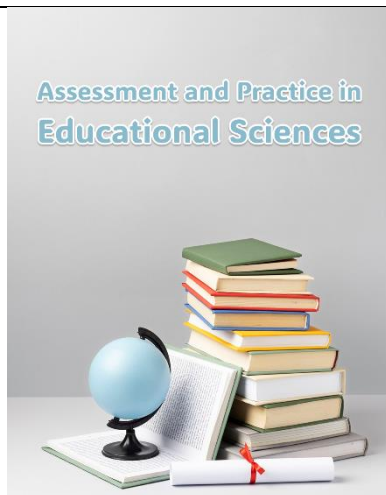




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A Comparative Study of Reflective-Journal and Portfolio-Based Writing Instruction on Iranian EFL Learners' Critical Thinking Skills

ABSTRACT

This study aimed to compare the effects of reflective-journal writing instruction and portfolio-based writing instruction on the critical thinking skills of Iranian EFL learners. A quasi-experimental pretest-posttest non-equivalent group design was employed. The participants were 60 Persian-speaking, eleventh-grade EFL learners aged 16–17 years, selected through convenience sampling from a technical-vocational school in Tehran and assigned to reflective-journal and portfolio-based writing groups, with 30 learners in each group. Participants' language proficiency was initially assessed using the 2022 Cambridge Preliminary English Test. Critical thinking was measured before and after the intervention using the Persian version of the 60-item Critical Thinking Self-Assessment Scale, covering interpretation, analysis, evaluation, inference, explanation, and self-regulation. The reflective-journal intervention was structured according to Gibbs' six-stage Reflective Cycle, whereas the portfolio-based intervention followed Hamp-Lyons and Condon's collection, selection, and reflection framework. Both groups received 12 instructional sessions from the same instructor. Data were analyzed using repeated-measures analysis of variance and simple-effects analyses. Repeated-measures analysis revealed a significant overall change in critical thinking scores across time, $F(1, 58) = 193.416$, $p = .001$, partial $\eta^2 = .769$. A significant group-by-time interaction was also observed, $F(1, 58) = 39.095$, $p = .001$, partial $\eta^2 = .403$, indicating that the magnitude of improvement differed between the instructional conditions. Simple-effects analyses showed significant improvements following reflective-journal instruction, mean difference = 96.567, $p < .001$, 95% CI [83.007, 110.127], and portfolio-based instruction, mean difference = 36.667, $p < .001$, 95% CI [23.107, 50.227]. The reflective-journal group also significantly outperformed the portfolio-based group at posttest, mean difference = 61.367, $p < .001$, 95% CI [32.749, 89.985]. Both instructional approaches effectively developed learners' critical thinking skills; however, reflective-journal writing produced substantially greater gains, suggesting that continuous, structured metacognitive reflection may foster higher-order thinking more effectively than portfolio-based evaluation and revision alone.

Keywords: Critical thinking; reflective-journal writing; portfolio-based writing; EFL learners; metacognitive reflection; writing instruction.

Introduction

Critical thinking has become a central educational objective because learners are increasingly required not merely to receive information but to interpret evidence, examine assumptions, evaluate competing claims, draw defensible conclusions, and

regulate their own reasoning. In educational contexts, critical thinking encompasses a group of interrelated higher-order cognitive processes through which individuals determine the meaning and credibility of information and decide how that information should guide judgment or action. These processes commonly include interpretation, analysis, evaluation, inference, explanation, and self-regulation, all of which contribute to purposeful and reflective judgment. The multidimensional nature of this construct has also informed the development of instruments intended to assess learners' perceptions of their own critical thinking abilities. For example, the Critical Thinking Self-Assessment Scale was developed and validated around distinct but related domains of critical thought, emphasizing that critical thinking cannot be reduced to a single general ability (1). Subsequent work on critical thinking assessment has similarly treated the construct as a measurable set of cognitive competencies that enables learners to evaluate information, make reasoned decisions, and respond analytically to complex academic situations (2). Consequently, the cultivation of critical thinking is particularly important in secondary and foreign-language education, where learners must simultaneously develop linguistic competence and the capacity to use language as a tool for inquiry, reasoning, and intellectual participation.

Within English as a foreign language education, critical thinking is closely connected with the development of active and autonomous language use. Language learning involves more than mastering grammatical rules and memorizing vocabulary; it requires learners to interpret messages, identify relationships among ideas, distinguish relevant from irrelevant information, assess the strength of arguments, and communicate reasoned positions. Such abilities are especially important in contexts where learners may have limited exposure to English outside the classroom and where formal instruction can become dominated by textbook exercises, teacher explanation, and examination preparation. Iranian EFL learners, for example, frequently study English in educational settings in which opportunities for extended analytical production may be restricted. However, recent work in the Iranian context has shown that pedagogical interventions emphasizing learner agency, strategic engagement, and adaptive beliefs can improve language-learning outcomes, suggesting that EFL learners benefit when instruction moves beyond passive reception and promotes active cognitive participation (3). This broader pedagogical orientation provides a basis for examining instructional practices that can integrate language development with higher-order thinking.

Writing is one of the most promising means of supporting this integration because it requires learners to transform ideas into organized and communicable form. Unlike brief receptive or recognition-based tasks, writing obliges learners to select information, organize relationships among ideas, clarify meanings, justify claims, and revise inadequate expressions. The connection between writing and thinking is therefore not incidental. Academic writing and critical thinking are mutually reinforcing processes: effective writing depends on the ability to analyze and evaluate information, while the act of writing can make reasoning visible, revisable, and open to further examination (4). Writing also creates a record of thought that learners can review, question, and refine. When learners are asked to explain what they know, compare perspectives, support claims with evidence, or reconsider previous conclusions, writing becomes a mechanism for cognitive development rather than merely a product used to evaluate linguistic accuracy.

Research on writing-to-learn supports this position. Writing activities can promote conceptual understanding when learners are required to reorganize knowledge, explain relationships, and represent ideas for meaningful purposes. However, writing does not automatically lead to deeper learning simply because learners produce written text. Its cognitive value depends on the nature of the task, the prompts provided, the audience, the instructional support, and the extent to which learners are encouraged to reflect on their reasoning. Writing-to-learn strategies are most effective when they engage learners in purposeful interpretation, explanation, and reconsideration rather than mechanical reproduction (5). Evidence has also shown that regular writing can improve critical thinking performance by requiring learners to articulate, evaluate, and revise their understanding (6). These findings imply that writing instruction should be designed to make cognitive and metacognitive processes explicit.

The quality and complexity of writing performance are also influenced by task demands. Different writing tasks may elicit different aspects of language ability and different forms of cognitive processing, meaning that learners' performance cannot be understood independently of the conditions under which writing occurs (7). For this reason, instructional writing activities should be carefully structured and aligned with the cognitive outcomes they are intended to promote. Practical writing resources can provide learners with models, guided activities, and opportunities to develop texts through planning, drafting, and revision rather than treating writing as a single-attempt performance (8). In EFL classrooms, process-oriented instruction is especially relevant because it allows learners to attend to both language and thought over time. Instead of evaluating only a final text, the process perspective emphasizes how ideas are generated, organized, evaluated, revised, and improved.

Metacognition provides an important theoretical explanation for why certain forms of writing may enhance critical thinking. Metacognition concerns learners' awareness and regulation of their own cognitive processes, including planning, monitoring, evaluating, and adjusting strategies. In second-language learning, metacognitive activity helps learners identify what they understand, recognize difficulties, select appropriate strategies, and evaluate whether those strategies are effective (9). Writing can support these processes because it slows down thought and gives learners an opportunity to inspect how they reached a conclusion, why they selected a particular strategy, and how their understanding has changed. However, such benefits are more likely when learners receive explicit prompts that direct attention toward their experiences, assumptions, strengths, weaknesses, and future actions.

Reflective writing is designed precisely around this form of metacognitive engagement. Reflection involves deliberate consideration of an experience, idea, or action in order to understand its meaning, evaluate its consequences, and inform subsequent behavior. It differs from simple recollection because it requires learners to examine not only what occurred but also why it occurred, how they responded, what assumptions guided their response, and what they might do differently in the future. Reviews of reflective practice have shown that reflection is widely regarded as a mechanism for connecting experience with learning, although the depth and effectiveness of reflection depend on instructional structure and learner engagement (10). In the classroom, reflective activities can create conditions under which learners move from description toward analysis, evaluation, and self-regulation.

Reflective-journal writing is a particularly accessible form of reflective practice because it enables learners to document their experiences and revisit them over time. Journals can function as spaces for self-questioning, emotional expression, evaluation of learning strategies, and identification of future goals. They also allow learners to develop a personal dialogue with their own learning processes. Reflective journals have been described as tools for both learning and professional development because they encourage individuals to examine practice, connect theory with experience, and become more aware of their own assumptions and decisions (11). When used consistently, journal writing may help learners recognize patterns in their performance, identify recurring problems, and develop more deliberate responses to academic challenges.

Evidence from educational research suggests that reflective-journal writing can strengthen self-regulated learning. By recording what they attempted, how they approached a task, what difficulties they encountered, and how they might improve, learners practice monitoring and evaluation. Reflective science-journal writing, for instance, has been associated with the development of self-regulated learning strategies, indicating that structured reflection can influence how learners plan, observe, and control their learning (12). These self-regulatory processes overlap substantially with critical thinking because both require learners to assess the quality of their own reasoning and modify ineffective approaches. Reflection therefore creates an instructional bridge between experience, metacognition, and higher-order cognition.

The relationship between reflective thinking and critical thinking is also supported conceptually. Reflective thinking can serve as a precursor to classroom critical thinking because it encourages learners to pause, question, analyze, and reconsider

rather than react automatically or accept information without examination (13). In language education, this process may be particularly valuable because learners must often evaluate not only content but also their use of language, their communicative choices, and their understanding of texts. Critical readers, for example, do not simply store textual information; they question claims, interpret implied meanings, relate ideas, and evaluate the author's position (14). Reflective writing can extend these habits by asking learners to make their interpretations explicit and examine how their judgments were formed.

Recent empirical evidence has further strengthened the case for reflective writing in EFL contexts. A quasi-experimental study of EFL student-teachers found that reflective writing activities supported the development of critical thinking by engaging learners in analysis, evaluation, and reconsideration of experience (15). Such findings are important because they demonstrate that reflective writing can move beyond personal expression and serve as a structured pedagogical means of developing higher-order cognition. Nevertheless, the effectiveness of reflection cannot be assumed under all conditions. Studies comparing different instructional approaches have sometimes produced mixed findings regarding gains in critical thinking, indicating that outcomes may depend on the discipline, duration, prompts, teacher guidance, and quality of learner participation (16). This variability highlights the need to compare reflective writing with other process-oriented approaches rather than evaluating it in isolation.

Portfolio-based writing instruction represents another influential approach that may foster critical thinking. A portfolio is a purposeful and systematic collection of learners' work assembled over time to demonstrate effort, progress, achievement, and reflection. Unlike conventional assessment practices that emphasize a single final product, portfolio instruction makes development visible by preserving drafts, feedback, revisions, and selected final pieces. The portfolio approach is grounded in the view that writing develops recursively and that learners benefit from examining evidence of their own progress. Portfolio assessment therefore combines instruction, learning, and evaluation in a continuing process rather than separating them into independent stages (17).

Portfolio-based instruction generally involves collection, selection, and reflection. During collection, learners preserve written work produced across a period of instruction. During selection, they choose items that represent their achievements, difficulties, or development. During reflection, they explain their choices, assess strengths and weaknesses, and consider how their work has changed. These activities can engage several critical thinking processes, including evaluation, comparison, justification, decision-making, and self-assessment. Portfolios may therefore help learners move from passive receipt of teacher judgments toward active participation in evaluating their own work.

Research in EFL writing has shown that learners may perceive portfolio keeping as beneficial for recognizing progress, developing responsibility, and becoming more aware of writing processes, although it can also require considerable time and sustained commitment (18). Portfolio instruction encourages learners to view writing as a developmental activity in which initial drafts are not fixed outcomes but materials for analysis and revision. This process may promote autonomy because learners must make decisions about which pieces to include, how to improve them, and what their work reveals about their development.

The value of portfolios for critical thinking has also been discussed in other educational fields. Portfolios can encourage learners to critically examine what they have learned, identify remaining gaps, and provide evidence of achievement, thereby making reflection and self-evaluation integral to learning (19). In ESL and EFL writing contexts, portfolio-based formative assessment can prompt learners to engage with feedback, substantiate arguments, recognize metacognitive strategies, and revise texts in more purposeful ways (20). These characteristics suggest that portfolios can develop critical thinking by requiring learners to evaluate external artifacts of their own performance and justify decisions about revision and selection.

Despite these shared features, reflective-journal and portfolio-based writing instructions may promote critical thinking through different mechanisms. Reflective-journal writing focuses primarily on internal experiences, cognitive processes, emotions, assumptions, and personal responses. Its central questions concern what the learner experienced, how the experience was interpreted, why particular reactions occurred, and what should be done differently in the future. Portfolio-based writing, in contrast, focuses more directly on external written products, feedback, revisions, and evidence of progress. Its central questions concern which texts best represent achievement, what weaknesses are visible in the work, how feedback should be applied, and why particular revisions are justified. Both approaches involve reflection, but the object, timing, and depth of reflection may differ.

Reflective journals may provide more frequent and continuous opportunities for self-directed introspection, whereas portfolio reflection often occurs at particular moments of selection and review. Portfolio instruction may promote evaluative judgment and developmental awareness, while reflective-journal instruction may generate deeper monitoring of thought processes and assumptions. These distinctions make direct comparison theoretically and pedagogically important. If one approach produces stronger gains in critical thinking, educators need to understand whether continuous introspective reflection offers an advantage over retrospective evaluation of written artifacts. Conversely, if both approaches are similarly effective, teachers may choose between them based on curricular constraints, learner preferences, and assessment purposes.

Rigorous comparison also requires appropriate assessment and methodological procedures. Because critical thinking is multidimensional, its measurement should address several subskills rather than rely on a single writing score. Self-report instruments can provide insight into learners' perceived abilities, but they require careful construction, translation, administration, and validation. Principles of questionnaire design emphasize clarity, cultural appropriateness, reliable scaling, and systematic administration, particularly in second-language research where linguistic comprehension may affect responses (21). Language proficiency must also be considered because differences in general English ability could influence learners' capacity to participate in writing interventions. Standardized proficiency measures, such as the B1 Preliminary examination, provide a structured basis for evaluating learners' reading, writing, listening, and speaking abilities at an established level (22).

The interpretation of intervention outcomes further depends on sound statistical analysis. Language-assessment research requires attention to score distributions, reliability, comparability, and the assumptions underlying inferential procedures (23). When writing performance or related cognitive outcomes are compared across groups and tasks, statistical conclusions should be based on appropriate models and careful examination of measurement conditions. Contemporary guidance on statistical analysis likewise emphasizes assumption testing, effect-size reporting, and correct interpretation of repeated-measures and interaction effects rather than exclusive reliance on significance values (24). These considerations are essential in quasi-experimental research, where intact groups are compared and initial equivalence cannot be presumed.

Although both reflective-journal and portfolio-based writing have been associated with reflection, autonomy, self-regulation, and critical analysis, relatively few studies have directly compared their effects on critical thinking among Iranian secondary-school EFL learners. Much of the existing literature has examined reflective writing or portfolio use separately, involved university students or professional learners, or focused primarily on writing quality rather than critical thinking as a multidimensional outcome. Consequently, it remains unclear whether the continuous metacognitive focus of reflective-journal writing produces greater critical thinking gains than the evaluative and revision-oriented processes characteristic of portfolio-based writing. Addressing this gap can provide empirical guidance for teachers, curriculum designers, and educational decision-makers seeking writing practices that develop both language competence and higher-order cognition.

Accordingly, the present study aimed to compare the effects of reflective-journal writing instruction and portfolio-based writing instruction on Iranian EFL learners' critical thinking skills.

Methods and Materials

Study Design and Participants

This study employed a quasi-experimental pretest–posttest non-equivalent group design to compare the effects of reflective-journal writing instruction and portfolio-based writing instruction on Iranian EFL learners' critical thinking skills. A quasi-experimental design was selected because random selection and random assignment of individual learners were not feasible within the natural school setting. The study population consisted of 297 eleventh-grade learners enrolled at a Technical-Vocational (Kar-Danesh) school in Area 18 of Tehran during the 2024–2025 and 2025–2026 academic years. From this population, 60 learners were recruited through convenience sampling and placed in two intact instructional groups, with 30 participants receiving reflective-journal writing instruction and 30 receiving portfolio-based writing instruction. All participants were native speakers of Persian, were between 16 and 17 years of age, and had comparable English-language proficiency based on their performance on the 2022 version of the Cambridge Preliminary English Test. The groups' critical thinking scores were also assessed before the intervention to establish their baseline comparability. The regular instructional content was based on *English 2*, the official textbook approved by the Iranian Ministry of Education; however, because this textbook did not sufficiently address the study's writing and critical-thinking objectives, it was supplemented with *The Writing Book: The Practical Writer with Readings* by Bailey and Powell (2008). Both groups were instructed by the same teacher to minimize instructor-related variation. The interventions comprised 12 instructional sessions delivered over one academic year in the participants' regular high-school setting.

Data Collection Tools

The Cambridge Preliminary English Test, 2022 version, was administered before the interventions to evaluate the participants' general English-language proficiency and establish initial homogeneity between the two instructional groups. The primary outcome measure was the Critical Thinking Self-Assessment Scale, which was administered as both the pretest and posttest. The scale was adapted by Payan-Carreira et al. (2022) from the original instrument developed by Nair et al. (2017) and consisted of 60 items assessing six major dimensions of critical thinking: interpretation, analysis, evaluation, inference, explanation, and self-regulation. To make the instrument comprehensible and culturally appropriate for Persian-speaking learners, the original English version was translated into Persian using a forward–backward translation procedure. The translated version was subsequently reviewed by subject-matter experts to assess its content validity and was piloted with 327 English-language learners who had characteristics similar to those of the main study participants. The internal-consistency coefficients for the scale's subskills ranged from .619 for detecting arguments, a factor represented by only two items, to .905 for assessing arguments, indicating acceptable to high reliability. Construct validity was examined through confirmatory factor analysis. All standardized factor loadings exceeded .50, all average variance extracted values were above .50, and most composite-reliability coefficients exceeded .60. These findings supported the reliability and construct validity of the Persian version of the scale for measuring critical thinking skills among the participating EFL learners.

Interventions

Participants assigned to the reflective-journal writing group received a structured intervention intended to develop critical thinking through sustained metacognitive engagement with their learning experiences, cognitive processes, emotional responses, and personal development. The intervention was primarily based on Gibbs' Reflective Cycle, which organizes reflection into six successive phases: describing the learning experience, identifying feelings and reactions, evaluating positive

and negative aspects of the experience, analyzing the experience to understand its meaning, drawing conclusions about what could have been done differently, and formulating an action plan for comparable future situations. Following each instructional experience, the learners were guided to write journal entries in which they described relevant classroom events and interactions with the instructor and classmates, reflected on their understanding of the lesson content, assessed whether they had achieved the instructional objectives, articulated their emotional reactions, and identified their strengths and weaknesses. They were also prompted to explain what they had learned, examine the effectiveness of their learning strategies, monitor their progress, question their assumptions, and connect new information with their prior knowledge. The protocol therefore treated writing as an ongoing means of retrospection, self-assessment, analysis, and future planning rather than merely as the production of a final written text. The sequential reflective prompts provided continuous metacognitive scaffolding and were intended to strengthen higher-order cognitive processes, including interpretation, evaluation, analysis, reasoning, self-monitoring, and self-regulation.

Participants in the portfolio-based writing group received instruction based on the classroom portfolio framework developed by Hamp-Lyons and Condon, which involves the interrelated stages of collection, selection, and reflection. During the collection stage, learners systematically retained their written assignments, preliminary drafts, revised texts, teacher feedback, and other evidence of their writing performance. During the selection stage, they reviewed the accumulated materials and selected pieces that represented their progress, achievements, persistent difficulties, and developing writing strategies. During the reflection stage, the learners critically examined the selected work, considered the feedback they had received, identified strengths and weaknesses, evaluated the quality of their writing decisions, and justified the changes they intended to make. They were required to revise initial drafts in response to instructor feedback and self-assessment and then submit improved versions. By comparing earlier and later drafts, participants were encouraged to monitor their development, recognize recurring weaknesses, identify successful approaches, and evaluate the effectiveness of their revisions. The portfolio functioned as a recursive and developmental record of writing performance, providing repeated opportunities for evaluation, selection, justification, revision, and self-assessment. Although reflection was included in the protocol, its main object was the learners' externally produced written work and documented progress rather than their internal experiences and emotional responses. The intervention was consequently designed to promote critical thinking through evidence-based evaluation, reasoning, decision-making, monitoring, and self-regulation across successive writing tasks.

Data Analysis

The data were analyzed using descriptive and inferential statistical procedures. Means and standard deviations were calculated for the pretest and posttest critical thinking scores in each instructional group. Before conducting the principal analyses, the statistical assumptions were evaluated. Normality was examined through skewness and kurtosis indices, with values between -2 and $+2$ considered acceptable; all observed indices fell within this range. Homogeneity of error variances was assessed using Levene's test and was supported for both the pretest and posttest scores because the corresponding probability values were greater than .05. Mauchly's test of sphericity did not yield an inferential probability value because the within-subject factor contained only two measurement occasions; with two levels, the sphericity condition is inherently satisfied. A mixed repeated-measures analysis of variance was then conducted, with time as the within-subject factor, instructional group as the between-subject factor, and critical thinking score as the dependent variable. This analysis was used to examine the overall change from pretest to posttest, the overall difference between the two groups, and, most importantly, the interaction between time and instructional condition. Partial eta squared was reported as the measure of effect size. Following the significant interaction, simple-effects analyses were performed to compare the groups at pretest and posttest

separately and to evaluate the pretest-to-posttest change within each group. Mean differences, standard errors, probability values, and 95% confidence intervals were reported, and the threshold for statistical significance was set at $p < .05$.

Findings and Results

Before conducting the repeated-measures analysis of variance, the relevant statistical assumptions were examined. The normality of the Cambridge Preliminary English Test and critical thinking scores was evaluated using skewness and kurtosis indices. Across both instructional groups and all measurement occasions, skewness values ranged from -0.565 to 0.501 , while kurtosis values ranged from -1.238 to 0.206 . Because all values were within the acceptable range of -2 to $+2$, the distributions were considered approximately normal. The homogeneity of error variances was examined using Levene's test based on the mean. The results were nonsignificant for both the pretest, $F(1, 58) = 0.099$, $p = .755$, and the posttest, $F(1, 58) = 0.698$, $p = .407$, indicating that the two groups had homogeneous variances at both measurement occasions. Regarding sphericity, the within-subject factor consisted of only two levels, namely the pretest and posttest. Consequently, Mauchly's test could not produce a probability value, and the Greenhouse–Geisser, Huynh–Feldt, and lower-bound epsilon coefficients were all equal to 1.000. With only two repeated measurements, the assumption of sphericity was inherently satisfied. Therefore, the assumptions required for the repeated-measures analysis were adequately met.

Table 1. Descriptive Statistics for Critical Thinking Scores by Group and Measurement Occasion

Measurement occasion	Instructional group	<i>n</i>	Mean	Standard deviation
Pretest	Portfolio-based writing	30	146.60	40.050
Pretest	Reflective-journal writing	30	148.07	39.384
Pretest	Total	60	147.33	39.387
Posttest	Portfolio-based writing	30	183.27	49.149
Posttest	Reflective-journal writing	30	244.63	60.962
Posttest	Total	60	213.95	63.019

As shown in Table 1, the two instructional groups had highly similar critical thinking scores before the interventions. The portfolio-based writing group obtained a pretest mean of 146.60, whereas the reflective-journal writing group obtained a pretest mean of 148.07, representing a difference of only 1.47 points. Both groups demonstrated higher mean scores at posttest. The portfolio-based writing group's mean increased to 183.27, reflecting an unadjusted improvement of 36.67 points. The reflective-journal writing group's mean increased to 244.63, reflecting an unadjusted improvement of 96.56 points. Across the total sample, the mean critical thinking score increased from 147.33 at pretest to 213.95 at posttest. Although these descriptive results indicated improvement in both groups, the considerably larger increase observed in the reflective-journal writing group suggested that the two instructional approaches did not produce equal changes in critical thinking skills.

Table 2. Repeated-Measures Analysis of Variance for Critical Thinking Scores

Effect	Type III sum of squares	<i>df</i>	Mean square	<i>F</i>	<i>p</i>	Partial η^2
Between-subjects effects						
Intercept	3,915,769.408	1	3,915,769.408	990.034	< .001	.945
Group	29,610.208	1	29,610.208	7.486	.008	.114
Error	229,400.883	58	3,955.188	—	—	—
Within-subjects effects						
Time	133,133.408	1	133,133.408	193.416	< .001	.769
Time $\times$ Group	26,910.075	1	26,910.075	39.095	< .001	.403
Error (Time)	39,923.017	58	688.328	—	—	—

The repeated-measures analysis of variance demonstrated a significant between-subjects effect of instructional group, $F(1, 58) = 7.486$, $p = .008$, partial $\eta^2 = .114$. This result indicated that, when the pretest and posttest scores were considered

collectively, the overall critical thinking scores differed significantly between the reflective-journal and portfolio-based writing groups. The partial eta-squared value indicated that instructional group accounted for approximately 11.4% of the variance in the combined critical thinking scores. More importantly, the main effect of time was statistically significant, $F(1, 58) = 193.416$, $p < .001$, partial $\eta^2 = .769$, demonstrating a substantial overall increase in critical thinking scores from pretest to posttest across the two groups. Time accounted for approximately 76.9% of the variance in the repeated critical thinking scores, indicating a large effect. The interaction between time and instructional group was also statistically significant, $F(1, 58) = 39.095$, $p < .001$, partial $\eta^2 = .403$. This large interaction effect showed that the degree of pretest-to-posttest improvement depended on the type of writing instruction received. Specifically, the pattern of descriptive means indicated that the reflective-journal writing group improved substantially more than the portfolio-based writing group. Because the interaction effect was significant, simple-effects analyses were conducted to clarify the between-group differences at each measurement occasion and the within-group changes over time.

Table 3. Simple-Effects Analyses of Within-Group Changes and Between-Group Differences

Comparison	Mean difference	Standard error	<i>p</i>	95% CI lower bound	95% CI upper bound
Pretest: Reflective-journal vs. portfolio-based writing	1.467	10.255	.887	-19.061	21.995
Reflective-journal writing: Posttest vs. pretest	96.567	6.774	< .001	83.007	110.127
Portfolio-based writing: Posttest vs. pretest	36.667	6.774	< .001	23.107	50.227
Posttest: Reflective-journal vs. portfolio-based writing	61.367	14.297	< .001	32.749	89.985

The simple-effects analyses showed that there was no statistically significant difference between the reflective-journal writing group and the portfolio-based writing group at pretest, mean difference = 1.467, standard error = 10.255, $p = .887$, 95% CI [-19.061, 21.995]. Because the confidence interval included zero, the two groups were considered comparable in critical thinking skills before the interventions. Within the reflective-journal writing group, critical thinking scores increased significantly from pretest to posttest, mean difference = 96.567, standard error = 6.774, $p < .001$, 95% CI [83.007, 110.127]. This result demonstrated that reflective-journal writing instruction produced a statistically significant improvement in learners' critical thinking skills. The portfolio-based writing group also showed a statistically significant pretest-to-posttest improvement, mean difference = 36.667, standard error = 6.774, $p < .001$, 95% CI [23.107, 50.227], indicating that portfolio-based instruction was likewise effective. However, the posttest comparison revealed that the reflective-journal writing group scored significantly higher than the portfolio-based writing group, mean difference = 61.367, standard error = 14.297, $p < .001$, 95% CI [32.749, 89.985]. Taken together, these findings showed that both writing interventions significantly enhanced critical thinking skills, but reflective-journal writing instruction generated substantially greater improvement than portfolio-based writing instruction. Accordingly, the null hypotheses concerning the absence of an effect for each intervention and the equality of their effects were rejected.

Discussion and Conclusion

The present study compared the effects of reflective-journal writing instruction and portfolio-based writing instruction on Iranian EFL learners' critical thinking skills. The findings demonstrated that both instructional approaches significantly improved learners' critical thinking from pretest to posttest. However, the magnitude of improvement was substantially greater in the reflective-journal writing group. The repeated-measures analysis revealed a significant main effect of time, indicating that critical thinking scores increased across the intervention period, as well as a significant interaction between time and

instructional group, showing that the two approaches did not produce equivalent patterns of change. Simple-effects analyses further clarified these results. The reflective-journal writing group showed a mean increase of 96.567 points, whereas the portfolio-based writing group demonstrated a mean increase of 36.667 points. Although the two groups did not differ significantly at pretest, the reflective-journal writing group obtained a significantly higher posttest mean than the portfolio-based group. Taken together, these findings indicate that both writing approaches were pedagogically effective, but structured reflective-journal writing exerted a stronger influence on the development of critical thinking skills.

The first major finding was that reflective-journal writing instruction significantly enhanced Iranian EFL learners' critical thinking skills. This result supports the view that writing can become a powerful cognitive instrument when it is combined with systematic prompts for reflection, analysis, evaluation, and self-monitoring. Writing alone does not necessarily produce higher-order thinking; its effectiveness depends on whether learners are required to explain experiences, examine assumptions, assess evidence, evaluate their responses, and consider alternative actions. Writing-to-learn activities are particularly valuable when they require learners to reorganize knowledge and actively construct meaning rather than reproduce information mechanically (5). Similarly, regular writing has been shown to improve critical thinking performance when learners use writing as a means of clarifying, testing, and revising their understanding (6). In the present study, reflective journals created repeated opportunities for learners to make their thinking explicit and reconsider it over time, which may account for the substantial improvement observed after the intervention.

The effectiveness of reflective-journal writing can also be explained through its metacognitive characteristics. The intervention encouraged learners to identify what they had learned, monitor their comprehension, examine the effectiveness of their learning strategies, recognize their strengths and weaknesses, and formulate plans for future improvement. These processes closely correspond to metacognitive planning, monitoring, evaluation, and regulation. Metacognition is central to language learning because it enables learners to become aware of how they process information and to modify ineffective strategies deliberately (9). When reflective writing is structured around questions concerning learning experiences and cognitive responses, learners are not merely recording classroom events; they are evaluating how they think and learn. This form of self-examination is closely related to critical thinking, particularly its self-regulatory dimension. The strong improvement among reflective-journal learners may therefore reflect the intervention's capacity to combine linguistic production with sustained metacognitive engagement.

The present result is consistent with previous research showing that reflective activities can provide a foundation for critical thinking. Reflective thinking encourages learners to move beyond immediate reactions and examine the reasons, assumptions, and consequences underlying their judgments (13). This process is particularly relevant to EFL education, in which learners may otherwise concentrate predominantly on linguistic correctness and overlook the conceptual quality of their responses. Through reflective journals, participants were encouraged to interpret their experiences, evaluate lesson outcomes, analyze difficulties, and justify future action plans. These activities correspond closely to the dimensions of interpretation, analysis, evaluation, inference, explanation, and self-regulation measured by the critical thinking instrument (1, 2). The alignment between the cognitive demands of the intervention and the dimensions of the outcome measure may have contributed to the strong effect observed in the reflective-journal group.

The finding also agrees with research suggesting that journal writing supports self-regulated learning. Reflective-journal activities can strengthen learners' ability to monitor progress, evaluate strategies, and regulate future behavior (12). Self-regulation and critical thinking are mutually reinforcing because learners cannot evaluate the quality of their reasoning without monitoring their own cognitive processes. In the current study, the reflective-journal group followed a structured sequence that moved from describing an experience to identifying feelings, evaluating strengths and weaknesses, analyzing meaning, drawing

conclusions, and preparing an action plan. Such sequencing may have prevented journal writing from becoming superficial narration. Instead, it provided cognitive scaffolding that gradually moved learners from description toward evaluation and prospective decision-making. The large gain in critical thinking suggests that this structured progression was effective in promoting deeper cognitive processing.

The result is further supported by recent evidence indicating that reflective writing can improve critical thinking among EFL learners. Reflective writing has been found to encourage learners to analyze experiences, evaluate their understanding, reconsider assumptions, and articulate reasoned judgments (15). The present study extends this evidence to Iranian secondary-school learners and demonstrates that the effect is not limited to university students or teacher-education settings. The result also fits with the broader view that active, learner-centered pedagogies can improve cognitive and language-related outcomes among Iranian EFL learners by encouraging strategic engagement and greater responsibility for learning (3). Reflective-journal instruction may have been especially effective because it positioned learners as active interpreters of their own educational experiences rather than passive recipients of teacher explanations.

Nevertheless, the positive finding should be interpreted in light of previous evidence showing that reflective activities do not always produce significant critical thinking gains. Some studies have found that changes in critical thinking depend on the instructional context, the depth of reflection, the quality of facilitation, and the period over which the intervention is implemented (16). This inconsistency suggests that merely asking learners to maintain a journal may not be sufficient. The present intervention differed from unstructured journal writing because learners received explicit, sequential prompts and were expected to evaluate experiences and develop future action plans. Its effectiveness may therefore be attributed not simply to the use of journals but to the systematic organization of reflective activity. The intervention's duration and repeated implementation across 12 sessions may also have allowed reflective habits to develop gradually.

The second major finding showed that portfolio-based writing instruction also significantly improved learners' critical thinking skills. This result suggests that reviewing, selecting, evaluating, and revising written work can activate important higher-order cognitive processes. Portfolio instruction differs from one-shot writing assessment because it presents writing as an evolving process. Learners preserve drafts, receive feedback, reconsider their decisions, and produce revised texts. This recursive process requires them to compare earlier and later performance, identify weaknesses, judge the relevance of feedback, and make decisions about improvement. Portfolio assessment consequently integrates instruction, learning, reflection, and evaluation rather than focusing exclusively on a final product (17). The significant improvement observed in the portfolio group confirms that these activities can contribute to critical thinking development.

This finding aligns with evidence from EFL writing research showing that portfolio keeping enhances learner responsibility, awareness of progress, and engagement with the writing process (18). By retaining and reviewing their work, learners can observe concrete evidence of development and identify recurring difficulties that may not be visible in isolated assignments. This longitudinal perspective may promote more accurate self-assessment and more deliberate revision. In the current study, participants were required to examine feedback, identify strengths and weaknesses, revise initial drafts, and submit improved versions. These tasks likely strengthened evaluative judgment and encouraged learners to regard writing as a process of inquiry and problem solving.

The result is also consistent with the view that portfolios can promote critical analysis by requiring learners to demonstrate what they have learned and identify areas requiring further development (19). Portfolio reflection can encourage learners to justify the selection of particular texts, explain revisions, and evaluate the quality of their work. Such practices involve analysis, decision-making, and self-regulation. In ESL and EFL contexts, portfolio-based formative assessment has similarly been associated with greater attention to evidence, argumentation, metacognitive strategy use, and purposeful revision (20). The

present findings support these observations by showing that portfolio-based instruction improved critical thinking even though the primary materials being evaluated were learners' own written products.

The relationship between portfolio writing and critical thinking may also be understood through the close connection between academic writing and reasoning. Effective writing requires learners to organize ideas, distinguish central claims from supporting information, evaluate the relevance of evidence, and present conclusions coherently (4). Portfolio instruction extends these processes across multiple drafts. Learners are not only expected to produce a text but also to inspect its quality, respond to feedback, and explain how it can be improved. Because different writing tasks can elicit different aspects of performance and cognition, repeated work across tasks may provide broader opportunities for learners to develop analytical and evaluative abilities (7). The use of process-oriented supplementary writing materials may also have supported this development by providing structured opportunities for planning, drafting, and revision (8).

Although both interventions were effective, reflective-journal writing produced significantly greater gains than portfolio-based writing. This finding may be explained by differences in the primary object and frequency of reflection. Portfolio-based instruction directed learners' attention mainly toward external products, including drafts, feedback, and revised texts. Reflective-journal instruction, however, focused directly on internal cognitive processes, emotional responses, assumptions, learning strategies, and future decisions. Portfolio learners evaluated what they had written, whereas reflective-journal learners evaluated how and why they thought, responded, and learned. Because critical thinking includes the regulation and appraisal of one's own reasoning, the more introspective orientation of reflective journals may have produced deeper engagement with the target construct.

The stronger effect of reflective journals may also be related to the continuity of reflection. Journal writing occurred as an ongoing response to learning experiences, allowing learners to examine their cognitive processes repeatedly and close to the time at which those experiences occurred. Portfolio reflection was comparatively retrospective and centered on selected pieces of written work. Although portfolio review encouraged evaluation and revision, it may not have required the same sustained questioning of assumptions or analysis of personal reasoning. Reviews of reflective practice indicate that reflection is most meaningful when learners move beyond description and critically examine experience, knowledge, and action (10). The structured journal protocol in the present study may have facilitated this deeper level of reflection more consistently than portfolio activities.

Another possible explanation concerns the degree of self-direction. Reflective journals provided a private and learner-centered space in which participants could express uncertainty, identify emotional reactions, acknowledge weaknesses, and reconsider their own interpretations. This may have reduced the pressure to produce an immediately correct response and instead encouraged exploration and intellectual risk-taking. Reflective journals have been characterized as tools that facilitate self-assessment, goal setting, and professional or personal development through sustained examination of experience (11). In contrast, portfolio work was more closely connected to teacher feedback and the quality of visible products. Although this external guidance was beneficial, it may have oriented learners toward correction and performance rather than toward deeper examination of their cognitive assumptions.

The greater effectiveness of reflective-journal writing does not diminish the pedagogical value of portfolios. Rather, the results indicate that the two approaches may contribute to critical thinking through complementary mechanisms. Reflective journals appear particularly suited to developing metacognitive awareness, self-questioning, and regulation of reasoning, while portfolios may be especially useful for developing evaluative judgment, revision skills, and awareness of progress. Critical literacy itself requires learners to question, interpret, synthesize, and evaluate rather than accept textual information passively

(14). Both approaches can support these abilities, but reflective journals may address them more directly by placing thought processes at the center of the writing task.

From a methodological perspective, the significant interaction effect is particularly important because it shows that the improvement cannot be attributed solely to repeated testing or the passage of time. The two groups began with statistically comparable critical thinking scores, yet their posttest outcomes differed substantially. The magnitude of the interaction effect indicated that instructional approach explained a meaningful proportion of change. The use of a validated multidimensional critical thinking scale strengthened the assessment of the outcome, while prior proficiency screening helped reduce the likelihood that initial differences in English ability accounted for the findings. Sound questionnaire development and administration are particularly important in second-language research, where language comprehension can influence responses (21). Similarly, attention to assessment quality, score interpretation, and statistical assumptions is essential for drawing defensible conclusions from language-related data (23, 24). The use of an established proficiency framework also supported comparability between participants before the interventions (22).

Overall, the findings suggest that critical thinking can be purposefully developed through writing instruction rather than treated as an incidental outcome of language learning. Both approaches required learners to engage with writing over time, but reflective-journal instruction provided more direct and continuous scaffolding for examining thought and experience. The superior performance of the reflective-journal group therefore appears theoretically coherent and empirically supported. At the same time, the significant improvement in the portfolio group confirms that reflection on written artifacts, feedback, and revision also contributes meaningfully to higher-order thinking. A balanced interpretation is that reflective journals may be more powerful for deep metacognitive development, whereas portfolios remain valuable for documenting growth and strengthening evaluative control over writing.

The study had several limitations that should be considered when interpreting the findings. The participants were selected through convenience sampling from a single technical-vocational school in one area of Tehran, which restricts the generalizability of the results to learners in other schools, regions, educational tracks, or sociocultural contexts. The use of intact groups and a quasi-experimental design also meant that individual random assignment was not possible, and unmeasured group characteristics may have influenced the outcomes despite their comparable pretest scores. The sample size was relatively modest, and the study focused on learners within a narrow age range and proficiency level. Critical thinking was measured through a self-assessment scale, which may have been affected by participants' perceptions, response tendencies, or understanding of their own abilities. The absence of a no-treatment control group makes it difficult to determine the extent to which ordinary instruction or maturation contributed to the improvements. In addition, the study assessed outcomes only immediately after the interventions and therefore did not determine whether the observed gains were maintained over time.

Future research should replicate the study with larger and more diverse samples drawn from multiple schools, regions, educational levels, and EFL proficiency groups. Randomized controlled designs should be used where feasible, and a conventional-instruction control group should be included to distinguish intervention effects from normal educational development. Follow-up assessments would help determine whether gains in critical thinking are sustained after the completion of instruction. Researchers should also combine self-report instruments with performance-based critical thinking tasks, writing samples, classroom observations, interviews, and think-aloud protocols. Examining individual critical thinking dimensions separately could reveal whether reflective journals and portfolios have different effects on interpretation, analysis, evaluation, inference, explanation, and self-regulation. Future studies could also compare structured and unstructured journals, investigate different frequencies of reflection, assess the role of teacher feedback, and examine whether a blended journal-and-portfolio model produces stronger or more balanced outcomes than either intervention alone.

In practice, EFL teachers should incorporate structured reflective writing into regular language instruction rather than using writing exclusively to assess grammar, vocabulary, and textual accuracy. Learners should receive clear prompts that guide them from describing an experience toward analyzing its meaning, evaluating their performance, identifying alternative strategies, and planning future action. Teachers should provide modeling and gradual scaffolding so that journal entries move beyond superficial summaries. Portfolio-based activities should also be used to help learners collect drafts, respond to feedback, justify revisions, and monitor progress over time. A combined approach may be especially useful: journals can be employed to cultivate metacognitive awareness and critical self-examination, while portfolios can document written development and strengthen evaluative judgment. Curriculum designers should allocate sufficient instructional time for reflection, revision, and feedback, and assessment practices should recognize the quality of learners' reasoning and self-evaluation in addition to the linguistic accuracy of final written products.

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Authors' Contributions

All authors equally contributed to this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

All ethical principles were adhered in conducting and writing this article.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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