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Enhancing the Practical Learning of English: Applying Bloom's Taxonomy to the ESP Curriculum for Students of Higher Education Institutions

Abstract

Introduction. In light of the growing importance of international relations and IT careers, it is imperative that university students possess proficiency in at least one foreign language. Notwithstanding the evident necessity of language proficiency in this field, efficacious methodologies for the design of practical foreign language curricula for IT students remain underdeveloped. The *objective of this study* is to examine the potential benefits of applying Bloom's taxonomy to improve the effectiveness of planning practical English for Specific Purposes (ESP) classes for Information Technology (IT) students in higher education. The aim is to enhance students' capacity for higher-order thinking skills. A comprehensive analysis of contemporary research on lesson planning methodologies revealed a number of advantages, including the ability of the educator to maximise the use of class time, to increase students' motivation and involvement in the learning process, to stimulate interest, to encourage critical thinking and analysis, and so forth. *Methodology.* In the course of this research, methods of a mixed type were employed, combining qualitative and quantitative approaches. This was done in accordance with the theoretical experience of well-known scientists in the field of pedagogy. The following instruments were employed: project work (either individual or group), observation of the learning process, and analysis of learning outcomes. *Results.* Bloom's taxonomy provides a structured methodology for the formulation of transparent learning objectives, thereby ensuring that students are able to comprehend the anticipated outcomes. By incorporating a variety of cognitive levels, educators can design engaging activities that accommodate diverse learning styles. Furthermore, aligning questioning and feedback with the aforementioned taxonomy levels provides students with explicit guidance on their progress in mastering specific skills and knowledge. *Conclusion.* This study demonstrates how Bloom's taxonomy can be used to create engaging and effective ESP lessons tailored to the needs of IT students. By effectively integrating Bloom's taxonomy into lesson planning, ESP educators can empower IT students to become proficient language users and critical thinkers. A student-centred approach to teaching that takes into account the individual characteristics of IT students has proven to be effective.

1 Introduction

The development of international relations and professional opportunities for IT specialists makes foreign language learning for university students a necessity in today's globalised world. Despite the obvious importance of a foreign language in the field, effective planning of practical classes

remains an area that requires further attention and improvement. Furthermore, there is an urgent need to develop systematic strategies for planning practical foreign language classes that are specifically adapted to the needs and characteristics of IT students.

A substantial body of research has been conducted on the planning of foreign language courses for non-language majors. This research has focused on a number of key areas, including the use of appropriate methods and techniques, the adaptation of materials to the needs of the target group, and the introduction of interactive tools and technologies into the learning process to identify optimal teaching strategies. The objective of such studies is to identify optimal teaching strategies that facilitate effective language acquisition by IT students, while also enhancing their motivation and interest in the learning process.

The existing research in the field of language learning indicates that the effective planning of a practical foreign language lesson can yield numerous benefits. Firstly, it facilitates an enhancement in students' motivation and involvement in the learning process. A meticulously designed lesson that adheres to a discernible structure and incorporates an array of pedagogical techniques and resources can effectively pique students' curiosity and guarantee their active involvement in the classroom (Moreno Rubio, 2009; Thompson et al., 2024). Secondly, effective planning facilitates a more comprehensive understanding and learning process. The utilisation of an array of pedagogical techniques and a coherent lesson framework facilitates the effective acquisition of a foreign language, enhancing both communication competencies and the comprehension of linguistic concepts (Guskey, 2014). Thirdly, the planning of foreign language lessons fosters critical thinking and analysis. The incorporation of practical tasks, project work, discussions, and other active learning techniques allows students to analyse and evaluate information, thereby facilitating the growth of critical thinking and analytical abilities (Suleimenova et al., 2019). Ultimately, the effective organisation of a practical foreign language lesson enables the instructor to optimise the utilisation of the allotted time, which is a pivotal element in the students' academic achievement (Parker, 2005).

The authors believe that effective planning of a practical foreign language lesson for IT students is an important part of the educational process that requires systematic analysis and development of new strategies to improve the quality of learning and achieve high results.

2 Literature Review

The question of how to plan practical classes in higher education institutions has been the subject of study by a number of prominent foreign researchers, including B. Bloom, C. Robertson, R. Acklam, D. Krathwohl, D. Newble, R. Cannon, L. Anderson, S. Ambrose and others.

In 1956, B. Bloom devised the original framework for educational objectives, which entailed classifying educational goals into a hierarchical structure. This foundational work provided a foundation for much of the subsequent research in the fields of educational psychology and curriculum design, emphasising the necessity for structured learning objectives in any educational programme.

In the late 1990s, Newble and Cannon (1995) provided a comprehensive guide for university and college educators, addressing a range of pedagogical strategies. Their insights constituted a valuable resource for educators seeking to integrate Bloom's principles into their teaching practices, thereby ensuring that lessons were both effective and research-informed.

Subsequently, in the work "Rethinking Bloom's Taxonomy" (1999), Anderson addressed the implications of the taxonomy for the domain of testing and assessment. He put forth the argument that assessments must be aligned with cognitive levels in order to accurately measure student learning. This perspective is of great importance for the development of assessments that accurately reflect the objectives of an ESP curriculum, thereby ensuring that evaluations are meaningful and targeted.

At the beginning of the 21st century, Robertson and Acklam (2000) provided actionable strategies for educators aiming to improve their English teaching practices. Their emphasis on practical application is a valuable complement to the theoretical foundations provided by Bloom's taxonomy, offering educators a range of effective tools for implementing these concepts in the classroom.

In their seminal works published in 2001 and 2002, Anderson and Krathwohl presented a comprehensive revision of Bloom's original taxonomy, transforming it into a more dynamic framework that reflects contemporary educational practices. It was observed that the taxonomy is a valuable tool for identifying the intended outcomes of a practical lesson and selecting suitable tasks. The revision introduced the cognitive process dimension, which is of particular importance for the structuring of learning objectives in ESP contexts. Today, this revised taxonomy serves as an important tool for educators seeking to promote higher-order thinking skills in IT students. A team of academics, Ambrose et al. (2010), presented seven research-based principles that highlight how students learn effectively. These principles serve as a foundation for intelligent teaching strategies that can improve engagement and learning outcomes. Their work emphasised the importance of understanding how learners construct

knowledge, which is essential for designing an effective ESP curriculum.

It can be observed that there are studies in the scientific literature that examine specific elements of lesson planning and Bloom's taxonomy. However, there is a dearth of research that addresses the subject of lesson planning for IT students in higher education institutions. This study aims to demonstrate the benefits of utilising Bloom's taxonomy as a valuable pedagogical approach for teaching a foreign language to IT students.

3 Bloom's Taxonomy for ESP Class for IT Students

The authors believe that the task of effective planning of a practical foreign language class for IT students is an integral part of the educational process that requires systematic analysis and development of new strategies to improve the quality of learning and achieve high results. It is also important to take into account the individual characteristics, abilities, interests and needs of each student when planning the educational process and classes. The use of differentiated approaches and tasks, taking into account different learning styles, can help each student to succeed. The use of modern teaching methods and technologies, such as information and communication technologies and e-learning resources, can also help to make learning more dynamic, interesting and effective. It is also important to regularly assess and monitor students' learning outcomes to provide information about their knowledge, skills and competences. The use of different assessment methods, such as tests, oral and written assignments and projects, can help to provide a more objective picture of student performance.

In their book Action Plan for Educators: A Guide to Teaching English, Robertson and Acklam identified clear elements that a educator should pay attention to in the classroom, which should be present in every teaching sequence, whatever the teaching point: 1) engage; 2) study (the study element can be a focus on any aspect of the language, such as grammar or vocabulary and pronunciation, on a new topic. The study stage may also include a continuation of previously studied material); 3) activate (activate the knowledge and skills acquired in the previous stages of learning). But these steps are best taken through the lens of Bloom's taxonomy, which helps plan the lesson from easy to difficult grammar, materials, tasks, etc.

For successful lesson planning, it is necessary to consider Bloom's taxonomy as a hierarchical model that structures the curriculum, learning objectives, etc. At the beginning of the 21st century, a new version of the cognitive taxonomy, previously known as Bloom's taxonomy, appeared thanks to David Krathwohl, who added two more taxonomies –

affective or psychomotor (Leslie Owen Wilson, 2016). Subsequently, Bloom's taxonomy has categorised educational objectives into three domains: cognitive, affective and psychomotor, which are interrelated and ordered according to their degree of complexity. The cognitive domain pertains to the concept of "knowing", encompassing knowledge, comprehension and critical thinking. The cognitive domain encompasses all aspects of the knowledge acquisition process, from memorising new information and ideas to problem-solving with the aid of the acquired knowledge. The affective domain is associated with the concept of emotional experience. This domain is concerned with the experience of feelings and emotions. The primary objective of the affective domain is to cultivate an emotional disposition towards the phenomena of the external world, encompassing an individual's reactions to diverse circumstances, their values, interests, and proclivities. The psychomotor domain is concerned with the concept of "doing". Psychomotor objectives are associated with the acquisition of practical abilities and the capacity to utilise a range of instruments (Anderson & Krathwohl, 2001).

Bloom's taxonomy helps to set educational goals correctly. Based on the goals, the educator formulates tasks for the students and selects assessment tools. With the help of the taxonomy, the educator builds learning and the student not only receives new knowledge, but also learns to analyse it and apply it in life. The system of objectives is built from simple to complex. Knowledge and understanding belong to the lowest level of thinking and development, application and analysis to the middle level, and synthesis and evaluation to the high level of thinking. According to Bloom, the educator's task is to ensure that students reach high levels of thinking (Krathwohl, 2002).

The first level "knowledge" begins with memorising and reproducing the information received. The student learns basic terms, specific facts, rules and can repeat them. At the first level, a general idea of the subject is formed. To set a goal, it is necessary to use action verbs: define, name, remember, list, study, find, specify, write down, create. For the first level of goals, there may be an assignment for IT students:
  – Create a glossary of technical terms;
  – write definitions for key terms in the industry;
  – name the steps in a technical process;
  – describe the functions of different computer components.

At this level, the questions are as follows: "What? Who? Where? When? How? Describe ..." etc. The second level, "comprehension", is about understanding and awareness. The main indicator of mastery of this stage is the ability to present material in one's own words. The learner knows and understands rules and principles, can explain facts and phenomena, for example, interpret graphs and

diagrams. Verbs at this level are: define, explain, characterise, interpret, compare, summarise, relate, extract, give an example, paraphrase. For example:
– Explain how a technical device or software works in English;
– summarise information from a technical text;
– formulate a conclusion based on the data;
– translate a technical text from English into Ukrainian or vice versa.

At this stage, the following questions are used to organise and select facts and details: "Retell ... in your own words. What is the main idea of ...? What is the difference between...? Can you write a short summary?" etc.

The aim of the third level, "application", is to learn how to use the knowledge gained in specific situations. The student solves practical problems using new rules, formulas and laws. The verbs used at this level are: solve, distribute, show, explain, apply, calculate, research, create, find, select. Examples of tasks include the following:
– Write instructions on how to use a particular technical device or software;
– create a presentation on a technical topic;
– write an email or letter of appeal to a technical specialist;
– develop a project plan using technical tools.

At this level, the following questions are used when using rules, principles and facts in the classroom: "How is ... an example of ...? How is ... related to ...? Why is ... important? Do you know any other examples of ...?" etc.

At the fourth level, "analysis", the student's goal is to understand the structure of the material and be able to divide it into interrelated parts. The student sees the principle of data construction and can find logical errors. Verbs: analyse, distinguish, construct, find out, explain, evaluate, invent, build, contrast, draw conclusions. Examples of tasks include the following:
– Analyse a technical problem and propose a solution;
– assess the impact of a particular technology on society;
– explain the ethical implications of using certain technologies;
– analyse a technical text and identify its main ideas and arguments.

This level involves dividing the whole into its component parts and answering the following questions: "What are the parts or features of ...? How does ... compare/contrast with ...? What evidence can you provide for ...? Classify ... according to ... Draw an outline/diagram/webpage/map of ...".

By reaching the fifth level, "synthesis", the learner is able to summarise and combine their knowledge. They use it to create a new construct, such as a classification method or a plan to solve a problem. Action verbs used at this level are as follows:

compose, develop, group, combine, establish, plan, summarise, test, propose, formulate. Examples of tasks include:
– Write an essay comparing and contrasting theories, events, and so forth;
– identify and analyse errors in an English-language text;
– formulate own thoughts about problems in IT;
– tell about one's own experience in English.

At this level, they combine ideas to formulate new ones: "What would you predict/deduce from...? What ideas can you add to...? How would you create/design a new ...? What might happen if you combine ... with ...?".

At the highest level, "evaluation", the student evaluates a statement according to criteria that he or she can formulate independently or that the educator can help him or her formulate. The main purpose of the level is to analyse the logic of the presentation of the material, to check the correctness of the conclusions, and to argue their point of view. The verbs used here are: evaluate, argue, defend, present, measure, discuss, check, justify, confirm, predict. The following are examples of tasks:
– Conduct research and write an essay on a technical topic;
– evaluate a certain technical phenomenon;
– discuss an innovative product or service that uses new technologies;
– propose a new development strategy for a tech company.

At the highest level, questions are used to form opinions, make judgements or take decisions: "Do you agree that...? Explain. What do you think about ...? Should we prioritise ... according to ...? How would you decide on ...? What criteria would you use to evaluate ...?".

These are just a few examples. It is possible to use imagination and creativity to create other tasks that meet the needs of the students.

The following serves as an exemplar of an English class based on Bloom's taxonomy for advanced IT students. The subject under discussion is the ethical implications of artificial intelligence. The initial step is to define the objectives.
– At the "knowledge" level, students can:
– Describe the main ethical issues related to artificial intelligence;
– give examples of these problems from real life;
– identify different perspectives on these issues.
 At the "comprehension" level, students can:
– Analyse the ethical implications of the use of artificial intelligence;
– evaluate different arguments about these issues;
– formulate their own opinions on these issues.
 At the "application" level, students can:
– Propose solutions to ethical issues related to artificial intelligence;
– justify their proposals;

– consider the different implications of their proposals.

At the "analysis" level, students can:
– Compare and contrast different ethical frameworks for analysing artificial intelligence;
– identify the limitations of these frameworks;
– develop their own ethical framework for analysing artificial intelligence.

At the "evaluation" level students will be able to:
– Evaluate the ethical implications of the use of artificial intelligence in different contexts;
– consider different perspectives on these issues;
– make their own judgment about the ethical use of artificial intelligence.

At the "creative" level, students can:
– Develop innovative solutions to ethical issues related to artificial intelligence;
– consider the potential risks and benefits of their solutions;
– consider the ethical implications of their decisions in the long term.

In the initial phase of the lesson, the educator provides an overview of the principal ethical concerns associated with artificial intelligence. Throughout the course, students engage in discussion and analysis of specific examples of ethical issues in pairs or groups, assuming the role of a stakeholder to explore the various perspectives on these issues. In this instance, the most appropriate methodology is that of debate. As a homework assignment, students are required to write an essay on the ethical implications of artificial intelligence.

In order to evaluate students' progress and provide feedback, it is necessary to implement control mechanisms. Student performance is evaluated based on their engagement in discussions, case studies, role plays, debates, and group projects. The assessment of individual assignments is based on the evaluation of essays and other submitted work.

The provision of feedback represents a crucial aspect of the learning process. Feedback enables students to ascertain their level of attainment in relation to the learning objectives set for them and to identify areas for improvement. In providing feedback, it is essential to concentrate on the student's advancement in attaining knowledge and proficiency at each stage of cognitive development. For example, in lieu of merely informing a student that their essay is erroneous, one can assist them in enhancing it by indicating particular aspects wherein they can more efficaciously deploy their grammatical and critical thinking abilities.

4 Conclusions

Using Bloom's taxonomy helps educators to clearly articulate learning objectives and what students should know and be able to do after the lesson. It also encourages the educator to plan a variety of tasks that span all levels of cognitive thinking to engage students with different learning styles and abilities. In addition, by using verbs from Bloom's taxonomy when formulating questions and instructions, the educator effectively communicates the expected level of thinking to students. It is important to provide clear feedback to students to focus on their progress in mastering the knowledge and skills at each level of cognitive thinking.

Bloom's taxonomy is a valuable tool that English educators can use in the classroom to improve lesson planning, increase student engagement and develop critical thinking skills. By using this system to set learning objectives, plan activities and provide feedback, one can create a more effective and efficient learning environment for their students.

Bloom's taxonomy helps educators set the right learning goals and formulate tasks for students, and helps students choose assessment tools. The principle of simple to complex helps to formulate appropriate tasks and ways of completing them.

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