

Implementing the Flipped Classroom Approach in the Teaching Process

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Abstract

Introduction: This study explores the application of the flipped classroom approach in teaching professional English to Civil Engineering students at the Technical University of Košice. This pedagogical shift aims to improve language proficiency, engagement, and critical thinking.

Methods: A flipped classroom approach was implemented over one semester with two student groups. Instructional materials, including videos and quizzes, were provided prior to class via the Moodle platform. In-class time was dedicated to practical language use, discussions, and case studies.

Results: A post-semester survey involving 40 students indicated increased satisfaction, improved English skills, and greater engagement. 75% found pre-class materials helpful, and 60% reported improved language proficiency.

Discussion: The flipped classroom approach allowed for deeper in-class interaction and skill development. Students gained exposure to real-life communication scenarios in the field of civil engineering.

Limitations: Challenges included students' time management, motivation, and occasional technical difficulties. However, a portion of students preferred traditional methods.

Conclusions: With effective planning and support, the flipped classroom approach enhances student engagement and language acquisition in professional English education.

Key words: flipped classroom approach, language learning, student engagement.

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Introduction

Teachers worldwide continuously develop and propose new approaches and methodologies to ensure effective teaching that aligns with evolving conditions and educational needs. Language teachers represent one such group of educators who embrace the benefits of using innovative approaches applied during the teaching process. Modern education, in which technology plays a key role, encourages teachers to enhance traditional teaching methods and to focus on more interactive forms of learning adapted to the needs of students.

Thanks to the developments in educational technologies, new innovative methods are gaining popularity, including the Flipped Classroom approach which is expressed as the combination of online and face-to-face education changing the traditional approach into a new teaching experience allowing students to decide when, how long and at what pace they learn. It promotes a personalised approach, making learning more tailored to each student's needs (Graham, 2006). In the flipped classroom approach, which involves a reversal of the traditional teaching process, students engage with instructional materials - such as videos, quizzes, and articles - with the help of educational technologies in out-of-class time. These materials typically cover the fundamental and theoretical content of the subject including new terminology and professional topics. In the classroom, the teacher has space for practical tasks, discussions and group projects and facilitates in-depth discussions, and problem-solving activities enabling students to apply their prior knowledge effectively (Baker, 2000; Lage, Platt, & Treglia, 2000).

1 The flipped classroom as an innovative approach

The flipped classroom as an innovative teaching approach has been part of the pedagogical practice for some time. The development of the flipped classroom approach is attributed to researchers M. J. Lage, G. J. Platt, and M. Treglia, who conducted studies on teaching economics in two high school classes. Their research led to the conclusion that, within the flipped classroom model, activities traditionally performed during class are shifted to an out-of-class setting, while in-class time is dedicated to tasks that were previously assigned as homework (Lage, Platt, & Treglia, 2000).

The flipped classroom methodology was advanced by Jonathan Bergmann and Aaron Sams (2012), educators at Woodland Park High School in Colorado, United States. They recognised that students require the most support when they encounter difficulties rather than when they passively receive content (Bergmann & Sams, 2012). To address this, they began prerecording their lectures, allowing

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class time to be fully dedicated to clarifying challenging concepts and fostering deeper engagement.

It is important to acknowledge that Bergmann and Sams were neither the first educators to incorporate prerecorded lessons into instruction nor the originators of the term flipped classroom. However, they played a pivotal role as early adopters and vocal advocates of the approach (Bergmann & Sams, 2012). The concept of flipped learning (FL) was initially introduced by Baker (2000) and further developed by Lage et al. (2000) to enhance student learning outcomes and enrich the teaching experience in higher education.

Table 1

Comparison of time use in traditional teaching and in the use of the flipped classroom approach

<i>Traditional teaching</i>		<i>Flipped classroom</i>	
<i>Activities</i>	<i>Time</i>	<i>Activities</i>	<i>Time</i>
Introductory activities	5 min.	Introductory activities	5 min.
Homework review	20 min.	Discussion of homework	10 min.
Presentation of new material	30-45 min.	Guided and independent practice/laboratory work	75 min.
Guided and independent practice/laboratory work	20-35 min.		

Source: Bergmann & Sams, 2012

Bergmann and Sams (2012), in their work *Flip your classroom*, state that in a flipped model, time is completely restructured. Students ask questions related to the content of the material, which they have studied through the video before the lesson, and the remaining time can be devoted to more extensive hands-on activities and problem solving. The following table shows the change in the teacher's position when using the flipped classroom approach in their Chemistry lessons.

1.1 The effectiveness of the flipped classroom approach

In 2014, a consortium of educators implemented the pedagogical strategies and established the *Flipped Learning Network* (n.d.). The FLN defines Flipped Learning as “a pedagogical approach in which direct instruction is shifted from the group learning dimension to the individual learning dimension, transforming the remaining group space into a dynamic and interactive learning environment, in which the educator guides students in the application of concepts and in their creative engagement with the course content.”

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They further outline four pillars of F-L-I-P in Flipped Learning:

- Flexible Environment: Students have the autonomy to choose the time, space, and pace of their learning - determining when, where, and how they engage with the material.
- Learning Culture: The traditional teacher-centred model is replaced by a student-centred approach, in which students take responsibility for their own learning. Class time is utilized for deeper exploration of complex subjects.
- Intentional Content (Targeted Content): Educators prioritise content that students can access independently, develop relevant materials, and optimise class time for active learning tailored to students' academic levels and subject areas.
- Professional Educator: Although the educator's role in a flipped classroom may appear less central than in a traditional approach, they remain actively engaged by providing individual and group feedback, assessing students through observation and documentation, and collaborating with colleagues to enhance instruction.

The flipped classroom approach is rooted in *active learning*, an instructional method that actively engages students in the learning process. One of the key challenges English language teachers face is effectively developing language proficiency in all students within the limited time of a class session. Since each student has a different level of language ability and motivation, providing individualised instruction in a traditional classroom setting - especially in groups of over 20 students - can be difficult.

The flipped classroom approach addresses this challenge by shifting the introduction of core material to independent study at home. Students engage with online resources, videos, audio recordings, presentations, and topic-specific word banks at their own pace, allowing for a more personalised learning experience. This, in turn, frees up valuable class time for *interactive and practical activities* such as discussions, role-plays, and solving case studies, which enhance communication skills and language interaction.

Beyond benefiting students, this approach also supports teachers by enabling them to use high-quality online materials and plan lessons more effectively. As a result, students not only improve their language proficiency but also develop independent learning skills and become more actively engaged in the learning process. Ultimately, the flipped classroom approach provides *more opportunities for in-class language practice* while fostering long-term language development beyond the classroom.

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2 Implementing the flipped classroom in the teaching process

As teachers of professional English for Civil Engineering at the Faculty of Civil Engineering of the Technical University of Košice (TUKE), we believe that the application of a new approach has opened up a space that brings benefits in terms of maximising student productivity during the seminars. Students learn English during 2 semesters in a time allocation of 90 minutes once a week. Topics covered in the summer semester include Structural and Architectural engineering, Transportation and Hydraulic engineering, Eco building and Smart house, Safety at a Construction site, Construction management, Data presentation, Interview process and self-presenting, and Effective business meeting. The implementing of the flipped classroom approach involves many activities carried out before and during the class, both by the teacher and the student.

Flipping the traditional way of teaching for the flipped classroom approach we have maximised time that students of professional English for Civil Engineering could use to improve and practise skills at seminars thanks to studying the core of the topic beforehand. There is enough space for such activities as expressing themselves in *professional terminology* - students learn technical terms related to construction, architecture, engineering and materials, which enable them to communicate in a professional environment. Next, students improve *reading and understanding of technical texts* - being able to understand construction standards, project documentation and articles from construction industry. Furthermore, they practice *oral and written communication* - by presenting projects, statistics, discussing technical solutions and writing technical reports and emails. Lastly, they improve *problem solving* skills by using case studies to argue and explain their technical proposals and solutions in English, which is important for them in the future if they consult with foreign partners and construction professionals.

2.1 Tasks performed outside the classroom using the flipped classroom approach

Our aim was to compare the traditional method of English instruction with the flipped classroom approach. In a conventional setting, vocational topics are introduced during seminars through teacher-led explanations, while deeper engagement with the material primarily occurs outside the classroom in the form of homework. However, by implementing the flipped classroom approach, the introduction of new topics takes place before class, allowing in-class time to be dedicated to active engagement, discussions, and practical application of newly acquired terminology.

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To integrate the flipped classroom approach into our teaching, we assigned preparatory homework to two groups of second-year students at the Faculty of Civil Engineering. These assignments typically involved short videos accompanied by comprehension questions or quizzes designed to familiarise students with the week's topic and its relevant construction terminology.

Students were provided with the material through e-learning portal - Moodle platform (Learning Management System - LMS) and were required both to watch a short explanatory video and to complete an assignment by answering related questions and familiarise themselves with key technical expressions that would later be discussed on the seminar. The videos were sourced from YouTube, providing access to a wide range of authentic materials, including real-life examples and native speakers' pronunciation. This exposure helped students develop their listening skills and improve their pronunciation. However, implementing the flipped classroom approach demands greater involvement from both teachers and students, which we initially considered a potential challenge.

From the teacher's perspective, preparation involves a several key steps. First, it is crucial to find or create suitable teaching materials. Our primary goal was to select short videos, ideally no longer than 2-3 minutes, that students could easily access. To maintain motivation and encourage independent study, videos were not replayed during class. The next step involved designing additional materials to reinforce and deepen students' understanding. Alongside our own resources, we developed tailored case studies and incorporated various interactive applications. Additionally, we selected relevant exercises from the *Professional English for Civil Engineers* textbook to address specific language challenges students encountered.

To reinforce and review the new expressions introduced through short videos at home, additional tasks were designed to complement textbook exercises. Our objective is to present tasks in a hierarchical order, progressing from simpler to more complex activities. These include:

- Recognition and identification tasks, such as applications or cloze tests, to familiarize students with new expressions.
- Production-oriented tasks, encouraging students to express opinions, propose solutions, or make suggestions in alignment with Bloom's taxonomy (Anderson & Krathwohl, 2001).
- Collaborative and interactive activities, fostering engagement and peer learning.

The primary focus of seminar sessions is practice rather than vocabulary explanation which can be effectively reinforced through interactive applications.

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The first step in achieving long-term acquisition of new expressions is ensuring sufficient practice. Initially, students engage in structured exercises such as completing sentences, matching expressions, selecting the correct options, or answering true/false questions. As they progress, more challenging tasks promote active language use, vocabulary expansion, and better retention.

Tasks focused on self-production - such as guided or independent activities, tandem or group work, case studies, discussions, or micro-presentations - enable students to apply their acquired knowledge in new contexts. This ability to transfer theoretical understanding into practical application is one of the key advantages of the flipped classroom approach.

The primary goal of the approach is to allocate more class time to the productive phase of learning. By practicing English actively during seminars, students not only achieve the required level of proficiency but also gain exposure to real-world challenges in the construction industry. Additionally, they develop essential skills such as analytical thinking, teamwork, and decision-making - competencies crucial for problem-solving in their future careers. Ultimately, systematic skill development enhances their professional growth and increases their employability after graduation. However, a crucial aspect of student preparation involves completing homework - whether watching a video, taking a quiz, or engaging with other assigned materials. Students who come to class underprepared often struggle to participate effectively in activities, creating an awkward situation that naturally encourages them to improve their home preparation in the future.

2.2 Recommended key steps for implementing the flipped classroom

Drawing from our experience in integrating the flipped classroom approach into the class time seminars of professional English for Civil Engineering, we propose four key steps that should be followed when implementing this approach in a specific course:

- Define clear objectives - Establish the knowledge and skills students should acquire before attending in-person classes.
- Develop instructional materials in advance - Prepare short videos with questions, e-material, professional articles, and presentations for students to study independently at home at their own pace.
- Emphasise interactive learning during face-to-face sessions - Utilise class time for collaborative activities such as discussions, student micro-presentations, group activities, solving case studies, etc., allowing for deeper engagement with the material.

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- Provide continuous feedback - Offer regular feedback on assignments and project work to help students assess their progress, identify errors, and improve their understanding.

The success of the flipped classroom approach largely depends on the teacher, whose guidance, teaching strategies, and motivational techniques can significantly influence student engagement and learning outcomes. When used effectively, this approach can produce equal or better academic results than traditional teaching.

3 The survey on the flipped classroom among students

The survey was conducted in the form of a questionnaire at the Faculty of Civil Engineering of TUKE after the summer semester of 2023 involving second-year students, from different fields of study at the Faculty of Civil Engineering. They completed the winter semester of the course in the traditional form of teaching and following the summer semester using the flipped classroom approach. The main aim of the survey was to assess student satisfaction with the flipped classroom approach in English for Civil Engineering seminars. The survey was conducted among 40 students to evaluate their perceptions, effectiveness, engagement, and challenges related to this teaching approach.

In the questionnaire, which consisted of multiple-choice and scale-based questions covering key aspects of the flipped classroom approach, students were asked about their overall satisfaction, effectiveness of pre-class materials, in-class engagement, skill development, and challenges faced.

In the question about students' general perception and satisfaction with the flipped classroom approach at the seminars, students' answers were generally positive. 65% of students expressed satisfaction or high satisfaction. However, 20% remained neutral, while 15% were dissatisfied. When comparing effectiveness to traditional teaching methods, 50% of students found the flipped classroom more effective, while 30% disagreed, and 20% were uncertain. This indicates that a significant portion of students recognise the benefits of this approach, although some remain unconvinced.

Pre-class materials and preparation play a crucial role in the flipped classroom approach. A notable 75% of students found these resources helpful or very helpful in understanding the topic content. Among the various types of learning materials, videos were the most preferred 40%, followed by readings 20%, interactive applications 15%, quizzes 15%, and practical tasks 10%. These findings highlight the importance of diverse and engaging resources in preparing students effectively.

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The interactive nature of in-class activities is a cornerstone of the flipped classroom approach. In the survey, 75% of students agreed that discussions, problem-solving tasks, and micro-presentations helped reinforce their learning. Additionally, 55% of students reported to be more engaged during flipped classroom seminars compared to traditional lectures. However, 30% felt the same level of engagement, while 15% reported lower engagement levels. This suggests that while the majority benefits from the interactive nature of the flipped classroom, some students may require additional strategies to enhance their engagement.

The flipped classroom approach has also been linked to skill development, particularly in English language proficiency. In this study, 60% of students believed that their English skills improved, particularly technical terminology, speaking, and writing. These findings suggest that the approach can be particularly beneficial in language acquisition and communication-based courses. Despite its benefits, the flipped classroom approach comes with challenges. Students identified several obstacles or drawbacks, including the following:

- Time Management: 30% of students struggled with allocating enough time for pre-class preparation.
- Understanding Materials: 25% found it difficult to grasp pre-class content.
- Motivation Issues: 20% reported difficulty staying motivated.
- Technical Problems: 15% experienced issues accessing or using digital resources.
- Preference for Traditional Lectures: 10% preferred conventional teaching methods.

These challenges highlight the need for additional support mechanisms, such as guided preparation strategies, technical assistance, and motivation-enhancing techniques to ensure the success of the flipped classroom approach.

Conclusion

The flipped classroom approach presents a promising alternative to traditional teaching methods, offering increased engagement, improved learning outcomes, and enhanced skill development. However, to maximise its effectiveness, a teacher must address student concerns related to time management, comprehension of pre-class materials, and technological accessibility. By refining the model and providing adequate support, the flipped classroom can become an even more powerful tool in modern education.

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