# Describing the Effect of Portfolios on Iranian EFL Learners' Use of Metacognitive Strategies in Writing Skill

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**Abstract**

The significance of metacognitive strategies in enhancing second language (L2) writing proficiency is well established. This study explored the impact of portfolio-based instruction on the application of metacognitive strategies in writing among Iranian learners of English to provide them learning opportunities to improve the education quality. A total of 50 intermediate-level female students were randomly divided into an experimental group and a control group. To assess their use of metacognitive strategies in writing, participants completed a questionnaire. During the intervention, the experimental group received explicit instruction on metacognitive writing strategies through the portfolio process, which involved revising their compositions based on feedback. In contrast, the control group underwent a similar instructional process but without the revision component. Data were analyzed using a one-way ANCOVA test. The findings revealed that (a) portfolio-based strategy instruction had a significant positive effect on learners' metacognitive strategy use in writing, and (b) learners' overall writing performance improved due to the strategy training. These results further support the effectiveness of strategy instruction, particularly when incorporated into classroom portfolio activities.

**Keywords:** metacognitive strategies, portfolio-based instruction, learning opportunities, education quality, writing strategies

## 1. Introduction

Teaching English has always faced challenges and opportunities in other ways (Barjestesh et al.2025). Research on second language (L2) writing has gone through several theoretical paradigms, with early studies heavily depending on theories of first language (L1) writing (Silva, 1990; Leki et al., 2008). According to such early theories, L2 writers adopted process-based pedagogical practices like goal-setting, ideation, structuring, and revision, and they used the same strategies as their L1 counterparts (Nation, 2009). Nevertheless, since the 1990s, L2 writing has gained recognition as a distinct field of study that requires approaches due to its difficulties and learner differences (Cumming, 2016; Hyland, 2019; Mitchell et al. 2019).

Additionally, L2 learners struggle with coherence, lexical and syntactic choices, planning, writing, assessing, and revising (Chamot, 2005; Santangelo et al., 2008). Due to these difficulties, empirical research has focused on teaching L2 writing techniques to overcome and improve writing processes, quality, and sociocultural aspects of L2 writing development (Leki et al., 2008). According to Wenden (1991), metacognitive strategies—cognitive processes that assist learners in managing their writing process—are among the many strategies that have been studied. It is impossible for students to effectively plan, monitor, and evaluate their writing development if they lack metacognitive awareness (Devine,1993). Therefore, metacognitive techniques are essential for helping L2 writers become more proficient, independent, and self-reliant (Hsiao and Oxford, 2002; Wei et al. in 2012).

Several frameworks, including those proposed by Oxford (1990), Cohen (2003), and Cohen and Weaver (2006), have been proposed for the categorization of metacognitive strategy and instruction. By empowering students to plan, monitor, and evaluate their writing process efficiently, metacognitive strategies are essential for developing second language (L2) writing skills (Harris et al., 2010). Additionally, these tactics are not considered enough in real-world settings, particularly portfolio-based educational settings (Riazi et al. 2018). More recently, portfolios have been incorporated into strategy-based instruction after being utilized in assessment and learner reflection in writing (Nunes, 2004). Writing portfolios, samples of students' written work over time, help students track their learning progress, become more conscious of strategies, and strengthen their strategic writing practices (Yang, 2003).

The salient characteristics of portfolios, such as the scope of the compiled works, contextual breadth, delayed appraisal, and learner-centered administration, render them potent conduits for advancing self-directed learning and written efficacy (Coombe & Barlow, 2004). Notwithstanding, the empirical basis supporting the effectiveness of portfolio-based pedagogical methods is scant (Plonsky, 2011; Yang, 2003). The present study aims to rectify this deficiency by scrutinizing the use of portfolios in amplifying learners' grasp and employment of metacognitive strategies in writing. Through a questionnaire to gauge learners' knowledge of metacognitive strategies, feedback on writing tasks, and strategy reinforcement through portfolio utilization, the research aims to establish whether this teaching approach can enhance the strategic writing capacity and overall performance of second language learners. The questions guiding this investigation are:

1. Do portfolios influence Iranian EFL learners' utilization of metacognitive strategies in writing?
2. Does portfolio-based strategy instruction have any tangible effect on Iranian EFL learners' writing skills?

By investigating the above questions, this research aims to contribute to the growing body of research on L2 writing instruction, offering evidence on the efficacy of portfolio-based strategy training and its potential for improving writing proficiency and learner autonomy.

## 2. Review of the Related Literature

Writing proficiency in a second language (L2) is a complex process that depends on several elements, such as linguistic ability, writing proficiency in the first language (L1), cohesive devices, and metacognitive skills and knowledge (Chamot, 2005; Ching, 2002; Oxford, 1994; Plonsky, 2011). Because they enable increased language capacity, autonomous learning, and self-regulation, metacognitive strategies are essential for differentiating between proficient and less skilled writers (Hsiao and Oxford, 2002). Awareness of cognition and deliberate control of cognitive processes are the two crucial elements of metacognition, a higher-order cognitive process that governs and synchronizes mental processes in learning (Tobias & Everson, 2009; 2010). Self-awareness of one's thoughts, or metacognitive awareness, entails understanding cognitive capacities, affective states, and the abilities, strategies, and information required for efficient task completion (Harris et al., 2010). When it comes to writing, this includes understanding the subject, goal, intended readership, linguistic structure, and one's writing strengths and shortcomings (Harris et al., 2010).

Metacognitive strategies, on the other hand, use declarative knowledge to accomplish particular objectives. Writing entails developing the skills necessary to organize, compose, edit, and ensure proper spelling, grammar, and punctuation, as well as establish an effective writing environment (Harris et al. 2010). According to Harris et al., conditional knowledge also helps students recognize the specific situations and circumstances in which they must apply their declarative and procedural knowledge, which makes it easier to choose the best approaches and timing for assigned writing tasks. 2010). Making the distinction between metacognitive knowledge and metacognitive strategies is crucial. Understanding one's cognitive processes is known as metacognitive knowledge, while consciously planning, observing, and evaluating cognitive processes is the focus of metacognitive strategies (Harris et al. 2010).

### Metacognition and L2 Writing

Second language (L2) writing is a complex process affected by metacognitive awareness, cohesive devices, linguistic competence, and L1 writing ability (Chamot, 2005; Qin and Zhang, 2019; Zhao & Liao, 2021). In particular, metacognitive strategies separate proficient L2 writers from novice writers through enabling independence and self-regulation (Hsiao & Oxford, 2002; Teng & Yue, 2023). There are two basic aspects of metacognition: the executive control of cognitive processes, metacognitive knowledge, that is, awareness of one's mental capabilities, and metacognitive regulation, that is, strategic control of learning (Harris et al., 2010; Everson & Tobias, 2009). Metacognitive knowledge in writing entails awareness of linguistic composition, audience requirements, and task requirements (Ramadhanti & Yanda, 2021). On the other hand, metacognitive strategies facilitate planning, monitoring, and revising of writing among students (De Silva, 2015; Teng, 2020). The research shows that proficient L2 writers use these strategies more than their less proficient counterparts (Wei & Zhang, 2020). Several models, such as Hayes' (1996) and Bereiter and Scardamalia's (1987), emphasize the processes of planning, drafting, and revising to highlight the role of metacognition in the development of writing (Hacker et al., 2009).

### Language Learning Strategies in L2 Writing

Oxford's (1990) taxonomy is one of the most prominent in the significant volume of language learning strategy (LLS) research conducted since the 1970s. This system divides Strategies into six categories: 1. Memory strategies (e.g., A. vocabulary retention mnemonics), 2. Cognitive strategies (e.g., A. rephrasing, repeating), 3. compensation plans (e.g., A. (circulation), 4. metacognitive strategies (e.g., A. self-monitoring, goal setting), 5. Emotional strategies (e.g., stress management), and 6. social strategies (e.g., peer collaboration. Planning, global organization, and revision are significant strategies in L2 writing (Arndt, 1987). According to research, teaching students explicit strategies, notably through models such as Self-Regulated Strategy Development (SRSD), is improving students' writing by teaching them how to set goals, track their development, and review in a systematized manner (Harris et al., Plonsky, 2011, 2010). Nonetheless, variables such as learner ability, age, and instructional context continue to provide mixed results about the effectiveness of strategy instruction (Kim and Pae, 2021; Sethuraman & Radhakkırıknahnan, 2020).

### Portfolios as a Metacognitive Strategy Development Tool

Portfolios, sets of student writing that show improvement over time, have been popular in L2 writing instruction because they encourage independence and self-reflection (Coombe and Barlow, 2004). Learner control (allowing ownership), delayed feedback (allowing iterative improvement), focus on process (drafting, revising, reflecting), and authentic measurement (connecting tasks to real writing in real

contexts) are all essential components of effective portfolios (Yang, 2003). Through students' recording and assessment of their writing procedures, portfolios may offer students metacognitive knowledge (Nunes, 2004). Peer collaboration and internet-based feedback in electronic portfolios or e-portfolios can facilitate improving strategies, asserts Riazi et al. (2018). Yet still, there are limited empirical research studies on teaching strategies through portfolios, especially in the context of EFL (Plonsky, 2011).

Language learning requires using metacognitive strategies in writing (Harris et al., 2010). Students use cognitive strategies to monitor and control writing processes, such as planning, assessing, and revising. According to research, students' writing skills rely, to a great extent, on explicit instruction and the use of metacognitive strategies in writing instruction. For instance, Ching (2002) found that students taught direct instruction in metacognitive strategies in an English for Specific Purposes (ESP) course could write and edit essays better. In addition, self-regulated strategy development (SRSD) enhanced the quality of students' writing, as seen in Graham and Perin (2007). Establishing background knowledge, talking about writing performance, providing support, and demonstrating techniques are all elements of SRSD. Writing instruction usually benefits from strategy instruction (Santangelo et al. (2008). It helps improve students' abilities to analyze complex tasks, guide mind processes, and provide crucial writing tasks like ordering, building, evaluating, proofreading, and revising. However, Plonsky (2011) contends that methodological shortcomings, the intricacy of strategy use, and insufficient knowledge regarding long-term effects are the main reasons why empirical evidence supporting the effectiveness of strategy instruction in second-language (L2) acquisition is ambiguous.

Portfolios as teaching tools of metacognitive writing abilities are an area that needs more study. Portfolios have been used to determine areas of difficulty with learners and styles of learning for centuries, aiding in improving skills and evaluation, states Nunes (2004). Yet research on how much they can utilize metacognitive writing strategies has been minimal. Self-assessment, reflective learning behaviors, independent skill acquisition, and involvement with assessment processes are all facilitated by portfolios. Since L2 learners are unlikely to have metacognitive skills for planning, regulating themselves, and monitoring their development in writing, the current research was carried out to evaluate whether portfolios can effectively teach EFL learners metacognitive writing strategies (Devine, 1993). The study aimed to raise learners' awareness regarding metacognitive writing strategies and the effect of instruction in strategy on their writing skills by using a teaching method based on portfolios that apply these strategies.

This review emphasizes the significance of metacognitive strategies to L2 writing skill development. Furthermore, it proposes that portfolios can act as a scaffolding tool, facilitating the development of these strategies. Teachers can make L2 students more autonomous and proficient writers by integrating portfolio-based instruction with explicit strategy instruction. Longitudinal methodology should be used in future research to test the long-term implications of such instructional techniques.

## 3. Method

### Design and Sampling

A quasi-experimental pretest-posttest control group design was used in this study to investigate how portfolio-based instruction affected the use of metacognitive techniques in L2 writing. Out of 98 students who obtained B1-level proficiency scores (70–95) on the Preliminary English Test (PET), 50 female high school students (16–17 years old) in Tehran, Iran, made up the sample. Afterward, they were randomized to either the experimental group (n = 25), which was taught portfolio-based metacognitive strategies, or the control group (n = 25), which was taught traditional writing instruction techniques. To minimize confounding variables, the participants' language skills, gender, and educational backgrounds were also comparable, allowing for a comparative assessment of the development of metacognitive strategies. In particular, according to their PET results, they were all native Persian speakers studying English at the B1 level (CEFR). High Cronbach's alpha coefficients for the reading ($\alpha$=0.91) and writing ($\alpha$=0.80) sections of the PET confirmed its reliability, and item discrimination indices offered more proof of the test's capacity to differentiate between various proficiency levels. The study ensured that any differences in outcomes could be more reliably attributed to the intervention and not to pre-existing conditions by only recruiting participants who fell within this narrow score range.

### Procedure

The intervention was implemented over six weeks and was integrated into participants' regular English language instruction. The intervention focused on enhancing learners' use of metacognitive strategies through reflective portfolio writing. The primary researcher, a qualified English language instructor with over ten years of teaching experience and formal training in metacognitive instruction, carried out the instructional sessions. Each weekly session (90 minutes) involved direct strategy instruction, modeled think-alouds, guided practice, and metacognitive journaling.

The participants were instructed on specific metacognitive techniques, including goal setting, planning, self-monitoring, and self-evaluation. These techniques were drawn from Oxford's (2011) Strategic Self-Regulation Model and were explicitly taught using sample language tasks. The reflective portfolios served as learning and assessment tools; participants used them to document their weekly strategy use, challenges faced, and perceived progress. These portfolios were reviewed weekly, and formative feedback was provided to scaffold learners' metacognitive growth.

All study participants were female university students, a decision influenced by the gender-based enrollment structure of the institution where the study was conducted. Accordingly, the title, research aim, and research questions were revised to reflect the participants' gender, acknowledging this demographic limitation and ensuring transparency in scope.mA researcher-developed questionnaire was administered

before and after the intervention to evaluate changes in metacognitive awareness and perceived writing development. The questionnaire was grounded in established instruments such as Schraw and Dennison's (1994) Metacognitive Awareness Inventory and adapted to suit the context of writing instruction. A panel of three applied linguistics experts reviewed the items to ensure content validity. The instrument was piloted with a similar group of ten female students, and necessary modifications were made based on their feedback. Cronbach's alpha coefficients for the main scales in the post-revision version indicated acceptable internal consistency ($\alpha = 0.81$).

Ethical considerations were rigorously addressed throughout the study. Before data collection, participants were given an informed consent form detailing the study's aims, procedures, and their rights as participants, including the right to withdraw at any stage without penalty. The research protocol was reviewed and approved by the institutional ethics committee. All data were anonymized to protect confidentiality, and participant responses were securely stored

**Data Analysis**

To establish intervention effectiveness, quantitative data were analyzed rigorously. Participant questionnaire responses and PET scores were combined through descriptive statistics, and ANCOVA established the portfolio effect by equating post-test scores between groups while adjusting for pretest differences. Reliability measures like Cohen's Kappa and Cronbach's alpha also maintained the internal consistency of instruments and the integrity of scoring processes. Using these analytical techniques, the research ensured that the results were pedagogically significant and statistically significant via examination of the hypothesis that portfolios increase the effectiveness of metacognitive strategies and determining the applied implications of the results.

## 4. Results

**Research Question 1: Effect of Portfolios on Metacognitive Strategy Use**

To examine the effect of the portfolio-based intervention on learners' metacognitive strategy use, an ANCOVA was conducted controlling for pretest scores. Table 1 summarizes the adjusted means, F-values, and effect sizes.

**Table 1.** ***ANCOVA Results for Metacognitive Strategy Use (Posttest Means Adjusted for Pretest)***

| Variable | Experimental Group M (SD) | Control Group M (SD) | F(1,47) | $\eta^2$ | 95% CI for $\eta^2$ |
|---|---|---|---|---|---|
| Overall | 4.12 (0.56) | 3.24 (0.61) | 31.82*** | 0.40 | [0.21, 0.52] |
| Planning | 4.35 (0.49) | 3.12 (0.72) | 32.15*** | 0.41 | [0.23, 0.53] |
| Monitoring | 3.98 (0.58) | 3.41 (0.65) | 15.62*** | 0.25 | [0.09, 0.38] |
| Evaluation | 4.22 (0.53) | 3.28 (0.69) | 26.84*** | 0.36 | [0.18, 0.48] |

Note. *All results significant at $p < .001$. ANCOVA controlled for baseline (pretest) strategy scores.*

The ANCOVA results reveal significant group differences in favor of the experimental group across all strategy domains. The largest effects were observed in planning ($\eta^2 = 0.41$) and evaluation ($\eta^2 = 0.36$), suggesting that portfolios helped students set goals, structure their writing, and critically assess their progress. While monitoring also improved significantly, its effect size ($\eta^2 = 0.25$) was relatively smaller, pointing to the need for more targeted support in developing this dimension of metacognition.

**Research Question 2: Effect of Portfolios on Writing Performance**

To assess the impact of the intervention on writing performance, a second series of ANCOVA tests were conducted using pre-intervention writing scores as covariates. Table 2 presents the adjusted posttest means and relevant statistics.

Table 2. *ANCOVA Results for Writing Performance (Posttest Means Adjusted for Pretest)*

| Measure | Experimental Group M (SD) | Control Group M (SD) | F(1,47) | $\eta^2$ | 95% CI for $\eta^2$ |
|---|---|---|---|---|---|
| Overall Score | 17.35 (2.14) | 14.20 (2.45) | 29.67*** | 0.39 | [0.20, 0.51] |
| Revisions | 4.20 (1.10) | 1.80 (0.90) | 50.12*** | 0.52 | [0.35, 0.61] |
| Syntax | 3.45 (0.62) | 2.78 (0.71) | 12.42** | 0.21 | [0.06, 0.33] |
| Lexis | 3.62 (0.58) | 3.05 (0.64) | 10.74** | 0.19 | [0.05, 0.30] |

Note. *$p < .01$*, **$p < .001$. ANCOVA controlled for pretest writing performance scores.*

Findings indicate that students in the portfolio condition significantly outperformed those in the control group in overall writing performance and on specific subcomponents. The most substantial improvement was in revision behavior ($\eta^2 = 0.52$), reflecting deeper engagement with the writing process. Gains in syntax and lexis also confirm that portfolio use supported more sophisticated language production. Together, the ANCOVA results confirm the dual impact of portfolio-based instruction: It not only fostered learners' use of metacognitive strategies, particularly planning and evaluation, but also translated into measurable gains in writing performance. Using covariates enhanced statistical control, making it clear that the post-intervention differences were not due to baseline disparities. These results underscore portfolios' pedagogical value as tools for cognitive and linguistic development in female EFL contexts.

## 5. Discussion

***Testing Hypothesis 1: Portfolio Effects on Metacognitive Strategy Development***

The statistically significant results validating our initial hypothesis agree with and supplement earlier work on the metacognitive development of L2 writing strategies. Macaro (2001) showed that explicit training of strategies facilitates learners' planning and self-evaluation skills. Table 1 shows that portfolio intervention influenced planning ($\eta^2 = 0.41$) and evaluation strategy ($\eta^2 = 0.36$). Tobias

and Everson (2009) describe the "online processing challenge" as the built-in difficulty of generating and monitoring language simultaneously, and this is something that can be illustrated in the relatively small gain found in monitoring strategies ($\eta^2 = 0.25$). This research upholds the argument presented by Cohen and Weaver (2006) that portfolios offer unique possibilities for strategic development as tools both for learning and assessment.

Ikeda and Takeuchi's (2006) argument that portfolios help with task analysis and goal-setting through the visibility and tangibility of the writing process is widely supported by the sheer volume of developments in planning theory. L2 writers, as they cannot frequently translate metacognitive knowledge into action, require this visibility (Zhao and Liao, 2021). Qin and Zhang (2019) found that metacognitive strategies develop unevenly in multimedia environments, such as in the differential gains by strategy type. Our findings show that portfolios can be particularly useful for strategies involving temporal displacement (evaluation of past performance and prediction of future performance) instead of concurrent processing (monitoring contemporaneous production). Within the context of Ramadhanti and Yanda's (2021) research on developing metacognitive knowledge, looking at this variation in further depth would be interesting.

The substantial writing gains noted in Table 2 ($\eta^2 = 0.39$ for overall writing performance) align with the metacognitive theory of writing development put forward by Harris et al. (2010). The substantial effect noted in revision practices ($\eta^2 = 0.52$) reinforces Graham and Perin's (2007) Self-Regulated Strategy Development (SRSD) model, stressing the way thinking based on portfolio can structure and make richer the process of revision. These findings directly answer Plonsky's (2011) call for more methodologically sound evidence in strategy instruction research by demonstrating that portfolios offer the contextual assistance necessary for purposeful strategy use and transfer.

The improved linguistic aspects of writing—syntax ($\eta^2 = 0.21$) and lexis ($\eta^2 = 0.19$)—also answer De Silva's (2015) finding that metacognitive strategy training improves not just the writing processes but also second language acquisition. Hyland (2019) argued that such results suggest that L2 writing instruction entails linguistic and metacognitive development synergistically, not competitively. Moreover, the correlation between metacognitive strategy use and writing performance supports Riazi et al.'s (2018) argument that strategic competence effectively lies at the root of writing quality.

## 6. Conclusions

The results shape the current body of research using portfolios and strategy instruction in second language instruction. Portfolios are advantageous to students in that they become more metacognitive in their strategy approach to writing, justifying their place as a tool for teaching second language strategy writing, according to the results. Students can rehearse critical strategies in a setting of personal meaning, translate them into writing assignments, and become masterful with portfolios. Apart from that, the research has pedagogical applications to teaching approaches. Incorporating strategy instruction into L2 writing courses purposefully facilitates instructors in strengthening the metacognitive knowledge of their students. Various teaching methods can be used to instruct writing strategies, and portfolios offer instructors a second option. Because portfolios are effective in instructing strategies, pedagogical shifts from explicit teaching of writing strategies to more effective, application-oriented instruction can result. The results also have significant pedagogical implications for EFL writing pedagogy. Following the research, implementing metacognitive strategies as an instructional intervention increased the students' writing production. The results imply that metacognitive strategies should aim at good writing instruction to support students in achieving the skills they need to write better through systematically teaching metacognitive writing strategies.

### Theoretical Implications

These findings add to current theoretical discussions in three essential ways. First, they support Silva's (1993) claims regarding the unique characteristics of L2 writing by demonstrating how portfolio-mediated strategy instruction can meet the particular metacognitive requirements of L2 writers. They secondly endorse Mitchell et al. By showing how portfolios establish a tangible interface between personal cognition and social feedback, they illustrate the socio cognitive perspective (2019). Third, they verify the results of Teng and Yue's (2023) structural equation modeling by offering experimental support for the relationship between writing performance and metacognition.

### Pedagogical Implications

In addition to contributing to existing research, the findings offer several important pedagogical insights for teaching L2 writing. First, as Ching (2002) suggested, writing courses should regularly integrate instruction in metacognitive strategies. Portfolios, which are useful for both skill assessment and planning, serve as an effective means to implement this integration. Teachers should receive targeted training to apply Cohen et al.'s (2003) interdisciplinary suggestions for implementing reflective portfolio practices. These practices bridge the gap between writing performance and metacognitive development, ultimately helping students become more competent writers.

Moreover, as Nunes (2004) argues, it is necessary to rethink how portfolios are used in student assessment—a position supported by the present findings. The assessment shift should place equal emphasis on both the writing process and the final product, prompting institutions to reevaluate traditional evaluation methods. However, as Coombe and Barlow (2004) cautioned, institutional support is essential for successful portfolio implementation. This includes providing appropriate technology, instructional workshops, and sufficient time for reflection.

Taken together, these factors highlight the need for a comprehensive approach. Effective integration of portfolios in L2 writing instruction requires coordinated efforts across curriculum design, teacher education, assessment frameworks, and institutional infrastructure.

## 7. Limitations and Future Directions

Although encouraging, these results should be interpreted with several important caveats. First, the short intervention duration (10 weeks) raises questions about the sustainability of the observed gains, echoing Plonsky's (2011) concerns regarding the durability of strategy instruction effects. Second, despite efforts to control for gender effects, the exclusive focus on female participants limits the generalizability of the findings to broader L2 learner populations. Third, as Sethuraman and Radhakrishnan (2020) argue, cultural factors may influence learners' willingness to adopt and apply metacognitive strategies, potentially affecting the transferability of results across contexts. Future research should therefore examine the effectiveness of portfolios across different proficiency levels (Kim & Pae, 2021), explore individual differences in engagement with portfolio tasks (Wei & Zhang, 2020), investigate the implementation and affordances of digital portfolios (Teng, 2020), and conduct longitudinal studies to assess the long-term maintenance of metacognitive strategies (Wenden, 1991).

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**Authors' contributions**

SA and MS were responsible for study design. GA was responsible for data collection. CL drafted the manuscript and TK revised it. All authors read and approved the final manuscript.

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No additional data is available.



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