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# STUDENT LEARNING ARRANGEMENT BASED ON THE 'FLIPPED CLASSROOM' MODEL'

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## Abstract

The article is devoted to the topical issues of remote student-teacher interaction in the Moodle environment. The article dwells on the opportunity of using the 'Flipped Class' model in higher education as one of the models of blended learning as it seems to be the most reasonable in today's epidemiological situation. During the study, the authors review psychological, educational and methodological literature on the problem of including the flipped classroom technology in teaching Teacher Training students, cover the use of modern information and communication technologies in education, report on the regulatory documentation related to the learning process in higher education; best practices of remote interaction between students and lecturers in a teacher-training university. As a result of the study, the authors describe the stages of planning a lesson typical of the 'Flipped Class' model, touch upon the trends of the course content transformation using modern information and communication technologies, give examples of digital tools that are supposed to be introduced into the interactive forms for teaching undergraduate students. The results obtained during the educational experiment and presented in the paper, point to the effectiveness of the 'Flipped Class' model in learning for Teacher Training undergraduate students.

*Keywords:* Blended learning, flipped class, LMS, Moodle

## 1. Introduction

Present-day higher education is changing greatly. It deals with the arrangement of a new educational system based on the development of a digital learning environment.

A digital learning environment is defined as a set of conditions for implementing curricula

using e-learning, distance learning technologies, taking into account the functioning of electronic information and education environment, which includes electronic information and educational resources and services, digital educational content, information and telecommunication technologies, technological tools and which let students master educational programs entirely regardless of their place of residence. (O provedenii eksperimenta..., 2020, p. 3)

It is important to note that the digital learning environment changes not only the technical component of learning but also the educational paradigm as a whole, which implies a transition to providing conditions for self-determination and self-actualization of an individual. The purpose of the new educational paradigm is not to learn a body of knowledge, but to develop a personality who thinks critically is creative, has information and digital competence, is capable of making independent decisions and chooses one's own development path. The student becomes a subject of pedagogical influence, i.e. he/she gets an opportunity to influence his/her own development. The lecturer is no longer seemed the only keeper of scientific knowledge, but rather becomes an expert and consultant (facilitator, tutor). The consequence of these processes is the new tools and ways of introducing new learning formats to be found and required into learning within a digital learning environment. One of the most effective learning models at present is the Blended Learning model, which combines traditional forms of classroom-based learning with e-learning elements and uses special information technologies, such as computer graphics, audio and video, interactive elements, etc.

The Flipped Classroom model as one of the components of blended learning is especially focused on in scientific and methodical publications of both foreign and national scientists. The point of the model is that students learn new material from home, and homework is done in the classroom. Classroom sessions become practical, differentiated and personalized.

This model was first proposed by Bergmann and Sams (2012). The study The Global State of Digital Learning in 2018-2019 (Trach, 2019) found out that the most commonly used approaches to learning are differential training (73.5%), blended learning (54.8%) and personalized learning (47.8%). Despite the fact that Flipped Learning is used only by 28.5% of the educators surveyed, learning technology in this model has proven to be promising, requested and attracting the attention of the teaching community worldwide.

There is the vast experience of using the Flipped Classroom model in different disciplines: humanities (Bergmann et al., 2015; Hung, 2015), science (Love et al., 2014; Mohanty & Parida, 2016), social (Martinez-Jimenez & Ruiz-Jimenez, 2020), engineering (Lavrushina et al., 2020), pharmacology and medicine (McLaughlin & Rhoney, 2015; Wells-Beede, 2020), etc. Most research works confirm the effectiveness of the Flipped Classroom model compared to the traditional teaching methodology.

Biggs and Tang (2011) turn the spotlight on the fact that a student learns through active student behaviour: students learn what they do rather than what the teacher does. A high level of student involvement in Flipped Classroom technology is also pointed out by Strelan et al. (2020).

For example, Baepler et al. (2014) note that the achievement of learning outcomes in this technology is much faster than in a traditional classroom while improving students' perception of the learning environment.

Muldrow (2020) records the clear benefits of the model: students can view and learn the material at their own pace and according to their needs, and teachers can structure classroom time to optimize individual attitudes toward students.

The important role of Flipped Classroom technology has been noted by Hoshang et al. (2021) because many students have to learn online in the Covid-19 situation.

Gilboy et al. (2015) emphasize that research point out the necessity of supporting students when they change traditional classroom style to FC. To make it easier, a communication strategy is needed to help students embrace this learning model.

Graney (2013) describes the technology of giving classes in the Flipped Classroom model in detail as well the features of teacher preparation for the upcoming class, his/her actions in different situations in the class, ways of controlling students.

The main disadvantage of Flipped Learning is that it relies mostly on the information and communication technology used and the students' access to it at home. However, as noted in most scientific and methodical literature, individualization, personalization, digitalization are the main trends of education in the 21st century.

## 2. Problem Statement

The inclusion of free Moodle, a specialized learning management system in higher education institutions, requires new effective technologies to transform the student learning system. Since the capabilities of Moodle platform allow distance interaction, the Flipped Class model as a part of Blended Learning can be a technology to provide the effectiveness of learning.

Thus, the subject of the study is the integration of the Flipped Class model in teaching the disciplines of the principal educational program.

## 3. Research Questions

When applying the Flipped Classroom model in learning, there are a series of questions that have to be answered before implementing the mentioned model. The first question concerns the structure of the lesson, the second question concerns how the content of theoretical material is transformed within the Flipped Classroom model. Another set of questions concerns the learning tools, namely which digital tools will enable successful usage of this model in learning, techniques, forms and methods. And the main research question is how effective this model is when applied in the classroom.

## 4.    Purpose of the Study

The purpose of the study is to determine the effectiveness of the *Flipped Class* model when included in learning, given that the content of theoretical material is transformed, different digital tools are used to arrange learning, and teaching methods and techniques are modified.

## 5.    Research Methods

The research involves the review of psycho-educational and methodical literature on the issue of involving the *Flipped Classroom* technology in teaching *Teacher Education* students, the issues of using modern information and communication technologies in education, the review of normative documentation related to learning in higher education; best practices of remote interaction between students and teachers in a teacher-training university.

The study was carried out in the academic year 2020-2021 based on *Omsk State Pedagogical University*. Sixty-eight 44.03.01 Teaching Education students of *Omsk State Pedagogical University* took part in the study. During the pedagogical experiment, the effectiveness of *Flipped Classroom* technology included in teaching bachelors is investigated, and the level of bachelor students' preparation to use *Flipped Classroom* technology while studying major disciplines is found put. The analysis of the research results is conducted using mathematical statistics methods. In addition, students' attitudes towards *Blended Learning* technologies are discovered in a survey.

## 6.    Findings

The pedagogical experiment took place in the State Educational Institution of Higher Professional Education 'Omsk State Pedagogical University' in the academic year 2020-2021 and consisted of three stages: summative and formative and controlled assessment.

The summative stage of the pedagogical experiment involved 68 undergraduate students. They were questioned to learn their attitude towards the use of Flipped Classroom technology in the course of studying the discipline *Information and Communication Technologies and Media Information Literacy*. It was found that all 68 respondents had the appropriate hardware to study the discipline using Flipped classroom technology. This was the result that was to be expected. On the one hand, students are supplied with a variety of modern means of communication, perfectly adapted for use in learning (smartphones, tablets, laptops and computers) with Internet access. On the other hand, the computer classes for students' individual work with access to the Internet and free Wi-Fi network in the university are available. Nevertheless, 43% of respondents had a negative attitude to the complete replacement to online mode, apparently affected by the negative practice of distance learning earlier. About a quarter of respondents (23%) supported traditional learning, finding them more effective. And only 3% were ready to move to a distance learning format completely. The next group of questions concerned the Blended Learning model. As a result, 90% of respondents did not know about the special character of this method and 10% found it difficult to answer.

At the formative stage of the pedagogical experiment, students were trained using Flipped Classroom technology. During the pedagogical experiment, students were divided into 2 groups. One of them used the technology of Flipped Classroom in the course of studying the discipline *Computer Science and Communication Technologies and Media Information Literacy*. This group was called *experimental*. The other group used traditional forms of learning, this group was the *control*. We assume that at the beginning of the experiment there were no statistically significant differences between the control and experimental groups.

Let us further consider the main stages of lesson planning which are common to the *Flipped Classroom* model:

1. Preparation stage.

The first stage is one of the most time-consuming when applying this model. The teacher needs to transform the theoretical content of the discipline using various digital tools, supplementing them with routing instructions, guiding and differentiating students in studying the theoretical material of the discipline. It is obvious that the presentations accompanying an off-line lecture should be transformed into an instructional video accompanied by interactive tasks, multilevel questions and other tools that increase the efficiency of students' individual work. At this stage, a group of teachers is working, as the developed educational material can be used in different majors of *Teaching education.*

2. Distance stage.

At this stage, students work remotely, studying tutorials developed by teachers using instructions to navigate a large number of materials. Student communication within the group is arranged to make this stage effective. During the communication, students solve not only technical matters that can happen while working on the learning materials but also discuss theoretical content and share additional aids and resources. At this stage, theoretical material is worked through remotely, allowing students to control the pace, time and place of learning on their own, thereby developing self-regulation and self-control.

3. Discussion holding stage.

This stage is arranged in a face-to-face format in the process of students' interaction with the teacher. At this stage the teacher presents thinking patterns, ways of initiating communication while discussing the teaching materials studied in the distance format to the students, answers the students' questions. The teacher encourages a discussion among the students on the issues covered in the teaching materials, as students may perceive and understand the same material differently.

4. Reflexive stage.

The reflexive stage is based on the SWOT analysis.

Other questions dealt with the transformation of learning material based on the use of different digital tools. These questions are directly related to all the steps in the structure of the Flipped Classroom model.

As mentioned above, learning in universities is implemented on Moodle platform. This LMS allows organizing training using Flipped Classroom technology. One of the elements of Moodle platform is an interactive *Lecture*, which allows dividing learning material into parts using audio and video format, supplementing it with questions not only to reproduce knowledge, but also to develop new knowledge (generalize, classify). Moreover, the transformation of theoretical material can be implemented using the

module *H5P* of Moodle platform, which allows creating a variety of interactive content and introducing it in the familiar educational environment for students. If the teacher needs to express his/her opinion on the learning content, a presentation with a video supplement can be created in the Canva service.

In the distance learning phase, learners are introduced to the proposed material at an individual pace through the Moodle platform. Such Moodle elements as Workbook, Forum, Workshop, Glossary, various games are used at the theoretical material transformation stage. Students design mental maps for the course sections to structure the theoretical material.

Tabs such as Chat, BigBlueButton can be used at the discussion promoting stage. Various surveys can be prepared both using the capabilities of the Moodle platform and outsourced services, for example, surveys in the Kahoot service or LearningApps.

The reflective stage while studying the course Information and Communication Technologies and Media Information Literacy is applied with by the course tab called Survey.

At the control stage of the pedagogical experiment, the authors made up a module test on the discipline Information and Communication Technologies and Media and Information Literacy among 68 bachelor students of the control and experimental groups. The results are presented in the table (Table 1).

**Table 1.** The results of the control phase of the pedagogical experiment

| Groups | Control (n= 36) | Experimental (n= 32) |
|---|---|---|
| Average module test scores | 62,5 | 81,5 |

To assess the effectiveness of applying Flipped Classroom technology in teaching students, a statistical t – Student's t-test was used when comparing two distributions of the same measurable attribute. This index stands for the degree of difference between the mean values in two samples (experimental and control groups). The empirical value of the t-test was 3.5, greater than the corresponding critical value (2.76) with a probability of reasonable error less than 0.1%. Consequently, we can speak about the meaningfulness of statistical difference between the mean values in the two samples, which acknowledges the hypothesis about the effectiveness of using the Flipped Classroom technology in teaching students.

## 7. Conclusion

Thus, the introduction of Flipped Classroom technology in teaching Teacher Training Education students not only transforms the approach to learning by changing the role of teacher and student but also constructing an effective learning environment using Moodle platform. In this environment, each student will be able to achieve results at a comfortable pace and degree of material mastering. When transforming the content of a discipline, the teacher does not chase a variety of services and effects, but chooses tools that allow differentiating students' activities, help organize students' work on learning theoretical material, allow creating an effective learning environment.

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