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THE FLIPPED CLASSROOM AS AN INSTRUCTIONAL MODEL

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ABSTRACT

The current national and international context has determined teachers to evaluate teaching methods and utilise active student involvement strategies in the classroom during learning processes. This article presents the Flipped Classroom instructional model, analyses its application, and proposes stages to follow in order to create a successful flipped classroom. Even though the flipped classroom instructional model is not utilised in Romania, the authors aim to attract attention to it, presenting its advantages and disadvantages. A change is due in the current teaching paradigm and it is high time to promote an innovative learning framework using the flipped classroom instructional model.

Keywords: *COVID-19 pandemic, e-learning, in-depth learning, Bloom's taxonomy, assessment*

INTRODUCTION

The period of school closings, determined by the new coronavirus pandemic, has forced education systems to find solutions so student instruction could continue in the form of distance learning. Transitioning the activities from a traditional learning environment to videoconferences, digital platforms or groups on social media has imposed the e-learning instructional type (Vereș et al., 2020b). One of the e-learning forms is blended learning, which supports the development of the flipped classroom model (Ardid et al., 2015). To "flip a classroom" means to inverse its traditional structure, thus

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the learning conducted by the teacher is centred on students who receive a personalised education adapted to their individual needs (Bergmann & Sams, 2012).

The practice which is situated at the base of this model is the utilisation of videos created by teachers and having interactive lessons, so students have access to class materials from home, before classes, and the next day in class they can apply what they have studied. This aspect allows the teacher to enable student learning and offers individual support because class time is freed up by the elimination of the lecture. The teacher's role in the class is to help, guide students, not to offer information (Bergmann & Sams, 2012). Furthermore, the application of this instructional model allows students to study in a way that strongly integrates technology, that is attractive and relevant to their lifestyle (Bergmann & Sams, 2012).

Classroom activities concentrate on developing some superior level thinking abilities (Brame, 2013; Bergmann & Sams, 2012). When including these elements, the "class becomes the place to work through problems, advance concepts, and engage in collaborative learning" (Tucker, 2012, p. 82). Teachers agree that the clips that students watch on their own are not responsible for the success of this learning model, but how the information received through them is integrated into face-to-face learning in the classroom (Bergmann & Sams, 2012; Vereș & Magdaș, 2020).

In this study, we aim to analyse, based on literature and own studies and observations, the flipped classroom as an instructional model. To achieve this objective, we search for answers to the following questions:

1. What is the flipped classroom?

2. What is the history of the flipped classroom?

3. What are the characteristics of the flipped classroom instructional model?

5. What are the advantages and disadvantages of the application of the flipped classroom model?

THE FLIPPED CLASSROOM CONCEPT

In the literature, there are multiple definitions of the concept of the flipped classroom and several methodological approaches. It is considered an event (Lage et. al., 2000), a pedagogical approach (Milman, 2012; Toto & Nguyen, 2009), a didactic approach (Alten et al. 2020), a method (Bergmann & Sams, 2012), an instructional model (Dulamă & Ilovan, 2020; Hamdan et al., 2013; Mull, 2012), an educational technique (Bishop & Verleger, 2013), and a learning strategy (Crișan, 2020).

Lage et al. defined the flipped classroom as one in which "events that have traditionally taken place inside the classroom now take place outside the classroom and vice versa" (Lage et al., 2000, p. 32). Bergmann and Sams, who developed and implemented the method in the classroom since

2007, define it as follows "In the traditional flipped model (It feels strange to say that there is a 'traditional' flipped model!), all students watch the same video on the same night. Then, in class, all students complete the same activity or lab" (Bergmann & Sams, 2012, p. 9), therefore "basically the concept of a flipped class is this: that which is traditionally done in class is now done at home, and that which is traditionally done as homework is now completed in class" (Bergmann & Sams, 2012, p. 13).

Toto and Nguyen (2009) have argued that the flipped classroom is an approach that increases the percentage of active learning activities and offers students the possibility to use their knowledge in the classroom under the teacher's guidance. Flipped learning is a pedagogical approach in which classroom work and homework are literally inversed, the content of the lecture being delivered home via an 8-10-minute-long video and classroom work is dedicated to the application of the content by the students, facilitated by the teacher. This approach aims to create a collaborative learning environment, where teachers act as guides while students solve problems helped by their colleagues (Tucker, 2012). According to Milman (2012), the flipped classroom is an approach that aims to increase lesson efficiency through knowledge transfer towards students through videos and vodcasts, as well as through discussions, group work and applications done during the class. The Flipped Learning Network (FLN), founded in 2012 by Bergmann and Sams, propose the following definition for this concept: "Flipped Learning is a pedagogical approach in which direct instruction moves from the group learning space to the individual learning space, and the resulting group space is transformed into a dynamic, interactive learning environment where the educator guides students as they apply concepts and engage creatively in the subject matter" (Flipped Learning Network - FLN, 2014). Practitioners underline that in this new approach various learning methods can be utilised (Flipped Learning Network - FLN, 2014). The flipped classroom is a didactic approach meant to allow students to come to class prepared and apply the learning material actively during class (Alten et al., 2020).

Mull (2012) defines the flipped classroom as an instructional model in which students are offered the possibility to prepare for the new lesson by watching videos, listening to podcasts, and reading articles. Hamdan et al. (2013, p. 4) point out that "in the Flipped Learning model, teachers shift direct learning out of the large group learning space and move it into the individual learning space, with the help of one of several technologies." Bishop & Verleger define "the flipped classroom as an educational technique that consists of two parts: interactive group learning activities inside the classroom, and direct computer-based individual instruction outside the classroom" (Bishop & Verleger, 2013, p. 23).

Crișan & Albulescu (2017) define the flipped classroom as a "strategy consisting in a swift of direct teaching from the common learning space, the classroom, to an individual learning space, i.e. the home" (Crișan & Albulescu, 2017, p. 132). The utilisation of the strategy was determined by the necessity of dividing the content meant for learning into more items and the necessity of reorganising time to reduce differences in the learning

rhythms of the participants of the instructional process (Crișan & Albulescu, 2017, p. 132).

Mohan (2018) points out that the flipped classroom, flipped teaching and flipped learning are terms used to describe a pedagogy in which lectures have been eliminated from the classroom, from their traditional space and supported by way of narration in PowerPoint recordings in order to be visualised by students before courses, clearing out time in the classroom for cognitive tasks that aim for a superior thinking level.

Based on literature and own observations, we consider that the flipped classroom is a blended learning type of instructional model, in which students acquire new knowledge after watching a video or studying .pdf documents, materials posted on websites, PowerPoint presentations, animation films and undertake at home understanding- and knowledge-based activities, and during classes, they undertake activities through which they are actively involved in the deepening of knowledge under the teacher's guidance.

INVERSION OF ACTIVITIES ACROSS TIME

The flipped classroom concept has developed since the 1970s. This instructional model was used without using the name of the concept at the beginning of the 1970s when teachers would ask students to read the new lesson at home, and, during class, they would engage in discussions about the new content (Dulamă & Ilovan, 2020). During the early 1990s, Harvard physics professor, Eric Mazur, worried about the test results of his students, offered his course notes to students before the courses and implemented a class approach that he coined "peer instruction" (Mazur, 1997). He gave students the responsibility of studying the lecture content outside of the classroom before courses, which offered time for interaction among students as they were applying the theory to solve real-world problems, instructing each other in this process.

At the same time with the launch of an online content managing system, in 1995, Baker placed online courses and tests to students (Strayer, 2007). Baker presented the concept at the conferences that took place in 1996, 1998 and 2000 and coined the method "The Classroom Flip" in the context of a pedagogy that he implemented at university (Baker, 2000). He mentioned that, in distance learning, educational videos were used to present content to students. Time spent in the classroom was used for applications of the content and student testing (Baker, 2000).

At the same time, Lage et al. (2000) implemented a similar procedure. They referred to the concept as "The Inversed Classroom" and, similarly, sent the lectures to be viewed by students at home. In class, time was used to explain ideas and difficult concepts, working together in small groups. In 2007, Bergmann and Sams developed the method of online video study to "inverse education". They were looking for a technique or approach to offer lectures to students who missed the lessons due to any reason (Bergmann,

2011). In March 2011, Khan used the term "flipping the classroom" in his TED Audio Collective speech – podcast collection (Khan, 2011).

THE FLIPPED CLASSROOM INSTRUCTIONAL MODEL

The flipped classroom instructional model has been used at all study levels. Ozdamli and Asiksoy (2016, p. 102) have applied this model at the university level, for 1.5-hour courses. Table 1 shows the classroom activity periods in the traditional approach and the activity periods in the flipped classroom approach.

Table 1. Activities in the *flipped classroom* and the time allocated, compared with the traditional classroom

Traditional classroom	Time	Flipped classroom	Time
Warm up	5 minutes	Warm up	5 minutes
Homework prior to the new lesson	20 minutes	Answers based on the video material Questions	10 minutes
The teaching of a new subject	30-45 min	-	-
Exercises, labs, applications	20-35 min	Exercises, labs, applications	75 minutes

Source: Ozdamli & Asiksoy, 2016, p. 102

At the pre-university level, during the COVID-19 pandemic, Vereș and Magdaș (2020) utilised this instructional model (flipped classroom) based on the animation film, in which they went through the following stages (Table 2):

Learning activity 1. Students watched the animation film sent by the teacher on the classroom group, with a viewing deadline.

Knowledge evaluation. The teacher applied a test designed in Google Forms to verify the acquired knowledge based on film watching.

Learning activity 2. Students watched again the animation film supplemented by the study guide elaborated in EdPuzzle and posted on the classroom group. They answered the questions in the guide, then sent the answers to their teacher.

Learning activity 3. In a Zoom meeting, students discussed with the teacher, asked questions, received additional information and explanations from their teacher, based on a PowerPoint presentation. Students played in pairs the game proposed for fixation and evaluation of knowledge.

Reevaluation. Students solved a test in Google Forms. The teacher evaluated their knowledge gained after the discussion in class about the given topic.

Table 2. Activities in the flipped classroom (Vereș & Magdaș, 2020)

Stages		**Teacher activity**	**Student activity**
Activities undertook before the lesson	I	Elaborating the study guide	
	II	Distributing the animation film to students	
	III		Watching the animation film Answering the questions in the study guide Sending answers to their teacher
The activity in the classroom	IV	Initiating a discussion to offer information and additional explanations	Undertaking individual activities/in pairs, project activities, evaluations

In the activity done by Vereș, Dulamă and Magdaș (2020), the following stages have been undertaken:

1) *Watching and watching the film again*. Students watched and watched again at home the animation film sent by their teacher to the classroom group. They had been notified that the film could be watched as many times as needed to understand the content.

2) *Discussion with the teacher*. During the Zoom meeting, the teacher discussed with students the content of the animation film, offered support to students who had difficulties understanding the content, offered additional explanations, and corrected wrong conceptions.

3) *Game-based evaluation*. The game designed using the Wordwall platform was sent through the Zoom chat. After finishing the game, students received the score, information about the correct answers as well as the wrong ones.

Based on the literature (Bergmann & Sams, 2012), as well as on our prior activities (Vereș, Dulamă & Magdaș, 2020; Vereș & Magdaș, 2020), we systematised the undertaken didactic activities as part of a flipped classroom instructional model. The instructional stages are listed below.

Stage I. Preparation activities

a) ***teacher activity***. During this stage, the teacher prepares and sends the students different materials on video hosting websites or posts on educational platforms: .pdf documents, videos, links to websites (Ozdamli & Asiksoy, 2016; Turker, 2012), PowerPoint presentations (Bergmann & Sams, 2012), animation films and the study guide (Vereș & Magdaș, 2020).

b) ***student activities at home.*** Students read/watch the materials received from their teacher, at home, before the classroom activity. During the viewing session, students can "interrupt" and "rewind" the video offered by their teacher (Bergmann & Sams, 2012). Students are encouraged to use the pause button to note down the important ideas of the lesson

(Bergmann & Sams, 2012). Students read/watch the received materials in the place and during the time of their choosing, all at once or in chunks, once or multiple times, according to their need (Mohan, 2018; Vereș, Dulamă & Magdaș, 2020; Vereș & Magdaș, 2020). Students can take notes using the Cornell method in which they summarise the lesson and note the questions that they want answers to. The students that wrongly adopted this model of note-taking attend the lesson with questions that help the teachers correct their wrong conceptions (Bergmann & Sams, 2012). The students answer the questions from the study guide and send their teacher these answers (Vereș et al., 2020a). They are allowed to share ideas with their colleagues (Bergmann & Sams, 2012).

Stage II. *Classroom activity, during the lesson*

a) ***frontal activity*.** The lesson begins with short questions and answers. If there are points during the lecture that have not been understood, these are explained comprehensively. An evaluation is applied (Bergmann & Sams, 2012; Vereș, Dulamă & Magdaș, 2020; Vereș & Magdaș, 2020).

b) ***student group activity.*** Students participate in research-based lab activities. The teacher answers questions addressed by the students, offers individual support to those who face difficulties, while the others collaborate and work. Therefore, students can learn by discussing with their colleagues or teacher (Bergmann & Sams, 2012).

c) ***individual activity.*** Students participate in problem-solving activities or tests, and in some lab activities. The group activities can alternate with the individual ones.

Stage III. *Individual and group activities after the lesson*

During this stage, students undertake individual activities consisting of project elaborations, portfolios, they perform self-evaluation and inter-evaluation of the activity products (Bergmann & Sams, 2012). They can work in groups as well.

Analysing the activities undertaken during the application of this flipped classroom model, from Bloom's revised taxonomy perspective (Anderson, et al., 2001), in Figure 1, one can notice that students undertake outside of the classroom activities that activate their inferior thinking levels (remembering and understanding), and during class, the activities activate the superior thinking levels (application, analysis, evaluation, and creation). In the classroom, students receive feedback from colleagues and guidance from the instructor (Brame, 2013).

In this instructional model, the entire activity is centred on the student, and the teacher has the role of a guide. The solving tasks activity and the results of students in the labs and tests are marked the same as in the traditional model of instruction.

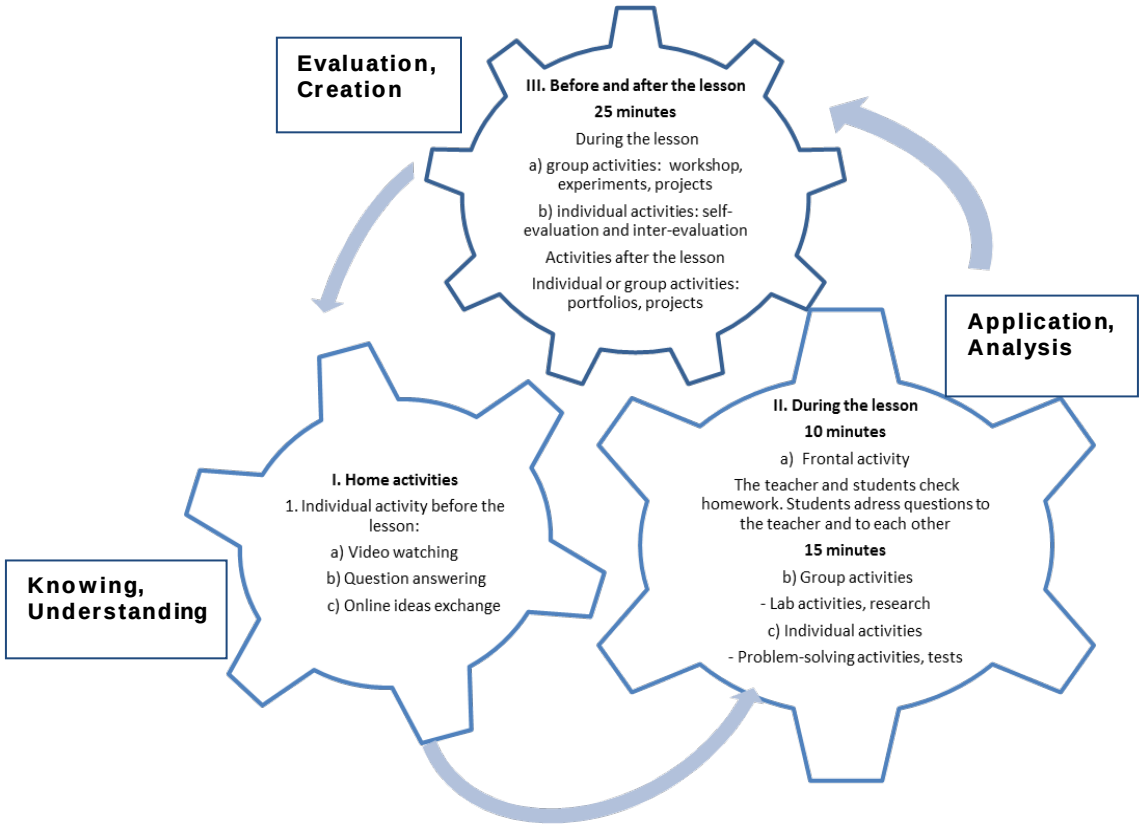

Fig. 1. The Flipped Classroom Model
from the perspective of Bloom's Taxonomy

ADVANTAGES AND DISADVANTAGES OF THE FLIPPED CLASSROOM MODEL

The application of the flipped classroom model during a lesson has multiple advantages but also some weaknesses. The most important advantage is that it allows for better utilisation of time during the lesson (Colomo-Magaña et al., 2020; Goodwin & Miller, 2013) because students have already studied at home the content meant for learning, as a consequence of sharing videos to be studied outside of the classroom hours (Bishop & Verleger, 2013). Another advantage is that students become responsible for their learning (Bergmann & Sams, 2012; Fernández-Martín, 2020). Students have some benefits: they do not fall behind if they miss classes, can obtain information online (Bergmann & Sams, 2012), choose when and where they study (Bergmann & Sams, 2012; Flipped Learning Network-FLN, 2014), participate in discussions during classes (Overmyer, 2012), interact with the teacher and the colleagues and receive and offer feedback (Dulamă & Ilovan, 2020; Tucker, 2012), work in teams (Formica, Easley & Spraker,

2010), develop their learning capacities through cooperation (Milman, 2012), and develop their abilities for autonomous and self-regulated learning (Fernández-Martín, 2020).

In some studies, a problem is observed, that not all students have access to devices connected to the internet – Personal Computer, laptop, smartphone (Hamdan et al., 2013; Kordyban & Kinash, 2013) – or that some students do not read or do not solve the tasks at home (Springen, 2013). In the case of teachers, in the literature, some problematic aspects are mentioned: high-quality video preparation requires a large amount of time and is demanded from the teacher (Herreid & Schiller, 2013; Ozdamli & Asiksoy, 2016).

CONCLUSIONS

At the end of the study, we underline that the flipped classroom is an instructional model that integrates synchronous and asynchronous activities in a flipped learning environment (cf. Dulamă & Ilovan, 2020; Ilovan, 2020). In a flipped classroom, students study the subject at home, independently, and in the classroom, they correct their wrong conceptions, solve problems, apply those concepts to case studies, in projects or doing practical activities. Teachers act as facilitators or trainers to help students who face difficulty in applying the concepts. Both teachers and students need online research competences (Rus et al., 2019) and digital ones (Buzilă et al., 2017). This instructional model enables students to develop their digital competences, learn at their own pace, and use collaborative learning supported by digital technology. The flipped classroom instructional model is one that can be successfully used at both the university and pre-university level. This model should be applied as a norm to those studying Natural Sciences, especially, so that young children would be interested, motivated, and instructed in using animated films in learning (Dulamă et al., 2020).

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