What Happens when we Flip the Class?

Peter Pšenák[1], *Ildikó Pšenáková*[2], *Tibor Szabó*[3]

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Abstract

What happens when we flip the classroom? Nothing. The students are still learning, and the teacher is still guiding them. But is the answer really that simple? Essentially, yes. However, the flipped classroom methodology comes with its own nuances, which can influence the overall educational outcomes. To ensure that students achieve outcomes equal to or better than those in traditional classrooms, some adjustments are necessary. In this article, we share our insights and experiences with the flipped classroom approach, offering perspectives from both teachers and students across various subjects.

Keywords: Education, Flipped Classroom, Teaching materials

1 Introduction

What occurs when we implement the flipped classroom model? Basically nothing. Essentially, the process remains unchanged: students continue to learn, and the teacher continues to guide them. Nevertheless, adjustments are likely necessary to ensure that students attain educational outcomes comparable to or exceeding those achieved through traditional teaching methods. So, the answer to the question posed is certainly not that simple.

The concept of flipped classroom is not new in pedagogical practice. Flipped classroom is a teaching method in which students watch educational videos or learning materials before the actual class takes place and then focus on discussions, problem-solving, and practical exercises under the guidance of a teacher in class.

Flipped classroom can be a very effective teaching method when used and implemented correctly. This method can help students with different learning styles to learn more easily

[1] Univerzita Komenského v Bratislave, Fakulta managementu, Odbojárov 10, P. O. BOX 95, 820 05 Bratislava 25, SR.
[2] Trnavská univerzita v Trnave, Pedagogická fakulta, Priemyselná 4, P. O. BOX 9, 918 43 Trnava, SR.
[3] Univerzita Konštantína Filozofa v Nitre, Fakulta stredoeurópskych štúdií, Drážovská 4, 949 01 Nitra, SR.
E-Mail: psenak9@uniba.sk

and quickly because videos and materials can be adapted to the individual needs and pace of the students. Additionally, using the classroom for discussions and teacher – led practical exercises can help students understand and apply the concepts and information they have learned from the materials.

2 Flipped Classroom

The flipped classroom method is a modern teaching method that brings change in the traditional teaching pattern. In traditional teaching, students learn new material in the classroom, listen to lectures from the teacher, and then do assignments, homework, and master the learning material at home. In the flipped classroom this situation is turned inside out. (Baig & Yadegaridehkordi, 2023; Bishop & Verleger, 2013) Students study new materials at home in advance, before class – they watch lectures in the form of online videos or read an article on the topic that they will later learn in class. The lesson then does not cover new topics, but emphasizes practical activities, discussions and problem solving. Students, together with their teacher, review and discuss knowledge and solve examples and problems within groups. (Tang et al., 2023)

This method allows students to have more control over their learning and adapt the pace of learning to their needs. Research has shown that the use of the flipped classroom method has a positive impact on students' studies, as it increases their interest in the subject, improves their motivation and self-confidence, helps develop their critical thinking and thus ultimately leads to an overall improvement in academic results. (Pšenáková at all., 2024)

A flipped classroom can reduce the amount of time spent on lectures, provide hands-on experience, and help students better prepare and motivate themselves for their studies. (Jiang et al., 2022)

Currently, the flipped classroom method is becoming increasingly popular, and several studies indicate its successful use in various areas of education, including higher education.

2.1 Benefits of flipped classroom in higher education

The flipped classroom brings several advantages to higher education that can improve the quality of teaching and learning efficiency. Based on various publications and our own experiences, we will list the following (Galindo-Dominguez, 2021; Mandasari & Wahyudin, 2021; Sointu et al., 2023):

More active involvement of students in work during face-to-face classes. Students come to class with prior knowledge of the topic, allowing them to immediately engage in discussions, exercises, or case studies. This approach leads to greater engagement and active learning rather than passive reception of information. Higher cognitive levels of thinking, such as analysis, synthesis, and application, are activated as students use basic knowledge to solve more complex problems in the classroom.

Flexibility, individual pace of learning. Students can study materials at their own pace, which supports effective time management. Materials such as videos and presentations can be viewed at their own pace and at a time that suits them best. They can return to materials whenever they need to, which is a great advantage for students with different learning styles and different speeds of knowledge acquisition. This approach fosters the development of independent and self-directed learning, which is especially crucial in higher education, where greater student autonomy is expected.

More efficient use of time in classroom. With students having studied the background information in advance, class time can focus on in-depth activities such as discussions, practical exercises, problem solving, or project work. This increases teaching effectiveness and promotes a deeper understanding of the subject content. Teachers can provide direct and specific feedback during class because they can focus on specific questions and problems that students have.

Developing critical thinking and problem solving. Active learning enables the development of critical thinking skills because students talk about the material they have studied, are encouraged to research, analyse, and discuss issues rather than simply memorising facts. They work on practical tasks that often require creative and analytical thinking. Students learn to solve problems and apply theoretical knowledge to real-world situations, which improves their readiness for practical challenges in the profession.

Improving the relationship between teacher and students. Face-to-face classes are focused on interactive activities and discussions, allowing the teacher to work more closely with the students. This approach reduces barriers between students and the teacher, strengthens the relationship and trust between them, promotes openness and improves mutual communication. Teachers can better understand the individual needs of students, their weaknesses and strengths, which allows them to tailor their approach to students according to their specific needs.

More space for immediate feedback. During various classroom activities, teachers can immediately identify areas that students are struggling with and provide immediate feedback. This gives students the opportunity to understand material that they may not have mastered through self-study. This type of direct interaction contributes to better knowledge acquisition and increases students' confidence in learning.

Increasing responsibility for one's own learning—supporting independence. By studying background information in advance, students take greater responsibility for their learning progress, as the flipped classroom encourages independent study prior to the lesson. Such an approach inspires students to recognise the importance of their own initiative and

engagement in the learning process. In this way, students become active co-creators of their own learning and develop the ability to independently plan and organise their tasks and time. Students are led to take responsibility for their own learning, thereby developing independence and self-management.

Preparation for the modern job market. The flipped classroom develops skills such as independent learning, critical thinking, teamwork, and communication that are essential in the modern job market. This way of learning teaches students how to prepare for their tasks effectively and responsibly. This approach supports students in acquiring skills important for lifelong learning, which is becoming increasingly important in dynamic professions.

2.2 Disadvantages of the flipped classroom in higher education

Although the flipped classroom method is currently becoming increasingly popular and has many advantages, there are also certain disadvantages that can affect its success. Disadvantages for teachers include:

- *Higher demands on the time needed to prepare teaching materials*. Preparing quality learning materials (such as videos, online quizzes, or interactive exercises) is not only time-consuming, but also requires certain technical skills that not every teacher has. Teachers need to spend more time planning lessons that include in-class activities, which can be challenging with many students.
- *Fewer opportunities for direct control of the study process.* The teacher has limited control over how well and to what extent students have studied the materials before class. If students do not assimilate the information well, classroom activities may be less effective and efficient.

For students, the flipped classroom may be disadvantageous for the following reasons:

- *It places higher demands on self-discipline.* The success of a flipped classroom depends on whether students study the necessary materials before class. If they do not, problems arise with active learning in the classroom. Some students who have trouble planning their time or studying independently may fall behind others.
- *Access to technologies.* There are still students who come from socially disadvantaged families and have limited access to new technologies.
- *Tiredness and exhaustion.* Some students may find the flipped classroom challenging because they must study in their own time. This method can be stressful when used across multiple subjects. Students with demanding personal or work commitments may find it difficult to devote time to independent study outside of class.

Finally, we must also realise that not all subjects are suitable for using the flipped classroom method, and it is also not suitable for all learning styles, e.g. for students who prefer a traditional approach to learning with clear guidance from the teacher.

Although these disadvantages are real, they can be entirely or partially mitigated through appropriate teaching planning, balancing self-study with face-to-face instruction, employing suitable technologies, and supporting students in independent learning. The challenge for teachers is to find an effective solution that encourages the involvement of all students in the learning process and yields the desired outcomes.

2.3 Steps for implementing a flipped classroom method

Based on our experience introducing the flipped classroom method into teaching certain subjects, we have proposed four basic steps that, in our opinion, should be followed when implementing this method in a given subject.

1. *Set clear goals*: Determine what students should know before arriving for an in-person class.
2. *Prepare learning materials in advance:* Video lectures, e-books or articles, presentations that students should study at home.
3. *Focus on interaction in face-to-face classes*: After preparing at home, focus on activities in class such as discussions, presentations, or group projects.
4. *Provide feedback to students*: Provide regular feedback on assignments and project solutions so that students know whether they are doing things correctly, where they are making mistakes, and where they can improve.

The effectiveness of the flipped classroom model in teaching largely depends on the teacher, who, through their activities and approach to students and their work, can properly motivate, guide, and lead students to achieve the same or better study results than in traditional teaching.

In practice, this method is successfully used at many universities and in various fields, such as engineering, medicine, and social sciences.

3 Analysis Results

Several studies have confirmed that the flipped classroom improves academic performance and engagement for both students and teachers. (Paňková, E., at al., 2017; Pšenáková at al., 2024)

As part of the project, we also conducted a smaller survey, some partial results of which we present here.

For data analysis, we used data from the responses of 61 respondents who participated in flipped classroom teaching. In total, we track over 20 variables in the survey, but in our analysis, we have only used 3 so far, namely:

1. *Student's preferred teaching method:* distance learning or face-to-face.
2. *Flipped classroom teaching quality assessment:* using a Likert scale.
3. *Overall quality of the course:* using a Likert scale.

We set the following hypotheses:

H1: Students preferring distance learning will evaluate flipped classroom teaching more positively than students preferring face-to-face teaching.

H2: There is a significant difference in the perception of the overall quality of teaching by students preferring the face-to-face form of study and students preferring the distance form of study.

Based on the answers to the question about the preferred teaching method, we found that most respondents prefer the distance learning form, which was chosen by 47 (77%) students, and only 14 (23%) prefer the face-to-face form.

The quality of teaching using the flipped classroom method was assessed by respondents using a Likert scale, and therefore it is appropriate to check the normality of the underlying distribution of variables using the Shapiro test (tab.1).

Shapiro-Wilk normality test		
Learning Preference	on-site	distant
W	0.75821,	0.48217,
p	0.001589	1.189e-11

Table 1: Normality test.

In both cases, it is confirmed that the result does not correspond to a normal distribution, which is what we expected. To verify hypothesis 1, we therefore used a one-sided Mann-Whitney U test, according to which the W statistic equals 443.5 and p-value = 0.005599.

The test result shows a significant difference in the evaluation of the flipped classroom method between students preferring the distance learning method (1.255319 – average value of the Likert scale answers) and students preferring the face-to-face method (2.142857).

Based on the answers given in Likert scale, we can also draw a conclusion from the average value of the responses, confirmed by the Mann Whitney test, that students who prefer the distance learning form of study evaluate teaching through the flipped classroom more positively than students who prefer face-to-face teaching. Hypothesis H1 was confirmed.

We follow a similar procedure to confirm our second hypothesis (tab. 2). Specifically, we first verify whether our expectations that the data are different from a normal distribution are confirmed.

Shapiro-Wilk normality test		
Learning Preference	on-site	distant
W	0.57641	0.53319
p-value	2.519e-05	5.225e-11

Table 2: Normality test.

The results confirm that this is not a normal distribution, and therefore we used the Mann Whitney U test, according to which W = 357.5, p-value = 0.5467.
The result did not confirm a significant difference in the perception of the overall quality of teaching between students preferring the face-to-face and students preferring the distance form of study. Students preferring the face-to-face form had an average assessment of the quality of the subject of 1.571429 and the group preferring the distance form of 1.361702. In this case, we rejected the hypothesis H2.

4 Conclusion

Based on the partial results of the survey, we were able to conclude that students who prefer distance learning perceive the flipped classroom method more positively than students who prefer face-to-face learning, which is completely understandable, since the flipped classroom method contains elements of distance learning. However, we are satisfied with the result that there is no significant difference in the assessment of the overall quality of teaching, which also confirms that the use of the flipped classroom method in education does not reduce its quality compared to traditional teaching.
The flipped classroom method, while it has its drawbacks, offers many advantages that can improve not only students' academic performance but also their skills needed for their future careers. Nevertheless, it is important to consider the specific conditions and capabilities of the university, department, subjects, and necessary technologies to make its implementation as effective as possible.

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