CASE STUDY AT ESP CLASSES AS MODE OF LANGUAGE ADAPTATION TO FUTURE ENGINEERING PROFESSION

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Abstract. In the current era of rapid modern society growth and Ukraine's integration into the European community, professional proficiency in English is a prerequisite for engineering personnel. This suggests that the national higher education system needs to meet new standards and that student's personal and professional qualities are essential. In this regard, it is crucial to realize that, to properly train future engineers, English language programs must imitate the most common professional scenarios to establish environments that are similar to those of professional foreign language communication. All of this is made feasible by employing the case study approach in English language lessons as a replicated model of an engineer's professional activities. The article aims to investigate and bolster the advantages of the case study approach for engineering students learning ESP. The experiment involved 82 engineering majors from the Podillia State University (Ukraine) who had finished the compulsory Business English course in the academic year 2022–2023. The respondents were divided into two groups: the first group learned languages using the conventional way, and the second group employed the case study approach. The data were confirmed using statistical calculation methods (namely the p-value). The experiment results support the theory that the case study methodology is a better approach to learning a foreign language than the conventional approach. The study findings show how useful the case study approach was, assuming both professional language proficiency and immersion in real-world language contexts.

Keywords: case study, conventional approach, ESP, engineering students, language proficiency, educational environment.

Introduction

In recent years, there has been a paradigm shift in pedagogical approach due to the growing use of the case method in research and teaching. It emphasizes how important conventional learning discourses are to professional education. Cases mainly look at how each individual develops, as well as how their cognitive behavior, personality, learning, and interaction patterns interact with one another. Such type of descriptive and qualitative research examines a person, a group, or an event in great detail and makes findings within a particular framework.

Several publications need inclusion because the issue of case studies has already been explored by several scientists and academics from both domestic and international sources.

Researchers can explain the genesis and evolution of phenomena in particular circumscribed circumstances through case studies, which also allow them to explain why other previously tested instructional strategies worked or did not work [1]. However, researchers do not necessarily appreciate case study designs because they rely on inductive reasoning to acquire transferability (not generalizability) from the investigated data [2-4].

Ironically, case studies are excellent illustrations of the fact that mixed methods studies should not be placed on the design terrain but rather "entail or privilege a particular design," according to Tashakkori and Teddlie, who were instrumental in the development and improvement of the mixed methods methodology [5, p. 241]. Either way, the landscape of research keeps changing, giving researchers more options for study designs while also overshadowing the potential benefits of qualitative research in general and case studies in particular.

In the process of showing the numerous complexities of a situation and the elements that can contribute to those complexities, case studies produce thick, detailed descriptions of the phenomena being studied [6]. As a result, researchers can determine the impact that individuals have on various topics, such as attitude differences, and how those differences may have affected overall outcomes. Researchers using a case study approach can obtain a thorough understanding of the deep elements involved in the phenomenon they are examining by utilizing a wide range of data sources, including test scores, observations, interviews, and newspaper articles [2; 4].

Case studies share a few fundamental characteristics. They are heuristic, descriptive, and particularistic in addition to being inductive and particularistic. They are primarily utilized to develop

case study propositions rather than to test theories [4]. Proposition development is a process that begins when researchers inductively determine the course of their investigation (as opposed to deductively supposing a hypothesis and testing it during the study). It is carried out continuously until the study's conclusions are reached [2; 7]. To overcome the conflicting constraints of both generalizability and case-specific, they emphasize the process-product approach, the importance of illustrations or exemplars, compromises and fusions, and several contextualizations [8-10].

Psychological case studies look at individual-focused educational issues. These can be very helpful when looking at aspects of human behavior, such as how people learn or behave when using Twitter in a classroom. Researchers who use sociological case studies examine the socialization and societal constructions associated with phenomena such as social networking software, considering social issues, community and other social institutions, demography, and people's roles in that social life [2; 5].

Phenomenological case studies search for fundamental meanings and understandings through those shared experiences, compare and analyze the experiences of various people to identify the essences of phenomena, and attempt to gain some sense of defining characteristics of phenomena like collaborative instruction [2; 4; 5].

Still, significant scientific interest in this issue indicates the relevance and feasibility of additional research in this field as the repertoire of instructional techniques and resources is continually growing and being supplemented by new ones. As a result, the case method merits analysis because it is an applied technique that combines pedagogy, psychology, and vocational education. Therefore, the goal of the current research is to examine how case study application affects future engineers' language competency and preparedness for the workforce.

Materials and methods

We started a combined research model based on quantitative, statistical, qualitative, and descriptive methodologies to meet the objectives. We processed the test results of students in two groups – one that learned language using traditional methods (the control group) and the other using a communicative (case-study) method (the experimental group) – by using quantitative and statistical methods (p-value) to obtain objective results. To investigate students' perspectives on the discussion of lesson difficulties, a qualitative technique was created. To verify the hypothesis on the efficacy of the case-study methodology, a written questionnaire survey was carried out. The research findings and the student questionnaire were analyzed using a descriptive technique.

During the 2022-2023 academic year, master students in engineering specializations such as mechanical engineering, food technologies and engineering, transport technologies, and automobile transport participated in the project. The "Business English" subject covers 3 ECTS credits (90 hours) per year due to the curriculum. Each responder provided their information voluntarily for participation and was informed about the experiment.

The experiment started with the students split into two groups: the experimental group and the control group. There were 41 respondents in each group out of a total of 82 respondents.

Master students in the Podillia State University engineering specialties were allowed to participate in a three-phase experiment to gauge the value of developing language competency: 1) the evaluation stage: diagnostic testing to confirm foreign language learners' primary language competency 2) the study time (2022-2023) and 3) the control, which consists of the final exams used to gauge students' level of proficiency in a foreign language.

Results and discussion

The first lecture of the Business English course was dedicated to the initial diagnostic test (http://prodibing.fkip.unsri.ac.id/userfiles/english_test.pdf/) to all groups of students. There were two components to it: a speaking session and a grammatical block. Students were given the same speaking assignments and grammar tests at the end of the year as a final assessment. A student could receive a maximum of 100 points for each accurate response on the five oral assignments in the speaking segment and 100 points overall for the 100 questions in the grammar sections (0,5 points for each correct answer). Table 1 displays the analysis of the responses.

Table 1

Data audit

Score	Grade	Language competency level
0-20	E	beginner
21-50	D	pre-intermediate
51-70	C	intermediate
71-90	B	upper intermediate
91-100	A	advanced

Students were supposed to integrate grammar and vocabulary in scenarios that were similar to real-world communication during the second stage, which was the study period. According to the program, both groups studied identical conversational subjects based on grammar and vocabulary. But the approaches were very different.

The control group received standard instructions, including the definition of new terminology and subjects, the completion of written and spoken assignments, and the production of essays. This group was taught Business English using the typical methodology (teacher-centered method). The instructor functioned as the teacher's supervisor, keeping an eye on every activity the students engaged in.

The implementation of the case-study method was used in the Business English classes for the experimental group. All of the classes took place in state-of-the-art labs furnished with engineering apparatus, which was frequently utilized as a model to describe linguistic patterns. After reading a list of keywords in English to study at home, the students were given written real-world professional cases that were explained in their native tongue. They were then expected to discuss the cases in small project groups, search the Internet for drafts, samples, or patterns, and finally present the case in English in front of their peers. The next stage was the debates between other project groups.

Additionally, students actively participated in the process of assessing the results by filling out the evaluation chart for all the participants of the project groups. But when it came to grading, the teacher had the last say, considering the outcomes of the group discussion. The outcome of solving the problem and the speaking abilities displayed by the students while working on the case assignment are both taken into consideration when evaluating the case assignment results and the student's work throughout its implementation. It is important to focus on the professional vocabulary and grammatical constructions that students use while writing or speaking, as well as pronunciation.

The suggested algorithm for working on a case study that combines the professional and communicative parts of the English language instruction for aspiring engineers happened to become extremely motivating. The act of motivation is essential to the process of acquiring knowledge [11].

The following chart was created in light of the findings from the initial diagnostic test and the final one for the control group (Table 2).

Table 2

Primary and final test outcomes for the control group

Test		Grades				
		A	**B**	**C**	**D**	**E**
Primary	**Number of respondents**	2	4	21	11	3
	%	5	10	51	27	7
Final	**Number of respondents**	3	5	23	9	1
	%	7	12	56	23	2
Divergence	**%**	+ 2	+ 2	+ 5	-4	-5

The following chart was created in light of the primary diagnostic test and final diagnostic test findings for the experimental group (Table 3).

Table 3

Primary and final test outcomes for the experimental group

Test		Grades				
		A	B	C	D	E
Primary	Number of respondents	3	4	24	9	1
	%	7	10	56	23	2
Final	Number of respondents	4	7	26	4	0
	%	10	17	63	10	0
Divergence	%	+ 3	+ 7	+ 7	-13	-2

For both student groups, communicative tasks comprising two parts – one focusing on sentence creation abilities and the other on sentence application – were administered as primary and final tests. To ascertain whether there is statistical significance in the study, the p-value was calculated. Typically, a p-value between 0 and 1 is displayed. The outcomes of the entire group – not just one student – were estimated to obtain the p-value index. It is specified by the lower p-value that the null hypothesis ought to be considered. Table 4 presents the statistics outcomes.

Table 4

Primary and final test outcomes for the groups

Group	Score	Speaking expertise					
		Sentence creating			Sentence using		
		Primary test outcomes%	Final test outcomes%	p-value	Primary test outcomes%	Final test outcomes%	p-value
Control	90-100	5.9	10.2	0.051321	5.1	11.3	0.051950
	82-89	6.7	11.8		7.7	12.6	
	75-81	51.4	45.2		51.3	45.2	
	66-74	29.2	25.5		28.2	21.5	
	50-65	5.7	10.3		7.7	9.3	
Experimental	90-100	5	19	0.000019	4	21	0.000069
	82-89	7.5	28		7.5	24	
	75-81	51	46		55	52	
	66-74	31	9		26	4	
	50-65	5.4	-		6.9	-	

Following the final phase, students in the experimental group using the studied method were asked to reply anonymously to a series of statements that indicated whether or not they agreed with the claims to assess the effectiveness of the case study. Six multiple-choice questions made up the questionnaire, which responders could choose from. The questions were not open-ended. Completing the questionnaire took about eight to ten minutes.

The questionnaire goal was to ascertain the students' opinions regarding the case-study approach used in the ESP classes' instructional process. Table 5 below displays the findings from the data analysis of the questionnaire. It should be mentioned that 78% of students are in favor of using the questionnaire goal to ascertain the students' opinions regarding the case-study approach used in the ESP classes' instructional process. Table 5 below displays the findings from the data analysis of the questionnaire. It is noteworthy that a significant portion of students – 78% – support the application of the case-study method in the classroom, and 75% believe that the creative approach used in the classroom helps students master English and improve their speaking abilities. Besides, the majority of the respondents – 96% truly believe that the case study will prepare and adapt them to their future professional careers.

Therefore, the findings supported the following hypothesis: 1) that the communicative approach to language teaching is superior to the traditional one in the context of language acquisition, particularly in professionally oriented situations; 2) that EFL students lack sufficient linguistic competence and are

unable to use appropriate language structures to display various facts and attitudes toward them in professional communication until they are given access to a special Business English communicative course that uses the case-study method. Besides, the case-study method provides an opportunity to develop the creative potential of students, which is reflected in the professional sphere.

Table 5

Questionnaire outcomes

Declarative	Completely agree, %	Agree, %	Not certain, %	Disagree, %	Completely disagree, %
For Business English course, the case-study approach is crucial	25	53	12	8	2
For Business English classes, the case-study approach is more engaging than other approaches	16	59	15	7	3
The case-study approach typically enhances speaking abilities	10	66	14	4	6
My English proficiency tends to increase with the case-study method	13	62	16	5	4
Application of the case-study approach prepares me for my future profession	26	70	2	1	1
I would prefer to use conventional ways to master Business English.	5	10	25	40	20

It is crucial to emphasize that the case-study approach to teaching foreign languages should not be disregarded since, with the use of specialized technology, it can address several educational issues far more effectively than alternative approaches. Teaching oral modes of communication, boosting learning motivation, and removing psychological barriers should be highlighted as some of these duties. It is fair to suggest case studies as one of the most effective ways to accomplish program goals that place a strong emphasis on oral modes of communication (speaking and listening), such as in the context of the communicative approach. However, we must not lose sight of the fact that applying the case-study technique calls for some revisions to theoretical frameworks, teacher retraining, and the development of new training programs that meet the requirements of higher education.

Conclusions

1. To effectively acquire foreign language competency, interdisciplinary approaches have become increasingly important in recent times. Particularly effective are methods that integrate psychological, pedagogical, and vocational education with foreign language learning, such as the case-study method.
2. Case studies are meant to expedite language acquisition while assisting students in adapting to their future professional endeavors. In case-study instruction, the teacher-student dynamic is comparable to that of a partnership. The method of instruction is "learner-centered". Students benefit from the case-study method in cognitive, motivational, emotional, professional, and social domains.
3. Derived on the outcomes, it can be stated that the study application of the communicative approach – that is, the case-study method of language instruction – insisted on improving EFL students' linguistic competence in forming and using language patterns appropriate to communicative situations and, consequently, on cultivating effective communication in professional settings. The experiment findings support the idea that it is more effective than the conventional method of teaching languages, preparing students for professional careers, and encouraging lifetime learning.
4. The best results from studying foreign languages for engineers, especially mechanical engineers, will be obtained after a successful combination of professional education and conceptual thinking

development. So, the ideas and conclusions presented in the paper are mostly practically applicable, and can be implemented globally in ESP course instruction.

Author contributions

Conceptualization, I.H.; methodology, A.R., and O.M.; software, Ju.P.; validation, I.H., and A.R.; formal analysis, O.M, and I.N.; investigation, I.H., O.M., I.N., and O.M.; data curation, I.H., I.N. an O.M.; writing – original draft preparation, I.H.; writing – review and editing, I.H. and A.R.; visualization, A.R., I.N.; project administration, I.H.; funding acquisition, O.M. All authors have read and agreed to the published version of the manuscript.

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