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Reconstructing the flipped classroom method. Its place in the context of scientific theory and 21st century educational challenges

Rekonstrukcja metody (odwróconej klasy), jej miejsce w kontekście teorii naukowych i wyzwań edukacyjnych XXI wieku

Słowa kluczowe: metoda odwróconej klasy, konstruktywizm, taksonomia celów nauczania B. Blooma, edukacja dwujęzyczna, edukacja zdalna.

Streszczenie: Celem artykułu jest omówienie metody odwróconej klasy (*flipped learning-FL*). Problem badawczy koncentruje się na znalezieniu odpowiedzi na następujące pytania: Jakie teorie naukowe stanowią ramy teoretyczne dla tejże metody? Dlaczego FL jest podejściem dydaktycznym na miarę XXI wieku? Metodą badawczą jest krytyczny przegląd literatury. Analiza dokonana przez pryzmat konstruktywizmu i taksonomii celów nauczania B. Blooma pokazuje, że metoda rozwija umiejętności myślenia wyższego rzędu oraz autonomię w uczeniu się. Podejście to stawia nauczycieli i wykładowców w roli moderatorów i przewodników, a podopiecznych w centrum procesu edukacyjnego. Ponadto metoda stosowana jest w nauczaniu dwujęzycznym oraz kształceniu na odległość.

Key words: flipped learning, constructivism, Bloom's taxonomy of Educational Objectives, bilingual education, distance education.

Abstract: The aim of the article is to discuss the flipped learning-FL method. The research problem focuses on finding answers to the following questions: which scientific theories provide the theoretical framework for this method? Why is FL a teaching approach for the 21st century? The research method is a critical literature review. An analysis through the lens of constructivism and B. Bloom's Taxonomy of Educational Objectives reveals that the method develops higher-order thinking skills and learner's autonomy. The approach places educators in the role of facilitators and guides, shifting the learners to the centre of the educational process. In addition, the method can be successfully applied to bilingual as well as distance education.

Introduction

Flipped learning (FL) is an instructional approach and a type of blended learning. It involves reversing the traditional teaching model, in which the teacher 'delivers' the material in class and students 'follow along'. The emphasis is placed on the students'

prior preparation for the lesson, while the lesson itself is treated as a meeting during which the students deepen their knowledge, clarify misconceptions, and work on live problem-solving. One of the key aspects of this pedagogical style is the use of technologies such as video recordings, e-books, multimedia presentations, and online platforms to deliver the educational material to the students. This allows students to familiarise themselves with the content at any time and place (Hwang, Lai and Wang, 2015; Roehling and Bredow, 2021).

FL aligns with the needs and demands of contemporary societies, in which technology plays an increasingly significant role, in both every day and professional lives. Moreover, digital literacy, namely finding, evaluating, creating and communicating information, becomes an imperative for full participation in today's working world. Undoubtedly, the growing interest in this concept has been influenced by global events in recent years. First of all, the COVID-19 pandemic has made the education sector appreciate the benefits of digital technologies for learning. With educational institutions worldwide being closed, the need for development in online learning has been noticed. Furthermore, alarmist reports about how ChatGPT, introduced by OpenAI, does homework for students, set the tone for discussions on the use of artificial intelligence (AI) in education.

This raises the question about the condition of schools, which are stagnating in the face of change. The requirements posed by technological advancements demand a profound reshaping of schools. Dorota Klus-Stańska refers to the school as a 'cultural museum' unaffected by ongoing world events and socio-economic transformations (2008, p. 26). Expanding on this idea, the author argues that schools confine themselves to 'inertially replicated pseudo-reality of teaching programs, narrowly understood didactic tasks', and understand learning as the mastery of textbook content, thereby nurturing useless competencies (Klus-Stańska, 2008, p. 26).

Unfortunately, the Polish scientific discourse still lacks research papers confirming the positive impact of the FL method on students' learning outcomes. We also need review articles which explain the theoretical underpinnings. Many accessible articles only have a practical or instructional nature. As much as they are valuable, they are unable to indicate research gaps and formulate new research questions. The aim of this article is to present the FL method in the context of scientific theories, as well as world trends and the events of the 21st century.

The flipped classroom method and constructivist education

Societies and the professional world continue to evolve with socio-economic, political, and cultural changes. These, in turn, are having a tremendous impact on the educational sector, leading to the modification of old teaching methods or the emergence of new ones. As an educational institution, the school is no longer the sole source of knowledge for students. It is increasingly being replaced by mass media. Regarding the organisation of a school and teaching methods, the doctrine of knowledge and skill transmission is gradually being replaced by a generative

doctrine, which is based a constructivist approach to learning and teaching processes. A constructivist teacher creates conditions for cognitive activity so that students can independently create knowledge and effectively utilise it. This means that students expand the 'space for cognitive freedom', which causes them to independently construct knowledge and skills (Malewski, 2006, p. 10; Kupisiewicz, 2012, pp. 47–48).

In a traditional teacher-centred classroom, teachers retain full control of the class. Their activities trigger students' learning processes (Klus-Stańska, 2010, p. 218). In short, 'learning involves following the teacher's instructions' (Klus-Stańska, 2010, p. 224). By contrast, in both the flipped classroom method and constructivist didactics, the activity of the student is the start of the learning process. Dorota Klus-Stańska emphasises that 'the goal [of the student-centred approach] is not to eliminate teacher explanations and public scientific knowledge, but to change the timing of their occurrence during the lesson (later) and the hierarchy of importance (non-priority)' (2010, p. 315). Experimental studies on the relationship between knowledge derived from school transmission and knowledge derived from personal experience show that the teacher should create space for students to engage in independent experimentation (including trial and error), leading to the solving of didactic problems. Reversing the order (learning preceded by teaching or social transmission) hampers a student's cognitive activity, the ability to generate questions, hypotheses, and, finally, contributes to the development of scholastic knowledge (Stemplewska-Żakowicz, 1996; cf. Klus-Stańska, 2018).

From the above considerations, the theses of constructivist education emerge, serving as guidelines for an educator who decides to 'flip' their classroom:

(1) Students have a natural curiosity about the world and adopt research behaviour to build their knowledge. Their intrinsic motivation is demonstrated by asking questions, experimenting, and having a desire to solve problems. The role of the teacher is to maintain this natural curiosity. (2) Students possess knowledge and cognitive strategies that should be continually utilised and do not need to be preceded by teacher transmission. (3) The tasks selected by the teacher should create conditions for learning. This means that teachers are obliged to trigger cognitive conflicts, put students into problem-solving situations, and foster autonomy in thinking and action. (4) The teacher is not the source of all knowledge. Their task is to create an environment rich in materials, resources, and digital tools (Klus-Stańska, 2018, pp. 149–150).

As much as the flipped classroom method holds a promising perspective for contemporary teachers, it reveals certain weaknesses. Obtaining feedback, both from the teacher and other students, can be impeded. John Hattie and Helen Timperley, in their publication entitled *The Power of Feedback*, provide three criteria for effective feedback. (1) *Feed up*: 'Where am I going?' refers to the student's understanding of the learning goal. (2) *Feedback*: 'How am I doing?' relates to

the student receiving feedback from their teacher, peers, or self to verify their progress towards the pre-set goal or task standards. (3) *Feed forward*: 'Where to next?' pertains to the student's next steps in the learning process. These actions may include setting higher challenges, developing self-regulation over the learning process, improving fluency, automaticity, and learning strategies to work on the task (2007, pp. 89–90).

Kaushal Kumar Bhagat and colleagues have demonstrated that one of the limitations of the flipped classroom method is that university students, while watching the assigned videos, or reviewing materials at home, may not always have the opportunity to immediately ask the teacher questions or interact with their peers (cited in Feng, Gary and Jung, 2019). The flipped classroom approach requires students to write down problems or questions while at home and bring them into the class (Fautch, 2015, cited in Feng, Gary and Jung, 2019). However, in practice, students tend to forget the issues they encounter while reviewing the material at home, which hinders their ability to ask accurate questions and clarify their understanding. The situation is most problematic in the domains of mathematics, engineering, and natural sciences because describing complex problems using text becomes incredibly challenging. As a consequence, these communication obstacles lead to an increased reluctance to ask questions and engage in interactive discussions within the flipped classroom setting (Feng, Gary and Jung, 2019).[1]

The flipped classroom method and Benjamin Bloom's Taxonomy

Benjamin Bloom's taxonomy is another theoretical framework for the flipped classroom method. The revised version includes a classification of learning objectives. Six levels can be used to structure the learning outcomes of the course: knowledge (can students memorise the content?), comprehension (can students explain the acquired knowledge?), application (can students apply what they have learned to different situations?), analysis (can students analyse the acquired information and integrate it into a whole?), synthesis (can students generalise and summarise the acquired information?), and evaluation (can students assess a given situation and express their opinion?) (Arends, 1991; Anderson and Krathwohl, cited in Muszyńska and Papaja, 2019).

Jenny Eppard and Aicha Rochdi used Bloom's taxonomy as a lens through which to view the various stages of learning in the FL classroom (2017). The initial learning activities, namely remembering and understanding, take place outside the classroom and are based on the instructional design model of Burrhus Frederic Skinner. Instructional design refers to the systematic approach of creating efficient training materials to facilitate learning and enhance performance. Both the instructional design and the processes of memorising and understanding are personalised to

[1] Compare with the next part of this article: The Flipped Classroom Method and the COVID-19 Pandemic.

accommodate the individual's learning pace. Students can dedicate as much time as necessary to memorising and understanding the material. Feedback is provided through quizzes or tests (Eppard and Rochdi, 2017; Klus-Stańska, 2018, p. 86). During subsequent tasks that require the application of knowledge and analytical skills, students construct knowledge through the 'processes of social interaction' (Wendland, 2017, p. 32). At this stage, learning takes place in the classroom and is based on collaboration with peers, while the teacher, providing subtle hints, serves as a source of support (Eppard and Rochdi, 2017; Klus-Stańska, 2018).

The final stages of synthesis and evaluation are based on the theory of cognitive constructivism, which views knowledge as a 'self-organizing cognitive process occurring in human brain structures that regulates itself spontaneously' (Wendland, 2011, p. 32). At this stage, students strive for autonomy. However, teacher support and collaboration among the students, which Dorota Klus-Stańska believes to have a 'knowledge-generating impulse' (Klus-Stańska, 2018, p. 162; Eppard and Rochdi, 2017), are still recommended.

The flipped classroom method provides teachers with the opportunity to design diverse tasks, ranging from those that require lower-order thinking skills (LOTS), such as remembering and understanding, to ones engaging higher-order thinking skills (HOTS), such as applying information, evaluating, analysing, or creating something new (Bloom, 1956, cited in Muszyńska and Papaja, 2019).

The flipped classroom method and bilingual education

The modern world faces enormous challenges whose roots lie in the socio-political situation in Europe in the late 1980s and early 1990s. At that time, globalisation and international mobility were recognised as major future directions and it was believed that coping successfully with them would require multilingual skills. It is a well-known fact that a good command of foreign languages provides the opportunity to communicate with people from different cultures and nationalities. In Poland, the necessity to speak foreign languages is reflected in the modification of the didactic offers. An example of such activities are bilingual classes in which instruction in a foreign language is given in at least two subjects[2].

One of the most common forms of bilingual education is content and language integrated learning (CLIL). This hinges on the idea that 'foreign/second language competence should not be regarded as a separate skill but one intertwined with students' cognitive, conceptual and social development, best supported by engaging students in meaningful and cognitively and academically challenging

[2] The legal basis for creating bilingual classes is provided by the following documents: The Act of December 14, 2016, on introducing provisions to the Education Law, the Regulation of the Minister of National Education dated March 17, 2017, regarding the detailed organization of public schools and public preschools, the Regulation of the Minister of National Education dated March 28, 2017, concerning the framework curriculum for public schools, and the Regulation of the Minister of National Education dated August 1, 2017, regarding the detailed qualifications required of teachers.

language use' (Nikula and Mård-Miettinen, 2014). The core features outlined by Hanna Komorowska (2005) include: (1) content is more important than grammatical correctness; (2) in order to acquire new knowledge and skills, students must have access to diverse sources by activating receptive and productive skills, such as listening, reading, and writing (as cited in Muszyńska and Papaja, 2019, p. 22). Importantly, developing linguistic competencies and activating cognitive processes ultimately lead to deep learning. This is because the foreign language is used during the critical analysis of the discussed content and the integration of new content with previously acquired knowledge. Implementing CLIL can utilise diverse active learning methods taking into account students' interests and experiences, engaging them cognitively and emotionally. According to Barbara Muszyńska and Katarzyna Papaja, FL is a highly recommended method in bilingual education. An important role of the foreign language teacher is to be responsible for preparing vocabulary, creating the materials, providing them before the lesson, encouraging students to ask questions, and evaluate the learning outcomes. Sharing materials can be done using Vimeo or mInstructor (Muszyńska and Papaja, 2019, pp. 88–90). An alternative solution is to use ready-made materials available on platforms like the Khan Academy or TED.com (Równiatka, 2020). The standard materials used in the flipped classroom include videos and authentic materials. These materials serve as the primary sources containing the content and direct instruction that are flipped from the traditional language classroom. The videos play a crucial role as an effective tool allowing the students to learn at their own pace out of class. A wide range of authentic materials such as news articles, advertisements, movies, songs, TV broadcasts, and newspapers can be meaningful learning materials for both inside and outside the classroom (Diab, Abdel-Haq and Aly, 2018).

The flipped classroom method and the COVID-19 pandemic

The COVID-19 pandemic has had a significant impact on various aspects of life, including education. The first wave of the pandemic led to the closure of schools worldwide. In the first two years of the outbreak, lessons were conducted remotely for 20 weeks and in a hybrid format for 21 weeks. Data from the report published by UNICEF, *Where are we on education recovery?*, reveals that approximately 1 in 10 countries completely closed their schools for over 40 weeks. In total, since the beginning of the pandemic, schoolchildren worldwide have lost approximately 2 trillion instructional hours that would have been delivered in a face-to-face setting under normal circumstances (2022). The same report also indicates that prolonged school closures have left their mark on students' cognitive development and increased dropout rates.

Studies have shown an increase in the number of students dropping out of school in those countries that were the first to implement remote learning (UNICEF, 2022). An example of such a country is Pakistan, where the dropout rate increased by 20% (ASER, 2021). Gaps in students' achievement have also been identified. An analysis

of the academic skills of students in British schools, categorised by gender, revealed significant differences favouring boys. Girls had a learning gap of 1.3 months in the summer of 2021 compared to boys, who were delayed by 0.6 months. Larger losses among students from lower socio-economic backgrounds and rural areas have also been noted. Many countries have started implementing remedial programmes aimed at reducing the educational gap (UNICEF, 2022). Pedagogical methods and their modification allowing for full student engagement have come under scrutiny.

The flipped classroom method can be seen as an example of such reconsideration. Research conducted among university students has shown that the effectiveness of the flipped classroom method increases when combined with other approaches. For instance, combining the flipped classroom method with problem-based learning (PBL), game-based learning (GBL), bring your own device (BYOD), or massive open online courses (MOOCs) has proven successful in the fields of medical and computer sciences (Portela, 2020; Bralin and Divjak, 2018, cited in Divjak et al., 2022).

The literature also points to other advantages offered by the flipped classroom method. A study by Joshua Collado-Valero and colleagues (2021) advances the notion that teachers use a wider range of digital video and audio resources more frequently during remote learning than before the pandemic. They also note this has enhanced communication among learners (cited in Divjak et al., 2022). Research conducted by Chengyuan Jia and colleagues identified key factors influencing student engagement in the flipped classroom. According to the researchers, student evolvement may, for instance, be influenced by interaction, active learning with feedback, teaching variation and teacher attributes, as well as supported problem-centric learning (cited in Diva et al., 2022).

Conclusions

Global events and processes shaping the current social situation necessitate changes in educational practice. Among the most important questions about the newly reorganised schools are: How to develop students' ability to take control of their own learning? How to assess knowledge and independence? Which is more important: what to teach or how to teach? Last, but not least, who should teach the generation growing up in the new reality? Educational institutions must implement measures to maximise learner autonomy. A crucial approach involves structuring the curriculum to centre it around learner autonomy, achieved through incorporating tasks and didactic methods that consider learner needs, aims, interests, and all elements related to learner independence. New cohorts of teachers need to be educated who will understand that the traditional role as the 'giver of knowledge' is no longer valid. Moving beyond their traditional role as experts in pedagogy and curriculum, constructivist teachers are now expected not only to meet the needs of a variety of groups of learners but also to modify pedagogical practices to adapt to the social and structural changes affecting learning environments such as bilingual education and distance learning.

The development of technology has led to the questioning of the traditional instructional responsibilities of teachers. Personalised online learning platforms, chatbots, and AI are challenging these roles to such an extent that the future existence of the profession is being debated. As certain aspects of teaching become increasingly automated, educators must place greater emphasis on developing competencies such as problem-solving abilities, collaboration, communication, and critical thinking. AI ought to be seen as a topic of education rather than a factor changing it. Therefore, students should be taught courses related to ethical AI and robotics, misinformation and impacts on the economy. Students will need to 'know how to use artificial intelligence technologies and also to be literate as to what AI is capable of, what it's not capable of, what its potential uses and misuses are' (Prothero, 2023).

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