

Enhancing ESP Vocabulary Proficiency through Five Elements of Online Cooperative Learning for Nursing Students

Wini Fitriana Sofyan, Aat Agustini & Eti Wati

Universitas YPIB Majalengka, Majalengka, Indonesia

[winifitrinasof2@gmail.com](mailto:winfitrinasof2@gmail.com)

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ABSTRACT

The widespread adoption of online learning has significantly transformed the dynamics of cooperative learning. One of the main challenges in distance cooperative learning is determining whether Online Cooperative Learning (OCL) can successfully elicit the fundamental elements of cooperative learning and, in turn, improve student learning outcomes. This study aims to examine whether the five essential elements of cooperative learning—positive interdependence, individual accountability, social skills, group processing, and face-to-face interaction—can emerge in a virtual environment and contribute to improving nursing students' proficiency in ESP (English for Specific Purposes) vocabulary. Using a quasi-experimental one-group design, this quantitative research involved 30 nursing students from a university in West Java, Indonesia, selected through convenience sampling. Paired t-test analysis was conducted to assess the impact of OCL. The comparison of pre-test and post-test values indicated that the five cooperative elements were effectively elicited, leading to enhanced student proficiency. The t-test yielded a t-value of 4.781, which surpassed the critical t-table value of 1.697, confirming a statistically significant improvement. These findings suggest that the OCL model successfully fosters the fundamental elements of cooperative learning and enhances nursing students' ESP vocabulary proficiency. Consequently, this model presents a promising approach for improving ESP vocabulary skills in nursing education.

1. Introduction

Online Learning (OL), a result of technological innovation, has significantly impacted the learning culture in higher education. Beyond offering flexible time options, OL allows students to access learning materials from any location, while also providing unlimited educational resources. In this context, distance-based Cooperative Learning (CL) has been extensively studied and implemented in various educational settings. For instance, earlier studies from the 2000s reported that cooperative learning conducted remotely can transform students' learning patterns by fostering cooperative behavior and enhancing a sense of togetherness (Denzinger & Kordt, 2000; Misanchuk & Anderson, 2001).

However, implementing Online Cooperative Learning (OCL) is not without challenges. According to Hutchinson (2007), the Online Learning Environment (OLE) presents unique difficulties for both practitioners and students. Practitioners must engage in meticulous planning, design, and execution to ensure that CL, conducted in a virtual environment,

replicates the value of face-to-face interaction found in traditional CL settings. From the students' perspective, accepting and understanding the principles of OCL is critical. Students must consciously apply these principles to foster interaction and collaboration within their groups, with the ultimate goal of achieving shared learning outcomes (Sofyan & Wati, 2022). In line with CL, OCL aims to develop group thinking patterns so that students can effectively work together under specific circumstances to improve their learning outcomes.

This research seeks to measure the impact of Online Cooperative Learning (OCL) on the English for Specific Purposes (ESP) vocabulary proficiency of nursing students. The study focuses on the emergence of five fundamental elements of cooperative learning (positive interdependence, individual accountability, social skills, group processing, and face-to-face interaction) and their impact on students' ability to learn medical register vocabulary. Register vocabulary, which refers to the specialized terms and phrases used within a particular field, is particularly important in

ESP, especially in the medical domain (Donesch-Jezo, 2014). Such vocabulary plays a crucial role in enabling effective communication and comprehension within the medical profession (Cambridge Dictionary, 2023). As an integral part of every ESP curriculum, register vocabulary must be taught systematically and consistently. Therefore, ESP educators must carefully select vocabulary teaching methods that align with students' needs, conditions, and proficiency levels (Costeleanu, 2019).

One of the main challenges of OCL is the physical distance it creates between instructors and students, which can feel “peculiar” to students accustomed to traditional classroom learning. As Tran et al. (2020) point out, this physical separation can limit interaction and constrain engagement between students, teachers, and learning materials. Because of these challenges, maintaining student motivation and engagement in an online environment requires additional strategies to foster meaningful connections (Swan, 2003). Furthermore, it is not uncommon for students to feel as though they are attending a simulated meeting rather than engaging in a real learning experience. As a result, they may exhibit reduced attentiveness, perceiving lectures or group member presentations more like television programs than meaningful interactions. This diminished sense of personal connection can lead to negative psychological impacts, such as a lack of support, feelings of detachment, and impersonality, making it harder for students to establish strong rapport with their teammates (Sofyan & Wati, 2022). Consequently, students must adapt their perspectives and attitudes to cultivate a new learning culture that fosters cooperation in this virtual setting.

Both CL and OCL involve organizing students into small groups to collaborate in ways that enhance individual learning as well as the learning of their peers. This pedagogy emphasizes that learning is a communal process, driven by interaction and engagement (Johnson & Johnson, 1999; Johnson et al., 1984). Numerous studies have confirmed that successful OCL relies on fostering fundamental cooperative elements, including positive interdependence, individual accountability, virtual face-to-face promotive interaction, interpersonal competence, social skills, group processing, equal participation, and simultaneous interaction (Kagan, 1994; Slavin, 2015; Johnson & Johnson, 2019). These elements have been shown to significantly improve student learning outcomes (University of Wisconsin, 2023; Megahed & Mohammad, 2014; Kristiansen et al., 2019; Chen et al., 2020; Han & Son, 2020; Shimizu et al., 2020; Syakur & Sabat, 2020). Nevertheless, Aranzabal et al., (2019) argue that presenting these fundamental elements remains the most challenging aspect of cooperative learning. As such, this difficulty becomes even more pronounced in OCL, leading to the question of whether online cooperative learning can effectively impact students' learning outcomes.

While previous research has shown that OCL can improve general vocabulary proficiency (Fekri, 2016; Karman & Indriani, 2021), this study is the first to explore its specific effectiveness in enhancing ESP vocabulary proficiency in nursing students. By examining the five essential elements of traditional cooperative learning (positive interdependence, individual accountability, social skills, group processing, and face-to-face interaction) in a virtual environment, this study addresses an important gap in the literature. Furthermore, the study's focus on nursing students in Indonesia a country with a large population of nursing students where English is a foreign language- extends previous research findings by providing insights into how OCL can impact ESP vocabulary proficiency at the higher medical education level.

2. Literature Review

Barker et al. (2017), drawing from Vygotsky's theories, argue that group learning is a meaning-making process that emerges from the accumulation of individual social experiences within a group. This is framed within constructivist and socio-constructivist approaches, where students are conditioned to engage collaboratively, bringing diverse skills, knowledge, and specific expectations of their group members. According to Johnson and Johnson, as cited in Thousand et al. (2002), students in Cooperative Learning (CL) function on two platforms: learning as a group and learning from the group. The success of CL hinges on five fundamental elements: positive interdependence, individual accountability, social skills, group processing, and face-to-face interaction (Kagan, 1994; Slavin, 2015; Johnson & Johnson, 2019). Similarly, in Online Cooperative Learning (OCL), these five elements are critical to facilitating meaningful learning.

However, implementing these elements in an online context presents unique challenges. Barker et al. (2017) highlight the difficulties in replicating the dynamics of traditional CL in the virtual environment, where differences in communication modes and technological barriers significantly impact learning outcomes. Several studies have examined OCL, revealing both strengths and limitations. For instance, Jo and Park (2021) concluded that social networking devices promote student accountability in collaborative learning, encourage diverse perspectives, and reduce educational disparities. Meanwhile, Aghajani and Adloo (2018) showed that students have positive attitudes toward OCL using platforms like Telegram. Conversely, Nam and Zellner (2011) found that while OCL enhanced academic achievement, it did not significantly improve students' attitudes toward the learning format. Similarly, Silalahi and Hutaaruk (2020) pointed out the challenge of asynchronous communication, which diminishes in-person interaction in OCL. These findings confirm that both CL and OCL must cultivate meaningful interactions to

foster cognitive development and support the individual and collective knowledge growth needed to achieve English for Specific Purposes (ESP) vocabulary proficiency.

Despite the extensive research on OCL, there has been little focus on how these five core CL elements emerge in the virtual context for health-related vocabulary acquisition. Theoretically, OCL can aid health science students in acquiring ESP vocabulary if instructors can successfully foster collaborative behaviors and attitudes. Medical vocabulary, often referred to as “register vocabulary,” is especially crucial for nursing and medical students, as mastering such terminology is key to improving their English proficiency, particularly in therapeutic communication. Mastery of this vocabulary is a vital skill for all medical professionals.

Register vocabulary encompasses terminology and expressions specific to a field, such as medicine (Cambridge Dictionary, 2023). This type of vocabulary is essential for effective communication within the medical profession. Therefore, ESP educators must systematically incorporate register vocabulary into their teaching curricula and select methods that align with students’ needs, proficiency levels, and learning conditions (Costeleanu, 2019).

There are several reasons why mastering ESP vocabulary is vital for medical students:

- a) It enables nursing students to articulate complex medical concepts and observations clearly (Barrows, 1986).
- b) It helps explain diagnoses, treatment plans, and potential risks, both in layman’s terms and using specialized medical vocabulary (Lipson & Sharma, 2018).
- c) It is critical for interprofessional collaboration, allowing medical students to communicate effectively with other healthcare professionals (Reeves et al., 2017).
- d) It enhances critical reading and research skills (Wilson, 2020).
- e) It is crucial for accurate and concise documentation in medical records, ensuring continuity of care and meeting legal requirements (Fraser et al., 2015).
- f) It is a necessity for passing medical licensing exams (USMLE, 2021).
- g) It enhances professionalism and credibility, as using accurate medical terminology demonstrates competence and builds trust among peers and patients (Abrams & Frank, 2014).

Given the importance of English in healthcare, OCL requires serious consideration to ensure the emergence of the five core elements of CL. The first of these elements is *positive interdependence*, which can be cultivated by assigning group tasks that require each member to contribute to the understanding of specific medical terms. For example, students could research a list of medical terms related to particular procedures or

conditions, then match definitions and present their findings to the group. This approach fosters a sense of mutual reliance and helps build a cooperative and supportive learning community (Kagan, 1994). Positive interdependence emerges when the group works as a unified entity (Collazos et al., 2003; Laal, 2013). It relies on each member understanding and executing their responsibilities. If a member fails to contribute adequately, the task’s success is jeopardized, underscoring the interdependency within the group (Sanjaya, 2009). However, one challenge with positive interdependence in OCL is the potential for free-riding, where certain group members contribute less, believing their individual input is less important to the group’s success.

The second element is individual accountability, which means that each student is responsible for their learning outcomes and performance within the group. While students collaborate to achieve shared goals, each member is evaluated based on their unique contributions. Mutual accountability helps prevent passive participation (Johnson & Johnson, 2009), and personal responsibility is essential for completing tasks and supporting fellow group members (Scager et al., 2016). In medical vocabulary learning, individual accountability can be promoted by assigning specific roles to each group member. For instance, one student could focus on researching terminology related to body systems, while another looks into pharmaceutical terms. Each student is responsible for contributing their findings, ensuring active participation. The potential drawback here is that it can be difficult to assess individual contributions within group tasks, potentially masking underperformance.

An actual action in learning medical vocabulary is assigning specific roles or responsibilities to each student within the group. For instance, one student may be tasked with researching definitions of medical terms related to a particular body system, while another student focuses on pharmaceutical terminology. Each student is responsible for contributing their findings and insights to the group, ensuring that everyone actively participates and learns from the process. The potential weakness in this element lies in assessing individual learning within a group project, which can be challenging. Traditional group-based assessments sometimes conceal individual weaknesses or contributions. When everyone receives the same grade for a group project, some students might not put in their best effort, relying on others to carry the weight.

The third element is social skills, or interpersonal competence, which refers to the ability to communicate effectively and constructively with others. This includes skills such as assertiveness, conflict resolution, empathy, and respect for group members (Han & Son, 2020). In an OCL environment, developing social skills may involve virtual group discussions, video conferences, or collaborative tasks in which students exchange knowledge about medical vocabulary.

Constructive feedback within the group is key to fostering effective social interactions. However, some students may naturally lack the social skills necessary for group work, especially in online settings. Instructors must encourage trust and openness to overcome these barriers.

Social skills are also labelled as a specific manner of communication skill to interact with others aimed at achieving certain results. This competence includes the initiative to find out information from group members, develop self-disclosure, enhance assertiveness, resolve conflicts, provide emotional support, sympathize, and respect group members (Han & Son, 2020). This skill emphasizes one's relationship with other individuals or groups, by utilizing human nature as a social being who will always need other people. Thus, leveraging conditions of diversity, leadership, effective communication, and synergy within groups needs to be improved in cooperative learning.

Interpersonal competence also refers to personality traits that initiate and sustain social relationships (Han & Son, 2020; Malkoc et al., 2019). An actual action in learning medical vocabulary to develop social skills in an OCL environment involves fostering effective communication and active listening in exchanging their ESP knowledge. Students are driven to engage in group discussions, virtual meetings, or video conferences to exchange information, clarify doubts, and collaboratively define and use medical terms in context. Encouraging positive feedback and constructive criticism within the group enhances social interactions and supports a supportive learning environment. The potential weakness in this element lies in the fact that not all students naturally possess the skills needed for effective group work, such as active listening, clear communication, and resolving conflicts constructively. There needs to be encouragement from instructors to build trust and rapport, especially in online settings where students might find it harder to feel comfortable and open with their peers, hindering effective collaboration.

The fourth element is group processing, where group members evaluate their performance, interactions, and collaboration to refine their approaches and reach their goals. In OCL, group processing can be facilitated through regular reflection sessions after completing vocabulary tasks. During these sessions, students can discuss their experiences, assess their group's performance, and plan improvements. The challenge lies in consistently allocating time for these reflections and ensuring that larger groups can effectively engage in problem-solving discussions.

OCL gives rise to this group processing, where group participants engage in the evaluation, reconstruction, and contemplation of their actions and interactions. This process allows group members to clarify, augment, fortify, or refine their endeavors with

the intention of attaining collective objectives and upholding efficient collaborative dynamics (Johnson & Johnson, 2009; Bertucci et al., 2012). A true cooperative group allocates dedicated time to assess the extent of goal accomplishment and the efficacy of inter-member cooperation. Consequently, the implementation of group processing activities, such as assigning tasks, for instance, to do checklists, plays a pivotal role within the OCL framework (Johnson & Johnson, 2009; Bertucci et al., 2012).

Group processing in learning medical vocabulary can possibly occur through regular reflection sessions. After completing vocabulary exercises or collaborative tasks, students can gather online to discuss their progress, share their learning experiences, and identify any challenges they encountered. These discussions enable the group to assess their performance, identify effective strategies, and plan improvements in future vocabulary learning activities. The potential weakness in this element lies in facilitating reflection and improvement. There is a need for allocating time for regular discussions about team dynamics, communication, and problem-solving within the group, especially with larger groups. Building skills to identify and address issues promptly, such as encouraging open communication about any problems within the group and taking steps to address them quickly, can be challenging for students, especially without guidance.

The final element is *promotive 'virtual' face-to-face interaction*, which involves creating opportunities for real-time engagement between group members. This element fosters extensive opportunities for each group member to engage in 'face-to-face' exchanges. These interactions serve the purpose of information dissemination, mutual teaching, respecting diversities, leveraging individual strengths, and addressing each member's shortcomings. The promotion of such interactions emphasizes the importance of face-to-face engagements, although this aspect becomes challenging within the context of online learning (Hutchinson, 2007; Kupczynski et al., 2012).

In OCL, video conferencing tools or live discussions can simulate traditional 'face-to-face' interactions, enabling students to practice medical vocabulary in context, receive immediate feedback, and engage in role-play scenarios. While online learning limits direct personal interaction, research by Kristiansen et al. (2019) has shown that students can still develop strong interpersonal connections and engage in meaningful collaborative work despite the virtual environment.

Therefore, actual action in learning medical vocabulary, where primarily takes place in a virtual setting, face-to-face interaction can still be simulated through video conferencing tools or live online discussions. Students can organize virtual study groups where they interact in real-time, practice pronunciation,

and engage in role-playing medical scenarios using the newly acquired vocabulary. These virtual face-to-face interactions provide opportunities for immediate feedback and encourage a more personal and interactive learning experience. By incorporating these five elements into OCL for medical vocabulary acquisition, students can improve their collaborative skills, language proficiency, and understanding of medical terminology.

3. Method

This study utilized a quasi-experimental design, employing a pretest-posttest single-group approach to evaluate students' ESP (English for Specific Purposes) vocabulary proficiency before and after the intervention. The pretest was administered at the beginning of the semester, while the posttest was conducted midway through the semester. The data collection tool was an ESP vocabulary worksheet containing 40 items, which had been previously tested for validity and reliability. This worksheet was distributed online. The vocabulary assessment was based on a rubric that included five components: 1) Matching word definitions, 2) Completing sentences, 3) Writing definitions, 4) Creating original sentences, and 5) Mechanics. Each component was rated on a Likert scale ranging from poor to excellent. The scores were then categorized into four levels: poor (0-5), fair (6-10), good (11-15), and excellent (16-20) (adapted from Zhang, 2012; SpellQuiz, 2022; iRubric, 2023). The data were analyzed using univariate percentage techniques and the paired t-test formula ($\alpha = 0.05$, one-tailed test).

The treatment in this study involved the implementation of Online Cooperative Learning (OCL) in the context of ESP for nursing students. Zoom was the platform used to facilitate this distance learning approach. During the opening phase, the lecturer provided a brief explanation of the learning process and then divided the students into six small groups, each consisting of five members. These groups were assigned to separate breakout rooms. In the main stage, the lecturer distributed materials to all groups, allowing them to engage in OCL for forty-five minutes. At the conclusion of the session, the students returned to the main room to present their group work. The ESP materials covered English for medical and healthcare purposes, with a focus on specialized vocabulary related to writing skills, including topics such as interacting with patients, addressing patient symptoms, and discussing treatments.

Additionally, the presence of cooperative learning elements was measured using an open-ended questionnaire consisting of 15 items (adapted from Sofyan & Wati, 2022), which was distributed to the students immediately after the posttest in the same

semester. This survey assessed the presence of five key cooperative learning elements: positive interdependence, individual accountability, social skills, group processing, and face-to-face online interaction. Responses were recorded on a nominal scale, with 1 indicating the presence of a particular element and 0 indicating its absence. The results were analyzed using simple descriptive statistics. Scores were then grouped into two categories: a total score below 3 indicated that OCL did not significantly contribute to ESP vocabulary learning, while a score of 3 or above suggested that OCL had a positive impact on vocabulary learning.

Participants in this study were selected through convenience sampling, a non-probability technique that selects individuals based on their availability and accessibility. The sample consisted of 30 third-year nursing students from class A, out of a total population of 500 at a university in Majalengka District, West Java, Indonesia. The students' ages ranged from 19 to 22 years. Most participants were at a novice level of English proficiency, having received formal English instruction only during obligatory courses from elementary school through high school. Only a few students had attended additional English courses or taken an English proficiency test.

4. Result

This section presents the findings of the study, organized into three key aspects: first, the ESP vocabulary proficiency of students prior to the treatment (pretest); second, an examination of how the intervention unfolded, focusing on whether the five cooperative learning elements emerged during the treatment; and third, the ESP vocabulary proficiency of students after the treatment (posttest).

4.1 The pretest

The study involved a single test group, consisting of 30 third-year nursing students from class A at a university in Majalengka District, West Java, Indonesia. These students were selected from a total population of 500. No control group was included in this study. The pretest was administered at the beginning of the odd semester to evaluate the students' proficiency in ESP (English for Specific Purposes) vocabulary.

The vocabulary assessment was conducted using a rubric with five criteria: 1) matching word definitions, 2) completing sentences, 3) writing definitions, 4) creating original sentences, and 5) mechanics. The ESP vocabulary proficiency levels were divided into four categories: poor (range: 0-5), fair (range: 6-10), good (range: 11-15), and excellent (range: 16-20) (adapted from Zhang, 2012; SpellQuiz, 2022; iRubric, 2023). The pretest results are as follows:

Table 1. Pretest Result

Item	Level								Sum
	Poor		Fair		Good		Excellent		
	N	%	N	%	N	%	N	%	
Match word definition	19	63.33	5	16.67	4	13.33	2	6.67	
Complete Sentence	20	66.67	5	16.67	5	16.67	0	0.00	
Write Definition	19	63.33	6	20.00	3	10.00	2	6.67	N= 30 % = 100
Write Original Sentence	21	70.00	5	16.67	3	10.00	1	3.33	
Mechanic	20	66.67	8	26.67	2	6.67	0	0.00	

Table 1 presents the ESP vocabulary proficiency of the students before the intervention. A standardized vocabulary proficiency worksheet was used to assess the students' proficiency, with a particular focus on writing skills. The assessment included five items: matching word definitions, completing sentences, writing definitions, composing original sentences, and mechanics.

The results for the matching word definitions item showed that 19 students (63.33%) were categorized as having poor proficiency, 5 students (16.67%) were at a fair level, 4 students (13.33%) demonstrated a good level, and 2 students (6.67%) achieved an excellent level. For the completing sentences item, 20 students (66.67%) performed at a poor level, 5 students (16.67%) at a fair level, 5 students (16.67%) at a good level, and none reached an excellent level.

Regarding the writing definitions skill, 19 students (63.33%) were at a poor level, 6 students (20.00%) at a fair level, 3 students (10.00%) at a good level, and 2 students (6.67%) at an excellent level. When analyzing the ability to compose original sentences, 21 students (70.00%) demonstrated a poor level, 5 students (16.67%) a fair level, 3 students (10.00%) a good level, and only 1 student (3.33%) an excellent level. Finally, for the mechanics category, 20 students (66.67%) exhibited poor proficiency, 8 students (26.67%) a fair level, 2 students (6.67%) a good level, and none reached an excellent level. Overall, the students' proficiency in medical vocabulary prior to the treatment was predominantly at a poor level.

4.2 The treatment

The intervention in this study involved the application of Online Cooperative Learning (OCL) for teaching ESP (English for Specific Purposes) to nursing students. The Zoom application was utilized as

the platform for distance learning. At the start, the lecturer provided a brief explanation of the learning process and then divided the students into six small groups, each consisting of five students. These groups were then assigned to separate breakout rooms. In their respective breakout rooms, the groups engaged in OCL activities and studied ESP vocabulary materials for 45 minutes. After completing their group work, the students returned to the main room to present their findings and discussions to the entire class.

The ESP content focused on English for medical and healthcare purposes, with an emphasis on specialized vocabulary related to writing skills. The topics covered included how to deal with patients, understand patients' symptoms, and handle patients' treatments.

To evaluate the presence of cooperative learning elements during the intervention, an open-ended questionnaire (adapted from Sofyan & Wati, 2022) was administered. The questionnaire contained 15 items designed to assess the presence of five key cooperative learning elements: 1) positive interdependence, 2) individual accountability, 3) social skills, 4) group processing, and 5) face-to-face online interaction. The questionnaire was distributed via Google Forms immediately after the OCL session.

Each cooperative learning element was scored as 1 if it was present during the OCL session and 0 if it was absent. The total score was then calculated. If the score was below 3, it indicated that the OCL failed to incorporate cooperative learning elements and did not contribute to ESP vocabulary learning. On the other hand, a score of 3 or higher suggested that OCL successfully incorporated cooperative learning elements and its significance in contributing to ESP vocabulary learning was further analyzed. The results are as follows.

Table 2. The Appearance of Cooperative Learning Characteristics

Characteristic	Task						Sum	Result (>3 = contribute) (≤3 = not contribute)
	Match Word Definition	Complete Sentence	Write Definition	Write Original Sentence	Mechanic			
Positive interdependence	1	1	1	1	1	1	5	Contribute
Individual accountability	1	1	1	1	1	1	5	Contribute
Social skills	1	1	1	1	1	1	5	Contribute
Group processing	1	1	1	1	1	1	5	Contribute
Face-to-face interaction	1	1	1	1	1	1	5	Contribute

(0 = appear 1 = do not appear)

Table 2 shows that all five cooperative learning characteristics were present in each task. Therefore, the five key elements of cooperative learning were successfully integrated into the process of learning ESP vocabulary. This suggests that each element made a significant contribution to the students' ESP vocabulary learning. Consequently, the significance of these contributions to ESP vocabulary acquisition is further analyzed and presented in Table 4.

4.3 The post test

The posttest was successfully conducted midway through the odd semester. The data collection instrument, an ESP vocabulary worksheet identical to the pretest, was distributed via Google Forms. The results are detailed below.

Table 3. Posttest Result

Item	Level								Sum (N)
	Poor		Fair		Good		Excellent		
	N	%	N	%	N	%	N	%	
Match Word Definition	12	40.00	5	16.67	9	30.00	4	13.33	N=30 %=100
Complete Sentence	14	46.67	2	6.67	10	33.33	4	13.33	
Write Definition	13	43.33	7	23.33	6	20.00	4	13.33	
Write Original Sentence	14	46.67	7	23.33	6	20.00	3	10.00	
Mechanic	16	53.33	7	23.33	6	20.00	1	3.33	

Table 3 outlines the students' ESP vocabulary proficiency after the treatment. For the task of matching words to their definitions, 12 students (40.00%) were classified at a poor level, 5 students (16.67%) at a fair level, 9 students (30.00%) at a good level, and 4 students (13.33%) at an excellent level. Regarding sentence completion, 14 students (46.67%) exhibited poor proficiency, 2 students (6.67%) fair proficiency, 10 students (33.33%) good proficiency, and 4 students (13.33%) excellent proficiency. For definition writing, 13 students (43.33%) demonstrated poor proficiency, 7 students (23.33%) fair proficiency,

6 students (20.00%) good proficiency, and 4 students (13.33%) excellent proficiency. In writing original sentences, 14 students (46.67%) displayed poor proficiency, 7 students (23.33%) fair proficiency, 6 students (20.00%) good proficiency, and 3 students (10.00%) excellent proficiency. Lastly, for mechanical skills, 16 students (53.33%) were rated at a poor level, 7 students (23.33%) at a fair level, 6 students (20.00%) at a good level, and only one student (3.33%) at an excellent level. Overall, after the treatment, the students' proficiency in medical vocabulary was generally rated as fair.

Table 4. Mean and Standard Deviation of Pretest and Posttest

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Posttest	10.00	30	4.934	.901
	Pretest	7.60	30	3.793	.692

4.4 Data Analysis

This study employed a paired-samples design, so a paired t-test was used to compare the mean scores of the same group at two different times: pretest and posttest. Table 4 shows that the mean pretest score for the nursing students (N=30) was 7.60, while the mean posttest score increased to 10.00. The standard

deviation for the pretest was 3.793, and for the posttest, it was 4.93.

A univariate analysis of the pretest and posttest results was performed using a paired t-test with a significance level of 0.05 and a one-tailed test. Table 5 shows that the calculated t-value was 4.781, while the critical t-value ($\alpha = 0.05$, one-tailed test, $df = 29$) was 1.697.

Table 5. Paired Samples Test

		Paired Differences					Significance			
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	One-Sided p	Two-Sided p
					Lower	Upper				
Pair 1	Posttest - Pretest	2.400	2.749	.502	1.373	3.427	4.781	29	<.001	<.001

5. Discussion

5.1 The pretest

Table 1 presents the students' ESP vocabulary proficiency before the intervention. To assess students' proficiency, this study utilized a standardized worksheet designed for vocabulary assessment, specifically targeting writing skills. This assessment was divided into five components: matching word definitions, completing sentences, writing definitions, composing original sentences, and evaluating mechanics.

In the matching words to their definitions component, the results revealed that 19 students (63.33%) performed at a poor level, indicating a limited ability to associate words with their respective definitions. Among those at the fair level, 5 students (16.67%) demonstrated the ability to match some words with their definitions. At the good level, 4 students (13.33%) exhibited proficiency in matching most of the words correctly, while 2 students (6.67%) attained an excellent level, successfully matching all provided words to their respective definitions.

Regarding the completion of sentences, the majority of students, numbering 20 (66.67%), performed at a poor level, reflecting their limited ability to correctly integrate vocabulary words into sentences. At the fair level, 5 students (16.67%) displayed competence in accurately completing some sentences. Additionally, 5 students (16.67%) achieved

a good level, demonstrating proficiency in completing most sentences with the correct vocabulary words. Notably, none of the students reached the excellent level, indicating a lack of proficiency in completing all sentences correctly.

Concerning the students' ability to write definitions, 19 students (63.33%) performed at a poor level, indicating that they could write only a limited number of definitions. Among those at the fair level, 6 students (20.00%) demonstrated the ability to write some of the provided definitions, while 3 students (10.00%) at the good level showed proficiency in writing the majority of definitions. Lastly, 2 students (6.67%) achieved an excellent level, showcasing their ability to write all provided definitions accurately.

The students' proficiency in writing original sentences also indicated challenges, with 21 students (70.00%) falling into the poor category, demonstrating their ability to compose sentences for only a limited number of words. At the fair level, 5 students (16.67%) were able to write sentences for some of the words, while 3 students (10.00%) achieved a good level, showcasing proficiency in composing sentences for most words. Remarkably, only one student (3.33%) attained an excellent level, capable of constructing sentences for all given words.

In terms of mechanical ability, 20 students (66.67%) performed at a poor level, frequently misspelling words and neglecting proper capitalization and punctuation. At the fair level, 8 students (26.67%)

occasionally misspelled words and inconsistently applied capitalization and punctuation rules. In the good category, 2 students (6.67%) infrequently made misspellings and inconsistently applied punctuation and capitalization, while none reached the excellent level, indicating an absence of students who consistently avoided errors and adhered to proper mechanics. Consequently, the overall condition of students' proficiency in medical vocabulary prior to the treatment was deemed poor.

5.2 The Appearance of the OCL Elements

Following the pretest, the study implemented the treatment by applying Online Cooperative Learning (OCL) to deliver ESP vocabulary instruction to students. The five key characteristics of cooperative learning are essential for fostering small group learning, encouraging active participation and collaboration among group members in their learning tasks. These characteristics must be present in OCL, as they are indicative of the successful implementation of cooperative learning. The primary objective of cooperative learning is to cultivate collaborative interactions among students, allowing them to share knowledge, skills, and perspectives to achieve common learning objectives. This method transcends traditional individual-centered learning and promotes a more interactive and social learning environment. Therefore, the absence of these characteristics means that the learning process cannot be considered genuinely cooperative.

The implementation of OCL facilitates meaningful learning, wherein students engage in discussions, debates, or group projects relevant to their real-life professional contexts as nursing students (Niess, 2005; Angeli & Valanides, 2009). Additionally, the theory proposed by Barker et al. (2017), inspired by Vygotsky's ideas, supports the constructivist and socio-constructivist approaches that emerged during the learning process. The notion that group work is a process of meaning-making derived from the accumulation of individual social experiences within the group has been validated. This theoretical framework has led to increased student engagement in collaborative situations. The diversity of skills, knowledge, and expectations among group members positively impacted their ability to support one another in achieving common goals. The results reflecting the presence of the five elements during OCL are detailed in Table 2, which is elaborated upon below.

The characteristic of positive interdependence was successfully observed during online learning. The results indicate that students in each group felt a sense of need for one another, exhibiting that distance learning did not hinder collaboration as effectively as traditional classroom settings. They took responsibility for all tasks, achieving a score of 5, signifying a strong presence of this element. In small groups, students collaborated to study and complete tasks. During the

word definition matching activity, they proactively divided tasks among themselves. In the sentence completion task, they assisted each other to ensure that the group provided accurate answers. In the definition writing task, they engaged in discussions to finalize their responses. For the original sentence writing task, they exchanged information to complete their answers, and in the mechanics task, they actively discussed proper writing techniques.

These activities demonstrate that positive interdependence naturally emerged within their small groups, and distance was not a barrier to establishing this connection. OCL fostered an environment where individuals recognized that their successes were positively linked to the achievements of their group members. Additionally, OCL encouraged a cooperative mindset, wherein group members understood that their success was contingent upon the success of the entire group. This finding aligns with Johnson and Johnson's assertion, as cited in Hertz-Lazarowitz and Miller (1995), that cooperation resembles a choice between swimming or sinking together, creating intrinsic tension among group members that stimulates movement toward achieving shared goals. Moreover, the behaviors exhibited by group members align with Lewin's field theory, which defines a 'field' as the totality of synchronized facts considered mutually interdependent (Lewin, 1951). Individuals displayed varied behaviors based on how they navigated the tension between self-perception and the online learning environment.

Individual accountability also manifested successfully within the OCL strategy, achieving a score of 5, indicating its contribution to students' cooperative learning. Students within their small groups felt a sense of responsibility for their own learning and contributions. Each student was held accountable for their input into the group's work, ensuring that all members actively participated without any free-riding across the five tasks. In fostering individual accountability, groups established specific roles and responsibilities; for instance, one student focused on researching medical terms related to a particular body system, while another concentrated on pharmaceutical terminology. Each student was responsible for sharing their findings with the group, ensuring active participation and mutual learning throughout the process. During the word definition matching task, students understood their assignments and completed their own work while also supporting each other. This dynamic involved holding each student accountable for fulfilling their designated roles within the group.

Social skills also developed during OCL, achieving a score of 5, which indicates the successful presence and contribution of social skills to students' online cooperative learning experience. Students demonstrated the ability to interact and communicate effectively within their small groups. This included skills such as active listening, effective communication,

empathy, cooperation, and conflict resolution across all tasks. Based on the observation results presented in [Table 2](#), students engaged in open communication and displayed mutual respect for one another in every task. They actively listened to each other's ideas, provided constructive feedback, and harmoniously resolved conflicts that arose during online group work.

Group processing was also effectively demonstrated during OCL, achieving a score of 5, indicating its contribution to students' online cooperative learning. This group processing involved students reflecting on and discussing their group's progress, functioning, and strategies for improvement. They evaluated how well the group worked together and identified areas for enhancement. During group processing sessions, students regularly engaged in discussions regarding their dynamics and progress, assessing their collaborative efforts, identifying strengths and weaknesses, and making adjustments to improve overall group performance. These results affirm that the distance setting did not hinder group processing; instead, it was facilitated through reflective discussions. After completing vocabulary exercises as collaborative tasks, students discussed their progress, shared learning experiences, and identified challenges encountered. Unlike traditional online learning, students addressed not only task-related issues but also internet connectivity problems, technical malfunctions, and other online challenges.

These discussions enabled groups to evaluate their performance, identify effective strategies, and plan improvements for future vocabulary learning activities while addressing any internet-related concerns. Furthermore, students engaged in reflection on their group's functioning, assessing progress and pinpointing areas for improvement. This self-assessment fostered group cohesion and enhanced learning outcomes. This aligns with [Slavin \(1995\)](#) and [Johnson and Johnson \(2009\)](#), who state that collaborative activities require students to share ideas, discuss concepts, and collectively solve problems. OCL also stimulated cognitive processing through virtual social interaction, as all online group members collectively processed their knowledge, understanding, and mental activities into reasoning, learning, and problem-solving.

The element of face-to-face promotive interaction was notably present during OCL. This term can be somewhat complex; traditional face-to-face interaction typically refers to direct, in-person communication and interaction among group members who are physically present at the same location and time. In contrast, while OCL primarily occurs in a virtual setting, face-to-face interaction can still be simulated through video conferencing tools or live online discussions. Students successfully organized virtual study groups to engage in real-time interactions, practice pronunciation, and learn ESP vocabulary related to medical contexts while completing tasks using the newly acquired vocabulary.

These virtual face-to-face interactions provided opportunities for immediate feedback and fostered a more personal and interactive learning experience. When face-to-face interaction was implemented in a small group setting, students could engage in real-time discussions, utilize non-verbal cues, and receive immediate feedback.

During these virtual face-to-face interactions, students participated in meaningful exchanges, fostering a deeper level of understanding and cooperation. They engaged in activities such as discussing complex medical cases and sharing their perspectives and insights. Through these discussions, they utilized specialized medical vocabulary, thereby enhancing their ESP vocabulary in a realistic and practical context. The exchange of ideas and collaboration in understanding the cases encouraged a deeper level of comprehension and cooperation among students.

5.3 The post test

[Table 3](#) presents the students' proficiency in ESP vocabulary following the treatment. The results indicate variability in the students' performance across different assessment tasks.

In the matching word definitions task, the proficiency levels varied significantly. Specifically, 12 students (40.00%) demonstrated a poor level, indicating they could match only a limited number of words to their definitions. At the fair level, 5 students (16.67%) showed the ability to match some words to their definitions. Furthermore, 9 students (30.00%) performed at a good level, successfully matching the majority of words to their definitions, while 4 students (13.33%) achieved an excellent level, indicating proficiency in matching all words to their respective definitions.

Regarding the completion of sentences, 14 students (46.67%) exhibited a poor level, managing to complete only a few sentences with the correct vocabulary words. At the fair level, 2 students (6.67%) demonstrated the ability to complete some sentences correctly. Meanwhile, 10 students (33.33%) performed at a good level, successfully completing most sentences with the correct vocabulary. Notably, 4 students (13.33%) excelled in this task, completing all sentences accurately.

Observations of students' writing definitions revealed diverse proficiency levels. In the poor category, 13 students (43.33%) were able to write only a few definitions. At the fair level, 7 students (23.33%) demonstrated the ability to write some definitions. Furthermore, 6 students (20.00%) achieved a good level, successfully composing most definitions, while 4 students (13.33%) reached an excellent level, indicating proficiency in writing all provided definitions.

Students' proficiency in writing original sentences also displayed variability. Specifically, 14 students (46.67%) performed at a poor level, managing to write sentences for only a few words. In the fair category, 7 students (23.33%) demonstrated the ability to write sentences for some words. Additionally, 6 students (20.00%) achieved a good level, successfully composing sentences for most words, while 3 students (10.00%) excelled at an excellent level, proficiently generating sentences for all provided words.

The assessment of students' mechanical abilities revealed varied performance levels. In the poor category, 16 students (53.33%) frequently misspelled words, improperly capitalized, and neglected correct punctuation. At the fair level, 7 students (23.33%) occasionally misspelled words, failed to capitalize appropriately, and did not use correct punctuation. Moreover, 6 students (20.00%) attained a good level, exhibiting infrequent misspellings, proper capitalization, and correct punctuation usage. Finally, only one student (3.33%) reached an excellent level, demonstrating consistent accuracy in spelling, appropriate capitalization, and correct punctuation usage. Consequently, the overall proficiency of students in medical vocabulary before the treatment was considered to be in fair condition.

Despite the physical separation that typically restricts interaction between students and teachers, as noted by [Tran et al. \(2020\)](#), such limitations did not occur in this study due to the effective presence of all OCL characteristics. In line with [Hutchinson \(2007\)](#), the Online Learning Environment (OLE) presents unique challenges for both practitioners and students; however, these challenges positively influenced the students' learning outcomes. According to Anderson's Online Learning Model, online media serve as a link between students, the knowledge/content interface, and teachers. These three aspects are interrelated and interdependent, facilitating asynchronous and synchronous communication, while also opening opportunities for exploring diverse learning approaches and promoting independent learning ([Picciano, 2017](#)).

5.4 The analysis data

According to [Table 4](#), the mean score for the pretest was 7.60, while the posttest mean was 10.00. This indicates that the average proficiency level of the students improved from a poor level before the treatment to a fair level after the treatment. Furthermore, the standard deviations for the pretest and posttest were 3.793 and 4.934, respectively. These results suggest that the scores were not significantly different, as both had low standard deviations, indicating that the scores were closely clustered around the mean and spread over a narrow range.

In [Table 5](#), the data were analyzed univariately using the paired t-test formula with an α level of 0.05

for a one-tailed test. The calculated t-value was 4.781, while the critical t-value from the t-table for $\alpha = 0.05$ with 29 degrees of freedom was 1.697. Since the t-value exceeded the t-table value, the results indicate that the five fundamental elements of Online Cooperative Learning (OCL) effectively enhanced the ESP vocabulary skills of nursing students.

The findings demonstrate that students successfully developed the five essential elements of OCL -positive interdependence, interpersonal competence, individual accountability, face-to-face promotive interaction, and group processing- within the online learning environment. Moreover, these elements facilitated simultaneous interactions and promoted meaningful virtual face-to-face engagement. By utilizing these five essential components, students were able to adapt to critical conditions and foster strong bonds within their groups, enabling them to navigate obstacles encountered during online learning and ultimately achieve their goals.

Aligning with theoretical foundations and previous studies, [Jo and Park \(2021\)](#) assert that social networking tools can promote student responsibility through collaborative learning, encourage diverse perspectives, and reduce educational inequalities. [Aghajani and Adloo \(2018\)](#) found that using the Telegram application in distance cooperative learning significantly influenced students' attitudes. Conversely, [Nam and Zellner \(2011\)](#) reported that while students participating in online cooperative learning with positive interdependence and group processing achieved higher grades, their attitudes did not improve. [Silalahi and Hutaaruk \(2020\)](#) emphasized that one challenge of online cooperative learning is the lack of in-person interaction. However, by emphasizing the five attributes of OCL, the method effectively mitigates the weaknesses of online learning. It fosters meaningful interactions that enhance cognitive skills and encourage self-development among group members, resulting in improved ESP vocabulary proficiency.

The basic element of positive interdependence significantly contributes to fostering a cooperative and supportive learning community, as suggested by [Kagan \(1994\)](#). Students collaborated effectively, relying on each other's expertise to complete medical vocabulary tasks successfully. Positive interdependence emerges when group members work together as a cohesive unit ([Collazos et al., 2003](#); [Laal, 2013](#)). Furthermore, the individual accountability demonstrated during OCL reflects a sense of obligation to complete personal tasks while assisting fellow group members ([Johnson & Johnson, 2009](#); [Scager et al., 2016](#)).

Social skills, or interpersonal competence, were effective in engaging students in both verbal and nonverbal communicative interactions, fostering mutual understanding. This competency encouraged students to seek information from group members,

develop self-disclosure, enhance assertiveness, resolve conflicts, provide emotional support, and respect one another (Han & Son, 2020). Such skills promote strong relationships among individuals and groups by leveraging diversity to facilitate effective communication, synergy, and sustainable social relationships (Han & Son, 2020; Malkoc et al., 2019).

Additionally, the incorporation of group processing in distance learning for medical vocabulary facilitated reflection sessions, allowing students to evaluate, reconstruct, and contemplate their actions and interactions (Johnson & Johnson, 2009; Bertucci et al., 2012). Lastly, the promotive virtual face-to-face interactions within the OCL framework were achieved by providing ample opportunities for each group member to engage in real-time exchanges. This emphasis on interaction was crucial in overcoming the challenges posed by online learning. Students adapted to critical conditions by establishing strong bonds within their groups to navigate the obstacles encountered during online learning (Hutchinson, 2007; Kupczynski et al., 2012). Thus, the five basic elements of OCL have proven effective in aiding health science students in acquiring ESP vocabulary.

6. Conclusions

This study underscores the effectiveness of Online Cooperative Learning (OCL) in fostering the five fundamental elements of cooperative learning: positive interdependence, individual accountability, social skills, group processing, and virtual face-to-face promotive interaction within an online educational setting. The findings reveal that OCL significantly enhances the English for Specific Purposes (ESP) vocabulary proficiency of nursing students, with statistically significant improvements reflected in posttest scores (t-value of 4.781 surpassing the critical value of 1.697). By overcoming challenges commonly associated with online learning, such as maintaining student engagement and motivation, OCL proves to be a practical and innovative approach for fostering collaboration and meaningful interaction. The study introduces a novel perspective by applying cooperative learning principles to an online context specifically designed for ESP vocabulary acquisition in the nursing domain, where precise communication is essential.

These findings have important implications for ESP educators, indicating that OCL can effectively bridge the gap between theoretical language instruction and real-world application in professional healthcare environments. Future research should explore the long-term impacts of OCL on broader language skills, such as speaking and writing, as well as its potential applicability to other specialized fields, extending the understanding of OCL's scalability and effectiveness in higher education contexts.

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