

Flipped learning – Pedagogic dilemmas

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Abstract

Scientific and practical examinations of pedagogues, educators and teachers are directed to finding the approach, methods and strategies which would motivate students and make them more active in the learning process. One of the ways to achieve this is flipped learning. This article aims to describe some characteristics of flipped learning, and also questions the pedagogic foundation, justification and limits of the usage possibilities and the potential challenges in the implementation of this model into the educational system. The research reports findings based on the trends in flipped learning. By replacing activities carried out in the classroom and at home, students are put into a new situation. A student independently realises the initial contact with the teaching content at home, whereas in the classroom, the activities (with the teacher and other students) that provide understanding and application of the learned are implemented.

Keywords: Education, flipped learning, students, teacher, pedagogic.

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1. Introduction

Accelerated technological development brings changes and progress in numerous fields of human activity. The field of education is no exception. Web 2.0 technology empowers designing, processing and publishing contents; in that, the accent is put on interaction and communication. Precisely, interaction and communication are concepts often used in describing the educational process, so it is not surprising that the technological possibilities of the Web 2.0 tool are swiftly *pedagogised*. The pedagogic implication of the technology's implementation is also visible in the use of the flipped learning approach in the classroom.

Visions of contemporary pedagogy, especially didactics (the art or science of teaching), are directed towards the student and his/her active role in the learning process. One of the ways to achieve uniting educational contents, pedagogic transformation, content adjustment and the use of advanced information technology is flipped learning. In order to realise successful integration of the technology's use in class, the balance should be achieved between three main areas: technology, pedagogy and content knowledge, on the theoretical and practical level (Koehler, Mishra & Cain, 2013).

Besides the concept of flipped learning, the relevant literature often uses the expressions inverted learning, flipped classroom or inverted classroom. Some authors consider them synonyms, while some find significant differences in the conceptual determination of the mentioned expressions. Apart from that, the definition of the concept of flipped learning used in this work utilises the following expressions: concept, model, strategy, technique, approach and design. Unevenness of conceptual determinations can potentially represent a problem in defining, understanding and using the flipped learning concept. In any case, one of the most frequently quoted definitions comes from the Flipped Learning Network (2014, p. 1) as follows:

'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'.

Relied-upon theories explaining the aspects of flipped learning are Bloom's taxonomy, constructivism and mastery learning (Eppard & Rochdi, 2017). The review of published works on the topic notes that flipped learning is used in all scientific areas and all school subjects. We will state only some, including mathematics, chemistry, biology, economics, sociology, information and communications technology, technical education, history, psychology, foreign languages and physical education.

Research on flipped learning wanting to better explain individual segments of its functioning are numerous and growing in number constantly. Some of the focuses of research on flipped learning are directed towards increasing interaction and active learning, cooperative learning's betterment, student achievement, critical thinking and successful communication competence.

2. Methods and materials

This research was a qualitative research. It discusses the trends in education in the 21st century. The research draws information from research in this field and it makes a comparison between traditional learning and flipped learning based on the findings from previous research. The research details how education has transformed over the years and questions that are yet to be answered in this regard.

3. Findings

Long before the 21st century, as far as the time of Ancient Greece, Socrates developed the *maieutic*, i.e., the method of active, student-centred approach. For centuries have numerous philosophers, scientists and teachers reflected upon the paradigm of quality teaching which places the student and his/her activities at the central position. The idea of pedagogic action in which the teacher leads the students, directs and encourages them in solving everyday life's problems is actualised once more by John Dewey. Is this paradigm reliving its renaissance through flipped learning, with the additional use of modern information technology?

The concept of flipped classroom can be traced to two chemistry professors, Bergman and Sams (2012), who posted video works watched by students at their homes (Arnold-Garza, 2014; Eppard & Rochdi, 2017). They discovered that the students who had been absent from class and skipped lessons, and those who had been acquiring the content more difficultly, benefitted from the video instruction, so they applied this approach in the work with their students in class (Yan & Howard, 2019). The students would prepare questions about the contents they did not understand. In such a way, the teaching paradigm has reversed completely. Contents were seen for the first time at home, and not in school, while the questions were raised by students, not teachers. In doing so, significantly more time could be devoted to problem-solving activities (Table 1).

Table 1. Comparison of class time in traditional versus flipped classrooms

Traditional classroom		Flipped classroom	
Activity	Time	Activity	Time
Warm-up activity	5 minutes	Warm-up activity	5 minutes
Go over previous night's homework	20 minutes	Q&A time on video	10 minutes
Lecture new content	30–45 minutes	Guided and independent practice and/or lab activity	75 minutes
Guided and independent practice and/or lab activity	20–35 minutes		

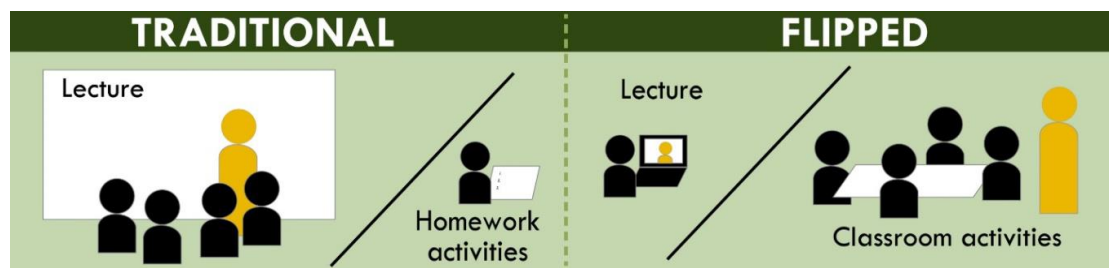
Source: Bergmann and Sams (2012).

The possibility of repeated watching, reading and listening to contents is limitless, bringing individualisation and flexibility to the maximum. Each student, depending on his/her abilities, can use the contents once or more times, see them without pauses or revisit certain parts and see it several times, skip a part of the content, fast forward or slow the recording. The use of computer technology is not a problem for students because regardless of their age students are more literate than their teachers (Paige, Hickok & Patrick, 2004). Wanting to find certain content, students will rather look them up 'on the Internet, where it is more abundant, more accessible, and more up-to-date' (Paige et al., 2004, p. 11).

In such a way, familiarisation of students with certain content at home is the first thing happening. In the course of watching or listening to a recording, students make notes, write down the important and single out queries. This work segment seems to us as extremely important because internalisation occurs where each student finds a specific, appropriated path. This step is essential in order for the students to actively participate in the work in the follow-up meeting with other students and the teacher. After home activities, students discuss and find possible solutions to the problem in class (in the classroom). In this situation, the role of the teacher is flipped. In the traditional way of teaching,

the presence of a teacher, a connoisseur, is expected and necessary. In flipped learning, this is not the case – whether alone or in a group, an individual learns mostly without the supervision of the teacher.

This twist is noted also in that the homework, inquiry and investigation are all implemented in the classroom, while students prepare at home by watching the video recordings, PowerPoint presentations or reading texts (Schmidt & Ralph, 2016). Lage, Platt and Treglia (2000, p. 32) point out that ‘inverting the classroom means that events that have traditionally taken place *inside* the classroom now take place *outside* the classroom and vice versa’. The walls of a traditional classroom disappear; what used to happen *inside* now happens *outside*. There are numerous ways in which the classroom can be flipped, but all have one thing in common – out of class, at home, students review the teaching material in order to be ready later, in the classroom, for active participation under expert teacher's guidance (Figure 1).



**Figure 1. Traditional instruction versus flipped classroom (University of Washington, 2017).
Source: Sommer and Ritzhaupt (2018)**

In expert and scientific literature, some of the authors name only video recordings as the teaching material when speaking about flipped learning (Merlin-Knoblich, Harris & McCarty Mason, 2019), whereas numerous other authors also state other didactic material besides video recordings that students can use at home, e.g., PowerPoint presentations and texts to read (Critz & Knight, 2013; Gaughan, 2014; Schmidt & Ralph, 2016). Arnold-Garza (2014) points out the lectures, which can be of various formats, and the usage of slides, audio recordings, podcasts, presentations alongside storytelling and video recordings, including animations and other multimedia contents.

There is no consensus on the duration of video recordings that students watch at home, although various recommendations exist. Merlin-Knoblich et al. (2019) present the experts' opinions that the recommended duration of video lectures should not exceed 15–20 minutes, whereas Schmidt and Ralph (2016) state that teachers consider the video recording's duration should not exceed the period of 10–15 minutes.

Students' age, previous knowledge, relevance and difficulty of the teaching content for student education are some of the criteria (alongside many others) that can have an effect on the recording's length. We are of the opinion that the duration of a video recording cannot be determined *a priori*, but that the decision should be pedagogically and psychologically founded, and the recording's duration should be optimal in order for the students to be acquainted with all relevant facts which would finally empower the realisation of the planned teaching outcomes.

Most frequently named advantages of flipped learning for students (in comparison to traditional teaching) are as follows:

- Better student achievement (Bhagat, Chang & Chang, 2016; Garrison & Vaughan, 2008; Hughes, 2012; Talley & Scherer, 2013).
- Students determine the work tempo themselves (Fulton, 2012);
- Greater student engagement and activity (Clark, 2015; Grant, 2013; Hughes, 2012);
- Higher motivation (Bhagat et al., 2016; Stratton, Chitiyo, Mathende & Davis, 2020);
- A more positive relationship to the subject (Clark, 2015; Wilson, 2013);
- More positive emotions towards the flipped learning model (Jeong, Canada-Canada & Gonzalez-Gomez, 2018);
- A more intense interaction between students and teachers (Lage et al., 2000);
- More in-depth understanding of concepts (Murphy, Chang & Suaray, 2016).

It is good to note that all research do not find the difference in favour of flipped learning over traditional teaching (Braun, Ritter & Vasko, et al., 2014; Findlay-Thompson & Mombourquette, 2014). By comparing educational outcomes in geometry instruction between the students who used flipped learning in the work and those who worked traditionally, no difference was found with regards to the learning outcomes, and the satisfaction with own work was even greater in the students who worked traditionally (DeSantis, Van Curen, Putsch & Metzger, 2015). Sommer and Ritzhaupt (2008) also carried out research in which they compared teaching which utilised flipped classroom and face-to-face instruction. Their research determined no differences in educational achievements, whereas they found a statistically significant difference with regard to the students' satisfaction in favour of regular face-to-face class. Differences in the academic achievement were not found by other authors either (Clark, 2015; Gross, Hoffman, Marinari, DeSimone & Burke, 2015; Stratton et al., 2020). As opposed to the aforementioned findings, O'Flaherty and Phillips (2015, p. 85) presented a comprehensive review of relevant research regarding the emergence of the flipped classroom and the links to pedagogy and educational outcomes. They emphasised that the results indicate much indirect evidence emerging from improved academic performance and student and staff satisfaction with the flipped approach, but that there is a paucity of conclusive evidence that it contributes to building lifelong learning and other 21st century skills in undergraduate and post-graduate education.

Arnold-Garza (2014, p. 11) points out that 'the flipped classroom appears to have originated in a middle school environment', and today flipped learning is used at all levels of the education system, from initial primary school grades to the institutions of high education (Schmidt & Ralph, 2016). It seems that the efficiency of the flipped learning method does not depend on age or the degree of education (Arnold-Garza, 2014).

Gender differences in favour of female participants in the use of flipped learning are determined in more intensive communication, more active engagement and clearer expectations (Chen, Young & Hsiao, 2016; Gonzalez-Gomez, Guardiola Rodriguez & Alonso, 2012). Lax, Morris and Kolber (2016) pointed out that the use of flipped learning has different influence on male, i.e., female respondents depending on the measured activity, while a part of research has not confirmed gender differences (Lee & Liu, 2016; Stratton et al., 2020).

Flipped learning is not beneficial solely for students; it is also useful for teachers, giving them more time for activities requiring in-depth learning since students come to class prepared, they are in

advance familiar with the content to be dealt with in class (Herreid & Schiller, 2013), and they can inquire about things they did not understand. The work of the teacher is also more challenging because they use more time for one-on-one activities with students (Francl, 2014). On the other hand, the use of the flipped learning method requires additional teacher's work in order for them to prepare quality didactic materials (Sommer & Ritzhaupt, 2018). Francl (2014) stresses that the greatest challenge in the flipped learning's implementation is actually teaching the teacher.

It is obvious that the exceptionally important responsibility of the student towards the work is reflected in the fact that if a student does not do the preparation at home by studying certain contents, she/he will not be able to actively participate in the classroom work. If not prepared, the student will not be able to communicate with the teacher and his/her classmates on the expected level. The ultimate goal is to transmit responsibility for learning from the teacher to the students and, since it is a process, it takes sufficient amount of exercise and time in order to do so.

3.1. Pedagogic dilemmas – unanswered questions

Reflecting upon the pedagogic possibilities of implementing flipped learning into the Croatian context, some questions arise (which are exceptionally actual in the current state of the COVID virus pandemic, and gain additional importance due to online teaching implementation):

1. Do all students have the technical requirements for accessing content we send them? What is to be done if they do not?
2. Who should create content for students to learn at home? Are teachers competent for designing contents, e.g., video recordings? Is it better to download ready-made content from the Internet? For the English-speaking areas, there are numerous contents on the web, but in the Republic of Croatia this is not the case (and probably in many other countries in which English is not the mother language).
3. How much and which content should be presented in such a way? Is there a possibility of *losing the compass* and use flipped learning for non-pedagogical reasons, e.g., because it is fashionable, because others are using it?
4. Is there a possibility of turning flipped learning into lecturing instruction moved from the classroom into the child's room?
5. Isn't flipped learning once again homework we decided to call by a different name?
6. What if students come to school unprepared, without accessing the sent contents? What will their activity in the classroom be like then?
7. Do teachers possess necessary IT and pedagogic-psychological competence for using flipped learning?
8. Is there a danger of turning pedagogy into *flipped pedagogy*?

4. Conclusion

The pressure from the public to find as effective ways as possible of quality teaching is constant. Scientific and practical reflections of pedagogues, educators and teachers are directed to finding approaches, methods and strategies which will motivate students and make them more active in the learning process. As one of the possible ways, dating almost two decades back, flipped learning is

emphasised. Flipped learning represents the use of computer technology with the goal of realising learning outcomes.

If we want flipped learning to motivate student learning, we need to be aware that not only the cognitive aspect should be covered, but also students' behaviour and their emotional development and, in accordance, we should choose the teaching materials and approaches attentively. The introduction of flipped learning should be systematically designed. We should start *refreshing* traditional teaching in order for flipped learning to move one step forward, and not back. More competent teachers, well prepared and motivated for using flipped learning can pave the way forward.

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