

## The Efficacy of the Project-Based Collaborative Learning Strategy in Enhancing Academic Writing Proficiencies among University Students

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### Abstract

Project Based Collaborative Learning (PBCL) is an instructional model that is gaining popularity in tertiary education as a future learning; one that promotes collaborative activity, intellectual engagement and knowledge co-construction. The current study explores how PBCL improves university students' CAF in academic writing. Working within an experimental between-subjects design, forty intermediate-level EFL learners at university level were randomly assigned to either a PBCL condition or a traditional instruction (control) group. Participants carried out a narrative-based writing task under pre-task, immediate task repetition and delayed task repetition conditions. No significant difference was found between PBCL and control groups in post-task immediate or follow-up delayed CAF performance using a quantitative analysis. Even though the PBCL class was more collaborative and interactive than the traditional instruction class, these benefits did not lead to observable improvements in writing complexity, accuracy or fluency over the intervention. Results herein might indicate that short-term implementation of PBCL may not be enough to make significant improvements in academic writing ability within a university EFL context. The article argues that PBCL can be used much more effectively, when it is supported with longer instructional points, explicit focus-on-form activities and structured peer feedback. Pedagogical implications and future research directions are further discussed.

**Key terms:** *Project-Based Collaborative Learning, Academic Writing, Complexity, Accuracy, Fluency, Collaborative Writing, Higher Education.*

فعالية استراتيجية التعلم التعاوني المعتمد على المشاريع في تعزيز كفاءات الكتابة الأكاديمية بين طلاب الجامعات

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ملخص

يُعدّ التعلّم التعاوني القائم على المشاريع (PBCL) نموذجًا تعليميًا يكتسب شعبية متزايدة في التعليم العالي باعتباره نموذجًا تعليميًا مستقبليًا، إذ يُعزز النشاط التعاوني والمشاركة الفكرية وبناء المعرفة بشكل مشترك. تستكشف هذه الدراسة كيف يُحسّن التعلّم التعاوني القائم على المشاريع مهارات الكتابة الأكاديمية لدى طلاب الجامعات. ضمن تصميم تجريبي بين المجموعات، تمّ توزيع أربعين طالبًا من متعلمي اللغة الإنجليزية كلغة أجنبية (EFL) في المستوى المتوسط عشوائيًا إلى مجموعتين: مجموعة التعلّم التعاوني

القائم على المشاريع ومجموعة التعلّم التقليدي (المجموعة الضابطة). أنجز المشاركون مهمة كتابة سردية في ثلاث مراحل: قبل المهمة، وتكرارها فوراً، وتكرارها لاحقاً. لم يلاحظ أي فرق ذي دلالة إحصائية بين مجموعتي التعلّم التعاوني القائم على المشاريع والمجموعة الضابطة في أداء الكتابة الأكاديمية، سواءً في مرحلة التكرار الفوري أو التكرار اللاحق، وذلك باستخدام التحليل الكمي. على الرغم من أن فصول برنامج التعلّم القائم على حل المشكلات (PBCL) كانت أكثر تعاوناً وتفاعلية من فصول التدريس التقليدية، إلا أن هذه المزايا لم تُسفر عن تحسينات ملحوظة في مستوى تعقيد الكتابة أو دقتها أو طاقاتها خلال فترة البرنامج. قد تشير النتائج الواردة هنا إلى أن تطبيق برنامج PBCL على المدى القصير قد لا يكون كافياً لإحداث تحسينات جوهرية في مهارات الكتابة الأكاديمية ضمن سياق تدريس اللغة الإنجليزية كلغة أجنبية في الجامعة. تُجادل المقالة بأن برنامج PBCL يُمكن استخدامه بفعالية أكبر عند دعمه بنقاط تعليمية أطول، وأنشطة تركز بشكل واضح على الشكل، وتغذية راجعة منظمة من الأقران. كما تُناقش المقالة الآثار التربوية وتوجهات البحث المستقبلية.

**الكلمات المفتاحية:** التعلّم التعاوني المعتمد على المشاريع، الكتابة الأكاديمية، التعقيد، الدقة، الطلاقة، الكتابة التعاونية، التعلّم العالي.

## ١. Introduction

Writing is fundamental to university success and an essential skill for graduates in all disciplines. It makes learners think critically, present their arguments logically and coherently, synthesise sources, and communicate knowledge in a structured academic voice. For L2 learners, the task of academic writing is a cognitively and linguistically challenging process that involves attention to content development as well as discourse organization and language accuracy (Rahman et al., 2015). Thus, it is assumed that in applied linguistics and language education research a key issue has been to find effective pedagogical strategies to foster academic writing competence. Project-Based Collaborative Learning (PBCL) has become increasingly established in recent years as a novel instructional strategy, which is in accordance with constructivist and socio-cultural learning theories. In PBCL, failing prototype action (FPA) is activated by student-centered learning for collaboration, problem-solving and interaction with authentic (or semi-authentic) tasks. In the context of PBCL, students collaborate to design, implement, and reflect on the projects; thus they share in responsibility for learning outcomes and help create knowledge through social interaction. It is further assumed that such environments lead to more profound learning, motivation and interactivity with the cognitive content than what is normally obtained through traditional teaching-centered instruction (Chao et al., 2025).

The theoretical base of PBCL is largely rooted in Vygotskian theory, notably his notion that learners may accomplish more with the help of others; as articulate peers that help their less capable buddies actualize it. In collaborative writing environments, there is peer-interaction which permits learners to negotiate meaning, as well as give feedback and provide scaffolding for each other's linguistic and concept growth. These processes are assumed to support metalinguistic awareness and transfer of new language forms (Fani & Ghaemi.,2011). This is not the case for PBCL, for which the empirical evidence

on its effectiveness in enhancing academic writing is mixed. Although many studies have reported positive results (in terms of learner engagement, motivation, and fluency), evidence is not as strong concerning linguistic accuracy and syntactic complexity. A reason for such heterogeneity could be the cognitive demands that writing itself imposes (Veresov, 2004). Under the framework of Skehan's (1996) Limited Attentional Capacity Model, it is argued that learners have limited cognitive capacities, and they are therefore sometimes compelled to attend primarily to one aspect of performance (e.g., fluency) at the expense of others (accuracy and complexity).

Additionally, the majority of PBCL and collaborative writing studies have targeted global quality in writing or immediate effects when investigating outcomes rather than systematic exploration on language dimensions such as complexity, accuracy, and fluency (CAF). CAF has become a recommended and widely accepted conceptual model of L2 performance, contributing fine-grained indicators for the development of learners' L2 (Abdallah, 2018). However, few studies have used CAF measures to examine the effects of PBCL on writing, especially in experimental designs that include both immediate and delayed testing (Huang et al., 2024). Redressing this gap, the present study seeks to investigate the impact of PBCL on improving university students' academic writing achievement in a focused manner regarding CAF components. The study aims to offer a nuanced perspective on PBCL's possibilities as well as shortcomings in an academic writing instructional context at the university level by comparing one PBCL class with a traditional instruction control class under pre-task, immediate task repetition and delayed task repetition conditions.

## ٢. Review of the Literature

Project-Based Collaborative Learning (PBCL) Studies Project-Based Collaborative Learning (PBCL) makes one of the most significant learner-centred pedagogical practices in higher education, especially those concerning second language learning instruction. Based on cognitive-constructivist and socio-cultural approaches to learning, PBCL focuses on the construction of knowledge through a combination of collaboration, authentic problems solving activities, and extended learner engagement. In sharp contrast to conventional teacher-based teaching, PBCL places learners at the heart of learning process and requires them to negotiate meaning, co-construct knowledge collaboratively and reflect critically on content as well as language use (Andargie et al., 2025).

At the university level, PBCL reportedly has a number of pedagogical benefits in academic writing classes. Writing is a complex cognitive and linguistic activity which demands for learners to apply a multitude of skills involving idea generation, organization, argumentation, linguistic accuracy and discourse-level coherence. For L2 learners, these challenges are exacerbated by restricted linguistic resources and processing limits (Hidayati, 2023). That is, in language production, as Skehan's (1996) Limited Attentional Capacity Model proposes,

learners may face challenges of attention allocation between complexity, accuracy and fluency (CAF). Collaborative settings such as PBCL might mitigate this cognitive load due to the shifting of responsibility in the group and scaffoldization-based learning from each other. A combination of task design, intervention length/target proficiency level and whether or not intensive form-focused explicit instruction is provided can all mediate PBCL's efficacy. In addition, most studies have examined short-term products or overall writing quality but there are scant studies on fine-grained language measures as the CAF. Filling this gap in knowledge, the current study examines immediate and long-term effects of PBCL on writing complexity, accuracy, and fluency among university students by means of a controlled experimental design. Project-Based Collaborative Learning (PBCL) has been widely explored in second language (L2) writing research as an approach that views writing as a socially mediated process rather than a purely individual activity. Grounded in socio-cultural theory, PBCL emphasizes collaboration, peer interaction, and shared problem-solving, allowing learners to co-construct meaning and develop writing skills through dialogue and mutual support. Informed by Vygotsky's (1978) Zone of Proximal Development, PBCL facilitates a learning environment where students can scaffold each other's development as writers of language and rhetoric. There is empirical evidence that PBCL may contribute to better L2 writing process, in terms of idea generation, organization and overall fluency. Collaborative writing allows students to contribute ideas, negotiate and negotiate meaning, and share the cognitive burden of producing texts which are often more coherent and fluent. But on its effect on linguistic accuracy and syntactic complexity, findings are mixed. Skehan's (1996) Limited Attentional Capacity Model, for example, posits that learners may favour meaning and task fulfilment over form in particular when working within project-based situations where an emphasis is placed on content and outcomes. Research also reveals that the impact of PBCL on L2 writing is mediated by variables, such as task design, length of instruction, and quality of peer interaction. Short-term PBCL treatments which do not contain focus-on-form activities may not cause much of a gain in accuracy or complexity. As a result, although PBCL brings important possibilities for collaboration and engagement, it might yield limited positive effects on L2 writing development unless supplemented with structured feedback and long-term instructional support (Munir., 2019). This view provides the basis for examining the effects of PBCL on writing complexity, accuracy and fluency in the current study.

### ٢.1 Task-Based Learning (TBL) and Writing Proficiency

Task Based Learning (TBL) is one of predominant pedagogical approaches for second language teaching with its focus on the leaning/exercise of a language and communication by real like life tasks. TBL is founded on the premise that language learning is optimized when learners are engaged in real

communication; 'form' therefore warrants noticing, but not at the cost of meaning. In L2 writing, TBL guides learners to producing rhetorical primary texts in tool-mediated tasks that require them to produce not only language output but also cognitive engagement and problem-solving. Research that has explored TBL in writing contexts indicates that it can enhance fluency, complexity and accuracy when learners complete tasks more than once and receive feedback on a repeated activity (Bygate, 2001; Ahmadian & Tavakoli, 2010). Repeated tasks help learners to fine-tune their language, start noticing deficiencies and implement changes that can lead to an incrementally improvement on the CAF aspects. In fact, some repetitive communicative-producers like story writing or description tasks have been shown to promote lexical richness and syntactic complexity without reducing immediate communicative motivation. However, the balance of accuracy and fluency is still difficult to strike in TBL environments. As VanPatten (1990) and Skehan (1996) have indicated, learners are initially likely to focus more on generating fluent language in a task at the expense of accuracy with form or linguistic complexity. In such case, then TBL alone might not promote enhancing of all writing skills dimensions unless learners were stimulated with reflective guidance and peer response as well as given explicit form-oriented instruction. Augmenting PBCL with TBL is a possible solution to these issues. The project-based nature of the tasks means that students are given more contact with content, negotiation of meaning and writing for a peer audience. This confluence encourages reflexive use, supports the development of metalinguistic awareness, and creates a parallel structure which includes engaging attention in form as well as meaning. Therefore, considering TBL in relation to PBCL shines a holistic light on investigation of L2 writing development in aspects of complexity, accuracy and fluency. (Hou et al., 2024)

Collaborative Learning and Writing Complexity ethnicity. Figure 1 depicts the framework of the experimental design. Collaborative learning facilitates the L2 writing complexity through students' ideas on sharing, negotiating meaning and incorporating various linguistic forms into their writing. Collaborative writing can lead learners to different sentence structures, vocabulary and discourse strategies that enhance their ability to generate more complex message production. Peer talk and collaborative revision help learners to see each other's writing, obtain feedback, and develop their ideas further, which in turn results in more syntactic variety, lexical richness, as well as higher order thinking (Zhang., 2024).

Co-constructing texts in collaboration also fosters metacognitive development: students reflect not only on their own language choices, but also those of their partners. This self-reflection can help make their use of complex sentences, linking devices and technical vocabulary more conscious. Furthermore, co-authorship motivates and activates the learner to generate effort toward

composing advanced texts. However, the collaborative learning on writing complexity works according to task design clarity of role on group and level of teacher support. Well-organized and scaffolded, structured collaborative activities play an important role in facilitating productive interaction among students providing them with the linguistic tools to interact on equal footing and using complex language structures, thus promoting skills for the development of advanced writing (Abdeta et al., 2026; Teng & Huang, 2023).

## 2.2 Project-Based Collaborative Learning and Writing Accuracy

Peer Feedback Role in PBCL for Writing Fluency This Project-Based Collaborative Learning (PBCL) confirms in a crucial extent the accuracy of L2 academic writing including correct vocabulary, grammar, and punctuation, sentence structure as well as organization of the paragraphs. In a PBCL, students coauthor in class through onsite as well as on line authoring, what involve drafting and revision but also peer review and feedback. It is assumed that such social interaction will help 'students' notice error in their own and fellow students' writing, talk about the correct shape of certain (time-oriented) language forms and finally absorb them (Andargie et al., 2025). Project-based learning lets there be a real task for grammar and syntax, namely by focusing to the content and not only correctness of language. Learners are provided plenty of models of correct language and co-authored writing processes in the construction of collaboratively produced text. This enhances their metalinguistic capacity and leads to appropriate self-correction. Research has provided evidence that PBCL with teacher input, explicit correction and systematic peer feedback results in impressive gains in writing accuracy. But there could be more room for benefit in some domains (e.g., sentence-level grammar, agreement) than in others across higher levels of organization (where longer-term retention is presumably required). Second, the trustworthiness of PBCL in achieving precision is particular to task design and dependent on group dynamics and takes time for review and reflection. At its macro level, PBCL promotes a social and an interactive environment of learning that can help learners learn for writing accuracy as well as other factors, such as fluency and complexity (naturally contributing to the development of L2 writing) (Nurchayoko., 2015; Al-Rawahi & Al-Mekhlafi., 2015).

Peer feedback is an essential companion with PBCL and has long-term impacts on writing fluency. Fluency in L2 writing contexts is essentially the ability to generate text smoothly, coherently and at an appropriate rate with little hesitation or interference. In PBCL, students collaborate on projects and share drafts with each other constantly so that they can identify ways to sharpen their thinking and make their writing flow. Getting peer responses motivates them to go back and rework their texts, which makes expression of ideas more fluent. As they are engaged in talking about revisions and accessing peer work, students

receive immediate feedback on the clarity and coherence of their writing, and hence build more confidence in themselves as writers. It has been found that learners in structured peer review have produced longer, more readable texts and greater organization (Lynch, 2007; Bygate, 2001).

Peer feedback also encourages metacognitive reflection, where students have the opportunity to evaluate their own and their peers' work with a critical eye and find patterns in errors or ways to advance. Such repetitive exercise encourages writing automaticity and decreases the demands on their cognitive capacity, which can in turn help them to spend more time with idea conceptualization and text coherence rather than language generation. The influence of peer feedback on fluency development is contingent upon the interaction quality, explicitness of feedback guidelines, and instructor scaffolding. Creative fluency that is supported with well-designed feedback tasks, which are based on clear criteria and examples and embedded within opportunities for discussion, will take maximum advantage of its effects while fostering a collaborative writing ecology where the students can learn from each other. In a word, peer feedback in PBCL not only encourages fluency but also reinforces complexity and accuracy in an all-rounded way of L2 writing (Al-Samiri & Bukhari., 2025; Shu., 2025).

### **2.3 The Need for Further Research on PBCL's Impact on Writing Proficiency**

Though there is support for some benefits of PBCL on L2 writing, current research indicates that substantive gaps still exist with respect to its impact on CAF in writing. Although PBCL has shown effect on collaboration, engagement, and fluency, the effects on syntactic complexity and grammatical accuracy were still inconsistent in short-term intervention. This suggests a requirement for more regular and longer-term research to identify how PBCL can best be used to support writing development in full. More studies are needed to determine how PBCL is affected by characteristics of the task, length of the intervention, group composition and quality of peer feedback. Furthermore, by exploring the additive effects of PBCL with other pedagogical approaches (i.e., structured focus-on-form tasks, explicit grammar instruction or self-assessment), it may be possible to identify conditions in which accuracy and complexity are developed more along fluency. Longitudinal research that examines both immediate and delayed effects of PBCL could shed light on the sustainability of improvement and the likelihood that PBCL leads to long-term change in academic writing ability (Sun et al., 2024; Tsai., 2021). Recognizing these dynamics is important in the shaping of higher education, especially course writing, and how they should integrate cooperative learning processes. However, by addressing this research gap, future studies can better understand under which conditions PBCL fosters balanced production across writing

proficiency dimensions and ultimately contribute to more successful L2 writing pedagogy (Hidajat., 2023).

### 3. Focus of the Present Study

This study aims to examine to what extent Project-Based Collaborative Learning can be an effective intervention to students' L2 writing achievement in terms of CAF when measured by their immediate and delayed writing performances through revising and reiterating the same writing task. While previous studies have shown a limited impact of PBCL on students' measures of CAF due to no immediate gain after task repetition, there remains a critical gap and need to investigate the possible impact of PBCL on such measures, especially one week after. The proposed study, which aligns with previous literature and theoretical background integration, will address the following research questions:

**RQ1:** To what extent can the proposed guided research activities improve students' CAF dimensions immediately after completing the proposed task?

**RQ2:** To what extent can the proposed guided research activities improve students' CAF dimensions one week after task completion?

Therefore, this study consists of a unique and controlled experimental approach that contributes to the current body of research on PBCL in immediate and delayed standalone writing performance.

## 4. Methodology

### 4.1 Design of the Study

The current study used an experimental between-subject research design to examine the influence of Project-Based Collaborative Learning (PBCL) on L2 academic writing proficiency. Participants were randomly assigned to the experimental PBCL condition or control group receiving typical individual instruction. It was a four week study, where the participants worked on academic writing in guided classes. PBCL participants worked on collaborative writing tasks, and control group members did the same tasks as individuals in regular instructional settings. The Writing section was completed on two occasions: immediately after the practice and 1 week later, to evaluate retention effects. All writing products were audio-recorded in MP3 format and then transcribed verbatim, coded and analyzed in terms of CAF (complex, accuracy and fluency) via the method suggested by Ellis and Barkhuizen (2005).

### 4.2 Participants

The study included 40 undergraduate students, aged 19 to 25 years ( $M = 21.05$ ,  $SD = 1.46$ ), all enrolled in education-related programs and possessing intermediate English proficiency. The participants were native Persian speakers who had not previously attended an English-speaking university. Twenty students were assigned to the PBCL experimental group, and twenty to the control group. Participants were matched based on general English proficiency

to ensure group homogeneity. Prior to the experiment, all participants completed the Oxford Placement Test (Allan, 2004) to verify proficiency equivalence. Independent t-tests indicated that the groups did not differ on pre-test scores ( $F = 0.262$ ,  $p = 0.875$ ), indicating comparability at baseline.

**Table 1: Participants**

Groups	Proficiency Test (M, SD)	Age (M, SD)	Gender	Number
<b>PBCL</b>	13.42(7.89)	21.05(1.58)	7 males 13 females	20
<b>Control</b>	13.8(8.49)	21.05(1.39)	4males 16 females	20

### 4.3 Tasks

The Tom and Jerry animated series was used for the main task material, which included four episodes. Episodes were predetermined based on pilot testing to be age-appropriate and engaging for the sample. All sentences were presented without sound in the auditory condition to eliminate any possible influence from auditory comprehension. Participants were instructed to watch each of these episodes in order to recall and retell the material as best as possible in English.

### 4.4 Procedure

The collection of data was conducted in four weeks in a systematic and gradual process intended to compare effects of Project-Based Collaborative Learning (PBCL) on with traditional individual instruction. On the first week, all of the students went through two procedures: OPT for topic allocation and a demographic questionnaire for background measurement to ensure homogeneity in entering the intervention. In the second week, participants did a practice task: They watched a soundless episode of Tom and Jerry on screen before recalling or describing the story in English. The PBCL group had to copy its' retellings literally with faults and amendments, and then retold the story orally one more time that gave an opportunity for collaborative interpretation and analysis. For their part, the control group only did the oral retelling without transcribing in order to keep an orientation towards individual production. The focal task took place in the third week when subjects re-watched the episode once more, and subsequently narrated it from memory. The PBCL group, however repeated the transcription and retelling process while for control, only oral retelling was continued. This visit was the main data collection point for measurement of complexity, accuracy, fluency (CAF) in immediate post-task written production. In the last session (4 weeks later) participants performed a delayed task, telling the story again in room 1 and without re-seeing the video. Neither group was given any notice that they would be tested later, so performance reflected true

retention rather than a previously prompted state. All oral retellings were digital-recorded in MP3, and transcripts for all were verbatim analyzed with CAF over the 4 weeks altogether aimed to serve as a corpus-based approach to evaluate the impacts of collaborative writing task interventions on L2 academic writing skills.

**Table 2 Weekly Procedure of Data Collection and Task Activities for PBCL and Control Groups**

Weeks	Activity Description	PBCL Group Activity	Control Group Activity
Week 1	Initial assessment	Oxford Placement Test and demographic survey	Oxford Placement Test and demographic survey
Week 2	Practice Task: Watch a muted episode and retell the story	Watch episode, retell orally, transcribe retelling with errors and revisions, retell orally again	Watch episode, retell orally only
Week 3	Main Task: Watch the same episode and recount from memory	Watch episode, retell orally, transcribe retelling, revise, and retell orally again	Watch episode, retell orally only
Week 4	Delayed Task: Retell the episode from memory without re-exposure	Retell orally based on memory	Retell orally based on memory

Both immediate and delayed estimates of response quality were obtained using this procedure. The PBCL group's transcription and revision exercises were intended to encourage peer based learning, correction of errors, and reflection on language use compared to the control group's independent production. All oral retellings were audiotaped in MP3 format, transcribed and analyzed in terms of CAF (complexity, accuracy, fluency) to determine the effects of PBCL on L2 academic writing.

#### 4.5 Data Analysis

Verbatim transcriptions of all participant oral retellings were made by the present writers. These multiple transcriptions were then further segmented into analysis units, according to Ellis and Barkhuizen's (2005) guidelines for investigating Complexity, Accuracy and Fluency (CAF). Intra-rater reliability was assessed on 15% of the corpus to ensure reliability, and clause identification, error identification & grammatical form placed at 100%. Regarding RQ1, regarding normality data was verified as normally distributed with one sample Kolmogorov-Smirnov test ( $p > 0.05$ ). Unpaired t-tests were then performed to compare the immediate post-task CAF scores between the two groups (PBCL versus controls). The same procedure was applied to address Research Question 2, comparing CAF scores for the delayed repetition task one week later.

**Table 3: Differences in CAF Measures Between the PBCL and Control Groups on Task Rehearsal (First Performance).**

Variables	M (SD) PBCL	M (SD) Control	t	p	Effect Size	Interpretation
Complexity Measures	1.30 (0.15)	1.28 (0.12)	-0.254	.801	Small	No significant difference
Accuracy Measures	48.45 (21.25)	52.43 (20.11)	0.592	.558	Small	No significant difference
Fluency Measures	117.52 (30.63)	119.11 (29.57)	0.163	.871	Small	No significant difference

## 5. Results

### 5.1 PBCL and Immediate Task Repetition

Research Question 1 aimed to examine the immediate effects of Project-Based Collaborative Learning (PBCL) on academic writing proficiency, measured in terms of Complexity, Accuracy, and Fluency (CAF). The independent-samples t-test results, presented in Table 5, indicated that there were no statistically significant differences between the PBCL and control groups for any of the CAF measures. In particular, complexity measures (i.e., how many different ideas were introduced and the variety of sentence types) also did not significantly rise for the PBCL learners than those in the control group. Likewise, accuracy measured in terms of error free clause ratio and grammaticality did not differ between the two groups. In addition, fluency markers (such as writing rate and overall flow of expression) were not significantly different between the two groups. These results imply that although PBCL can contribute to collaborative engagement and peer interaction, repeated task performance without gap did not cause any significant evidence of positive impacts on students' academic writing across complexity, accuracy or fluency. The findings suggest that a brief cooperative activity may not be enough to affect the organization and language of written production if it is not supplemented with further instructional assistance, or extended participation or direct feedback.

**Table 4: Results of Immediate Task Repetition for PBCL and Control Groups**

Variables	M (SD) PBCL	M (SD) Control	t	p	Effect Size	Interpretation
Complexity Measures	1.25 (0.13)	1.27 (0.13)	0.457	.650	Small	No significant difference
Accuracy Measures	48.75 (19.41)	49.16 (19.42)	0.064	.949	Small	No significant difference
Fluency Measures	127.13 (26.24)	131.84 (28.88)	0.526	.602	Small	No significant

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## 5.2 PBCL and Delayed Task Repetition

Research Question 2 examined whether task repetition and immediate post-task transcription in the PBCL group would lead to improved performance in a delayed academic writing task, conducted one week after the main session. For CAF measures, independent-samples t-tests were employed to compare between-groups (PBCL vs control).

As shown in Table 5, none of the comparisons between PBCL and control groups were significant for any of the CAF subscales. Measures of complexity, namely disruptive topic and length of sentence did not improve in the PBCL group compared to controls. Accuracy, in terms of error-free clauses and grammatical usage, was not different between the groups. No significant differences were found for fluency, as determined by graphemic transmission rate and overall fluidity. These results suggest provision of PBCL had no carry-over effects lasting one week. The failure to demonstrate lasting improvements indicates that PBCL interventions—regardless of the inclusion of transcription and collaborative retelling—may, in the short-run at least, not lead to sustainable gains in academic writing proficiency. This however, emphasizes the necessity for longer term interventions and additional pedagogical support in raising L2 academic writing complexity, accuracy and fluency.

**Table 5: Results of Delayed Task Repetition for PBCL and Control Groups**

Variables	M (SD) PBCL	M (SD) Control	t	p	Effect Size	Interpretation
Complexity Measures	1.27 (0.21)	1.31 (0.16)	0.634	.530	Small	No significant difference
Accuracy Measures	55.03 (20.54)	53.33 (20.46)	-0.255	.800	Small	No significant difference
Fluency Measures	124.24 (27.47)	125.91 (27.56)	0.186	.853	Small	No significant difference

**Table 6: CAF Measures of Task Rehearsal (Pre-Task Performance)**

Variables	M (SD) PBCL	M (SD) Control	t	p	Effect Size	Interpretation
Complexity Measures	1.30 (0.15)	1.28 (0.12)	0.254	.801	Small	No significant difference
Accuracy	48.45	52.43	0.592	.558	Small	No

Measures	(21.25)	(20.11)				significant difference
Fluency Measures	117.52 (30.63)	119.11 (29.57)	0.163	.871	Small	No significant difference

## 6. Discussion

This study examined the effects of Project-Based Collaborative Learning (PBCL) on Complexity, Accuracy and Fluency (CAF) in academic writing of undergraduate students. Overall results indicated that PBCL had no significant effect over immediate- as well delayed task repetition performance on academic writing production from a CAF perspective. These findings are in accord with the CAF data presented in Tables 4 and 5, where no differences between PBCL and control were found. It is possible that the short-term length of intervention might be a reason for these results. Participants conducted task repetition and immediate transcription only, with few possibilities for feedback or correction. This might have hindered their potential to internalize new linguistic forms and strategies required to enhance L2 complexity and accuracy. Additionally, tasks were not disclosed as repeated to participants in advance, an effort which may reduce form-related processing during performance. It would appear that task repetition in the absence of explicit support or structured scaffolding might not be adequate to generate noticeable enhancements in academic writing proficiency. While PBCL truly retained no major CAF benefits, PBCL did seem to support engaged participation and peer interaction, which are both important for general L2 learning and motivation. These results support earlier literature (Foster & Skehan, 2013) in that collaborative activities might lead to increases in fluency and engagement but that they may need more scaffolding as well as prolonged practice to improve accuracy and complexity. In this sense, PBCL might be regarded more as an element of a general pedagogical approach, rather than an individual answer for the acquisition of academic writing expertise. The present study also emphasizes the need for longer-term interventions, feedback processes and focus on form. Opportunities for revision, reflection and guided peer-feedback tasks would be useful ways to convert group work into improvements on CAF looking at the student level. Further study is warranted to investigate the incorporation of PBCL approach into explicit grammar instruction, self-assessment, and longer reflection time in order to achieve its full potential for improving academic writing.

## 7. Conclusion

This study examined the effectiveness of Project-Based Collaborative Learning (PBCL) in enhancing academic writing proficiency among university EFL students, focusing on Complexity, Accuracy, and Fluency (CAF). Findings

suggested that PBCL encouraged group work and peer interaction, but did not lead to greater written productivity or complexity than the comparison condition. This effect was present in both the immediate and delayed task repetitions, indicating that a short-term intervention might not be sustained long enough to show changes in writing performance. In theory, the research demonstrates that although collaborative learning approaches such as PBCL may help to support engagement, motivation and fluency in writing tasks, they might not necessarily lead to the development of higher order writing skills like syntactic complexity, grammatical accuracy or a strong argumentation without additional pedagogical intervention. This highlights the relevance of social and cognitive aspects in language learning, and also indicates that collaborative processes should be combined with explicit instruction on form and content. Practical and pedagogical implications The findings suggest that teachers cannot rely on PBCL to improve writing skills in itself. Because CAF is not easy to obtain, in order for PBCL to produce meaningful changes in CAF the skills should be raised through a series of structured writing workshops and guided peer feedback work, self-assessment processes, and numerous practice. Teaching in such a way that allows student to reflect and think about their mistakes, making changes and just getting more complex overall with structure of language/writing techniques. In addition, the study also highlights significant implications for higher education curriculum development. Although PBCL can develop students' abilities to work in groups and communicate (skills that are known to be important for academic and professional success), it has to be considered one skill among many, with writing instruction as its complement rather than its replacement. Finally, the current study provides a basis for investigating L2 academic writing with PBCL long-term effect. A further area for future research could investigate the role of extended PBCL, mediation, and integrating TBLT. This kind of research would inform how CBL should best be planned so that every aspect of LW competence can be developed by L2 learners.

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