

## Effectiveness of the Inquiry-Based Method in English Language Teaching of Ukrainian University Students Through Technology-Enabled Learning

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### Abstract

The requirements of the time and significant changes in the educational system with emphasis on distant learning due to the Covid-19 pandemic force teachers to reconsider methods, approaches, techniques, and tools in foreign language teaching to ensure the effectiveness of the learning process. This study describes the implementation of the inquiry-based method in the process of English language acquisition by Ukrainian university students specializing in cybernetics and information technology. It aims to determine the effectiveness of inquiry-based learning in developing Ukrainian university students' comprehension and communication skills in professional English through technology-enabled learning. The main research question is to investigate the benefits and challenges of inquiry-based learning for Ukrainian university students to ensure impactful results. The methodology presupposes activities that encourage the independent and collaborative acquisition of the material, increase learners' intrinsic motivation, enhance communicative and digital skills, and provoke critical thinking and meaningful learning. The teacher becomes a facilitator and organizer directing students' learning process, fostering their active thinking and interest. It contributes to their better comprehension and meaningful study. The research findings proved the undeniable benefit of the inquiry-based method for university students as it develops their curiosity, inspires deeper understanding and learning, and motivates them to make discoveries and achievements.

**Keywords:** Covid-19 pandemic, English language teaching, inquiry-based method, quantitative analysis, technology-enabled learning, Ukrainian university students

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## Introduction

The rapid development of the teaching trends in world education, the transition to a modular competency-based approach, the development of new forms, methods, and tools of teaching, establishing of new methodological foundations, and improving the legal framework of higher education in Ukraine all contributed to the integration of new technologies in the teaching and learning process. Learning is a highly mobile and dialectical process (Zaichenko, 2008). Therefore, the system of methods should be dynamic to reflect this mobility, considering changes in the practice of their usage.

*The National Doctrine of Education Development* of Ukraine outlines the basic requirements for higher education: personal orientation, the priority of universal and national values, and ensuring the quality of education based on the latest achievements in science, culture, and social practices (Kovalenko, 2003). Following the requirements and directions of the National Doctrine and taking into account new conditions of teaching and learning English due to the COVID-19 pandemic, we carried out research to evaluate the effectiveness of the inquiry-based method (IBM) in English classes with the students of cybernetics and information technology (IT) specialties.

The research aims to describe the experimental implementation of IBM combined with the communicative approach in the process of English language acquisition by Ukrainian university students in terms of technology-enabled learning. The study adopts the Oxford University Press methodology of teaching English with IBM that showed positive results in the primary and secondary students' acquisition of the target language. The paper addressed the following research questions: 1) If using IBM can increase students' intrinsic motivation, in what particular way does it happen? 2) What is the role of the teacher in this methodology? 3) How does students' learning with IBM in technology-enabled learning demonstrate their deep reflection on what they have learned?

## Theoretical Background

We use the term *inquiry* in education and daily life to seek explanations or information by asking questions. It is sometimes equated with research, investigation, or 'search for truth' (Harlen, 2013). The inquiry-based learning (IBL) scholars promote as pedagogy for improving science learning (Bybee, 2009; Shah, 2020).

Perry and Richardson (2001) define IBL as a process of meaningful and valuable knowledge creation from knowledge at hand by asking questions, drilling, and analyzing information. This method presupposes that learning relies on research. "The teacher as a facilitator provides guidance and support for students, getting them involved in the learning process as they play an active and participatory role" (Renau, 2016, p. 82). Other scholars specify that inquiry-based approaches are "one of many instructional approaches that use meaningful tasks such as cases, projects, and research" (Avsec & Kocijancic, 2016, p. 3). Learners come to new experiences with the ideas already formed from earlier thinking and experiences through their inquiry. Students learn something about specific content, but more importantly, they develop an understanding of similar events by linking past and new experiences (Harlen, 2013). They work in collaborative and cooperative groups to identify what else they need to learn to solve a problem and gain necessary

research skills. Moreover, students are at the center of the learning experience and take ownership of their learning. The teacher's role in IBL is to guide students and promote thinking and curiosity (Wells, 2016).

Quite an exciting approach to IBM application we observe in many course books of Oxford University Press, such as: "Bright Ideas," "Oxford Discover," "Oxford Discover Futures" (Bilsborough, Bilsborough, & Casey, 2018; Kampa & Vilina, 2020; Wildman, 2020). It focuses on the "Big Question" section at the beginning of each course book unit. This approach consists of several communicative tasks (a set of preliminary questions for discussion, video watching, picture description, and filling out the Big Question Chart). The main goal of these tasks is to enhance students' natural curiosity (to ask questions, find answers, and explore the world around them). This approach presupposes asking students the same questions at the beginning and the end of the topic, and comparing their answers at different stages of learning. In this way, there is an opportunity to see how their outlook changes, vocabulary, and knowledge increase and to conclude that every point of view has the right to exist. The teacher, in this case, may ask additional questions on the topic or inquire about controversial issues which require verification and discussion.

Thus, IBM gives an opportunity to encourage students' initiative, stimulate a deeper understanding of the content, motivate them to build relationships between the acquired knowledge, create a sense of autonomous learning, etc. It helps students develop critical thinking and life skills crucial for global skills, including problem-solving, practical cooperation, decision-making, digital literacy, motivation, learning, and research skills (Kori, 2021; Renau, 2016; Wells, 2016).

The methodology based on inquiry-based teaching (IBT) involves the 5E model: Engage, Explore, Explain, Evaluate, and Elaborate. This model suggests a flexible learning cycle built in the ordered sequence of stages and illustrates reform-based, best teaching practices (Bybee, 2009). Later, Peters and Stout (2011) developed a new version of the model that included one more component: e-learning which has become of primary importance in the current pandemic situation.

The research results prove that most studies of IBT and IBL used primary and secondary school experiences (Korkman & Metin, 2021; Caswell & LaBrie, 2017; Gholam, 2019). However, they are still relatively uncommon for higher education institutions. Some works are devoted to IBL in science classes and different courses (Bayram et al., 2013; Fan & Ye, 2022; Kori, 2021). These studies prove that IBL is an active learning method beneficial for developing students' inquiry skill and improving their academic performance, engagement, and motivation.

Referring to a range of examples of IBL, Spronken-Smith (2012) assumed that this approach is applied in all disciplines and stages of higher education. Considering the obtained results, we addressed our study to implementing IBM in the English language acquisition, mainly professional English, by Ukrainian university students specializing in cybernetics and IT.

## Methods

We used a quantitative approach to data collection and a set of general scientific methods to facilitate data generalization. As for the research procedure, five groups of students were engaged in the study at Taras Shevchenko National University of Kyiv. We surveyed 76 students specializing in cybernetics and IT during the academic year 2021-2022. The age of the participants ranged from 17 to 18 years old. The methodology of IBL, combined with the communicative method, was implemented and tested in the English language classes. It was proved through testing and assessment of a variety of students' activities. The applied methodology allowed us to involve many participants, obtain accurate results, and collect the data we needed in the shortest time possible.

## Research Procedure

Many factors are responsible for motivational learning, where teaching methods are the most prominent ones. The pandemic year 2020 caused even more significant amendments in teaching and the methods of presenting and mastering the material. Distance learning became the reason for the quick acquisition of synchronous and asynchronous learning methods, modern tools and programs for interactive data visualization, and their application in practice during online classes. After all, every teacher realizes that without those tools, students' attention, motivation, and activity decrease even faster. In our work with the students of cybernetics and IT specialties, we faced the necessity to adapt the existing methods, particularly interactive, to current conditions.

In IBL, students work together, compare, review, analyze and debate what they learn. For example, discussing "Futurology," students were very motivated to discover inventions in their field of study that would become a reality in 20-30 years. They had heated debates about the opportunities of these inventions and showed enthusiasm to participate in some projects to obtain more information on the topic. As a facilitator, the teacher responded to students' zest for knowledge and proposed to prepare a PowerPoint presentation on the issues discussed during the lesson. It is important to note that students may present their research results using interactive whiteboards via collaborative platforms Padlet, Miro, or Jamboard, which teachers and students have successfully mastered in response to technology-enabled learning. Finally, students voted for the best presentation and got the motivation to participate in such activities.

One of the benefits of IBM is the absence of incorrect answers. The teacher's task is to create a sustainable environment for students to express themselves on the suggested topic. It is possible and quite reasonable to use one of the tools of the Zoom platform, breakout rooms, to do this task. They allow splitting students into small groups where they can easily collaborate to discuss the topic.

Learning from peers is one more key principle of the IBL. Students have to cooperate throughout the whole educational process. The effective results of such cooperation we observed when native speakers joined online discussions with students. It became possible due to the technology-enabled learning via an online invitation link. Ukrainian students, in this way, had an opportunity to discuss with their American and European guests many questions about their attitude to active usage of social media, the influence of social media on our offline life, smartphone, and Internet addiction, future technology trends, some of the best examples of cutting-

edge technology, etc. In this activity, the teacher acquires the status of a moderator and may propose to summarize the information in the form of an online Mind map with the help of the online tool Miro.

During our experimental teaching, we facilitated the activities applied in IBL, described the methodology, and created the model of those activities, presented in Figure 1:

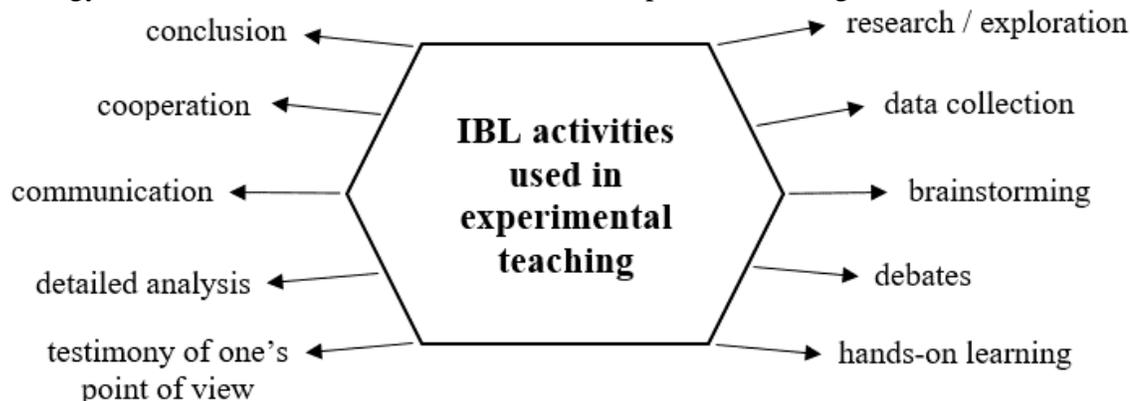


Figure 1. IBL Activities in Experimental Teaching

The suggested model called for such areas of inquiry as engagement, acquisition, interaction, analysis, explanation, reflection, and evaluation of the discovered knowledge with IBL. As we can see, during IBL, students communicate, investigate, read, explore, make choices, extend, clarify, and reflect on their thoughts, knowledge, ideas, and experiences. Such activities encourage inquiring minds to the independent and collaborative acquisition of the material, increase learners' intrinsic motivation, enhance communicative and digital skills, and provoke critical thinking and meaningful learning.

In our study of the effectiveness of IBT and IBL, we surveyed teachers (A) and students (B) as a form of generating data. We also applied the quantitative analysis to get accurate and objective findings.

Table 1. Sample questionnaire on inquiry-based teaching and learning

A		B	
1.	Can you describe your experience in using inquiry-based teaching as positive or negative?	1.	Can you describe your experience in using inquiry-based learning as positive or negative?
2.	Do you think the students achieved their aim(s)?	2.	Do you think you achieved your aim(s)?
3.	Can you name any factors of inquiry-based learning you find the most/least useful?	3.	Can you name any factors of inquiry-based learning you find the most/least useful?
4.	What was the most challenging in the experimental teaching?	4.	What was the most challenging in inquiry-based learning?
5.	Have you had any experience in inquiry-based teaching?	5.	Have you had any experience in inquiry-based learning?
6.	Do you have any suggestions/amendments for inquiry-based teaching?	6.	Do you have any suggestions/ amendments for inquiry-based learning?

The data obtained from the survey are rendered in tables 2-6, which demonstrate the number and percentage of the participants by reference to the questions in the questionnaire.

Table 2. *Acquisition of the inquiry-based teaching/learning*

Participants	Attitude	Positive		Neutral		Negative	
		Number	%	Number	%	Number	%
Teachers		3	75	1	25	-	-
Students		64	84	7	9	5	7

As we can see, most teachers (75%) and students (84%) found the teaching/learning process with IBM rather inspiring. Only 7% of students expressed a negative attitude to IBL. The reason for this might be students' low level of critical thinking and meaningful learning. Overall, participants' reflections on the IBL were positive.

Table 3. *Aims achievement*

Participants	Rate of achievement	Achieved		Partly achieved		Not achieved	
		Number	%	Number	%	Number	%
Teachers		3	75	1	25	-	-
Students		56	74	16	21	4	5

The study shows that most respondents (75% teachers and 74% students) achieved or partly achieved (25% teachers, 21% students) their learning and teaching aims. The exception is four students (5%) who skipped most lessons and demonstrated low motivation to improve their academic achievements.

Table 4. *Essential factors of the inquiry-based teaching/learning*

Participants		Teachers		Students	
		Number	%	Number	%
1.	Meaningful learning of the topic	4	100	59	78
2.	The intrinsic motivation which fosters curiosity	3	75	60	79
3.	Constructive interaction	3	75	47	62
4.	Open-ended answers	4	100	41	54
5.	Personal enrichment with a better understanding of the material	2	50	52	68
6.	Students ownership of learning	3	75	61	80

The survey revealed that IBL considerably promoted students' research-based curiosity (78%), enhanced their internal motivation to learn professional English (79%), and encouraged them to participate actively in constructive communication (62%), thus, developing their communicative skills, especially with foreigners. This approach helped students understand that there was no right or wrong answer (54%) in class discussions and that all responses were acceptable. This understanding enriched their knowledge with new information and vocabulary (68%). The ownership of learning is also a crucial factor for students (80%) as they have an opportunity to explore the topic with a sense of ownership over their education. That simultaneously allowed them to deepen their understanding of the material. The above factors were advantageous in learning English as they contributed to developing and improving students' speaking, listening, and reading skills. Additionally, peer work improved cooperation and

communication; group discussions created immersion in an authentic atmosphere and thought-provoking interaction with people from different countries.

Table 5. *Essential challenges in experimental teaching/learning*

Participants		Teachers		Students	
		Number	%	Number	%
1.	Issues with the Internet connection	1	25	10	13
2.	Language barrier	-	-	16	21
3.	Cooperation with native speakers	1	25	9	12

The research results proved that 21% of students felt a language barrier, and 12% of participants had difficulties communicating with native speakers. The fear of expressing opinions and lack of experience in IBM learning might explain this.

Table 6. *Preceding experience in the inquiry-based teaching/learning*

Responses	Yes, at college or school		Yes, at university		No	
	Number	%	Number	%	Number	%
Teachers	1	25	3	75	-	-
Students	9	12	-	-	67	88

According to the survey, 88% of participants had no previous experience or interactions with foreigners. However, the most effective in this teaching/learning process, from our perspective, were tasks and questions that generated students' interest, curiosity, and enthusiasm. They contributed to developing students' critical thinking, encouraging their initiative and stimulating them to a deeper understanding of the subject and the English language itself.

Therefore, counting all positive responses from tables 2-6, we can observe effective dynamics in the use of IBL among teachers (78%) and students (72%), which proves that applying this methodology is valuable and motivational to boost students' competencies and capabilities. It develops inquiring minds and provokes meaningful learning. Overall, 12% of students mentioned negative experiences. We can explain this by issues with the Internet connection, language barrier, and lack of speaking experience with foreigners. Therefore, the goal of the experimental study was achieved, and the research questions were disclosed by the impactful teaching/learning results.

## Discussion

The research results showed that a new generation of students requires new ways of teaching and learning. They prefer to be fully involved in education and need self-motivation to gain knowledge. One of the main reasons for applying IBM to language acquisition is to promote the development of intrinsic motivation. It is a rather powerful type of motivation, as a person's desire generates interest and is characterized by stability. Motivation is one of the most fundamental and studied factors that ensure learning success. It triggers any activity, whether work, communication, or cognition (Kholmakova, 2016).

Referring to the first research question of our study on increasing students' motivation using IBM, it is essential to note the following. Numerous studies of IBL effectiveness revealed that a high level of students' motivation depends on their natural curiosity. It is distinctive for primary and lower-secondary age groups (Panasanand & Nuangchalerm, 2010). Researchers

observed a strong motivation and a high level of engagement among secondary students (Caswell & LaBrie, 2017; Avsec & Kocijancic, 2016; Gholam, 2019). A relatively high level of motivation for learning science with IBL is also traced among university students (Bayram et al., 2013). Accordingly, the benefit of IBM for university students is undeniable as it develops their curiosity, inspires deeper understanding and learning, and motivates them to make discoveries and achievements.

The second research question was about the role of the teacher in IBL. Our findings on the issue confirmed that it had changed significantly. There is an opinion that students should construct their knowledge for themselves (Funa & Talaue, 2021), and they must be ready for self-directed learning (Melkonian, 2022). As we suggested above, the teacher plays the role of a facilitator and organizer, focusing on collaborative and communicative activities. In this way, he fosters students' active thinking and contributes to their better comprehension and meaningful study. According to Vlassi and Karaliota (2013), the students explore, and the teacher becomes the guide in this research.

The most significant for experimental teaching was students' reflection which became the third research question in our study. The methodology proposed in many course books of Oxford University Press and addressed to primary and secondary students proved effective when applied in English classes with university students. It contributed to their engagement in various activities that helped refine their communicative skills, activate their prior knowledge, and realize the need for self-improvement. In this respect, reflection makes students understand their personal development and growth in the learning process to evaluate their progress in achieving the learning objectives.

After considering the research questions, it is essential to note the difficulties the students encountered in the learning process. The first was related to the Internet connection during online classes. The second belonged to the language barrier, where students with a lower level of English felt ashamed to express their opinions. In this case, blogs or chats were the solutions for such students. They had more time and resources to formulate their thoughts and share them with others. And finally, cooperation with native speakers became an issue for students who were shy and uncertain about their language skills. It prevented them from active participation in the conversation. However, moderation of the learning process by the teacher, who captures the inactivity of such students and proposes a set of written questions in a chat box, often motivates them to become active participants in the class discussion and can be viewed as one of the solutions to the problem.

## Conclusion

The paper met the target set in the research: to improve the teaching process in Ukrainian higher education institutions following the world's education standards and modern students' requirements. The study fulfilled the tasks aimed at investigating, implementing, and experimentally checking the effectiveness of IBM in the English language acquisition by Ukrainian university students specializing in cybernetics and IT. The research results allowed us to gain insight into the challenges the students and teachers faced during the online study and to

analyze their self-reflection and self-evaluation to improve the methodology used in the English language classes.

The findings of our study proved the effectiveness of the inquiry-based tasks that included exploration, investigation, discussion, evaluation, etc. These tasks allowed students to gain knowledge by working on a problem, making decisions, improving their critical thinking, developing communicative and digital skills, fostering cooperation, and promoting learners' autonomy and independence. The application of IBM in language teaching and learning in combination with the communicative method confirmed that the effectiveness of learning increased up to 72%. Thus, the obtained results indicate that the methodology described above contributed to effective teaching and meaningful learning and ensured impactful results.

However, there is a need for further studies of IBM application in higher education institutions during different courses to gain more diverse experience and a broader scope of data to validate the reliability of the methodology. Future research could also examine the effectiveness of the IBL 5E model in learning English for Specific Purposes that would add value to the existing studies.

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