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Effects of students' self-reflection on improving essay writing achievement among Ethiopian undergraduate students: a counterbalanced design

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Abstract

Reflection in education has seen an upsurge in research interest since as reported by Dewey (How we think, Prometheus Books, Buffalo, 1991) ground-breaking work, which plays an integral role in fostering students' self-reflection and demonstrable learning skills. However there have not been enough studies to determine whether writing instruction from the perspective of self-reflection before action improves undergraduate students' essay writing achievement. This article investigates the effects of Ethiopian university-undergraduate students' self-reflection before action on their essay writing achievement through the mediation of teaching writing instruction. The study's methodology involved two phases of intervention in a counterbalanced design. The participants were 47 male and female students aged 19–22, from Arba Minch University. They were assigned to a control group and an experimental group using the matched sampling technique. During the first phase, the experimental group (Group A) was instructed to engage in self-reflection-based course activities over a period of two months while the control group was not. In the second phase Group B was engaged in self-reflection-based course activities over a period of two months while Group A was kept under control. To collect data, preliminary students' self-reflection was provided using an open-ended questionnaire, and pre- and post-tests of writing were given to both groups. Mean and standard deviation statistics were applied after the thematic analysis of the qualitative data. Additionally, a univariate analysis of variance was performed to answer the query regarding the impact of self-reflection on students' essay writing performance. The findings demonstrated that, despite the students encountering numerous difficulties during their essay-writing exercises; the self-reflection-based instruction had a significant positive impact on the participants' essay-writing achievement. In conclusion, the findings have some implications for teaching essay writing instructions.

Keywords: Counterbalanced design, Essay writing, Self-reflection, Self-reflection-based instruction, Undergraduate students

Introduction

Language learning is concerned with achieving the goals of the four fundamental pillars: listening, speaking, reading, and writing skills. Writing is widely regarded as the most difficult and least liked of the four language abilities (Anh, 2019; Defarzio et al., 2019; Sahle et al., 2023). However, it also plays an important role in a user's actual writing skills in terms of writing production and communication (Troia et al., 2015). Sorenson (2010) outlines the four skills that a writer must possess: independence, knowledge, skills and sub-skills, fluency, and creativity; Clark (2012), Cole and Feng (2015), Huy (2015) and Sommers (2006, 2010) all define writing in this manner. According to Clark (2012), Cole and Feng (2015), Elkhayma (2020) and Sommers (2010), writing skills are essential for reading information, reporting news, and communicating via digital emails and messages.

In Ethiopia primary and junior schools more than 30 languages are used as a medium of instruction (Tesfay, 2017) and samples of higher education students' writing skills have been found to be poor and mediocre (AlMarwani, 2020; Wondim et al., 2023). Moreover, freshmen learners at university are expected to be able to write effectively for both communication and academic purposes (Fareed et al., 2016; Rao, 2017). To overcome these challenges, students require essay writing assistance at various levels. One approach to addressing students' writing difficulties is to provide them with instruction-based assistance. Therefore, the curriculum of the targeted group of students should be based on writing literacy in order to enhance their learning and enjoyment of using it successfully.

Self-reflection is a contentious issue when it comes to improving writing skills. However, teachers and researchers have different views on its effectiveness (Bubnys, 2019; Olteanu, 2017; Sumarni et al., 2018). While some researchers believe it has a negative impact on learners' writing achievement (Elkhayma, 2020), Botelho and Bhuyan (2021) contend that it is useful in helping learners improve their writing. Furthermore, Edwards (2017) argued that most previous studies have lacked ecological validity due to their use of one-shot research design (i.e., enhancing writing skill achievement in different independent variables); less is known about counterbalanced designs and their effects on essay writing achievements. Therefore, there is a need for research that target a range of writing improvements while considering different phase of study design incorporating a delayed balance of students with their need-based instruction. Such a study would be more ecologically valid, and could provide more practical and applicable advice to writing skill teachers (Cavilla, 2017; Lew & Schmidt, 2011; Naidoo et al., 2023).

Most of the previous research on self-reflection has focused on its efficacy; however, how learners process and make use of self-reflection has not been sufficiently explored (Botelho & Bhuyan, 2021; Klimova, 2014). Botelho and Bhuyan (2021) particularly noted that the processing of self-reflection in class has not been investigated. Although there is substantial evidence that self-reflection helps students' writing achievement, there is a gap in understanding its effects when used in need-based instruction (Naidoo et al., 2023). Additionally, most self-reflection studies have been conducted in health related fields. For example Olteanu (2017) studied how students used self-reflection to learn from the teacher by facilitating their plan starting from their prior experience. This may be crucial for less proficient essay writers who need particular support (Ismail, 2011).

Contemporary studies on essay writng difficulties have been mushrooming in many different settings (Bulqiyah et al., 2021). However a study about investigating essay writing difficulties encounteres by higher education institution learners in Ethiopia is still lacked. Therefore, a critical study of university undergraduate students' essay writng difficulties mus be undertaken through self-reflection instruction. The contribution of the study will be a basis for students' self-reflection instruction effects in improving essay writing university undergraduate classrooms. Thus, the purpose of this study was to investigate the challenges undergraduate students face when writing essays through self-reflection strategies, as well as the impact that self-reflection-based instruction has on their essay writing achievement. To this end,the following research questions were posed:

(1) What challenges do undergraduate students encounter when writing essays?
(2) Does self-reflection-based instruction improve undergraduate students' essay writing achievement?

Review literature

From the constructivist view point, self-reflection is seen as a tool for improving learners' knowledge and skills. According to Bubnys (2019) self-reflection is a method of learning that focuses on one's understanding and practical activities in relation to the learning context. Edwards (2017) asserts that to properly process reflection before taking action requires focusing on what an experience means. Botelho and Bhuyan (2021) suggest that self-reflection can be employed to enhance learning, promote autonomy, and transfer some of the responsibility of learning from students to teachers. Furthermore,when facing the challenge of writing an essay, teachers can instruct students to use self-reflection to solve the problems. This adds a new concept of writing process and specific writing standards to the essay writing instruction. It is also work with social-constructivist view of collaboration with their classmates and the small group of teacher-students interaction. Fidelia (2015), Lew and Schimdt (2011) and Schmalz et al. (2022) all suggest that self-reflection-based instruction has a positive effect on learners' essay writing achievement.

The literature review below, demonstrates potential links between students' ability to reflect on their own learning and their essay writing success. Although, students can improve their learning through self-reflection, the majority of university students encounter numerous difficulties in developing knowledge-based practices. This implies that the effectiveness of writing exercises is dependent on both prior experience and scientific knowledge of writing processes.

Self-reflection-based instruction

The literature has addressed reflection on action from various angles for a range of purposes. However, restricting reflection before action and in action in essay writing is not common to study. Attention to this neglect and engaging students in their real learning practice is needed (Edwards, 2017; Schmalz et al., 2022). One example of this is the effect of self-reflection on student learning. For instance, Klimova (2014), examined

the metacognitive process of self-reflection in the context of the autonomous learning approach. The student-centered learning approach which has been embraced by many academics in recent decades is critical for education (Cavilla, 2017; Sevilla & Gamboa, 2016). Self-reflection can be defined as a process that allows students to pause and reflect on their prior knowledge. While the benefits of self-reflection for students are obvious and understandable, finding these benefits from an instructor's perspective presents significant challenges (Sumarni et al., 2018). Self-activity analysis in higher education institutions is a complex learning/teaching process that can be developed both formally and informally (Bubnys, 2019).

Dewey (1991) defines reflection as an active and deliberate process that begins with discomfort over an experience and culminates in knowledge and deeper insights. Recent research (e.g., Botelho & Bhuyan, 2021; Olteanu, 2017; Sumarni et al., 2018) has highlited the importance of self-reflection in the teaching and learning context,particularly in empowering students' writing achievement. Therefore, teachers must closely monitor their students' activities to help them become proficient in essay writing (Fidelia, 2015). Self-reflection is a dynamic process that occurs before, during, and after the writing process. It is not about remaining passive and looking back, but about actively engaging with knowledge and experience. Despite the new and deeper understanding and use of knowledge that self-reflection provides, it has received little attention in recent studies (Al Zahrani & Chaudhary, 2020; Naidoo et al., 2023). Nevertheless, students' self-reflection prior to writing instruction encourages teachers to plan their teaching instruction in a need-based manner connecting their students' prior experience with the new instruction. For instance, if students' reflections reveal a lack of understanding of writing criteria, teachers can then announce the writing criteria and their effectiveness.

Recently, self-reflection has been used as a form of course evaluation. The reflective essay does not have a fixed format (Edwards, 2017). To understand what writing is and how to write an essay, a solid background in the subject is required. As a result, many students lack the technical and practical skills necessary for essay writing (Fidelia, 2015). Structuring an essay requires careful planning (Cavilla, 2017; Ferris, 2003). To develop the main and auxiliary themes, logic must be used (Bubnys, 2019). By using writing techniques such as topic selection, data collection, outlining, drafting, writing, and proofreading in greater detail, you can become more proficient at essay writing by: analyzing the audience or reader; and improving your writing skills (Klimova, 2014; Sevilla & Gamboa, 2016).

Students' writing challenges and their achievement

Writing proficiency is required at all educational levels (Kroll, 1990, 1994). According to Dhanya and Alamelu (2019), students' writing in the early grades may be an attempt to demonstrate that they understand the subject's specialized material, even though it may apear as if they are merely learning how to write. Javed et al. (2013) suggested that young students must become proficient writers in order to learn new information. Anh (2019) asserts that having a talent for writing takes work and ongoing study, emphasizing that knowledge of the writing topic and the style of writing are necessary (Hyland, 2003; Palanisamy & Abdul Aziz, 2021; Sahle et al., 2023). Despite this, we were uninterested in writing (Troia et al., 2015). Undergraduate university students are required

to submit a detailed essay. (Huy, 2015; Hyland, 2003). Studies (Cole & Feng, 2015; Ferris, 2003; Elkhayma, 2020; Jannah, 2020; Moses & Mohamad, 2019; Suhono, 2017) have revealed that university-level undergraduate students' writing development is subpar in terms of writing criteria. Moses and Mohamad (2019) and Rao (2017) both demonstrate how the requirement for students to practice writing and reading multiple written pieces is essential for the development of writing skills. Additionally, Anh (2019) noted that a number of issues, including a lack of motivation, a limited capacity for comprehension, and the impact of the writing, can frequently make it difficult to learn to write.

In order to produce quality writing, students must be able to write. According to Huy (2015), many university level undergraduate students lack interest in learning how to write, despite the fact that it is a crucial skill and is often regarded as a difficult and/or sophisticated talent, Moses and Mohamad (2019) investigated whether children who are able to produce quality writing as early as elementary school can comprehend the value of writing and effectivelly practice it. Fareed et al. (2016) discovered that the majority of university-level undergraduate students have good handwriting, are unaware of the importance of writing skills in their education, and consistently receive low scores on writing skills assessments. Rahmat et al. (2022) investigated the undergraduate students' perceived writing difficulties. The results revealed that the students' writing challenges began with their personal belief that writing is very difficult. This perception may influence the learners' behavior towards writing essay. Bulqiyah et al. (2021) also reported that learner's belief influence the way they view writing skill and its difficultiness. Consequently, Sajjad et al. (2021) concluded that what learners claimed as difficulties in writing. In addition to their perception and belief to writing as a difficult puts more challenges to the writing process, they faced challenges with word choice, vocabulary and organization.

Despite the importanceof writing is crucial for all students' academic performance, it has still become the onerous skill for them. This situation has occurred in many different contexts around the world with several aspects of writing difficulties like: 1) content knowledge; 2) structural; 3) grammatical; 4) mechanical; and 5) vocabulary (Bulqyiah et al., 2021; Defazio et al., 2010; Jannah, 2020; Rahmat et al., 2022; Sahle et al., 2023; Tesfay, 2017; Toba et al., 2019). As Dhanya and Alamelu (2019) and Hyland (2003) have noted. Rao (2017) articulated the idea of writing as a technique for communicating with others around the world, not just in academia. Therefore, university-level students are expected to write well in order to communicate effectively with the fulfillment of the writng aspects such as content comprehension, idea organization, grammar correctness, word choice, and stylistics (AlMarwani, 2020; Deane et al., 2008).

Self-reflection and writing achievement

Good writing skills can also help students find a good job after they graduate from college (Fareed et al., 2016; Moses & Mohamad, 2019). Ethiopian businesses, for example, now seek out individuals with excellent writing and communication skills to translate documents from one language into another and to provide updates on the status of projects or tasks. Unfortunately, many students are never required to learn how to structure their ideas and write in different styles (Bulqiyah et al., 2021; Rahmat et al., 2022; Sajjad et al., 2021). Writing is often regarded as a difficult skill, especially when students

struggle with it. Many students at various educational levels are unaware of the importance of writing skills (Deane et al., 2008; Kroll, 1994; Troia et al., 2015). Dar and Khan (2015), and Rao (2017) have argued that numerous errors can be found in undergraduate students' written work. Due to their lack of focus and other issues, most students struggle to write well (Dhanya & Alamelu, 2019; Fareed et al., 2016).

Many researchers (e.g., Anh, 2019; Cole & Feng, 2015; Dar & Khan, 2015; Deane et al., 2008) have discovered that self-reflection writing improves students' academic progress in the classroom as well as their writing skills. Some of them (Dar & Khan, 2015; Fareed et al., 2016) have concluded that social constructivist view is preferable to uniqueness in the writing process. Previous research (Bulqiyah et al., 2021; Huy, 2015) has classified students' writing abilities regards to the writing aspects: (1) word choice; (2) organization; (3) language use; (4) structural organization; and (5) mechanics. Further research into the difficulties that these failed writing products present is still needed. In the this context, two points stand out. Firstly, there is a misconception regarding the importance of writing abilities (Palanisamy & Abdul Aziz, 2021). Most students think it's difficult and/or complicated, and some think the same about handwriting. Secondly, a variety of language education components, including curriculum design at all levels of education, have an effect on writing learning (Anh, 2019; Dar & Khan, 2015; Deane et al., 2008; Defazio et al., 2010; Elkham, 2020).

To sum up, several studies have approved the positive role of self-reflection on students' learning achievement particularly their writing skill with regard to the importance of writing accuracy in language learning. This counterbalanced design study can be a step to investigate the effects of self-reflection-based instruction on essay writing due to the lack of studies about the effect of self-reflection-based writing instruction, the study aims to investigate 1) The challenges tha undergraduate students encounter when writing essays; and 2) The effect of self-reflection-based instruction on undergraduate students' essay writing achievement.

Methods

Design

This study utilized a counterbalanced design. In the experimental process, this design was used to ensure that the educational delivery between the control and treatment groups was comparable and free of various internal and external influences (Sarkies et al., 2019). The design consisted of two phases which separated the participants into two groups (Groups "A" and "B"). In Phase One; Group "A" received a self-reflection-based teaching intervention, while Group "B" served as a control. In Phase Two, Group "B" received a self-reflection-based writing instruction intervention, while Group "A" served as a control. Furthermore, both groups of participants were tested on the same tests before and after each intervention period. The counterbalanced design model used to implement this research is shown in tabular form below (Table 1).

Study participants

Participants in the study were first-year students at Arba Minch University in 2020/2021 academic year. As soon as the study participants and their department colleagues gave their consent, the study's formal procedures began. Information was also shared with

Table 1 Counterbalanced design implementation model

Participated groups	Intervention phases			
	First phase	N	Second phase	N
Experimental group	Group A	24	Group B	23
Control group	Group B	23	Group A	24
	Column average		Column average	

the participants, and data handling was confidential. Before the study's participants were chosen the written request was granted by the university college dean administration. In addition, the particpants received information about the objective, advantages and risks of the study as they might affect.

The study was conducted on university students, regardless of the university chosen for the intervention process; as long as the purpose and the intervention process of the study remain the same, the results will not differ significantly 47 first-year students (38 females and 9 males at the age range of 19–22 years old) were chosen to participate in the study's intervention process using convenience sampling technique and as they are learning writing skills from the modules organized by the university. The curriculum which the students learn about writing is an education that allows them to practice in an action-oriented manner.

Although the participating students were classified as one group, they were divided into two groups (Group "A" and Group "B") to facilitate the intervention of the counterbalanced design. The distribution of students was based on their test scores. As a result, 47 writing students were ranked first based on their writing proficiency test results. The student with the highest score is then matched with the student with the lowest score, and they were placed in the categories of each group in the ranking order. Using the Matched Sampling method, 24 students from Group "A" and 23 students from Group "B" were selected. Each group took part in the intervention process of a counterbalanced design.

Data collection tools

Based on the study's objectives, the main data collection tools chosen were a reflective open-ended questionnaire and writing skills tests. Prospective students take two consecutive writing skills classes per academic year: basic writing skills and advanced writing skills, with no difference in focus beyond the order of content. Both subjects were studied. The level of students' writing skills was assessed in classroom and out-of-class writing activities during the first basic writing course lessons. It was determined that many of them struggle with basic writing knowledge and techniques. The teacher assigned to the course consulted with other writing experts and collected self-reflection information from the students to identify the problems they faced in essay writing practice. Open-ended questions (for example, what worries you when you think about writing an essay, do you know the criteria of writing, mention the problems you face in the process of writing practice) were presented to reflect the writing disabilities they face individually and the gaps that prevent them from being able to write in the learning and teaching process. The goal was for students to participate in their own learning and teaching

process and identify their own problems, so that teachers could focus on solving the writing problems expressed by students.

The Writing Ability Test is the second data collection tool used in this study. Essay writing skills tests were administered to students over two intervention periods. Two experts evaluated two different question strategies and content during each intervention phase to ensure a comparable approach and level of appropriateness. Each essay writing proficiency test consists of three sections and is presented in two application phases in a counterbalanced design. The first section encourages students to write about a memorable experience from their past. The second requires them to read a prompt and respond to it in writing. The third encourages them to reflect their personal position and point of view in writing based on the alternative viewpoints presented. For the second intervention period one of the three questions was a prompt to write an essay explaining the relationship between cause and effect. The second application structure was prepared to prompt on expository essay, providing a reason for writing. The third assignment required students them to write a critical essay based on one extreme of reality and combining it with their personal point of view.

The questions used for data collection instruments in the pre- and post-tests were prepared in four instructions and different topics or guides for each session. In each exam, four topics were presented, and students were asked to choose two of the optional topics and write about them. The instructions presented in the pre- and post-tests were as Table 2.

Students were expected to write at least two of the questions based on the instructions and alternative topics. Each student's written paper was graded using the rubric, which included content, organization, word choice and use, language use (grammar), and mechanics or writing style. To ensure the accuracy of the pre- and post-tests, three professional teachers checked the test for validity issues. As a result, each participating student was required to write three essays in each of the essay writing skills tests.

Validity and reliability of data collection tools

Although there was no difference in the scores of the writing skills tests administered during the two intervention periods, the questions were balanced and divided into two types. During the pilot study, two-choice questions were presented in three sections to broaden students' writing options on the writing skills test. However, when students wrote essays on various topics, the correcting teachers reported difficulty in correcting and grading them. There may also be a test adaptation effect when writing essays using the same questions over time. Thus, out of the six optional topics included in the pilot study (three optional topics/questions for writing three essays), it was appropriate to include three questions in the two equivalent tests presented during each application for the main study. In order to reduce the effect of test adaptation, the essay writing tests given at each level have used questions with similar content and approach. Three applied linguists with a second degree or higher were evaluated using the test criteria to ensure that the tests were of the same level and weight. In particular, to ensure that the tests did not fall outside of the curriculum, their content is related to essay structure methods, they were free of gender and physical injury issues, they were of appropriate weight and

Table 2 Pre- and first and second phase interventions and test type clues

Test phases	Test types clues
Pre-test	1. Write an expository essay on the following topic What do you believe is the most serious issue at your educational institution? Explain your problem in detail providing compelling reasons 2. Create a technical essay based on the next concept presented You rented an apartment in Addis Ababa. The electricity meter in your rented house is broken and inoperable. You called the company to make sure the electric meter worked for you. But they did not schedule an appointment at the time you specified. I don't mind if you call the company several times a day to ask them to keep the power on for you 3. Write a narrative essay based on the idea presented below People go about their daily lives with a variety of experiences. Experience has never been divorced from human life, and some of these experiences can be life changing or memorable. Writing a narrative essay about a once-in-a-lifetime or memorable experience can be a great way to reflect and remember these meaningful moments
First phase	1. Write a cause and effect essay based on the following proposition A university student who has recently finished his studies to help his impoverished family was unfortunately expelled from school due to his poor academic performance. He now finds himself in a difficult situation, unsure of whether he will be able to easily find another job without completing his university education. Furthermore, his mother is seriously ill, and they cannot hear what happened to their child; as it may worsen her condition. In this unfortunate incident were to happen to you, what would you write to Arba Minch University's registrar's office or any other concerned body? 2. Write a technical essay based on the following proposition After carefully reading the job advertisement, write a letter stating that you are qualified for the position based on the criteria specified in the advertisement No prior experience as a news reporter is required for employment in Ethiopian mass media. It is sufficient to be a language and literature expert, with a pleasant personality and the ability to generate creative ideas. To be competitive, you must also submit a written application stating who you are and how relevant and important you are to the job you are applying for. If you meet the requirements, a warm welcome awaits you Ethiopian Agency for Mass Communication 3. Compose a critical essay on the following proposition What is truth to you? Is there such a thing as truth? If you say "yes", provide reasons to prove the existence of reality; if you say no, write an essay using your own or someone else's experiences of betrayal as evidence
Second phase	1. Write a narrative essay based on the idea presented below What are the qualities of a good teacher? Make your point using convincing evidence and detailed examples 2. Write a technical essay based on the following proposition In Addis Ababa, a job and employee liaison organization matches job seekers with employers based on their reputation, appearance ethics, work experience, and Special skills. To be successful in this process it is important to describe in detail your appearance, demeanor, work experience, and special skills. Additionally, a written application should be prepared mentioning the job you wish to do 3. Write a compare and contrast essay based on the following proposition Some people believe that learning collaboratively with others produces better results. While others believe that competitive learning can lead to better preparation. Which of the cooperative and competitive learning concepts do you support, and why? Provide persuasive evidence to support the argument

language level, and structural characteristics were emphasized. This is done to avoid test adaptation and repetition.

Ten open-ended questions were prepared and evaluated by three appropriate teachers based on Ferris' (2003) composition evaluation criteria. The teachers were asked to rate their level of agreement using numbers (4, 3, 2, 1) representing the ten evaluation criteria from highest to lowest agreement options. The three remaining open-ended questions invite the evaluator teachers to share their thoughts. Cronbach's Alpha values of 0.778, and 0.714 were calculated for the three assessors' results in terms of cross-validation reliability. Pearson's correlation coefficient, r = 0.982, was used to calculate the correlation between the two scores. Both tests showed that the level of consistency

was acceptable and that the results were very close. The findings indicated that the tests' content validity was satisfactory. Furthermore, the form and content of the tests were revised and redrafted based on the evaluators' responses and comments to the open questions.

Following each practice session, the general essay writing ability scores were examined using a cross-sectional reliability statistic to determine their level of reliability. Thus, in the first phase, the writing ability test was measured to be 0.935, and in the second phase, 0.788. According to Pallant's (2011) level classification, when Pearson's correlation coefficient was calculated to confirm the correlation between the results of the two tests, a high correlation ($r = 0.72$) was observed. The correlation score indicates not only the equivalence of the tests, but also the reliability of the data obtained from the tests. Thus, the results obtained from writing skills are reliable as their reliability levels are greater than 0.7 during the first and second phases.

Finally, the distribution consistency test was used to determine whether the students' scores in both application periods were distributed consistently. The Kolmogorov-Sminov test was used to separate the treatment and control groups' results. Furthermore, the consistency of the distribution of the students' essay writing ability test results in all methods of testing was confirmed by inspecting the related column and bar graphs for the total result. This showed that the distribution of the results met the criteria for using parametric tests to answer the first question of this study.

Procedures

Following the design of the study, appropriate precautions were taken to avoid any issues in its application of the study. In terms of the education system, the goals, content tasks, and explanations of the education in which the study was implemented were presented in a natural manner. To investigate the role of individualized teaching in improving students' writing skills a teaching tool was created and integrated with the teaching contents and activities of the essay writing lesson only for the experimental groups in both intervention periods. The selected content and activities were made compatible with the purpose of the modularization curriculum and the content and activities in the writing course. Essay writing processes, essay structural parts (introduction, body, and conclusion), essay structuring methods (argumentative, descriptive, narrative, compare and contrast, cause and effect, analytical, and process analysis), and structural essays were covered. The content and activities included activities that allow students to structure the process of writing an essay (selecting a topic, planning, organizing, drafting, writing, editing, and proofreading). Practice relationships include narrative, descriptive, cause and effect, compare and contrast, and process analysis. These activities in both intervention periods began by introducing students to the nature and distinguishing features of the activity writing content in each class. Then, after presenting each of the essay practice topics separately, students were asked to follow the writing skills process and write an essay.

In the 2020/2021 academic year, first semester, the basic writing skill course given in the first lesson was collected individually to identify the students' writing problems and analyzed separately according to their themes. Prior to the intervention of the study, certain precautions were taken such as approval of the study site and participants, as well as

clearly stating the purpose of the study. The researcher then explained the purpose and intervention of the program to the coordinator and teachers of the classroom requesting permission to teach in the classroom. By meeting with the participants chosen for the study, it was possible to confirm their willingness by explaining the purpose of the study. Finally, after giving their permission to participate, the introduction of the course, which was found in the first chapter, Essay Writing Procedures, began on February 18, 21, 26, and 29, 2020/2021 academic year. For two weeks (two days a week, Monday and Thursday, two hours each day), students studied together without being divided into two groups. The lesson was presented in the usual manner of writing an essay, and the lesson they took together was an introduction to essay. Writing aiming to introduce the procedures needed to write an essay.

Students were tested on Thursday, February 29th, 2020/2021 academic calendar, after learning the first essay introduction chapter together. Because the participating students who took the test were only one group (47 students) according to the class classification, and the balanced design required at least two groups, they were divided into two groups to participate in the study using the Matched Sampling Method. As a result, the students who took part were divided into two groups based on their results. By matching those with high and low results, the classification process was made from two extremes to the middle. During this process, two groups called "A" and "B" were formed. Each application period, the two teams were judged, with group "A" judging the first phase and group "B" judging the second. Conversely, in the first phase, group "B" was in control, and in the second phase, group "A" was in control.

Before the study's intervention, the nature and purpose of the course and the coordinated intervention were explained to the participating students in each phase so they could understand the presentation of the course and the processes of its intervention. The intervention process of the study was also explained to the participating students during the intervention process. The tests and lesson activities were described in terms of writing proficiency, as well as their types, features, and organizational framework. Results from each test were provided along with an explanation of why and how those results were anticipated for each test and task. Choosing a starting point (reason for writing) or a model topic was the first step in each essay writing lesson's application period. This was followed by planning (selecting and narrowing a topic, gathering and vetting information, organizing and sharing information), and drafting (writing and organizing an idea as it is downloaded).

The primary interventions took place between March 3rd and May 29th, 2020/2021 academic year (48 h—two days a week). The participating group for the first stage of the intervention was "A". Justice's intervention began on March 3rd, and concluded on April 11th. (for 24 h, two days a week). The students (group B) who remained under control during the first phase of the intervention participated in the second phase of the justice intervention. This intervention was carried out between April 15th and May 23rd, (24 h, two days a week).

Data analysis
The first step was to determine the equivalence level of the students who had been divided into two groups using the kinship sampling method and had to participate in

two intervention periods. The Kolmogorov-Sminov test was then followed by a sample analysis to determine the consistency of the distribution of the results yielding a $t(45) = -0.067$, $p = 0.948$. Descriptive statistics a p-plote, and a counterbalanced design were used to examine the mean scores from the two groups on the tests of their essay-writing abilities during both intervention periods. An independent samples t-test was then employed to calculate the test scores of essay writing ability with the first intervention. Levene's Test for Equality of Variance was then used to examine the outcomes of both interventions. If the test results showed a significant difference (*p*.05) between the justice and control groups, the magnitude of the difference was calculated using partial eta coefficients. Additionally, if there was a difference in the results of both intervention periods, the partial eta square of intensity level was calculated. In the fair group analysis, the results of the control group students were subjected to both t-test and covariance analysis methods and Levene's Tests of Between-Subjects Effects confirmed the possible differences between the groups. This statistical procedure was used because it is a better option for measuring the effect of judgment on writing ability (Pallant, 2011) by reducing the Within-Group Error Variance of dependent and independent subjects.

Ethical consideration

The manuscript is unique, and the data reflect the actual achievements of the undergraduate students who took part. It has not been published in any form or language, in part or in its entirety, anywhere else. The outcomes are presented clearly, truthfully, and without fabrication, falsification, or improper data manipulation. There is no representation of information, text, or concepts by others as though they were the author's original work, with appropriate acknowledgement of others' works taken into account. Before implementing the intervention, official letters were obtained from the respected body and used to contact participants at the study site. The data collection process, including the experiment was approved by two reviewers assigned by the Research Development Committee (RDC) of the College of Social Science and Humanities. All the participants were informed that they could voluntarily take part in the study and the results would be used for educational purpose.

Results

To collect data, a self-reflection strategy was used, with structured open-ended questionnaires divided into two sections. The first data component corresponds to the first study question: students' self-reflection strategies. The data collected through the self-reflection open-ended questionnaires were coded and thematically analyzed in the first subsection of the data analysis. The data gathered through essay writing tests in the pre-test and two phases of the main interventions were then presented and analyzed in the second subsection of the data analysis section.

Challenges in essay writing achievement

Undergraduate university students were found to be prone a range of writing challenges. Data from the self-reflection-based open-ended questionnaire was used to answer the first research question. Data coding and thematic classification were employed to identify the core challenges encountered in the essay writing classroom when analyzing and

determining the participants' writing challenges through self-reflection. The data from the structured open-ended questionnaire was used to illustrate the depth of students' reflections on issues with writing skills through data coding and thematic description, as displayed in Table 3.

The data gleaned from the students' self-reflection was primarily used to answer the first question. The findings in Table 3 revealed the obstacles to writing effectively for university-undergraduate students. The students faced numerous challenges during their essay writing practice, which hindered their writing achievement. As a result, the results were organized into three themes; misconceptions about writing standards, lack of practice during the learning stages, and a lack of writing invitations. To summarize, the results of Ethiopian university-undergraduate students' self-reflection appear reasonable, indicating that the students faced numerous challenges during essay writing practice.

Many of the targeted students identified the main issue as a misunderstanding of the importance of writing abilities. Three students' reflections are provided below.

> *What is the nature of writing? ... I'm having trouble grasping the concept of writing.... The problem is a misunderstanding of the writing procedures. It does not appeal to me.... (St, 42)*
> *... The most difficult aspect of writing is underestimating the importance of writing skills.... (St, 10)*
> *The fundamental flaw in my writing is a misunderstanding of how paragraphs develop. I can't write a complete paragraph by connecting distinct sentences logically. (St, 2)*

Based on the three factors listed above, the majority of the targeted students' self-reflection agreed that there was a misunderstanding of writing skill methods and criteria. Additionally, seven students discussed their writing concerns in their self-reflection. The outcomes of the challenges were identified by the targeted group of

Table 3 Students' self-reflection on their writing challenges, coded and thematically classified

Coded data	Thematic classification
What exactly does writing consist of? Uncertainty about the writing process, misunderstanding of how paragraphs develop, and difficulty mastering these skills can all be obstacles to writing. Trouble coming up with complete sentences and organizing paragraphs, unfamiliarity with the characteristics of writing, and difficulty stringing together a coherent paragraph are all common issues. Problems with an essay begin with selecting a topic, but the most difficult aspect of writing is coming up with an idea and beginning and ending it in a well-organized manner. Writing is indeed a difficult task	Misconceptions about how to write, including writing standards
It is difficult to read and comprehend anything written. The written concept is incomplete because it lacks a clear topic definition and development framework Problems would start with the first sentence. I disliked writing practice and was not sure what the writing criteria were. I was incapable of summarizing my thoughts. The written content had glaring faults and errors. Writing problems were caused by a lack of writing practice	Less practice during the learning stages, including writing anxiety
Misconceptions about the importance of writing, lack of idea production during writing, not knowing the writing criteria, lack of idea construction in good organization, unreadable written works, less motivation to write repeatedly, problems arising from teachers' instruction, writing problems arising from lack of concentration, and not knowing the procedures of writing	Lack of invitations to write

university-undergraduate students, who were unconcerned about the importance of writing, lacked concept generation, and demonstrated less proficiency in organizing their thoughts. Furthermore, some students' misconceptions about their writing abilities have resulted in a misinterpretation of writing requirements and procedures.

> *My problem with writing an essay starts with deciding on a topic. When writing an essay, I can't help but use specific knowledge. I'm not familiar with the characteristics of effective writing. I also struggle with grammar and writing style. Anyone attempting to read my writing will notice that it is a mash-up of many accents. ... (St, 38)*

Different students described the difficulties they encountered during the writing skills practice in various ways. These seven students' perspectives on the challenges of practicing writing skills were highlighted, and some of them mentioned the following in their written self-reflection:

> *I'm even more terrified when I think back on what I've written. Whatever I write is difficult to read and comprehend.... My written concept is incomplete because it lacks a clear topic definition and development framework.... (St, 12)*
> *... Writing is difficult for me. I have the ability to come up with ideas in my head. But it is difficult for me to write them adequately. (St, 11)*

The students were confronted with reflected descriptions related to the second thematic showing challenges in their writing skills due to a variety of factors, including a misunderstanding of the boundaries of writing skills, unreadability of written essays, lack of teachers' commitment, and a lack of experience writing during their learning years.

Effects of self-reflection-based instruction on writing achievement

The data from the essay writing tests were used to answer the paper's second research question. The central tendency of mean values and standard deviations were used to analyze and determine the participants' essay writing achievement, as shown in Table 4.

Table 4 displays descriptive statistics for Ethiopian university undergraduate students' essay writing achievement in the pre-test and two experimental phases. The mean pre-test scores for the experimental and control groups are $M = 16.792$; $SD = 3.683$ and $M = 16.957$; $SD = 3.082$, respectively. The experimental group A ($M = 20.958$; $SD = 2.985$) outperformed the control group B ($M = 16.319$; $SD = 2.755$) in the first

Table 4 Achievements of participants in essay writing during the pre- and first, and second phases

	Groups	N	M	SD	SE
Pre-test	Group A	24	16.792	3.683	.752
	Group B	23	16.957	3.082	.643
First phase intervention	Group A (experimental)	24	20.958	2.985	.609
	Group B (control)	23	16.319	2.755	.574
Second phase intervention	Group A (control)	24	20.125	1.793	.366
	Group B (experimental)	23	20.348	2.551	.532

phase of the intervention. Finally, the second phase of the intervention reveals that the experimental group B (M = 20.125; SD = 1.793) and the control group A (M = 20.348; SD = 2.551) have interrelated results. However, the mean values and standard deviations cannot be used to determine whether there are statistically significant differences between the experimental and control groups in the pre-test and the two phases of the intervention in this study. To that end, the univariate analysis of variance test was used to see if there were statistically significant differences in students' essay writing achievement, as shown in Tables 5, 6, and 7.

Univariate analysis of variance was used to determine whether there was a statistically significant difference between the mean scores of the pre-test results of the university-undergraduate students. The analysis results, indicated that the pre-test results of the two groups did not differ statistically significantly at F(1,45) = 0.028,

Table 5 Tests of between-subjects effects of pre-test result

Source	Type III Sum of Squares	Df	Mean Square	F	Sig	Partial Eta Squared
Corrected model	.319[a]	1	.319	.028	.869	.001
Intercept	13376.489	1	13,376.489	1155.548	.000	.963
Group	.319	1	.319	.028	.869	.001
Error	520.915	45	11.576			
Total	13,901.000	47				
Corrected total	521.234	46				

[a] R squared = .001 (Adjusted R squared = − 0.022)

Table 6 Tests of the between-subjects effects of the first phase intervention

Source	Type III sum of squares	Df	Mean square	F	Sig	Partial eta squared
Corrected model	252.803[a]	1	252.803	30.585	.000	.405
Intercept	16,320.264	1	16,320.264	1974.472	.000	.978
Group	252.803	1	252.803	30.585	.000	.405
Error	371.954	45	8.266			
Total	17,039.000	47				
Corrected total	624.757	46				

[a] R squared = .405 (Adjusted R squared = .391)

Table 7 Tests of between-subjects effects of second phase intervention

Source	Type III sum of squares	Df	Mean square	F	Sig	Partial eta squared
Corrected model	.583[a]	1	.583	.121	.730	.003
Intercept	19,238.370	1	19,238.370	3986.296	.000	.989
Group	.583	1	.583	.121	.730	.003
Error	217.176	45	4.826			
Total	19,460.333	47				
Corrected total	217.759	46				

[a] R squared = .003 (Adjusted R squared = − .019)

$p = 0.869$, eta square $= 0.001$. This demonstrated that the two participant groups were matched to the treatment; the participant students had comparable essay writing achievement. Thus, the first phase of the intervention was carried out, and the essay writing test results were analyzed as shown in Table 6.

Table 6 shows the mean scores of university-undergraduate students' essay writing achievement in the experimental and control groups of the first phase intervention. The statistical analysis revealed a statistically significant difference between the experimental and control groups of the intervention at $F(1,45) = 30.585$, $p = 0.000$, eta squared $= 0.405$. According to Pallant (2011), this eta squared can be seen as a high effect size. Thus, based on the previous effect size boundaries indicated that, this study yields a 40.5%, implying that there is a significant relationship between the students' self-reflection-based teaching and essay writing achievement. It can be stated that students' self-reflection-based instruction had a high effect on the Ethiopian university-undergraduate students' essay writing achievement. To see if there is a significant difference between the two counterbalanced groups in the delayed second phase intervention; Table 7 needs to be examined.

As shown in Table 7, there is no statistically significant difference between two counterbalanced groups at $F(1,45) = 0.121$, $p = 0.730$, and eta square $= 0.003$. This result, however, is due to the study's design: both groups participated in both experimental and control interventions. Thus, the finding does not imply that self-reflection-based instruction had no effect on Ethiopian university-undergraduate students' essay writing achievement at a 0.05 level. In contrast, the results show that there is a significant relationship between the students' self-reflection-based instruction and their essay writing achievement. As a result of the two counterbalanced experiments and controlled interventions, it is revealed that the effectiveness of self-reflection on students' essay writing achievement plays an important pedagogical role.

Finally, the overall results of the Ethiopian University-undergraduate students were calculated as the sum of the study findings. After balancing the two phases of the interventions, the results were found to be statistically similar. The implication of this similarity after the counterbalanced design implementation in estimated marginal means is that different students' self-reflection-based instruction influenced their essay writing achievement differently. As a result, the implementation model is illustrated in Fig. 1.
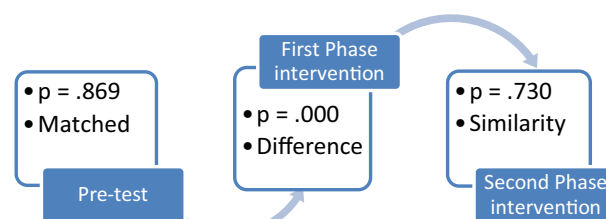

Fig. 1 The Process of counterbalanced design and its expected results

Discussion

Despite the need to investigate the gaps and niches in students' essay writing classrooms, there is insufficient empirical data to support the effectiveness of self-reflection in learners' pedagogical knowledge and skills (AlMarwani, 2020). Thus, the primary goal of this study was to examine the effectiveness of self-reflection-based instruction on Ethiopian university-undergraduate students' essay writing achievement using the most appropriate methodological design. As such, the first purpose of the study was theoretically well known due to its difficulty in improving writing skills in classrooms. To that end, there is a need to address this difficult situation in the field of writing skills in relation to the development of learners' essay writing achievement through various pedagogical approaches and study designs. Consequently, the purpose of this study was to take a step towards addressing this need. Furthermore, the second goal of this study had a motivational impact on the improvement of learners' writing achievement. As a result, the study examined the effect of students' self-reflection-based instruction on essay writing achievement among Ethiopian university-undergraduate students, due to the scarcity of studies determining the effectiveness of students' self-reflection on essay writing achievement.

This study sought to identify the primary challenges encountered during writing practice. The data transcribed and thematically classified revealed three types of issues affectingstudents' writing achievement: misconception about writing standards, lack of practice during learning stages, and dislike of writing. The findings suggested that these challenges are critical issues in learners' essay writing achievement. Which is consistent with previous studies exploring challenges encountered during writing instruction (AlMarwani, 2020), and student problems in their written works (Palanisamy & Abdul Aziz, 2021).

Writing is the most important literary requirement for global communication (Dhanya & Alamelu, 2019). It is also the most difficult skillto master (Palanisamy & Abdul Aziz, 2021), and is essential for for writing experts and global communication demands (Fareed et al., 2016). The new findings of this study suggested that writing skills are not seen as difficult in series and that the problem of writing does not begin in elementary school. These findings overlapped with previous research. (AlMarwani, 2020; Elkhayma, 2020; Moses and Mohamad, 2019). According to Huy (2015) and Moses and Mohamad (2019), writing is a difficult skill to master, especially in university-undergraduate, when students face numerous obstacles, and the problem of writing begins in elementary school.

The qualitative findings of this study support and validate previous research and observations about essay writing achievement. Huy (2015) and Palanisamy & Abdul Aziz (2021) also show that many university-undergraduate students are unaware of the importance of writing abilities and do not practice in a variety of ways. Additionally, students' written work often contains numerous errors, due to poor concentration skills when writing. The result was consistent with the findings of Bulqiyah et al. (2021), Rahmat et al. (2022) and Sajjad et al. (2021). For example, Bulqiyah et al. (2021) and Rahmat et al. (2022) revealed that the difficulties of writing began with the learners' perception toward their writing skills. The perceptions may influence the learners' behavior towards writing practice and the overall their writing performance.

The second research question of this study was to investigate whether self-reflection-based instruction had any effect on the essay writing achievement of Ethiopian university undergraduate students. According to Fidelia (2015), essay writing is a fundamental skill of the arts requiring students to organize their thoughts clearly and effectively. To assess this, prior to the intervention of the two-phase approach research design, the participants had comparable results ($p = 0.869$) in their essay writing achievement. Following the first phase intervention, univariate analysis of variance, revealed that self-reflection-based instruction had a significant effect on the essay writing achievement of the participant students. The findings agree with those of Meza et al. (2020), who discovered that implementing self-reflection learning led to improved self-reflection-based instruction. Additionally, Botelho and Bhuyan (2020) investigated self-reflection before action in clinical sessions to determine if students could identify their problems and clear their doubts before entering clinics. The students were able to recall and practice clinical procedure knowledge, and felt well prepared and confident in their performance.

The results of the second research question, on the other hand, contrast with those reported by Olteanu (2017), who investigated reflection for action in relation to the goal of learning and discovered that self-reflection for action essays were limited to preparing for the improvement of learning in the actual curriculum in Sweden. Moreover, Suhono (2017) found that language learners with lower levels of writing proficiency may be unable to identify and correct problems encountered during writing practice. According to Lew and Schmidt (2011), there is a limited extent of self-reflection and academic performance relationships. Furthermore, Bubnys (2019) showed that self-reflection effectiveness is related to students with low learning achievement.

After all, the results of the second phase of the intervention showed no significant difference between the two group of participants who took part in both control and experimental interventions based on the counterbalanced design model. This similarity in the results of the second phase of the intervention confirmed that self-reflection has a significant effect on Ethiopian university-undergraduate students' essay writing achievement. According to Meza et al. (2020), students' self-reflection improves their writing skills by expanding their cognitive and metacognitive abilities. These findings were consistent with the findings of Klimova (2014) and Sumarni et al. (2018). Klimova (2014) demonstrated the importance of self-reflection for students to learn about their experiences and think critically about what they have learned. It is also a valuable source for teachers as it enables them to assess to success of their teaching and to reconsider their teaching methods, strategies, and activities based on the students' reflections. Additionally, Sumarni et al. (2018) revealed the impact of students' reflection on creative writing achievement. The results showed that reflection-based instruction improved the creative writing abilities of 76% of the participants.

Although the current study revealed the positive effect of students' self-reflection-based instruction in essay writing, some issues may influence the intervention process of essay writing. For instance, the perception of students toward writing is questionable. According to Rahmat et al., (2022), many of university undergraduate students have fear of learning essay writing, initially as they perceive it as a difficult. Moreover, some discrepancies can be attributed to contextual variables and distinctions in teachers' understanding of the research focus and assessment rubrics.

Conclusions

The study suggests that self-reflection-based instruction for students prior to essay writing may be effective in improving their writing achievement. Despite the fact that students often struggle with essay writing, this study provides an insightful reminder that this problem can be addressed through self-reflection-based instruction. The current habit of self-reflection before action should be intentionally used and reconfigured in educational classrooms. Furthermore, the current study results stimulate further research into the utility of self-reflection-based instruction and reflection before action for a wide range of students. This implies that students' prior experience might be explored before implementing course content in the field.

To shed more light on the interactive process of self-reflection in essay writing and related fields of language education requires attention. Related to this, future research needs to be conducted within the context of a longer instructional program with ecological valid writing essays and where self-reflection is meaningful for the language learners because it has a clear purpose. In many ways, the self-reflection instruction aids in the development and practice of writing skills. Understanding the significance of writing and its components, such as ideas, organization, language use, word choice, and writing style, is essential for effectiveness. To that end, students should be given writing practice from the start of writing skills classes, possibly as early as primary school, to help them become proficient in their educational age.

Declarations

Ethics approval and consent to participate
We, authors, declare that this research design and data collection process has been proved by two reviewers assigned by College of Social Science and Humanities Research Coordination office, Arba Minch University. And all the participants have been informed that they could voluntarily take part in the study and the results would be conducted for the educational purpose.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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