

Methods of Studying Web Technologies in a Blended Learning Format: Analysis of Models in Education

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Abstract

The purpose of the article is to study the methodology of studying web technologies in a blended learning format, to analyse existing models used in education. To achieve this goal, the article uses the methods of analysis and synthesis, as well as content analysis to study the existing scientific literature, and modelling to study the relevant models. The results of the study show that blended learning is a form of learning organisation that combines elements of traditional classroom learning and online learning. In this model, students have the opportunity to learn both in the classroom and in the online environment. The main idea is to combine the advantages of both forms of learning to create a more individualised and effective learning process. In this context, advanced innovative technologies play an important role in shaping the educational experience. The choice of information technologies should be adapted to the individual capabilities of students to ensure the effective involvement of all participants in the educational process. It is determined that the main web-based technologies used in a mixed form are learning management systems, cloud services, special chats, learning platforms, electronic portfolios, multimedia resources. The use of these technologies has its advantages and disadvantages, including accessibility, flexibility, customisation and visualisation. The general conclusion is that all blended learning models aim to combine traditional and online learning to create a more individualised, flexible and diverse learning experience for students. Each model has its own characteristics, such as rotation between different modes of learning, flexible study schedules, the choice of specific courses or modules, or a combination of online learning and periodic classroom meetings. Each of these models offers learning approaches that suit different student needs and learning contexts, and the choice of a particular model may depend on learning objectives, available resources and pedagogical strategy.

Keywords: blended learning, web technologies, learning environment, educational models

1. Introduction

In today's world of information technology and digital opportunities, the study of web technologies is becoming an important and relevant component of education. Since the advent of the World Wide Web, learning web development, programming and other aspects of the Internet has become a key task to improve and accelerate information exchange, as well as to organise the learning process of students in many fields (Kozlovskiy et al., 2024).

At the same time, along with the development of new technologies and approaches to teaching, challenges have begun to emerge that are essential for the quality and new acquisition of knowledge using digital data channels. Blended learning, which combines traditional classical teaching methods with the capabilities of online resources and interactive tools, is becoming increasingly popular in education. This opens up new opportunities for much more flexible and efficient improvement of web technologies. However, the successful implementation of this approach requires an in-depth analysis of current trends in education and the use of digital technologies for specific educational purposes.

1.1 Introduce the Problem

The study of these trends helps to identify important aspects, such as the impact of social media, mobile applications, online courses, and other technological tools on the modern learning process. It also helps to identify the challenges that arise in blended learning and how they can be overcome. Understanding these aspects is critical for developing effective web-based learning methods that take into account the current realities of education and, accordingly, improve the process.

This issue has been partly the subject of academic interest and discussion. In particular, Arpacı (2017) studied the importance of the digital environment in the learning process. It is important that his study took place before the global pandemic, so the conclusions about the importance of the digital vector of education development can be considered to have had quite specific results. Norberg et al. (2011) noted that the prospect of the overall development of education is a combination of the use of digital tools and real classes, i.e., what we now call blended learning. Zacharis (2015) explored the problems and challenges that will arise before the introduction of blended learning. Some researchers have identified the effectiveness of information technology in various fields of education (Vasiutiak et al., 2021; Kubitskyi et al., 2022; Bakhmat et al., 2023; Tsekhmister, 2023). Holovatska (2023) also highlighted the use of modern technologies and methods in English language teaching, such as online courses, virtual platforms, multimedia resources, etc. alongside traditional teaching methods. Lisetskyi (2015) traced the methods and models of blended learning, their impact on the quality of higher education, the benefits and challenges of implementing this approach, as well as possible strategies for implementing blended learning to improve the learning process. According to Mykhalchenko and Tytarenko (2023), dataanalytics in conjunction with tailoredmarketingtactics on e-commerceplatformscanresult in moreaccurate and efficientdataanalysis, givingstudents a thoroughunderstanding of webtechnologies and how to use them to createproductivelearningenvironments.

In general, the content of the articles included a review of previous studies, a description of specific models and methods, an analysis of the studied cases of higher education institutions, and additional recommendations for the implementation of blended learning in the higher education system.

Special mention should be made of those publications that highlight the prospects of using blended learning in the future. First of all, we are talking about the study by Faulkner & Green (2017) and Poulouva & Cerna (2018) also addressed this issue. Marienko & Sukhikh (2021) focused on the peculiarities of using blended learning. Martyniuk et al. (2023) identified the peculiarities of using distance and blended learning in wartime. The example of Ukraine may be important for a general understanding of the prospects for the development of distance learning, as military challenges and methods of dealing with them are unique to democratic countries. By analysing these works, it was possible to trace possible prospects for the development of blended learning and certain aspects of the methodology of studying web technologies. At the same time, the publications analysed do not cover the numerous manifestations and peculiarities of blended learning. For this reason, addressing the possibilities of learning web technologies will require further detailed study.

1.2 Research Focus

This article will discuss the key trends in education and their impact on the study of web technologies in a blended format. An important aspect will also be the proposal of certain specific methods and approaches aimed at optimising the learning process and preparing students for a successful career in the modern information society.

1.3 Research Aim and Questions

The purpose of the article is to analyse the methodology for studying web technologies in a blended learning format and to study the relevant models in education. The realisation of this goal involves the allocation of certain specific tasks, in particular, a general analysis of the concept of blended learning and the formation of models with its most optimal use.

2. Method

The methods of analysis and synthesis were used to process the extensive theoretical material. The use of the analysis method made it possible to trace the evolution of ideas about the development of blended learning and the peculiarities of its reception in the educational environment. It also helped to identify specific facts and features of its application. A similar methodology has been used by other researchers, including Uprichard (2006). The scientific method of synthesis led to the writing of substantial conclusions and generalisation of the theoretical material. This method is extremely effective when working with large amounts of information, as it allows to identify general perspectives on the development of blended learning, web technologies, etc. The content analysis method was also useful, as it contributed to the qualitative study of the existing scientific literature on the subject. This method also made it possible to identify the existing problems faced by modern researchers when studying the specifics of the use of digital information channels in the educational environment.

3. Results

When studying the issue of methods of teaching classes in a blended learning environment, it is necessary to define in detail certain definitions related to this topic. First of all, let's analyse the concept of "methodology". This term is understood as a set of methods and ways of expediently organising any activity. In modern scientific research, the phrase methodology of a particular subject means a branch of pedagogy that studies in detail the content of the subject and the nature of the educational process, which contributes to the acquisition of the appropriate level of knowledge and skills by students, the development of their competencies and thinking (Uprichard, 2006). All these components contribute to the formation of an independent worldview in modern students. Moreover, it should be noted that the content of academic subjects is demonstrated in the educational standards based on which educational programmes are created: national standards for specific professions are formed based on a modular competence framework.

Thus, learning methodology is a system of approaches, methods, techniques, and strategies used for the effective acquisition of knowledge and skills in the learning process. This methodology includes ways of organising learning, lesson planning, selection of learning materials, interaction between teachers, educators, and students, assessment, and much more (Chapman, 2011). Therefore, the main aspects of the learning methodology include several important points (see Table 1).

Table 1. Key Aspects of the Study Methodology

| <i>Aspect</i> | <i>Explanation</i> |
|---|---|
| Analysing pedagogical strategies | Teachers use a variety of pedagogical strategies to ensure quality learning, such as lectures, discussions, group work, individual assignments, etc. |
| Research of modern tools | In the study methodology, an important role is played by the analysis of fixed assets and tools for organising effective training |
| Features of the layout | Teachers develop lesson plans and curricula to structure the learning process and define goals and objectives. |
| Features of the implementation of training materials | Selection of appropriate learning materials that meet the learning objectives and needs of modern students. |
| Analysing key points in the assessment and engagement of applicants | Determining how to evaluate the success of the training organisation. Identify the main trends in promoting active participation of students in the learning process, creating incentives for self-study and self-development |
| Adapting to your needs | Modern teaching trends should be tailored to the needs and capabilities of specific students, taking into account their individual characteristics. |

Source: compiled based on research: Guthrie (2014); Chapman (2011); Uprichard (2006)

Study methods may vary depending on the specific subject, learning objectives, and means of accessing learning resources. However, despite this, the main goal of the teaching methodology is to ensure quality learning and student development (Guthrie, 2014). All the components listed in Table 1 are important components of modern pedagogical models.

A pedagogical model is a direction or inclination in the development of education and pedagogy that defines the basic ideas, values, methods, and approaches that determine a certain period or direction in the educational process. Pedagogical models reflect the contemporary needs of society and the requirements for education. For this reason, they may arise as a response to various factors, such as technological changes, socio-cultural shifts, scientific discoveries, changes in societal values, etc. Such trends influence teaching methods, the organisation of the learning process, the choice of learning content, assessment methods, etc. (Arpaci, 2017). However, pedagogical models are dynamic and can change over time to reflect current requirements and discoveries in education and pedagogy. They can also be influenced by education policy and evolve under the influence of social and cultural changes.

4. Results

The use of network technologies has contributed to the development of modern distance, e-learning, and modular learning (M-learning). All these systems are now effectively applied in various educational institutions and are based on the use of digital technologies. Information and communication technologies in the educational process involve the use of innovative online services, digital tools, educational platforms, cloud technologies, multimedia, and educational and development projects during classes (Bakhmat et al., 2023). Therefore, thanks to the development of e-learning, a new paradigm has emerged - blended learning. Thus, blended learning is based on three important components: distance learning, face-to-face learning, and online learning (see Figure 1).



Figure 1. The Three Pillars of Blended Learning

Source: author's thoughts

The methodology of studying web-based blended learning technologies dates back to the first mention of this system in a press release by Interactive Learning Centres. This document stated that the company was starting to offer not just distance online courses, but blended ones. However, it should first be noted that the term “blended learning” did not originally refer to a general pedagogical theory, but rather to partial hybrid and blended learning methodologies that developed in parallel with practices such as e-learning and virtual learning. These methods combined traditional and distance learning courses (Cook & Ley, 2017). Nowadays, the implementation of the educational process in the blended learning format involves a high level of development of digital competencies in teachers and lecturers, which, accordingly, becomes the most important condition for the formation and development of the teacher's information and digital culture, as well as the future specialist in the XXI century (Tsekhmister, 2023; Kubitskyi et al., 2022). Also, in the context of higher education, innovative models are becoming relevant today, in which there is a need for a new level of consciousness and computational thinking. Technologically mediated communication and new educational models are also gaining importance. Therefore, in the methodology of studying blended learning, its content is associated with the integration of the best traditional and innovative (mobile) ways of organising learning, which enable students to learn more independently, determine and control their pace, time, and place of knowledge acquisition.

The effectiveness of blended learning was demonstrated by a survey conducted at the Kyiv National University of Culture and Arts. In particular, two groups of students were created for the survey: a control group and an experimental group. Both had a size of 100 people. The respondents from the control group studied according to the

traditional model, while the respondents from the experimental group studied according to the blended learning system. The results showed that the average score in the control group was 76, while in the experimental group it was 81 (with a standard deviation of 6-7%). There was an improvement in skills and knowledge of theoretical material (control group - 77, experimental group - 82). The level of students' motivation increased: in particular, there were only 30 of them in the control group and 53 in the experimental group. So, in general, we can conclude that the use of blended learning models has a positive impact on the educational outcomes of students. It is important to note that this is due to individual tools.

Therefore, blended learning uses a variety of web-based technologies to enhance the learning process and enable collaboration between students and teachers. Below is a description of key web technologies that are often used in blended learning.

1. Learning Management Systems (LMS). LMSs such as Moodle, Blackboard, Canvas, and others allow teachers to create interesting courses, assignments, upload learning material, and interact with students in an online environment. Such systems provide centralised platforms for managing many aspects of learning, creating convenient access to materials and assignments for students, etc. For example, the National University of Culture and Arts uses the Canvas service to create individual interactive courses, including the integration of video lectures, automated testing, and the use of Google Drive to save and share documents.
2. Video and webinar platforms. Services such as Zoom, Microsoft Teams, and Google Meet allow for video lessons and webinars, information exchange, and real-time communication (Martyniuk et al., 2023). Such platforms are primarily suitable for asynchronous learning, i.e., they provide students with the opportunity to study at any convenient time. For example, the Ivan Franko National University of Lviv uses Zoom to conduct classes for blended education. For this purpose, a full package of services was purchased, and special training was organised for teachers on the necessary settings and features of using Zoom.
3. Electronic portfolios. Students can create electronic portfolios to store and present their work, projects, and achievements. Electronic portfolios allow you to track progress in learning, demonstrate skills and knowledge.
4. Forums and chats. Online forums and chats allow students to discuss material, communicate, and collaborate even when they are away from the classroom. Such tools are suitable for establishing collaborative learning, which opens up opportunities to exchange ideas and learn together.
5. Shared documents and cloud storage. Google Docs, Dropbox, and other tools allow you to edit documents together and save them to the cloud for sharing. Such digital mechanisms allow you to use project-based learning in real time, with easy access to all the materials and devices needed for the educational process. Many Ukrainian universities use Google Docs to conduct group projects so that students can edit shared documents and actively participate in projects. At the same time, the importance of security is emphasised to ensure that unauthorised people do not have access to the projects.
6. Multimedia resources. The use of audio, video, and other multimedia resources for learning and illustration of educational material (Arpaci, 2017). These features make the learning process more interesting and interactive.
7. Mobile applications. The use of mobile applications to access learning material, complete assignments, and communicate with teachers or other students (Martyniuk et al., 2023).
8. Assessment and testing: Using online tests and tools to assess students' knowledge and skills.

Figure 2 shows the structure of the use of web technologies in a blended learning system (in terms of electronic interaction). This system was developed by Bieliaieva et al. (2023) and is actively used in modern scientific pedagogical literature.

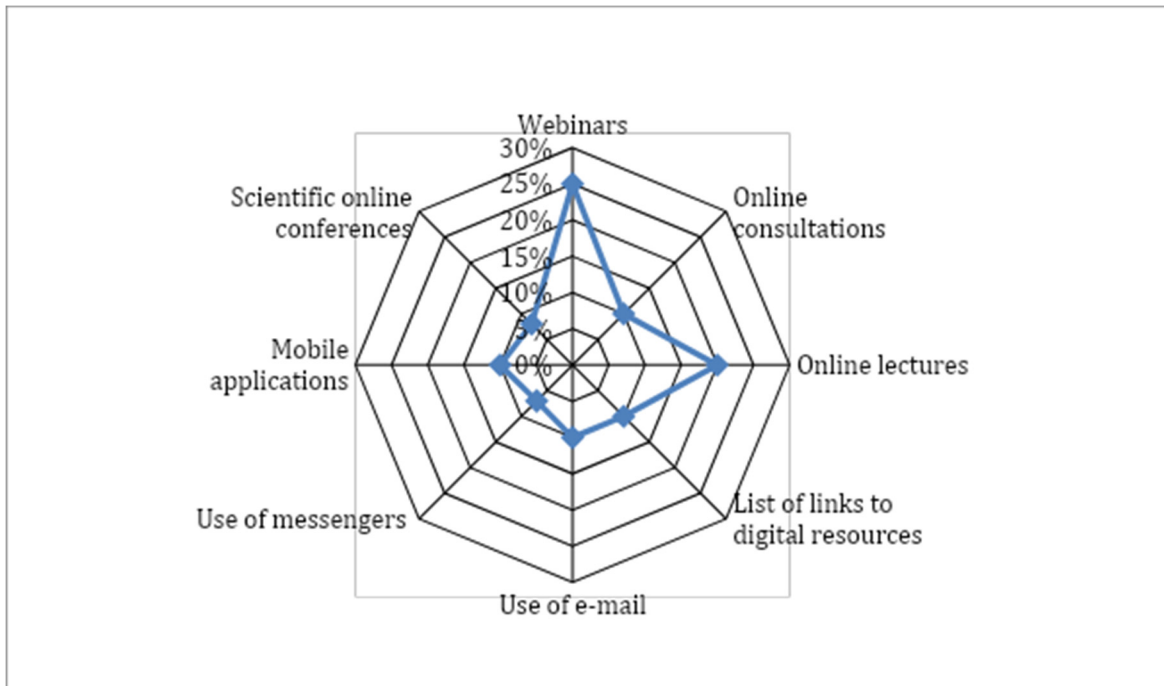


Figure 2. The Structure of Web Technologies in a Blended Learning System

Source: Bieliaieva et al. (2023).

These web-based technologies facilitate the creation of an interactive and personalised learning environment that helps students access learning material and communicate with teachers and classmates even when they are not physically present in the classroom. A modern approach to blended learning should embody a comprehensive framework that encompasses both synchronous and asynchronous interactions between students and teachers, learning materials, and digital interfaces. In this context, advanced innovative technologies play a key role in shaping the educational experience. The choice of information technology should be adapted to the individual capabilities of students to ensure effective engagement. In the field of blended learning, the content of education should be structured to use both a wide range of information and telecommunication technologies and traditional methods of organising the learning process (Marienko & Sukhikh, 2021). Moreover, such a structure should take into account the different ways in which learners perceive educational content, whether in text, audio, or graphic formats. Given the open access to digital learning resources, they should be seamlessly integrated into the overall educational structure, serving as an additional component for classroom organisation and quality assurance Bieliaieva et al. (2023). Thus, comprehensive blended distance learning should include several key components, including technological, organisational, methodological, and pedagogical elements. The technological aspect emphasises the advantage of using digital electronic resources (Martyniuk et al., 2023). This technological infrastructure lays the foundation for effective blended learning. The organisational and methodological components assume a crucial responsibility for facilitating productive interaction between educational stakeholders and curating educational content. Each task stipulated by educational standards should be thoughtfully developed within a digital educational space Bieliaieva et al. (2023). This space should also include various digital assets, such as specialised media repositories and links to publicly available sources of information. The pedagogical element is characterised by a commitment to innovative teaching methods and modern educational approaches. Thus, in the modern pedagogical concept, blended learning is a multifaceted system that uses innovative technologies and traditional means of organising learning. However, it also responds to the unique needs and capabilities of students (see Figure 3).

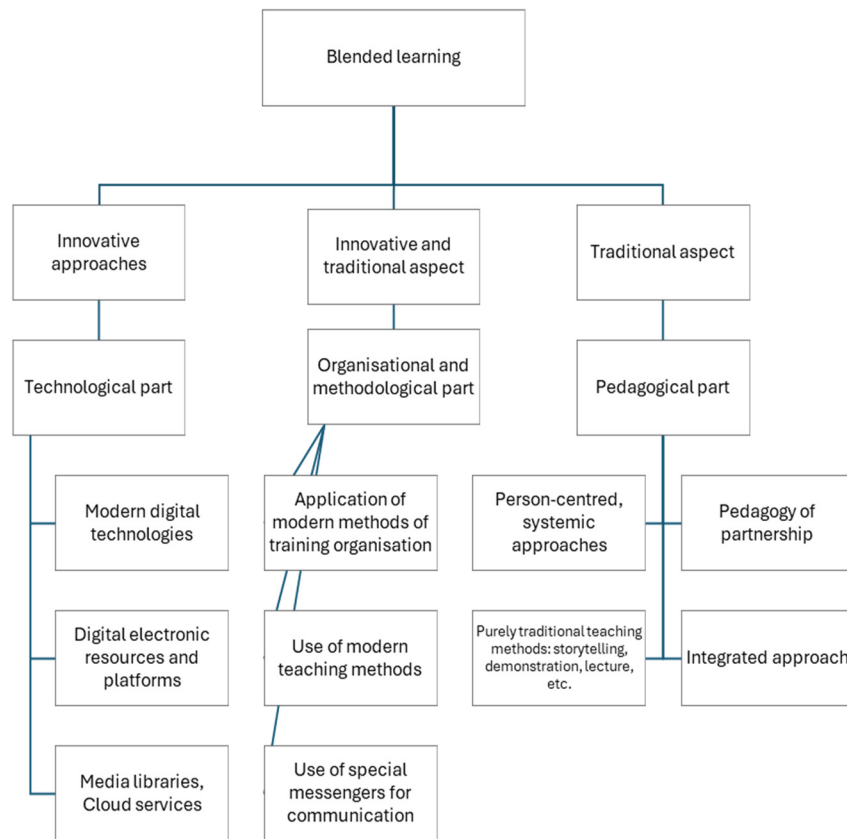


Figure 3. The Structure of Blended Learning

Source: Compiled based on the analysis of Bieliaieva et al. (2023) and Marienko & Sukhikh (2021)

In the methodology of studying the peculiarities of using web-based blended learning technologies, important attention is paid to the analysis of modern models of this form. In modern pedagogy, several models of blended learning are actively used in the organisation of an innovative educational environment (see Figure 4).

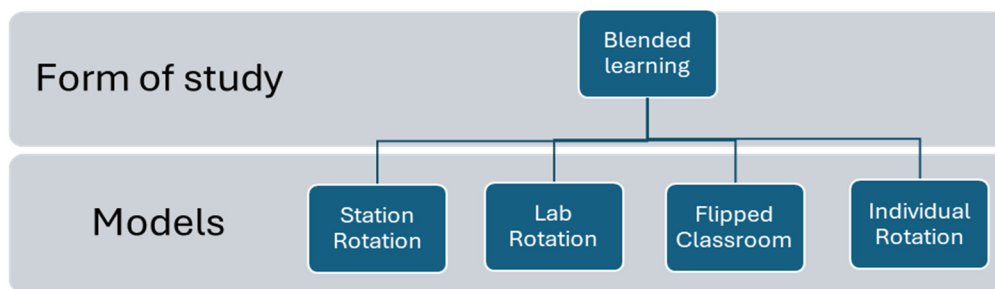


Figure 4. The Main Models of Blended Learning

Source: author's development

In particular, the rotational model is a common blended learning approach that combines traditional face-to-face learning with online learning components. In this model, students alternate between different learning methods, usually in a planned sequence. There are several variants of the rotation model, each with its own design. However,

several other sub-models within this system have their own characteristics (see Figure 5).

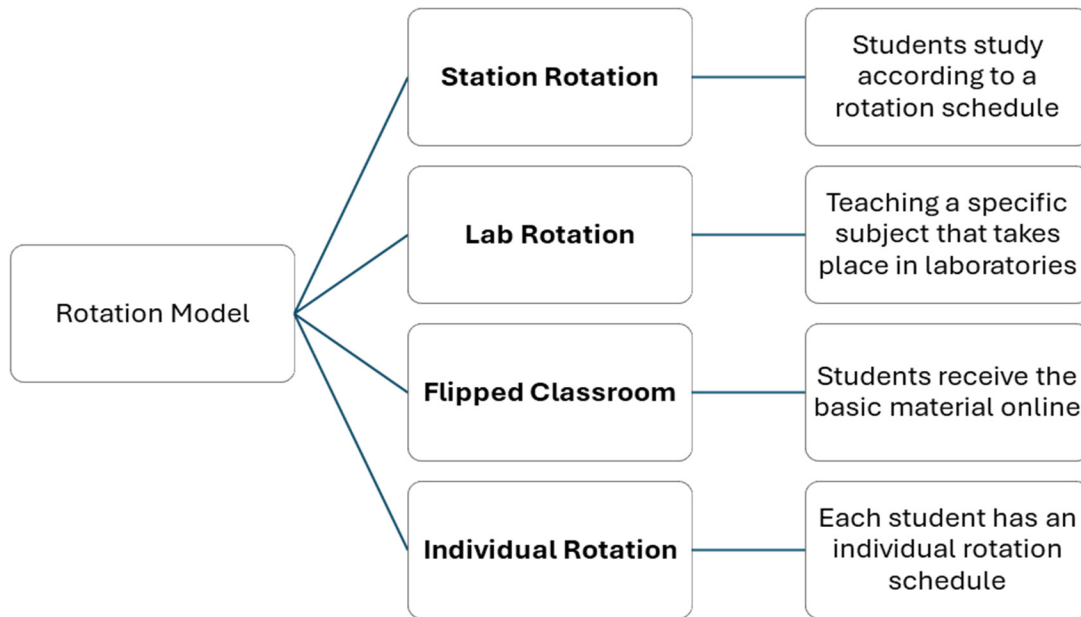


Figure 5. Key Aspects of the Rotation-Based Model

Source: based on analysis by Faulkner & Green (2017)

The use of blended learning models may require specific guidelines. While teachers can use a variety of approaches to blended learning, there are some general guidelines to follow. This includes clear planning of the organisation of classes, creating a kind of schedule that will allow students to act and learn. An important step is to prepare materials in advance, as blended learning requires independent work of students, and providing them with the necessary information will improve the learning process. The third part is taking into account technological aspects. As digital technologies are expected to be used, it is important that students have timely access to them and can realise their potential.

The station-based sub-model involves students rotating between different stations or learning activities in a physical classroom. Some stations may involve instructor-led learning, while others may include independent or collaborative online learning (Poulova & Cerna, 2018). The rotation schedule determines how much time students spend at each station. Lab rotation involves students alternating between a traditional classroom and a computer lab. The teacher can provide face-to-face instruction, and then students move to the lab for online classes. In a flipped classroom, students study course content at home using online materials and then spend time in class working on assignments or specific projects, or discussions (Faulkner & Green, 2017). In the individual rotation option, students have more control over the sequence of rotations and can progress at their own pace. They can access different online modules or resources as needed and then meet with the teacher periodically for guidance or clarification (Prokopchuk, 2016). Overall, the rotation model provides educators with the opportunity to integrate online learning into traditional classroom settings (Zacharis, 2015; Cook & Ley, 2017). It can be adapted to meet the needs of different grade levels and subjects. This approach aims to benefit from the advantages of both face-to-face teaching and online learning, creating a blended learning environment that suits different learning styles and paces of learners.

Another model used in blended learning is Flex, which offers learners greater flexibility in how they interact with learning content and resources. In the Flex model, the learning environment is highly personalised, allowing learners to have more control over when, where, and how they access their learning materials (see Table 2).

Table 2. Main Features of the Flex Model

| Aspect | Explanation |
|------------------------------|---|
| Individualised study plan | At Flex, every student has their own personalised learning plan. This plan outlines the specific learning objectives, resources, and assessments they need to complete. This is often driven by the individual needs, interests, and skill level of the students. |
| Time flexibility | Students have the freedom to choose when they will work with their learning materials. They can set their own schedules. |
| Diversity of resources | The Flex model provides students with access to a range of resources, including digital materials, textbooks, videos, interactive simulations, etc. |
| Support for teachers | Teachers can offer individual or small-group instruction, answer questions, and tailor educational processes to meet individual needs. |
| Data management at the heart | Flex often relies on data analytics and educational technology to track learner progress. |

Source: author's thoughts

The Flex model is particularly well suited to students who benefit from a personalised learning experience, as well as institutions that want to offer more flexible learning options. Compared to the first approach, the key role here is given to online learning.

Another blended learning model, called À La Carte, is a model that allows students to choose individual courses or learning components based on their specific needs or interests. It is characterised by a cafeteria-style or menu-based approach where students have the flexibility to choose from a variety of courses, subjects, or learning opportunities (see Figure 6).

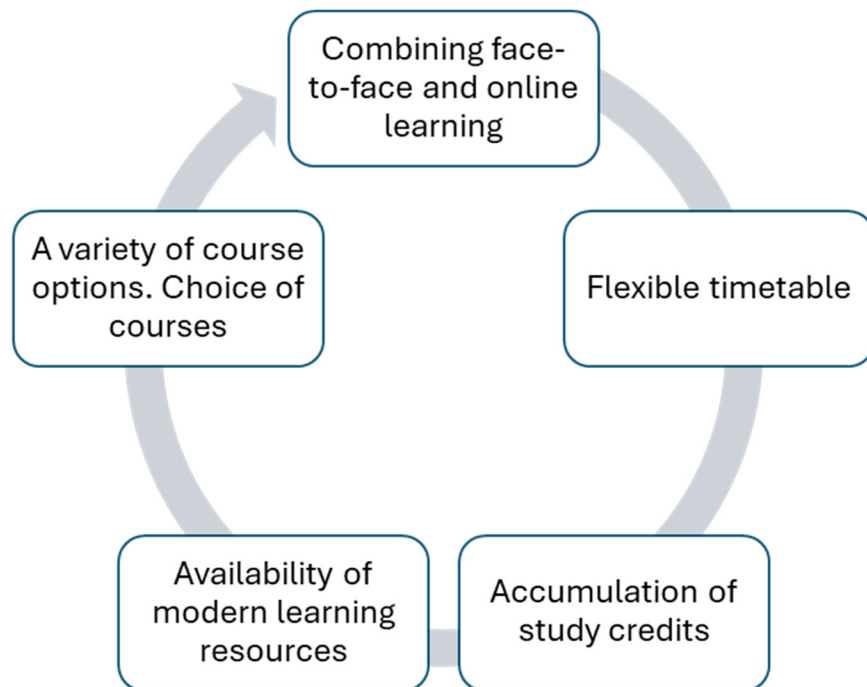


Figure 6. Features of Using the À La Carte Model

Source: author's thoughts

In general, the À La Carte model is often used to expand course offerings to meet a wider range of student needs and interests (Tan & Hew, 2016). It can also be used to offer more flexible, personalised learning options. This model allows learners to take responsibility for their education, plan their learning experience, and study subjects that are meaningful to them.

In the Enriched Virtual model, subjects are first taught through the prism of traditional classroom learning, and the rest of the discipline is mastered remotely. Thus, one teacher implements both traditional and distance learning. This is a special approach to blended learning that combines online and classroom components, offering students a fully individualised and flexible learning experience (see Table 3).

Table 3. Key Aspects of the Enriched Virtual Model

| Aspect | Description |
|-----------------------------|---|
| Online learning | Strong emphasis on online learning. Students access digital content through a learning management system. |
| Scheduled personal meetings | Although most of the training takes place online, the model includes scheduled face-to-face meetings. |
| Individual training | Students can choose from a variety of courses and activities, selecting those that meet their specific needs. |
| Flexible timetable | Students have the opportunity to manage their own schedule, completing online assignments when it best suits their needs. |
| Mixed resources | In addition to online digital materials, the model can include a variety of educational resources, including textbooks. |

Source: author's development

The enhanced virtual model thus offers learners a personalised learning experience that allows them to work at their own pace, explore areas of interest and benefit from face-to-face interaction when needed.

5. Discussion

In the period up to 2006, in the professional-pedagogical and even popular science literature, the concept of blended learning was repeatedly used together with several similar concepts: web-enhanced instruction, technology-mediated instruction, hybrid learning, mixed-mode instruction, mixed learning, etc. They were confused or used as synonyms. It was only in 2006, after the publication of the comprehensive Handbook of Blended Learning, that the term blended learning became generally accepted to refer to online and offline learning. However, it should first be noted that the term 'blended learning' was not originally intended to refer to a specific pedagogical theory, but rather to explain partial blended learning methodologies that have been transformed and developed in parallel with e-learning or virtual learning (Mintii, 2023; Parshyn, 2024). However, today, the implementation and use of blended learning requires a high level of digital competence development for both teachers and lecturers, and students (Bushman, 2022). Therefore, these areas are an important part of the development and improvement of the system of this form of education.

Thus, according to Chaeruman&Maudiarti (2018), blended learning goes beyond a simple combination of online and face-to-face learning; it is dynamic and dependent on specific contexts or conditions. It can be perceived from different contexts and perspectives, each with unique needs and characteristics, requiring a customised blend for each. And this opinion is shared by many modern scholars who have studied the main conditions for the introduction of blended learning in modern educational institutions (Chaeruman, 2019; Kukharensko, 2015; Androsova, 2023; Smyth, Bossu, & Stagg, 2017; Cockbain et al., 2009).

The main focus of modern research on this issue is mainly on analysing the potential advantages or disadvantages of using web technologies in a blended learning system. Holovatska (2023) determined the impact of using web-based technologies in blended learning on the outcomes of foreign language learners. This article uses data analysis to show that students express enthusiastic approval and preference for blended learning as a means of improving their skills. Over two-thirds of the students surveyed reported significant improvements in their language proficiency compared to traditional methods. Just over three-quarters of all students found blended learning to be a motivating

and useful approach to improving their skills. This topic was also addressed by Nurdiana et al. (2023), who also generally found blended learning to be effective in foreign language learning. Thus, modern studies have shown that web technologies play an important role in blended learning, providing an opportunity to integrate online elements into traditional learning and improve the learning process. In particular, Learning Management Systems allow teachers to upload learning material, create tasks, and manage the learning process (Suryari Purnama & Cicilia Sriliasta, 2023; Kuzheliev et al., 2023). They are important for organising, storing, and tracking student progress. The results also demonstrate that platforms such as Zoom, Microsoft Teams, and Google Meet allow for video tutorials and webinars, facilitating real-time interaction. They help visualise learning material and collaborative projects. In addition, students can create electronic portfolios where they store their work, projects, and achievements (Cockbain et al., 2009). This allows them to track their learning progress and share it with others. Tools such as Google Docs and Dropbox allow students to collaboratively edit documents and store them in cloud storage. This makes it easier to work together on projects and assignments. At the same time, in a blended learning system, it is important to use online tests and assessments that allow teachers to measure students' knowledge and skills, as well as provide feedback for further improvement (Dziuban et al., 2018). Therefore, the use of these web-based technologies is important because it allows for an interactive and individualised learning environment, facilitates collaboration, and tracks progress.

In the current scientific debate, an important topic is the discussion of the advantages and disadvantages of using web technologies in blended learning. In particular, the main advantages are flexibility, accessibility, individualisation, etc:

1. Flexibility and accessibility. Web-based technologies allow students to access learning material and resources at a time and place that is convenient for them. This is especially important for students from different locations and schedules.
2. Individualisation. Web-based technologies allow you to create individual learning paths and provide students with the opportunity to choose material and assignments according to their needs and skill level (Iskakova, 2023).
3. Interaction and collaboration. Forums, chats, and other tools facilitate interaction between students and teachers even when they are not in physical contact, promoting the exchange of ideas and teamwork on projects.
4. Visualisation. The use of multimedia resources, videos, and other tools helps to improve understanding of the material and facilitates the learning process.
5. Assessment and feedback. Online systems allow for quick assessment of students' knowledge and provide feedback for further improvement. These data correlate with the results of modern scholars (Dziuban et al., 2018; Tsekhmister, 2022).

Nevertheless, the main disadvantages are a number of important aspects, including the need for Internet access: The use of web-based technologies requires access to the Internet, which can be a challenge for students in remote regions or with disabilities. In addition, the need for digital literacy is an important prerequisite. Students need to have basic computer and internet skills to successfully use web-based technologies in their studies. Nevertheless, the lack of physical contact can lead to a sense of social isolation among students. It is also worth considering that there is always the possibility of technical problems, such as internet failures or hardware issues, which can interfere with normal learning.

Overall, there are many advantages to using web-based technologies in blended learning, but it is important to consider potential drawbacks and develop strategies to overcome them to ensure the effectiveness and success of this approach to education.

5. Final Considerations

Based on the findings, blended learning is a form of learning that combines elements of traditional classroom learning with online learning. In this model, students have the opportunity to learn both in the classroom and in an online environment. The main idea is to combine the advantages of both forms of learning to create a more individualised and effective learning process.

In this context, advanced innovative technologies play an important role in shaping the educational experience. The choice of information technologies should be adapted to the individual capabilities of students to ensure the effective involvement of all participants in the educational process. It has been determined that the main web technologies used in a mixed form are learning management systems, cloud services, special chats, learning platforms, electronic

portfolios, multimedia resources. The use of these technologies has its advantages and disadvantages. In particular, the advantages include their accessibility, flexibility, individualisation, visualisation, etc.

The general summary of blended learning models is that they all aim to combine traditional learning with online learning in order to provide more individualised, flexible, and diverse learning experiences for students. Each model has its own characteristics. In particular, the Rotation Model uses rotation between different learning modes, allowing students to gain experience both in the classroom and online. The Flex Model gives students more freedom to manage their learning and a flexible study schedule. À La Carte Model gives students the opportunity to choose specific courses or modules that meet their individual needs. The Enriched Virtual Model combines online learning with periodic classroom meetings to provide individualised learning and real-time communication opportunities. Each of these models offers approaches to learning that suit different student needs and learning contexts. The choice of a particular model may depend on learning objectives, available resources, and pedagogical strategy.

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