding strategy use, most of the participants reckoned connections between their L2 grit and their writing strategies usage, in addition to an emphasis on L2 proficiency. They also believed that other influencers on their strategy usage exist. The main variables reported by students were the importance of the task, which means to get a higher score, as described by the student below:

Sometimes I would judge how important the task is. If it is a daily practice, I would not use so many strategies because it has nothing to do with my final score in this course. (S6)

Meanwhile, some students reported task complexity and L2 proficiency were also related to strategy use: "I didn't use Chatgpt for brainstorming because it's only a 250-word task. It's not so difficult for me. If I'm not a diligent learner, then my language proficiency cannot be very high. If I'm a low proficiency language learner, I cannot identify which strategy is useful and I might just put everything in machine translation" (S1). These findings indicate that the relationship between grit and strategy use is complex with many other intermediate factors.

5 Discussion

This study investigated the correlation between self-regulated writing strategies and L2 grit in L2 digital writing. The quantitative data showed that in the two components of grit, the mean for consistency of interest appeared somewhat higher compared to the mean for perseverance, which is inconsistent with previous studies [18,24]. The possible explanation for this inconsistency lies in students' previous experience of digital writing. Since the education these participated students experienced before the university level often focused on handwriting tests, they have fewer opportunities or needs to write text on computers before undergraduate studies, causing their indifferences to L2 digital writing and insufficient understanding of its importance.

The statistical correlation analysis indicates similarities with previous studies [18,19] with slight differences. This study found that consistency of interest showed no correlation with self-regulated strategy use, which is in accordance with [24] study, whereas other study revealed students' grit related to time and study environment management strategies [18]. It is highly possible that results vary due to the different targeted

students (e.g., different majors) and context (e.g., L2 learning, L2 digital writing), which as a result, showcases the need of more studies on this topic with diverse student groups.

Similarly, the interview results also showed that students' belief in grit is able to predict the usage of writing strategies, while other influencers (e.g., writing tasks) on strategy use are more outstanding. The main reason for strategy use in digital writing that students reported was the importance of the task. Students' effort to do the task depended on the relationship with the final exam or other important test (e.g., CET-4 and TEM-4), which is related to the exam-driven education fever in China [25]. Furthermore, students believed that one with high language proficiency tends to use, monitor, and evaluate more strategies during the process, meanwhile also probably with high L2 grit. Their belief highlights the role of language proficiency in both self-regulated strategy and grit, generally aligning with previous studies on L2 grit and writing performance (e.g., [4]), and self-regulated strategies and writing proficiency (e.g., [26]).

6 Conclusion

The findings in the study extend the previous work by investigating the correlation between self-regulated writing strategies and L2 grit in L2 digital writing, suggesting a complex relationship between the importance of strategy use and grit in L2 digital writing. These give insights to educators that it is necessary to level up students' grit aiming to boost more strategy use in digital writing process. At the same time, students should shift their understanding of L2 digital writing from only achieving high scores to generating and acquiring knowledge. Further research may concentrate on the other variables that can influence grit and self-regulated strategies (e.g., language proficiency).

References

1. Liou, H.-C.; Kuo, C.-H.; Chang, J.S.; Chen, H.-J.; Chang, C.-F. Web-Based English Writing Courses for Graduate Students. In *Encyclopedia of networked and virtual organizations*; IGI Global, 2008; pp. 1871–1878.
2. Ching, K.L. Tools Matter: Mediated Writing Activity in Alternative Digital Environments. *Written Communication* 2018, *35*, 344–375, doi:10.1177/0741088318773741.
3. Bai, B.; Guo, W. Influences of Self-Regulated Learning Strategy Use on Self-Efficacy in Primary School Students' English Writing in Hong Kong. *Reading & Writing Quarterly* 2018, *34*, 523–536, doi:10.1080/10573569.2018.1499058.
4. Zhang, J.; Zhang, L.J. Examining the Relationship between English as a Foreign Language Learners' Cognitive Abilities and L2 Grit in Predicting Their Writing Performance. *Learning and Instruction* 2023, *88*, 101808.
5. Bai, B.; Wang, J. Hong Kong Secondary Students' Self-Regulated Learning Strategy Use and English Writing: Influences of Motivational Beliefs. *System* 2021, *96*, 102404.
6. Teng, L.S. Explicit Strategy-Based Instruction in L2 Writing Contexts: A Perspective of Self-Regulated Learning and Formative Assessment. *Assessing Writing* 2022, *53*, 100645, doi:10.1016/j.asw.2022.100645.
7. Zimmerman, B.J. Theories of Self-Regulated Learning and Academic Achievement: An Overview and Analysis. *Self-regulated learning and academic achievement: Theoretical perspectives* 2001, *2*, 1–37.
8. Zimmerman, B.J. Investigating Self-Regulation and Motivation: Historical Background, Methodological Developments, and Future Prospects. *American Educational Research Journal* 2008, *45*, 166–183, doi:10.3102/0002831207312909.
9. Teng, M.F.; Yue, M. Metacognitive Writing Strategies, Critical Thinking Skills, and Academic Writing Performance: A Structural Equation Modeling Approach. *Metacognition Learning* 2023, *18*, 237–260, doi:10.1007/s11409-022-09328-5.
10. Nguyen, C.T. EFL Students' Perceptions of the Effects of the Integration of Reading and Writing on Their Writing Skills. *Journal of Language Teaching and Research* 2022, *13*, 1177–1187.
11. Csizér, K.; Tankó, G. English Majors' Self-Regulatory Control Strategy Use in Academic Writing and Its Relation to L2 Motivation. *Applied Linguistics* 2017, *38*, 386–404.
12. Bai, B. Understanding Primary School Students' Use of Self-Regulated Writing Strategies through Think-Aloud Protocols. *System* 2018, *78*, 15–26, doi:10.1016/j.system.2018.07.003.
13. Bai, B.; Wang, J.; Zhou, H. An Intervention Study to Improve Primary School Students' Self-Regulated Strategy Use in English Writing through e-Learning in Hong Kong. *Computer Assisted Language Learning* 2022, *35*, 2265–2290.
14. Duckworth, A.L.; Peterson, C.; Matthews, M.D.; Kelly, D.R. Grit: Perseverance and Passion for Long-Term Goals. *Journal of personality and social psychology* 2007, *92*, 1087.
15. Teimouri, Y.; Plonsky, L.; Tabandeh, F. L2 Grit: Passion and Perseverance for Second-Language Learning. *Language Teaching Research* 2022, *26*, 893–918.
16. Lam, K.K.L.; Zhou, M. Examining the Relationship between Grit and Academic Achievement within K-12 and Higher Education: A Systematic Review. *Psychology in the Schools* 2019, *56*, 1654–1686, doi:10.1002/pits.22302.
17. Allen, R.E.; Kannangara, C.; Carson, J. True Grit: How Important Is the Concept of Grit for Education? A Narrative Literature Review. *International Journal of Educational Psychology: IJEP* 2021, *10*, 73–87.

18. Wolters, C.A.; Hussain, M. Investigating Grit and Its Relations with College Students' Self-Regulated Learning and Academic Achievement. *Metacognition Learning* 2015, *10*, 293–311, doi:10.1007/s11409-014-9128-9.
19. Guo, W.; Bai, B.; Zang, F.; Wang, T.; Song, H. Influences of Motivation and Grit on Students' Self-Regulated Learning and English Learning Achievement: A Comparison between Male and Female Students. *System* 2023, *114*, 103018, doi:10.1016/j.system.2023.103018.
20. Shen, B.; Bai, B. Chinese University Students' Self-Regulated Writing Strategy Use and EFL Writing Performance: Influences of Self-Efficacy, Gender, and Major. *Applied Linguistics Review* 2022.
21. Ivankova, N.V.; Creswell, J.W.; Stick, S.L. Using Mixed-Methods Sequential Explanatory Design: From Theory to Practice. *Field Methods* 2006, *18*, 3–20, doi:10.1177/1525822X05282260.
22. Teng, L.S.; Zhang, L.J. A Questionnaire-Based Validation of Multidimensional Models of Self-Regulated Learning Strategies. *The Modern Language Journal* 2016, *100*, 674–701, doi:10.1111/modl.12339.
23. Dörnyei, Z. Research Methods in Applied Linguistics 2010.
24. Martin, H.; Craigwell, R.; Ramjarrie, K. Grit, Motivational Belief, Self-Regulated Learning (SRL), and Academic Achievement of Civil Engineering Students. *European Journal of Engineering Education* 2022, *47*, 535–557, doi:10.1080/03043797.2021.2021861.
25. Yu, L.; Suen, H.K. Historical and Contemporary Exam-Driven Education Fever in China. *KEDI Journal of Educational Policy* 2005, *2*.
26. Hu, J.; Gao, X. Self-Regulated Strategic Writing for Academic Studies in an English-Medium-Instruction Context. *Language and Education* 2018, *32*, 1–20.