

Using an Online Collaborative Learning Program Based on the Cognitive Apprenticeship Model for Developing Student Teachers' EFL Argumentative Writing and Critical Thinking Skills

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Abstract

This study aimed to investigate the effectiveness of an online collaborative learning program based on the cognitive apprenticeship model to develop student teachers' EFL argumentative writing and critical thinking skills. The study used a pre-post experimental one-group design. The participants were 45 third-year English students enrolled in the English section at the Faculty of Education, Benha University. The study instruments included an EFL argumentative writing skills test and an EFL critical thinking skills test. Students were pre-tested to measure their level of argumentative writing and critical thinking skills. Then, they underwent training via the online collaborative learning and cognitive apprenticeship model to develop their argumentative writing and critical thinking skills. The training encompassed six phases of the program: modeling, coaching, scaffolding, articulation, reflection, and exploration. Students were post-tested at the end of the intervention to assess the progress in their level of performance in EFL argumentative writing skills and critical thinking skills. The results demonstrated a statistically significant difference between the mean scores of the study participants in the pre- and post-administrations of the EFL argumentative writing skills test and the critical thinking skills test in favor of the post-administration. Therefore, it could be concluded that participation in online collaborative learning activities based on cognitive apprenticeship theory greatly enhanced student teachers' EFL argumentative writing and critical thinking abilities.

Keywords: Online Learning, Collaborative Learning, Cognitive Apprenticeship Model, Collaborative Cognitive Apprenticeship Model, EFL Argumentative Writing Skills, Critical Thinking Skills.

Introduction

Due to migration and globalization, English has taken over as the most widely spoken language in the world. It is a global language used in various fields such as education, research, commerce, industry, business, and science. Hence, the educational system teaches English as a foreign language in schools and universities. Of all the language skills, writing is considered one of the most crucial academic competencies university students need to develop and perfect. It allows students to express their ideas to readers and analyze the knowledge they have gained, as well as challenges they encounter in their daily lives. In light of this, Eid (2022) stressed that writing requires complex cognitive processes, self-regulation, strategic planning, and knowledge development—leading to cognitive content generation. Therefore, writing a formal argument requires a great deal of cognitive demands. To help students with this task, guidance, and support in writing argumentative essays are essential.

Argumentative writing is one of the pivotal topics among researchers, including Moschella (2023), who defined argumentative writing as a type of essay that presents arguments about both sides of an issue. Both sides are equally argued, or one side is argued for more than the other. The core of an argumentative essay is a statement that readers may disagree with. The argumentative essay must support that statement in a way that convinces readers of its truth. Therefore, it mainly strives to persuade the reader using logical and ethical methods and avoiding biased statements that weaken your claim. According to Saleh (2022), argumentative writing is the genre of writing in which a writer formulates a clear thesis statement, supports it with logical and convincing evidence, states a counterargument, creates a refutation to persuade the reader, writes a conclusion, and ensures proper grammar, mechanics, and style. Therefore, EFL argumentative writing is more than just organizing words, phrases, and sentences; it is also a complicated process that includes a claim, data, statistics, supporting evidence, a warrant, and rebuttals to create an essay addressing a disputed issue.

The skill of argumentation has long been recognized as essential in academic studies at various levels, so the writer should know the key elements of argumentation. According to Toulmin (2003), the structure of an argument includes three key elements: claim, data, and warrant, as well as three

supporting elements: backing, qualifiers, and rebuttals. Claim (C) is the thesis or assertions a person wants others to agree with. This assertion may be a recommendation, conclusion, advice, or belief. It should be specific and appealing to the audience. Data (D) refers to the evidence providing proof for a claim or the information that supports the claim. Information can take numerous forms, including facts, illustrations, findings of graphic or statistical analysis, comparisons, descriptions of artifacts, and even professional judgments. Warrant (W) establishes a link between the claim and the evidence for audience understanding. Backing (B) (further support for W) refers to the underlying presumptions or hypotheses that support warrant. A qualifier (Q) refers to the linguistic cues that show the strength of the C, D, or W, such as very, more, probably, or slightly, or as a brief sentence. Rebuttal (R) refers to a restriction or exception between the data and the claim. These six elements represent the basis of argumentative discourse and an organizational framework for argumentative essay writing. On the other hand, Nimehchisalem and Mukundan (2011) combined these elements under the sub-goal of "content" and added additional components—organization, vocabulary, style, grammar, and mechanics— to deem students' writing as skillful. These elements were added to the popular four-point holistic scale for evaluating argumentative writing in education and research.

Argumentative writing is a crucial 21st-century skill in both academia and daily life. In this sense, Özdemir (2018) identified several justifications for the significance of argumentative writing. These are as follows: First, written arguments can boost motivation and problem-solving in academics. Second, argumentative writing focuses on the quest for the truth. To find the truth, one must logically consider opposing viewpoints. Third, writing argumentative texts can help you improve your skills in controlling, questioning, regulating, and producing knowledge. Fourth, argumentative writing calls for an understanding of the subject, knowledge organization using advanced thinking abilities, recognition of the format of argumentative texts, and the presentation of ideas in this format. Furthermore, Widyastuti (2018) indicated that developing argumentative skills can aid students in thinking more clearly about complicated subjects that eventually call for a reasoned view based on logical, empirical, or conflicting evidence. Therefore,

argumentative writing is one of the writing modes that promote reasoning and critical thinking skills.

Moreover, one of the fundamental skills for 21st-century citizens is critical thinking. The term "critical thinking" (CT) has varied definitions in different academic fields, such as education, philosophy, and psychology. However, the essence of the meaning is the same: the ability to think logically in an inquiry-based way. Several researchers in the area of education have defined critical thinking, including Kaowiwattanakul (2021), who defined critical thinking as the process of analysis and self-reflection. Students analyze the problem or issue using domain knowledge and assess, interpret, and draw conclusions from any new information received through reading materials. Lu and Xie (2019) defined critical thinking as a systematic and disciplined way of thinking. It tackles ideas logically and precisely. It comprises challenging presumptions, provides fair and correct assessments, and necessitates the capacity to recognize and concentrate on relevant information while reaching conclusions. In this sense, Lin (2018) defined critical thinking as a cognitive process that centers on argumentation and necessitates the application of reason to reach logical conclusions or judgments. These cognitive abilities are interpretation, analysis, explanation, evaluation, inference, and self-regulation. To conclude, critical thinking is a combination of communicative competence, argumentation, metacognition, problem-solving, decision-making, creativity, autonomous learning, and emotions.

Critical thinking comprises a set of skills such as generating and evaluating arguments (Ennis & Weir, 1985), interpretation, analysis, inference, evaluation, explanation, and self-regulation (Facione, 1990), inference, recognition of assumptions, deduction, interpretation, and evaluation (Watson & Glaser, 1994), inductive and deductive processes, identifying assumptions and judging the credibility of arguments (Anikina, 2020), and remembering, understanding, applying, analyzing, evaluating, and creating (Anderson & Krathwohl, 2001). In light of this, Ennis (1989) indicated that these skills represent the fundamental cognitive skill of critical thinking.

Developing critical thinking skills is a dire need to cope with the demands of 21st-century society, characterized by rapid changes in every field. In this sense, critical thinking has gained significant importance in recent

years. Rajesh (2009) identified two reasons why critical thinking is an essential educational goal. The first reason is that students should be treated with respect as members of their communities; however, they cannot earn this respect unless they receive the freedom to think independently and take charge of their education and life. The second reason is that critical thinking is a vital tool for solving problems and making good decisions. I.e., students should be actively involved in the learning process, capable of using their knowledge to solve both academic and social problems, and able to arrange and evaluate data to make judgments. Therefore, the essential function of education is to prepare students to be self-directed, self-sufficient, problem solvers, and decision-makers from elementary to higher education levels.

Lin (2018) added that critical thinking can assist students in analyzing, synthesizing, evaluating, questioning, and developing skepticism towards topics, information, and evidence presented in the educational setting. Therefore, the critical thinker is an active learner who continually asks questions, seeks information, analyzes, and organizes his thoughts to establish relationships between topics discussed in class and other aspects of daily life. In addition, Zhang and Kim (2018) asserted that CT enhances students' language learning efficiency, increases their confidence in studying, and facilitates their learning processes. Zare and Othman (2015) concluded that higher education success relies on guiding students to think critically and form opinions based on research, evidence, theories, and values. Moreover, being a critical thinker gives you an advantage to be successful, not only in academic settings but also while tackling real-world problems.

Therefore, there is a great demand for writing arguments and critical thinking at the university level. There is a tight association between writing and thinking. Argumentative writing is a vital means of exercising the ability of metacognitive and critical thinking. Critical thinking teaching helps students produce better argumentative essays. I.e., students who are highly skilled in critical thinking are better able to evaluate and analyze arguments, employ more reliable evidence, respond to opposing viewpoints, draw inferences, solve problems, support conclusions, make intelligent decisions about what to believe and what to do, and maintain the logical flow of ideas in their essays. In this regard, a lot of researchers have indicated that writing an argumentative essay in universities requires the use of critical thinking skills

(Afshar, Movassagh, & Arbabi, 2017; Hastiari, 2020; Murtadho, 2021; Pei et al., 2017; Sato, 2022; Setiawan & Komara, 2022; Srinawati & Alwi, 2020). The results revealed that writers must consider what to write about and analyze their ideas based on 'clarity, precision, accuracy, depth, relevance, breadth, logic, importance, and fairness. They conclude that the greater the students' metacognitive and critical thinking skills, the more likely they are to be able to write an argumentative essay effectively.

On the other hand, learning a foreign language requires learners to use language in communicative contexts that allow them to write, think, and act critically, so fostering argumentative writing and critical thinking skills stimulates collaborative learning. Collaborative learning theories are rooted in the socio-constructivist theory, which suggests that knowledge is created socially by groups of people, and individuals gain knowledge by being part of these knowledge communities (Vygotsky, 1978). Therefore, learners increase their knowledge through collaboration and sharing information in real-world situations (Kuo et al., 2012). In education, collaborative learning is a peer interaction process mediated and structured by the teacher. Collaborative learning involves students engaging in social collaboration regarding their varied backgrounds, abilities, and interests, as well as the learning materials that include the readings and writings they are studying. Collaborative teaching activities include think-pair-share, jigsaw, peer instruction, and group investigations (Hewitt, 2022).

Collaborative learning involves various forms that heavily involve using technology as a means and a medium. Collaborative learning activities, particularly those supported by collaborative technology, are recognized for their positive results and benefits. According to Rahayu (2016), this benefit has two categories: social and academic. Within the social benefit, students learn how to manage their emotional aspects, reporting feelings of increased inclusion, reduced isolation, and improved engagement and motivation. Within the social academic benefit, Brindley, Walti, and Blaschke (2009) highlighted the benefits of collaborative learning in online courses for EFL students as follows: (1) It enables students to learn from a variety of teachers and mentors; (2) students can serve as models, guides, coaches, or experts in online learning. First, they will be accountable for explicitly demonstrating a task. Then, they will encourage peers to improve performance, and lastly, they

will become experts as the instructor gradually withdraws from the process; (3) it promotes diverse understanding among students and teachers; (4) it creates a suitable environment for modeling and practicing collaboration; and (5) it promotes 21st-century skills, including communication, creativity, critical thinking, and digital literacy, which are vital for future success.

According to Liu (2005), there are several online collaboration platforms accessible to students and instructors, each with its own set of features, functions, and benefits. These platforms provide several types of online collaboration, including synchronous and asynchronous communication, video conferencing and presentation, document sharing and editing, brainstorming, and gamification. The researcher used a learning management system (LMS), such as the Nearpod and Zoho Writer platforms, for e-collaborative learning. Both help students arrange ideas and interact with others. The Nearpod platform offers live feedback on student comprehension via interactive lessons, gamification, videos, and activities, all on one platform. Utilizing Nearpod for teaching writing provides the following benefits: 1) it provides immediate access to writing tools, materials, and assignments; 2) it helps students get better skills in writing; 3) it makes students more interested in and engaged with writing; 4) it helps teachers give feedback on students' shared writing, or students get feedback from peers and the teacher to use it in revising and editing their writing; 5) Nearpod lessons are designed with scaffolded interactive activities that assist students in explaining, analyzing, evaluating, problem-solving, and more, all of which are aspects of critical thinking. Finally, the Nearpod platform serves as a safe environment for instruction, collaboration, content sharing, discussing specific points or issues, or receiving notifications about feedback and assessments.

On the other hand, Zoho Writer is a powerful and feature-rich platform for collaboration, writing, editing, and sharing documents. Using Zoho Writer to teach writing has the following benefits: 1) it allows students to brainstorm topics to activate prior knowledge about a topic and use the highlighting tools to mark the text in order to find the main ideas and details; 2) it allows students to build a new document from one of the available templates or import an existing document from their desktop and begin modifying it; and 3) It allows students to publish and share their essay with an individual or group

of individuals. In addition to document sharing, you may collaborate with other users and modify your essay in real time.

Moreover, collaboration and interaction are essential to cognitive development. In the theory of cognitive development, Vygotsky (1978) argued that ideal instruction occurs when teachers scaffold apprentices to develop new ideas or understanding. Argumentative writing and critical thinking skills are developed through collaborative tutorial sessions where apprentices work with their instructors and classmates, engaging in small group activities and participating in course debates. Therefore, the Cognitive Apprenticeship Model (CAM) is the most effective learning approach for enhancing students' higher-order thinking, cognitive, and metacognitive skills. According to Collins (2006), an apprentice is a person who learns a skill or talent from a more experienced and skilled individual. Apprenticeship is a learning process in which the expert aids the learner in becoming a master of skills by modeling, scaffolding, and coaching. On the other hand, Collins, Hawkins, and Carver (1991) defined cognitivism as mental processes that start with triggering events marked by the emergence of problems that encourage exploration and end with the synthesis or integration of ideas to arrive at solutions that can be employed in other contexts (resolution). These processes include feeling, attention, encoding, perception, and memory. Consequently, the concept of apprenticeship was modified to make it applicable to current topics such as mathematics, reading, and writing. We called this updated concept "cognitive apprenticeship."

The term cognitive apprenticeship focuses on instructing through guided experience, emphasizing cognitive and metacognitive skills that enable students to observe, play out, and learn with support (Collins & Kapur, 2014). The cognitive apprenticeship model has adopted the situated cognition theory of learning, which integrates learning into activities and intentionally uses physical and social contexts (Collins, 2006). According to the theory of situated cognition, knowledge does not exist apart from the learner, but every person's life experiences entirely shape it. Learning occurs when a person engages in activities (enacted) in various contexts (situated). These activities and contexts are determined by the social groups that participate, the changes that occur over time with respect to materials or location (distributed), and the perspective on learning held by that community (worldview).

Collins and Kapur (2014) outline the following four features of cognitive apprenticeship: First, its social constructivist base embraces the idea that meaning is something that people negotiate and create together. Everyone must take an active role in identifying, expressing, modeling, and refining conceptions of the material, as well as the circumstances that allow for its meaningful application. Second, cognitive apprenticeship emphasizes the development of mental models or metacognitive abilities rather than emphasizing physical skills. Third, cognitive apprenticeship learning entails practicing real-world tasks rather than isolated component skills. The method of scaffolding is a fourth feature. Cognitive apprenticeship, which combines the ideas of modeling and scaffolding, requires the instructor to demonstrate expert-like skills while offering suitable scaffolds at each level of the learning process (Vygotsky, 1978). Thus, the role of the instructor becomes that of a coach and facilitator, whose job is to help students deal with challenging problems by modeling, providing scaffolding, and, lastly, encouraging reflection. Learners progress toward expert-like performance by observing, discussing, and receiving feedback on their strategy use, reflecting on the learning process, and developing task-oriented problem-solving strategies (Seel, 2012).

Many researchers have highlighted the importance of the cognitive apprenticeship model in the teaching and learning process, such as Collins et al. (1991), who stated that CAM aims to increase students' levels of cognitive competence, promote reflection, and make thinking visible in the teaching and learning process. Walters-Williams (2022) also stated that CAM aims to foster high-order thinking abilities, develop problem-solving skills, and teach specific skills. Collins and Kapur (2014) added that CAM aids in enculturating students into real-world practices through social interaction, which helps them imitate expert behaviors, pick up relevant jargon, and gradually begin acting according to disciplinary norms. Others added that the cognitive apprenticeship model allows students to practice and observe skills. This will aid students in defining and formulating the problem that has to be solved (Collins, 2006; Kazuko, 2020).

According to Collins et al. (1991), cognitive apprenticeship focuses on the four principles that make up any effective learning environment: content, method, sequence, and sociology. The ultimate purpose of these cognitive

apprenticeship principles is to allow students to complete tasks independently. In the first dimension of content, there are four types of knowledge: domain knowledge, heuristic strategies, control strategies, and learning strategies. The second dimension focuses on instructional methods like modeling, coaching, scaffolding, articulation, reflection, and exploration. These methods foster collaboration between students and teachers. The third dimension is to make instruction more complex and diverse, translating global skills into local ones. Tasks must be assigned to apprentices with increasing density. The instructor will gradually raise the level of challenge until the apprentice becomes proficient. The fourth dimension emphasizes providing apprentices with an opportunity to engage in situated learning, allowing them to take on authentic responsibilities within a suitable learning environment.

Within the dimension of the method, the six teaching methods related to cognitive apprenticeship fall into roughly three categories. Nevertheless, the first three—modeling, coaching, and scaffolding—are the foundation of a conventional apprenticeship and are designed to assist students in developing an integrated set of abilities through observation and guided practice. The following two methods, "articulation" and "reflection," are designed to assist students in narrowing their observations and building awareness of and control over their problem-solving strategies (Collins, Brown, & Newman, 1989; Collins et al., 1991). The last method, exploration, seeks to foster learner autonomy by allowing them to formulate their problems and use expert problem-solving techniques (Collins & Kapur, 2014). These six methods are based on social learning theory because they allow students to engage in activities that require them to observe, perform, respond to feedback, and discover or invent expert strategies in context (Collins, 2006; Rodríguez-Boncos & Ortiz, 2016). These methods will be discussed in detail as follows:

The modeling method focuses on the teacher demonstrating tasks for the apprentice to imitate. This calls for externalizing typical internal processes and activities in cognitive domains. This is done at the beginning of the instructional relationship so the students can see what they can achieve after instruction. The coaching method aims to observe students during the process, offering hints, scaffolds, feedback, and demonstrations of new objectives. Besides, the teacher helps students make summaries, ask questions, identify problems, and predict what will happen next (Brown, Collins, & Duguid,

1989). The scaffolding method refers to the support provided by the teacher to assist the student in completing a task. This support can be recommendations or suggestions, whereas coaching includes all the methods coaches use to support learning. The timing of the support is particularly effective when learners have failed to complete a task (Collins et al., 1989; Kazuko, 2020). In addition, scaffolding helps students achieve higher levels of performance than they could on their own, thanks to the instructor's precise monitoring and assessment of each student's current ability level.

The articulation method refers to helping students explicitly articulate and verbalize their knowledge, reasoning, thinking, understanding, and problem-solving processes in a particular area. The reflection method is the outcome of collaborative practices in which students discuss, assess, analyze, and compare their problem-solving methods to those of experts. Therefore, it implies assessment and self-analysis. The exploration method is employed after basic knowledge is acquired. The instructor encourages apprentices to set challenging goals and explore different topics independently. Therefore, it promotes autonomy in both problem formulation and problem-solving (Collins et al., 1991). Last but not least, the current study takes into account all six methods to help students gain a more conscious understanding of what they have learned as well as create background knowledge, connect new and prior knowledge, naturally use their skills in a range of appropriate contexts, and assess their learning progress. Therefore, all CAM teaching methods offered opportunities for collaboration.

Essentially, a collaborative learning program based on CAM aims to teach writers how to take control of their cognitive processes to meet the demands of the writing task. It helps students understand writing genres, master genre conventions for writing tasks, learn problem-solving strategies, and develop critical thinking skills. When students actively engage with the instructor while constructing an argument in the classroom, they learn more about how the teacher formulates and evaluates claims (Tsai et al., 2012). The teacher assists students in developing arguments by having an open conversation in which both sides may share observations, comments, and recommendations. During this open dialogue, students' weaknesses and strengths are made clear (Dennen & Burner, 2008). Moreover, the role of the

teacher shifts from lecturer to mentor, who guides and scaffolds the apprentices through the process (Tsai et al., 2012).

Using a collaborative learning and cognitive apprenticeship structure in writing classes has distinct advantages for students and teachers (De Bruin, 2019; Matsuo & Tsukube, 2020). It pushes writing education beyond decontextualized tasks and incorporates authentic activities (Ding, 2008). Students engage in a more authentic learning experience by undertaking specific tasks and collaborating with their peers. Brown et al. (1989) suggested that incorporating authentic tasks into instruction helps students engage with the relevant domain culture and acquire knowledge about the genre, activity system, discourse community, and embedded circumstances. Therefore, students have more opportunities to expand their learning experience, test out new ideas, and get critical and constructive feedback. On the other hand, teachers play a crucial role in fostering students' thinking by making their thoughts visible through various methods like writing, speaking, or drawing. EFL students benefit from teachers who model their thinking process and explicitly teach them how to put their ideas into writing, argue, analyze, reflect, propose solutions, and make decisions, ultimately leading to desired outcomes (Hastiari, 2020). In summary, the three activities included in utilizing a collaborative learning and cognitive apprenticeship model (Collins, 2006) are: 1) making thinking processes visible; 2) supporting learning in real-world contexts; and 3) tasks that promote learning transfer to diverse new contexts.

Based on several studies conducted on text production within the cognitive framework, Collins et al. (1989) investigated the application of cognitive apprenticeship in teaching reading, writing, and mathematics. The results revealed that using CAM was beneficial for developing reading and writing skills. Ding (2008) investigated the use of cognitive apprenticeship in writing classrooms. This study helped students move from peripheral participation to more central participation. The results revealed that writing teachers should recognize and use resources found in other student-participating activity systems. Tsiriotakis et al. (2021) investigated how university students engaged in cognitive apprenticeship during pair work activities to improve their argumentative writing in an EFL classroom. This study revealed that students engaged in cognitive apprenticeship by playing

two roles: (a) advisor, involving exploration, articulation, and scaffolding, and (b) advisee, involving exploration and articulation.

On the other hand, only limited studies have used online collaborative learning in writing curriculums for pre-service and in-service teachers based on cognitive apprenticeship theory. Liu (2005) conducted a research study adopting cognitive apprenticeship as a theoretical foundation to construct a web-based learning model that integrates expert teachers and Internet technologies. The results revealed that the web-based cognitive apprenticeship model improves pre-service teachers' writing performance. Rodríguez-Bonces and Ortiz (2016) investigated how the cognitive apprenticeship model enhances online collaborative learning via a chat tool. The results revealed that modeling, coaching, scaffolding, exploration, and reflection may be implemented in a chat room, developing a sense of collaboration. Learners also moved from guided instruction (modeling) to more independent learning (articulation), assuming the roles of experts.

Based on the previous review, EFL argumentative writing and critical thinking are important variables that should be developed among EFL learners. Moreover, a collaborative learning program based on CAM seems to be a promising model that needs further empirical research. Accordingly, the present study attempted to investigate the effect of using a collaborative learning program based on CAM on developing EFL argumentative writing and critical thinking.

Context of the Study

In everyday life, writing has become a tool for people to think critically, learn and memorize, broaden their knowledge, and communicate. Although one of the main goals of higher education is to improve students' argumentative writing and critical thinking skills, most Egyptian universities lack programs that focus on developing both through the EFL learning process, especially in the age of easy access to information. Consequently, college EFL students do poorly in written arguments owing to a lack of critical thinking. Besides, they struggle when they come across thinking questions and challenges.

Concerning the Egyptian context, mastering argumentative writing and critical thinking proves to be a challenge for third-year student teachers

enrolled in the English Section of Benha University's Faculty of Education. These students lack these skills. Several studies addressed this lack, such as Helwa (2014), Sharadgah, Sa'di, and Ahmad (2019), Abd El-Glil (2021), Kener (2021), Abu Ayyash (2022), Eid (2022), and Saleh (2022). These studies reported that students continue to write argumentative essays with weak arguments since there aren't enough justifications, supporting details, or evidence. Giving an argument, gathering support, and developing a counterargument become sources of difficulty. Besides, they cannot write a good paragraph that includes indicators of writing ability (originality, accuracy, content, and organization). On the other hand, they lack self-regulation skills in terms of planning, monitoring, evaluating, drafting, revising, and regulating the writing process. They are unwilling to think critically, suggest alternatives, or even collect relevant data on a specific topic. As a result, they have a low level of EFL argumentative writing and critical thinking skills.

Out of the researcher's experience teaching EFL to Faculty of Education students, she noticed several deficiencies in the students' argumentative writing and critical thinking skills. Students struggled to formulate an adequate thesis statement, support the claim with sufficient reasons, provide evidence, identify counterarguments, and refute them. They failed to give both the reason for the counter-claim and the refutation of the justification for the counter-claim. i.e., they tend to accept a claim from other sources without trying to judge and evaluate it. Furthermore, when given indirect questions that require practicing CT, EFL students usually get confused and struggle to analyze data to solve a given problem or to suggest solutions. Therefore, they struggle to ask questions in class, express thoughts in writing, and engage in discussions or debates. On the same side, the researcher also observed that most EFL students had little chance to study online because EFL learning in Egypt mainly occurs in regular face-to-face contexts. However, they were eager to go through the experience and use technology to develop their argumentative writing and critical thinking skills.

To document the problem of the research, the researcher conducted a pilot study to identify argumentative writing and critical thinking skills among third-year students enrolled in the English language section. The participants were 25 third-year students from the Benha Faculty of Education who had

enrolled in the English language department during the first semester of the academic year 2023-2024. The pilot study involved two instruments: an EFL argumentative writing test and an EFL critical thinking test (see Appendix A). Using a one-sample t-test, the results revealed that third-year students did not reach mastery in any of them (see Table 1).

Table 1: *The findings of a one-sample t-test of student teachers' level of EFL argumentative writing and critical thinking skills*

	N.	Mean	S.D.	t-value	D.F.	Sig.
EFL ARS Test	25	21.120	3.073	30.719	24	0.01
EFL CTS Test	25	11.72	1.646	25.149	24	0.01

The results of the argumentative writing test revealed that the majority of students do not achieve proficiency in argumentative writing. They cannot state a clear claim, generate logical evidence, compose an appropriate counterargument, and refute the counterargument. As a result, they struggle to produce relevant and coherent pieces of argumentative writing. Additionally, the results of the critical thinking test revealed that third-year students had poor levels of EFL critical thinking skills. They cannot think critically and reflectively to decide what to believe and how to do. Besides, they lacked this type of questions that required analyzing, getting the main idea of a passage, or making inferences based on given data. Therefore, EFL student teachers did not reach mastery in any of them, either in argumentative writing skills or critical thinking skills.

Consequently, the positive link between argumentative writing and critical thinking skills provides an implicit indication for EFL teachers to use this correlation to help students improve their writing skills. Moreover, the present study proposes a program based on online collaborative learning and a cognitive apprenticeship model for developing third-year students' EFL argumentative writing and critical thinking skills.

Statement of the problem

In spite of the importance of EFL argumentative writing and critical thinking skills, third-year students enrolling in the English language section of the Faculty of Education at Benha University lack these skills. That is why the present study aims to assist them in developing their EFL argumentative writing and critical writing abilities by utilizing an online collaborative

learning tool based on the cognitive apprenticeship model. To overcome this problem, the present study aims to provide answers to the following questions:

1. What are the features of the online collaborative learning program based on a cognitive apprenticeship model?
2. What is the effectiveness of using an online collaborative learning program based on a cognitive apprenticeship model for developing third-year students' EFL argumentative writing skills?
3. What is the effectiveness of using an online collaborative learning program based on a cognitive apprenticeship model for developing third-year students' EFL critical thinking skills?

Hypotheses of the Study:

In light of the literature review and related studies, the following four hypotheses are formulated:

1. There is a statistically significant difference between the participants' mean scores in overall EFL argumentative writing skills on the pre- and post-assessment of the EFL argumentative writing skills test in favor of the post-assessment.
2. There is a statistically significant difference between the participants' mean scores in the EFL argumentative writing sub-skills on the pre- and post-assessment of the EFL argumentative writing skills test in favor of the post-assessment.
 - There is a statistically significant difference between the participants' mean scores in EFL content skills on the pre- and post-assessment of the EFL argumentative writing skills test in favor of the post-assessment.
 - There is a statistically significant difference between the participants' mean scores in EFL organization skills on the pre- and post-assessment of the EFL argumentative writing skills test in favor of the post-assessment.
 - There is a statistically significant difference between the participants' mean scores in EFL language use skills on the pre- and post-assessment of the EFL argumentative writing skills test in favor of the post-assessment.
3. There is a statistically significant difference between the participants' mean scores in overall EFL critical thinking skills on the pre- and post-assessment of the EFL critical thinking skills test in favor of the post-assessment.

4. There is a statistically significant difference between the participants' mean scores in the EFL critical thinking sub-skills on the pre- and post-assessment of the EFL critical thinking skills test in favor of the post-assessment.
 - There is a statistically significant difference between the participants' mean scores in inference skills on the pre- and post-assessment of the EFL critical thinking skills test in favor of the post-assessment.
 - There is a statistically significant difference between the participants' mean scores in recognition skills on the pre- and post-assessment of the EFL critical thinking skills test in favor of the post-assessment.
 - There is a statistically significant difference between the participants' mean scores in deduction skills on the pre- and post-assessment of the EFL critical thinking skills test in favor of the post-assessment.
 - There is a statistically significant difference between the participants' mean scores in interpretation skills on the pre- and post-assessment of the EFL critical thinking skills test in favor of the post-assessment.
 - There is a statistically significant difference between the participants' mean scores in evaluation skills on the pre- and post-assessment of the EFL critical thinking skills test in favor of the post-assessment.

Methodology of the study

This part of the study describes the procedures used to investigate the effectiveness of an online collaborative learning program based on the cognitive apprenticeship model in developing EFL argumentative writing and critical thinking skills among third-year students. It includes the following points:

- A. Participants of the study
- B. Design of the present study
- C. Instruments of the study

A. Participants of the study

The participants of the study were 45 third-year English students enrolled in English language departments at Benha University's Faculty of Education during the first semester of the academic year 2023-2024. The participants were randomly chosen and allocated to one group that taught using online collaborative learning and the cognitive apprenticeship model.

The rationale for choosing this participant is poor argumentative writing at the college level. It is distinguished by the absence of fundamental elements

and by solely relying on biased arguments. Within the current objectives, as proven, the focus will be on argumentative skills that concentrate on a solid thesis, demonstrate critical thinking and innovative arguments, and are written in a clear essay with substantial evidence to back it up.

B. Design of the Study

The present study used the experimental one-group pre-test and post-test design to compare the students' EFL argumentative writing and critical thinking skills before and after implementing online collaborative learning activities based on cognitive apprenticeship theory.

The study includes four variables: collaborative learning, cognitive apprenticeship, EFL argumentative writing skills, and critical thinking skills. The experiment lasted for ten weeks.

C. Instruments of the Study

This study aimed at using a collaborative learning program based on cognitive apprenticeship to develop student teachers' EFL argumentative writing and critical thinking skills. To achieve the aims of the study, the present study researcher developed the following instruments:

○ EFL Argumentative Writing Skills Test

The researcher designed the EFL argumentative writing skills test to measure the argumentative writing skills of third-year students in the English department at the Faculty of Education, Benha University. The test was used as a pre- and post-test (applied before and after implementing the program). The final form of the test included three sections that measure different aspects of EFL students' argumentative writing performance, including content (claim, data, warrant, backing, qualifier, and rebuttal), organization (structure and unity), and language use (accuracy and mechanics) (see Appendix C). The EFL argumentative writing skills test lasted one hour. The test time was estimated by averaging the quickest and slowest students' responses to the test questions.

○ The Analytical Rubric for the EFL Argumentative Writing Skills Test

The researcher developed an analytical rubric to determine the students' scores on the argumentative writing skills test (pre-and post-test) and to identify the efficiency of a program in developing EFL argumentative writing

skills among third-year English language section students at Faculty of Education, Benha University. The rubric consists of three parts, each with four items ranging from "4" to "1" marks. Students received a "4" for good performance and a "1" for poor performance (see Appendix D).

- **Critical Thinking Skills Test**

The researcher designed the critical thinking skills test to measure the critical thinking skills of third-year students in the English department at the Faculty of Education, Benha University. The test assesses a person's ability to analyze, comprehend, and draw logical conclusions from text. It was used as a pre-posttest (applied before and after implementing the program). The final form of the test consisted of twenty-two multiple-choice questions that assessed students' ability in specific critical thinking skills such as inference, recognition of assumptions, deduction, interpretation, and evaluation of arguments (see Appendix F). The EFL critical thinking skills test lasted 45 minutes. The researcher graded the test by giving one point for each correct answer and zero for each incorrect answer.

The Validity of the Study Instruments

To estimate the face validity, the EFL argumentative writing skills test and critical thinking skills test were submitted to jury members (see Appendix H). They verified the instruments. In light of their feedback, they indicated that the instructions were clear and suitable for students' levels and background knowledge. Therefore, the instruments were valid for measuring EFL argumentative writing and critical thinking skills. To estimate the content validity, EFL jury members were asked to judge if the instruments were representative of what they were supposed to measure (see Appendix H). Finally, they all agreed that the instruments were valid and had content validity, without a doubt. To estimate internal consistency, the Pearson correlation coefficient between the study participants' scores in each main skill of the argumentative writing skills test and the total score was .480* for content skills, .898** for organization skills, and .960** for language use skills. Furthermore, the Pearson correlation coefficient between the study participants' scores in each main skill of the critical thinking skills test and the total score was 738** for inference skills, 765** for recognition skills, 668** for deduction skills, 602** for interpretation skills, and 467* for evaluation skills.

The Reliability of Study Instruments

The EFL argumentative writing test and critical thinking test were piloted on a sample of 25 third-year students at the English section in Faculty of Education, Benha University, during the first term of the academic year 2023-2024. Piloting the instruments aimed at investigating the simplicity of instructions, appropriateness of the language level to the sample, and clarity of test items. The reliability of the instruments was measured using Cronbach's alpha method and the split-half method. Cronbach's alpha method was used to estimate the reliability of the instruments. The alpha coefficient for the EFL argumentative writing skills test was .942, whereas it was .729 for the critical thinking skills test. These values reveal that the instruments have internal consistency and are reliable, as it is desirable [with an alpha coefficient] to possess a reliability measure of 0.7 or above (Wells & Wollack, 2003). The split-half method was also used to estimate the reliability of instruments. The split-half method for the EFL argumentative writing skills test was .893, whereas it was .678 for the critical thinking skills test. These values reveal that the instruments have internal consistency and are reliable since it is desirable to have a reliability coefficient of 0.7 or above (Wells & Wollack, 2003).

The collaborative learning cognitive apprenticeship-based program

This section provides a comprehensive overview of the study program, covering its objectives, content, framework, procedures, and evaluation techniques (see Appendix I).

Objectives of the Program

The objectives of the program were to develop the EFL argumentative writing and critical thinking skills of third-year students enrolled in the English language section of the Faculty of Education at Benha University. Throughout the sessions, the researcher employed a range of activities and tasks to help the participants attain the program's objectives.

Content of the Program

The program contained a variety of topics, situations, activities, and tasks designed for developing third-year students' EFL argumentative writing and critical thinking skills and adopted from books and related studies, such as Starkey (2010), Afshar et al. (2017), Pei et al. (2017), Lin (2018), Widyastuti

(2018), Lu and Xie (2019), Hastiari (2020), Abd El-Gilil (2021), Murtadho (2021), Hewitt (2022), Lustyantje et al. (2022), Saleh (2022), Sato (2022), Moschella (2023), and Yamin et al. (2023) (see Appendix I).

Framework of the Program

During the first semester of the academic year 2023-2024, 45 third-year English section students from the Benha Faculty of Education participated in the present study. The program consisted of 15 sessions. The first two were orientation sessions about the online collaborative tools used in the program and the strategies of cognitive apprenticeship, the sub-skills of EFL argumentative writing and critical thinking skills, and the importance of these skills to the study sample. The third session (formative evaluation) aimed to ensure that the students met the objectives of the prior sessions. The following sessions were instructional ones for practicing EFL argumentative writing and critical thinking skills (see Appendix J).

The researcher met with the students for 10 weeks, twice a week. Week 1 was for pre-tests, and Week 10 was for post-tests. Every session lasts for 90 minutes. At the beginning of each session, the researcher told students the objectives of the session, its procedures, the role of the researcher and students, the instructional materials that will be used, the activities they will perform, and ways of evaluating their progress. At the end of each session, the researcher gave students some activities relating to what they had learned to ensure that they had mastered the skills in each session (formative evaluation). At the end of the program, the researcher assessed the students' achievement using the EFL argumentative writing test and the critical thinking test (summative evaluation).

Procedures of the Program

The present study involved third-year students at the Faculty of Education, Benha University, in the 2023-2024 academic year. The study procedures stem directly from the six teaching strategies related to cognitive apprenticeship outlined by Collins et al. (1989). The program followed four stages: content, method, sequencing, and sociology within an online collaborative learning environment through synchronous and asynchronous tools (Nearpod and Zoho Writer Platforms) as follows:

- **The first stage (designing the content):** In this stage, the researcher first clarifies the skills in general, concepts, and main procedures. After that, she illustrated how students can accomplish tasks related to EFL argumentative writing and critical thinking skills. The researcher created an account on the Nearpod and Zoho Writer platforms and invited students to join. In addition, the researcher created a WhatsApp group to chat and communicate with each other.
- **The second stage (adapting the methods within the online collaborative cognitive apprenticeship-based program).** Within the program, six instructional methods are employed: modeling, coaching, scaffolding, articulation, reflection, and exploration methods within the online collaborative learning tools (Nearpod and Zoho Writer platforms).
 - A. Modeling method:** The researcher warms up pre-online discussion activities and builds background knowledge of the task. She demonstrates a task and explains the steps for students to observe and imitate (Asynchronous Learning Phase).
 - B. Coaching method:** The researcher observes students performing tasks and solving problems (Asynchronous Learning Phase).
 - C. Scaffolding method:** The researcher provides support to help students perform more complex tasks (Asynchronous Learning Phase).
 - D. Articulation method:** The researcher encourages students to explain what they are doing, their knowledge, reasoning, and problem-solving strategies (Synchronous Learning phase).
 - E. Reflection method:** The researcher enables students to reflect on their task and compare it with others (Synchronous Learning Phase).
 - F. Exploration method:** The researcher asks students to solve new tasks and make independent discoveries to practice EFL argumentative writing and critical thinking skills (Synchronous and Asynchronous Learning).
- **The third stage (sequencing of learning activities):** The researcher ordered learning activities that were included within the online collaborative cognitive apprenticeship-based program. Tasks are gradually increasing in difficulty. In this way, the study researcher continues to increase the level of effort as the apprentice reveals expertise in performance.

- **The fourth stage (sociology of the learning environment):** The researcher generously offered students the opportunity to participate in situated learning, enabling them to obtain and tackle authentic tasks in an appropriate learning environment.

The Evaluation Techniques of the Program

Findings of the Study

The study findings are presented in light of the study hypotheses using the Statistical Package for Social Sciences (SPSS). The findings are as follows:

The first hypothesis

There is a statistically significant difference between the participants' mean scores in overall EFL argumentative writing skills on the pre- and post-assessment of the EFL argumentative writing skills test in favor of the post-assessment.

To test this hypothesis, the paired samples T-test was used to compare the participants' mean scores in overall EFL argumentative writing skills on the pre- and post-administration of the EFL argumentative writing skills test. Table (2) presents the mean scores, standard deviation, t-value, and significance level in the pre- and post-assessment of the overall EFL argumentative writing skills.

Table 2: *"t" test between the mean scores of the study participants in the pre- and post-assessment of the overall EFL argumentative writing skills*

	Test	N.	Mean	S.D.	t-value	D.F.	Sig.
Overall EFL	Pre	45	36.00	5.56	20.171	20.171	0.01
Argumentative Writing Skills	Post	45	59.75	3.05			

This table shows that the study participants outperformed in the post-administration of the overall EFL argumentative writing skills, where the t-value is 20.171, which is significant at the (0.01) level. Therefore, the first hypothesis was confirmed.

The second hypothesis

There is a statistically significant difference between the participants' mean scores in the EFL argumentative writing sub-skills on the pre- and post-

assessment of the EFL argumentative writing skills test in favor of the post-assessment.

The second hypothesis has the following three sub-hypotheses:

- There is a statistically significant difference between the participants' mean scores in EFL content skills on the pre- and post-assessment of the EFL argumentative writing skills test in favor of the post-assessment.
- There is a statistically significant difference between the participants' mean scores in EFL organization skills on the pre- and post-assessment of the EFL argumentative writing skills test in favor of the post-assessment.
- There is a statistically significant difference between the participants' mean scores in EFL language use skills on the pre- and post-assessment of the EFL argumentative writing skills test in favor of the post-assessment.

To test this hypothesis, the paired samples T-test was used to compare the participants' mean scores in the EFL argumentative writing sub-skills on the pre- and post-administration of the EFL argumentative writing skills test. Table (3) presents the mean scores, standard deviation, t-value, and significance level in the pre- and post-assessment of the EFL argumentative writing sub-skills.

Table 3: "t" test between the mean scores of the study participants in the pre- and post-assessment of the EFL argumentative writing sub-skills

EFL Argumentative Writing Sub-Skills	Test	N.	Mean	S.D.	t-value	D.F.	Sig.	η^2
Content Skills	Pre	45	17.64	1.97	20.038	44	0.01	0.90
	Post	45	27.48	1.82				
Organization Skills	Pre	45	7.55	1.98	15.353	44	0.01	0.84
	Post	45	13.08	.820				
Language Use Skills	Pre	45	10.80	2.85	15.887	44	0.01	0.85
	Post	45	19.18	1.35				
Overall Skills	Pre	45	36.00	5.56	20.171	44	0.01	0.90
	Post	45	59.75	3.06				

This table shows that the study participants outperformed in the post-administration of the EFL argumentative writing sub-skills, where the t-value is (20.038) for content skills, (15.353) for organization skills, and (15.887) for language use skills, which are significant at the (0.01) level. Therefore, the second hypothesis was confirmed.

The third hypothesis

There is a statistically significant difference between the participants' mean scores in overall EFL critical thinking skills on the pre- and post-assessment of the EFL critical thinking skills test in favor of the post-assessment.

To test this hypothesis, the paired samples T-test was used to compare the participants' mean scores in overall critical thinking skills on the pre- and post-administration of the critical thinking skills test. Table (4) presents the mean scores, standard deviation, t-value, and significance level in the pre- and post-assessment of the overall critical thinking skills.

Table 4: *"t" test between the mean scores of the study participants in the pre- and post-assessment of the overall critical thinking skills*

	Test	N.	Mean	S.D.	t-value	D.F.	Sig.
Overall Critical Thinking Skills	Pre	45	8.75	1.49	23.112	44	0.01
	Post	45	15.06	1.73			

This table shows that the study participants outperformed in the post-administration of the overall critical thinking skills, where the t-value is 23.112, which is significant at the (0.01) level. Therefore, the third hypothesis was confirmed.

The fourth hypothesis

There is a statistically significant difference between the participants' mean scores in the EFL critical thinking sub-skills on the pre- and post-assessment of the EFL critical thinking skills test in favor of the post-assessment.

- The fourth hypothesis has the following five sub-hypotheses:
- There is a statistically significant difference between the participants' mean scores in inference skills on the pre- and post-assessment of the EFL critical thinking skills test in favor of the post-assessment.
- There is a statistically significant difference between the participants' mean scores in recognition skills on the pre- and post-assessment of the EFL critical thinking skills test in favor of the post-assessment.
- There is a statistically significant difference between the participants' mean scores in deduction skills on the pre- and post-assessment of the EFL critical thinking skills test in favor of the post-assessment.

- There is a statistically significant difference between the participants' mean scores in interpretation skills on the pre- and post-assessment of the EFL critical thinking skills test in favor of the post-assessment.
- There is a statistically significant difference between the participants' mean scores in evaluation skills on the pre- and post-assessment of the EFL critical thinking skills test in favor of the post-assessment.

To test this hypothesis, the paired samples T-test was used to compare the participants' mean scores in critical thinking sub-skills on the pre- and post-administration of the EFL critical thinking skills test. Table (5) presents the mean scores, standard deviation, t-value, and significance level in the pre- and post-assessment of the EFL critical thinking sub-skills.

Table 5: "t" test between the mean scores of the study participants in the pre- and post-assessment of the critical thinking sub-skills

EFL Critical Thinking Sub-Skills	Test	N	Mean	S.D.	T-Value	D.F	Sig.	η^2
Inference Skills	Pre	45	1.68	.792	9.639	44	0.01	0.67
	Post	45	3.17	.777				
Recognition Skills	Pre	45	1.73	.579	7.731	44	0.01	0.57
	Post	45	2.53	.756				
Deduction Skills	Pre	45	1.77	.420	13.046	44	0.01	0.79
	Post	45	3.17	.613				
Interpretation Skills	Pre	45	1.53	.504	13.383	44	0.01	0.80
	Post	45	3.04	.638				
Evaluation Skills	Pre	45	2.02	.336	9.614	44	0.01	0.67
	Post	45	3.13	.726				
Overall Critical Thinking Skills	Pre	45	8.75	1.49	23.112	44	0.01	0.92
	Post	45	15.06	1.73				

This table shows that the study participants outperformed in the post-administration of the critical thinking sub-skills, where the "t-value" is (9.639) for inference skills, (7.731) for recognition skills, (13.046) for deduction, (13.383) for interpretation skills, and (9.614) for evaluation skills, which are significant at the (0.01) level. Thus, the fourth hypothesis was confirmed.

Discussion and Interpretation of the Study Findings

This study aimed to develop student teachers' EFL argumentative writing and critical thinking skills. The findings revealed that the program was effective in helping student teachers develop EFL argumentative writing and critical thinking skills. The findings are interpreted and discussed in light of the study hypotheses.

Regarding the first and second hypotheses of the study, the findings revealed that there is a statistically significant difference between the participants' mean scores in the pre- and post-assessment of overall EFL argumentative writing skills and its sub-skills in favor of the post-assessment, as the t-value was 20.171 which is significant at 0.01. In this sense, participants showed considerable progress in their overall EFL argumentative writing skills and their sub-skills. This result confirmed the first and second hypotheses. This progress may be due to many factors.

The program promoted active learning by increasing chances for collaboration and interaction in an online environment. Collaborative learning helped students improve their argumentative writing skills by working on tasks like analyzing a picture and brainstorming ideas. They brainstormed essay ideas through collaborative discussions with peers, ensuring a coherent flow of related thoughts and building a deep understanding of the topic. In this sense, EFL students support their ideas, state their position, agree or disagree with others' perspectives, and learn from experienced learners. The researcher also adopted six methods throughout the program: modeling, coaching, scaffolding, articulation, reflection, and exploration. Each teaching method incorporated a variety of instructional tasks, such as games, reflections, interviews, information gaps, role plays, and problem-solving. The number of tasks presented to participants is increasing. The researcher gradually increased the difficulty level throughout the training sessions as the individuals' performance improved. As a result, students move from passive information consumers to autonomous users and creators of the same knowledge and ability. These results are consistent with Liu (2005), Kuo et al. (2012), and Rodríguez-Bonces and Ortiz (2016).

During the program sessions, the researcher followed cognitive apprenticeship methods mixed with online collaborative learning tools. Using

Nearpod as a collaborative learning platform helped participants communicate, brainstorm, share opinions, write, argue, think critically about a specific subject, and provide feedback. Students worked in various groups, receiving support and guidance while engaging in real-time discussions on the Nearpod platform. At first, the researcher warms up with pre-online discussion activities and builds a foundation of knowledge for the task at hand. She gives students conceptual models of the task, such as texts, pictures, videos, PowerPoints, websites, or PDFs. Besides, the students received the content using the Nearpod platform. Then, students do the task and solve problems. The researcher observes them while completing a task and offers hints, feedback, guidance, and support as needed. After that, the researcher encourages the students to explain what they are doing via Zoom. She gradually helps students work towards achieving the objective of completing a task independently. She gradually reduces the level of support and increases the complexity of the problems in response to the student's progress. In this sense, students become more experts. As the participants become more proficient, the researcher fades away, taking on the role of monitor and giving distinct indications or comments. Therefore, the program was effective in helping the students' transition from guided to independent practice. This is considered to be a factor behind its success and is consistent with Rodríguez-Bonces and Ortiz (2016).

Furthermore, the program supported the participants through various forms of scaffolding. The most effective scaffolds were: (1) more time for research and learning before class using videos and (2) quick feedback from the teacher or peers online. In the current study, the researcher found synchronous online feedback more helpful than asynchronous feedback in fixing grammar errors. For example, the teacher and student can view the document on their screens, with the teacher providing feedback and the student making immediate changes while discussing them verbally. Scaffolding helps students perform at a greater level than they would be able to if acting alone. In this sense, students expressed gratitude for obtaining valuable input from their peers. Therefore, the increased opportunities for receiving feedback from peers and the instructor could significantly enhance the quality of argumentative writing among EFL students, as feedback is known to have one of the most impactful effect sizes out of all instructional

methods available. In addition, feedback is vital scaffolding that instructors rely on in building EFL students' confidence, as consistent with Collins et al. (1991), De Bruin (2019), and Kazuko (2020).

The researcher also focused on the sociological dimension within the collaborative learning program based on the cognitive apprenticeship model, which allowed participants to engage in real-situated learning while learning and working on faithful tasks in an appropriate learning environment. The researcher used authentic content, diverse tasks, and activities connecting them to real-life situations and promoting reading and reflection. This aids them in building their knowledge through collaborating and sharing information in real-life situations. It also encourages them to write freely and participate in various discussions held during the program.

Furthermore, positive social interaction facilitates learning, with group members providing support and instruction to each other. i.e., a more experienced member aids less knowledgeable members in internalizing the new information. Besides, the researcher established a mutually beneficial relationship with the EFL student teachers by treating them as equals and friends. She consistently places value on their inputs and shares relevant information. In this way, students feel accountable for their learning and can share roles flexibly. Therefore, establishing a sense of social presence online is very beneficial when integrating CAM methods. Additionally, emotions of isolation and demotivation transform into participation and motivation. This result was consistent with the studies of Ding (2008).

Concerning the third and fourth hypotheses of the study, the findings revealed that there is a statistically significant difference between the participants' mean scores in the pre-and post-assessment of overall EFL critical thinking skills and its sub-skills in favor of the post-assessment, as the T-value was 23.112 which is significant at 0.01. This means that the participants achieved better improvement in their overall EFL critical thinking skills and their sub-skills. This result supported the third and fourth hypotheses. This development can be due to a variety of factors. The researcher used a set of strategies to enhance their students' thinking and cognitive skills, such as collaboration, CA, and problem-solving. These strategies range from teacher-assisted to purely student-controlled. These

strategies aim to engage students in tasks that involve arguing, analyzing, criticizing, judging, problem-solving, and evaluating situations.

It was found that the utilization of collaborative learning and the inclusion of cognitive apprenticeship had a significant effect on developing EFL students' critical thinking skills. The program guided students to think more critically about the information they received, check the credibility of sources, attempt to consider alternative theses, detect fallacies, evaluate arguments, and evaluate evidence. The program fostered reflection, made thinking visible in the teaching and learning process, raised students' levels of cognitive expertise, fostered high-order thinking abilities, promoted learner autonomy, and developed problem-solving skills by transitioning between concrete and abstract concepts as needed. Students also demonstrated strong critical thinking through their arguments. They presented a solid enough explanation and evidence in the argumentative essay to support their perspective and arguments. Therefore, critical thinkers need diverse writing skills to analyze facts, generate ideas, defend opinions, make comparisons, evaluate arguments, solve problems, be open-minded, consider the situation, search for reasons, and address complex issues systematically. These results are consistent with Tsai et al. (2012), Afshar et al. (2017), Hastiari (2020), and Saleh, M. M. (2022).

In addition, the findings may be due to the Nearpod platform, which promotes critical thinking skills. Throughout the sessions, the participants used the Nearpod platform to argue about a problem, which helped them strengthen their critical thinking skills, especially when they learned to write about an engaging topic. In addition, it assisted students in developing self-regulation skills by encouraging them to engage in reflective practices and take ownership of their learning. Self-reflection in online environments is not limited to the reflection teaching method stage but also to scaffolding and articulation. Therefore, the Nearpod platform is a bridge that supports self-reflective practices through synchronous interaction.

On the other hand, using the Zoho Writer platform, participants can share products with individuals or a group. In addition to sharing documents, they can collaborate with multiple users and edit their files in real time. i.e., they work on a document together in real time, chat about it, and receive feedback through comments and suggestions. Furthermore, they can collaborate via

WhatsApp group chat, enabling them to communicate, engage in discussions, and share images, recordings, and other files. The students can share resources related to their subjects or courses with each other using WhatsApp. Thus, during the program sessions, students collaborated on revisions with their chosen partners. Participants reported that reading other people's writing was a more beneficial activity than receiving feedback. Besides, they added that having a partner helped them feel better about the process, parse out the comments from the instructor, and lower their stress level. Moreover, these platforms were beneficial for engaging with others while learning, as students self-reflected, gave feedback, and asked questions. All of these factors play a role in the success of the intervention. These results are consistent with Abd El-Glil (2021) and Hewitt (2022).

It can be concluded that online collaborative learning based on CAM provided students with a secure and friendly environment to interact, brainstorm ideas, comment on writings, and enhance critical thinking skills. This program boosts language learning efficiency, increases confidence in studying, and supports the learning process. It also assists learners in discussing and negotiating the meaning of words, grammar, dialogues, and discourse, as well as analyzing, synthesizing, assessing, questioning, and becoming skeptical of topics, data, and evidence introduced in the classroom environment. Therefore, it can be asserted that participants' EFL argumentative writing and critical thinking skills are developed after participating in the collaborative cognitive apprenticeship-based program.

Conclusion

The study results revealed that the six teaching methods of CAM (modeling, coaching, scaffolding, articulation, reflection, and exploration) improve online collaborative learning. The use of CAM with the Nearpod and Zoho Writer platforms allows students to share ideas, debate, ask questions, reflect on learning, and receive feedback in an instant. Furthermore, learners progressed from direct teaching (modeling) to more autonomous learning (articulation), taking on the roles of experts. Therefore, the development of information technology has enhanced the quality of language teaching and learning.

This study concluded that a highly significant correlation existed between critical thinking and argumentative writing skills. Critical thinking is crucial to producing quality written documents, such as argumentative essays. The more proficient the students are in CT, the better they are at argumentative writing skills, and vice versa. The analysis of participants' essays showed improvements in the five critical thinking skills: inference, recognition of assumptions, deduction, interpretation, and evaluation of arguments. Hence, most students believe online collaborative learning is better than face-to-face learning. Accordingly, this study concludes that integrating cognitive apprenticeship and collaborative learning mechanisms within online learning environments has great potential for developing EFL argumentative writing and critical thinking skills among student teachers.

Recommendations of the study

In the light of the results of the study, the following recommendations are presented:

- EFL teachers should be prepared to use collaborative cognitive apprenticeship strategies to develop students' argumentative writing skills in the early educational stages.
- EFL teachers need to know effective strategies for developing thinking and language skills.
- EFL teachers should stress group work activities that allow students to communicate and interact with each other.
- EFL teachers should engage students in various activities before, during, and after writing, such as brainstorming, conversations, dialogues, oral discussion, pair and group work activities, and debates.
- EFL student teachers should practice online collaborative learning tools such as Nearpod and Zoho Writer for reading skills and other language skills.
- Curriculum designers should embed online learning tools in the early educational stages for better results in the following stages.

Suggestions for Further Research

Based on the research findings, the following implications for further research were suggested:

- Investigating the effectiveness of an online collaborative learning program based on CAM in English language learning among preparatory school students.
- Clarifying the effect of using other programs on developing students' EFL argumentative writing skills and overcoming writing apprehension.
- Clarifying the influence of an online collaborative learning program based on CAM on other language skills such as reading.
- A comparative study of the effect of using an online collaborative cognitive apprenticeship-based program on both freshmen students and higher studies students.
- A follow-up study assessing the long-term impact of a CAM-based online collaborative learning program on participants' EFL argumentative writing and critical thinking abilities, and if these can be transferred to other circumstances.

References

- Abd El-Glil, A. G. M. (2021). Developing EFL adult learners' critical thinking through a program based on an e-community context. Unpublished master thesis, Faculty of Education, Ain Shams University, Egypt.
- Abu Ayyash, A. I. (2022). Teachers' perspectives: Developing undergraduate EFL learners' critical thinking skills. *European Journal of Education and Pedagogy*, 3(4), 32-35. Retrieved from <https://www.researchgate.net/publication/362166535>.
- Afshar, H. S., Movassagh, H., & Arbabi, H. R. (2017). The interrelationship among critical thinking, writing an argumentative essay in an L2 and their subskills. *Language Learning Journal*, 45(4), 419–433. <https://doi.org/10.1080/09571736.2017.1320420>.
- Anderson, L. W., & Krathwohl, D. R. (Eds.). (2001). *A taxonomy for learning, teaching and assessing: A revision of Bloom's taxonomy of educational objectives*. Complete Edition, New York: Longman.
- Anikina, Z. (Ed.). (2020). *Integrating Engineering Education and Humanities for Global Intercultural Perspectives*. Switzerland: Springer International Publishing.
- Brindley, J., Walti, C., & Blaschke, L. (2009). Creating effective collaborative learning groups in an online environment. *International Review of Research in Open and Distance Learning*, 3(10), 1-18.

- Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher*, 18(1), 32–42.
- Collins, A. (2006). Cognitive apprenticeship. In R. K. Sawyer (Ed.), *The Cambridge Handbook of the Learning Sciences* (pp.109-127). Cambridge: Cambridge University Press.
- Collins, A., & Kapur, M. (2014). Cognitive Apprenticeship. In R. K. Sawyer (Ed.), *the Cambridge Handbook of the Learning Sciences* (pp. 109–127). Cambridge: Cambridge University Press.
- Collins, A., Brown, J. S., & Newman, S. E. (1989). Cognitive apprenticeship: teaching the craft of reading, writing, and mathematics. In Resnick, L. B. (Ed.), *Knowing, learning, and instruction: Essays in honor of Robert Glaser* (pp. 453-494). Hillsdale: Lawrence Erlbaum Associates.
- Collins, A., Hawkins, J., & Carver, S.M. (1991). A cognitive apprenticeship for disadvantaged students. In B. Means, C. Chelemer, & M.S. Knapp (Eds.) *Teaching advanced skills to at-risk students: Views from research and practice* (pp. 216-243). San Francisco, CA: Josey-Bass Publishers. This material is reproduced with permission of John Wiley & Sons, Inc.
- De Bruin, L. R. (2019). The use of cognitive apprenticeship in the learning and teaching of improvisation: Teacher and student perspectives. *Research Studies in Music Education*, 41(3), 261–279.
- Dennen, V. P., & Burner, K. J. (2008). The cognitive apprenticeship model in educational practice. In M. Spector, M. Driscoll, D. Merrill and J. Merrienboer (Eds.). *Handbook of Research on Educational Communications and Technology* (pp. 425-439). Chinese: Routledge.
- Ding, H. (2008). The use of cognitive and social apprenticeship to teach a disciplinary Genre: Initiation of graduate students into NIH grant writing. *Written Communication*, 25(1), 3–52. doi:10.1170741088307308660.
- Eid, S. A. E. (2022). A program based on writer's workshop to develop secondary sage students' argumentative writing and reduce their writing apprehension. *Journal of Reading and cognition*, (254), 17-61.
- Ennis, R. H. (1989). Critical Thinking and Subject Specificity: Clarification and Needed Research. *Educational Researcher*, 18, 4-10. <http://dx.doi.org/10.3102/0013189X018003004>.
- Ennis, R. H., & Weir, E. (1985). *The Ennis–Weir Critical Thinking Essay Test*. Pacific Grove, CA: Midwest Publications.
- Facione, P. (1990). Critical thinking: A statement of expert consensus for purposes of educational assessment. *Journal of Curriculum and Teaching*, 11(8), 1-23 Retrieved from <https://files.eric.ed.gov/fulltext/ED315423.pdf>.

- Hastiari, D. (2020). Assessing student's critical thinking in essay writing. Unpublished doctoral dissertation, State Institute for Islamic Studies IAN, Bengkulu.
- Helwa, H. S. A. A. (2014). The effectiveness of a program based on the combination of relevance and confidence motivational strategies in developing EFL argumentative writing skills and overcoming writing apprehension among students teachers at Faculty of Education. *Arab Studies in Education and Psychology*, 59, 1-37.
- Hewitt, L. C. C. (2022). Collaborative learning strategies to build critical thinking and collaboration in the mathematics classroom: A qualitative case study. Unpublished doctoral dissertation, Northcentral university school of education.
- Kaowiwattanakul, S. (2021). CEFR based learning approach: Using literature to enhance EFL students' reading skills and critical thinking skills. *English Language Teaching*, 14 (11), 66-79. Retrieved from <https://doi.org/10.5539/elt.v14n11p66>.
- Kazuko, M. (2020). Cognitive apprenticeship during pair work activity to improve oral presentations. *Journal of Atomi University Faculty of Letters*, 55, 123-143.
- Kener, N.F.M. (2021). The impact of pragmatic tasks on EFL prospective teachers' critical thinking skills. *Journal of Faculty of Education*, 32(127), 67-102. DOI: 10.21608/jfeb.2021.240897.
- Kuo, F. R., Hwang, G.-J., Chen, S. C., & Chen, S. Y. (2012). A Cognitive Apprenticeship Approach to Facilitating Web-based Collaborative Problem Solving. *Educational Technology & Society*, 15 (4), 319–331.
- Lin, Y. (2018). *Developing Critical Thinking in EFL Classes: An Infusion Approach*. Singapore: Springer.
- Liu, T. C. (2005). Web-based cognitive apprenticeship model for improving pre-service teachers' performances and attitudes towards instructional planning: design and field experiment. *Educational Technology & Society*, 8 (2), 136-149.
- Lu, D., & Xie, Y. (2019). The effects of a critical thinking oriented instructional pattern in a tertiary EFL argumentative writing course. *Higher Education Research & Development*, 38 (5), 969-984. Retrieved from <https://doi.org/10.1080/07294360.2019.1607830>.
- Lustyantie, N., Ramli, R., Isnani, F. N., & Supriyati, Y. (2022). Exploring students' critical thinking skills and their performance in writing argumentative essay. Paper presented at Proceedings of the 9th Asbam International Conference. *Advances in Social Science, Education and Humanities Research*, 660, 1-4.

- Matsuo, M., & Tsukube, T. (2020). A review on cognitive apprenticeship in educational research: Application for management education. *The International Journal of Management Education*, 18, 1-9. Retrieved from <https://doi.org/10.1016/j.ijme.2020.100417>.
- Moschella, J. A. (2023). Computer-based formative assessment in developmental writing targeting argumentative essay writing skills. Unpublished doctoral dissertation, The Graduate School of Education, Rutgers, the State University of New Jersey.
- Murtadho, F. (2021). Metacognitive and critical thinking practices in developing EFL students' argumentative writing skills. *Indonesian Journal of Applied Linguistics*, 10 (3), 656-666. Retrieved from <https://doi.org/10.17509/ijal.v10i3.31752>.
- Nimehchisalem, V., & Mukundan, J. (2011). Determining the evaluative criteria of an argumentative writing scale. *English Language Teaching*, 4(1), 58–69. Retrieved from <https://doi.org/10.5539/elt.v4n1p58>.
- Özdemir, S. (2018). The Effect of argumentative text pattern teaching on success of constituting argumentative text elements. *World Journal of Education*, 8(5), 112-122.
- Pei, Z., Zheng, C., Zhang, M., & Liu, F. (2017). Critical thinking and argumentative writing: Inspecting the association among EFL learners in china. *English Language Teaching*, 10 (10), 1-12.
- Rahayu, E. S. (2016). Using Google Docs on collaborative writing technique for teaching English to non-English department students. *Proceedings of ISELT FBS Universitas Negeri Padang*, 4(1), 226-236.
- Rajesh, R (2009). *Cognitive Development in English Language Teaching*. Bangalore: Lulu Press Inc.
- Rodríguez-Bonces, M., & Ortiz, K. (2016). Using the cognitive apprenticeship model with a chat tool to enhance online collaborative learning. *Gist Education and Learning Research Journal*, 13, 66-185.
- Saleh, M. M. (2022). A cognitive load –based program to develop student teachers' EFL argumentative writing and reduce apprehension. *Journal of Educational Sciences*, 30 (4), 1-50. Retrieved from https://journals.ekb.eg/article_293031.html.
- Sato, T. (2022). Assessing critical thinking through L2 argumentative essays: an investigation of relevant and salient criteria from raters' perspectives. *Language Testing in Asia* 12 (9), 1-19.
- Seel, N. M. (Ed.). (2012). *Encyclopedia of the Sciences of Learning*. New York: Springer. Retrieved from <https://books.google.com.eg/books>.
- Setiawan, A. K. K., & Komara, C. (2022). Assessing undergraduate EFL students' critical thinking in writing argumentative essay. *International Undergraduate Conference on English Education*, 1(1) 88-100.

- Sharadgah, T. A., Sa'di, R. A., & Ahmad, H. H. (2019). Promoting and assessing EFL college students' critical thinking skills through argumentative essay writing. *Arab World English Journal*, 10 (4) 133-150. DOI: <https://dx.doi.org/10.24093/awej/vol10no4.11>.
- Silviana, N., & Miftakh, F. (2021). Activating students' cognitive perspective using problem based learning in EFL speaking. *Journal of Applied Studies in Language*, 5(1), 147—155. Retrieved from <http://ojs.pnb.ac.id/index.php/JASL>.
- Srinawati, W., & Alwi, R. (2020). Critical thinking ability in EFL students' argumentative essay writing: The difficulties and the strategies. *Journal of Scientific Information and Educational Creativity*, 21(2), 200-210.
- Starkey, L. (2010). *Critical thinking skills success in 20 minutes a day* (2nd ed.). New York: Learning Express, LLC.
- Toulmin, S. E. (2003). *The uses of argument* (Updated edition first published). Cambridge University Press, Cambridge.
- Tsai, C. Y., Jack, B. M., Huang, T. C., & Yang, J. T. (2012). Using the cognitive apprenticeship web-based argumentation system to improve argumentation instruction. *J Sci Educ Technol*, 21:476–486.
- Tsiriotakis, I., K., Spiliotopoulos, V., Grünke, M., & Kokolakis, C. (2021). The effects of a cognitive apprenticeship model on the argumentative texts of EFL learners. *Journal of Education and Learning*, 10 (5), 63-75.
- Vygotsky, L. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.
- Walters-Williams, J. (2022). H-CUP: Increasing higher order thinking skills levels through a framework based on cognitive apprenticeship, Universal Design and Project Based Learning. *Creative Education*, 13, 2878-2902. Retrieved from <https://www.scirp.org/journal/ce>.
- Watson, G., Glaser, E. (1994). *Watson–Glaser critical thinking appraisal manual*. New York, NY: Harcourt, Brace & World.
- Wells, G. S., & Wollack, J. A. (2003). *An Instructor's guide to understanding test reliability* (A technical report). Wisconsin: The Office of Testing & Evaluation Services. University of Wisconsin. Retrieved from <http://testing.wisc.edu/Reliability.pdf>.
- Widyastuti, S. (2018). Fostering critical thinking skills through argumentative writing. *Journal Cakrawala Pendidikan*, 37(2), 1-9. DOI:10.21831/cp.v37i2.20157.
- Yamin, M., Setiawan, S., Anam, S. (2023). Designing the English Argumentative Essay Writing Test Based on Critical Thinking Skills. *Voice of English Language Education Society*, 7 (1). 193-204. Retrieved from <http://dx.doi.org/10.29408/veles.v7i1.11671> 193.

- Zare, P. & Othman, M. (2015). Students' perceptions toward using classroom debate to develop critical thinking and oral communication ability. *Asian Social Science*, 11 (9), 158-170.
- Zhang, L. & Kim, S. (2018). Critical thinking cultivation in Chinese college english classes. *English Language Teaching*, 11 (8), 1-6.