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Artículo de Revisión

The Flipped Classroom in Higher Education: An Effective Model for Promoting Active Participation and Meaningful Learning

El Aula Invertida en la Educación Superior: Un Modelo Eficaz para Fomentar la Participación Activa y un Aprendizaje Significativo

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ABSTRACT

The flipped classroom model has established itself as an innovative strategy in higher education, fostering active participation and deeper learning. This approach transforms traditional teaching by shifting theoretical instruction outside the classroom, using digital resources such as videos, interactive readings, and dynamic presentations. Its implementation aims to empower students, making them active participants in their learning while leveraging technological tools and collaborative methodologies. By reorganising class time for practical activities, it strengthens key skills such as critical thinking, academic autonomy, and problem-solving. Through a comprehensive literature review, this study confirms that the flipped classroom enhances academic performance, as students arrive better prepared for in-person sessions. Furthermore, this approach develops essential competencies such as autonomy, teamwork, and critical analysis.

Keywords: Flipped learning; Student engagement; University; Innovative methodology.

Resumen

El modelo de aula invertida, o Flipped Classroom, se ha consolidado como una estrategia innovadora en la educación superior, promoviendo la participación activa y un aprendizaje más profundo. Este enfoque cambia la enseñanza tradicional al trasladar la instrucción teórica fuera del aula, utilizando recursos digitales como videos, lecturas interactivas y presentaciones dinámicas. Su aplicación busca empoderar al estudiante, haciéndolo protagonista de su aprendizaje y aprovechando herramientas tecnológicas y metodologías colaborativas. Al reorganizar el tiempo en clase para actividades prácticas, se fortalecen habilidades clave como el pensamiento crítico, la autonomía académica y la resolución de problemas. A través de una revisión exhaustiva de la literatura, este estudio confirma que el aula invertida mejora el rendimiento académico, ya que los estudiantes llegan mejor preparados a las sesiones presenciales. Además, este enfoque potencia competencias esenciales como la autonomía, el trabajo en equipo y el análisis crítico.

Palabras clave: Aprendizaje invertido; Interacción estudiantil; Universidad; Metodología innovado.

1. INTRODUCTION

The flipped classroom approach, also known as Flipped Classroom, has established itself as an innovative methodology in higher education, distinguished by its ability to encourage active participation and facilitate deep learning. Plaza et al. (2022) state that this model transforms traditional teaching by moving theoretical instruction outside the classroom, relying on digital resources such as educational videos, interactive readings, and dynamic presentations.

In the university context, where the development of key skills such as critical thinking, academic autonomy, and teamwork is prioritised, this strategy takes on particular significance. By placing the student at the centre of learning, it promotes their active role in the construction of knowledge and strengthens essential competencies for their education.

The implementation of the flipped classroom model in higher education, as noted by Casimiro et al. (2023), faces several obstacles that affect both its effectiveness and widespread adoption, highlighting an issue that requires a comprehensive solution from both an educational and professional perspective. One of the main challenges is the lack of proper teacher training in the design and integration of pedagogical strategies based on this model, which hinders its planning and implementation in academic contexts. Furthermore, inequalities in access to essential technological resources, such as electronic devices and internet connectivity, persist, creating a

digital divide that undermines educational equity and limits the active participation of certain student groups.

This research is relevant due to its ability to transform teaching and learning processes, adapting to the current needs of student-centred, dynamic, and inclusive education. This approach fosters active participation and meaningful learning, empowering students to take responsibility for their own development through the use of educational technologies and engaging in practical activities in the classroom. Furthermore, the flipped classroom model meets the demands of a globalised academic environment, where competencies such as critical thinking, problem-solving, and teamwork are essential.

The main objective of analysing and promoting the implementation of the flipped classroom model in higher education is to drive an innovative pedagogical approach that places the student at the centre of their learning, maximising the use of technologies and collaborative methodologies. This model aims to develop key competencies, such as critical thinking, academic autonomy, and problem-solving, by reorganising class time for practical and meaningful activities. Furthermore, it seeks to assess its impact on motivation, academic performance, and active student participation, as well as identify effective strategies to overcome the challenges related to its adoption.

Based on the research, we pose the following questions: How does the flipped classroom model impact the active participation of university students across various fields of study? What obstacles do teachers and students encounter when implementing the flipped classroom model in higher education institutions?

2. DEVELOPMENT

Theoretical Framework

The conceptual and theoretical foundations necessary to address the flipped classroom model in higher education. Its purpose was to contextualise the problem, justify the objectives, and define the scope of the study, providing academic support that reinforced the importance of the topic. The theoretical framework was a key element in the research, as it offered the necessary support to highlight the significance of the subject.

Definition of the flipped classroom model

The flipped classroom model is an innovative pedagogical strategy that transforms the traditional dynamic of the teaching-learning process. According to Ventosilla et al. (2021), direct instruction activities, such as the presentation of theoretical content, are moved outside the classroom, primarily using technological resources like videos, interactive readings, or digital presentations. This allows classroom time to be dedicated to practical and collaborative activities, such as debates, problem-solving, case analysis, or group projects. The main goal of this model is to make the student an active participant in their own learning, promoting autonomy and creating an environment that fosters interaction, critical thinking, and the construction of meaningful knowledge.

From an educational perspective, the flipped classroom, according to Alarcón et al. (2021), positions the teacher as a facilitator of learning rather than the sole transmitter of information, while the student adopts an active role by preparing in advance for classroom activities. This approach is based on constructivist theories, which emphasise learning through experiences and social interaction as essential elements for knowledge acquisition. Furthermore, the model encourages the use of educational technologies, which not only enrich learning materials but also meet the needs of modern and dynamic education.

Digitised society

The flipped classroom model is characterised by placing the student at the centre of the educational process, promoting their active participation and autonomous learning. According to Cardoso (2022), the key pedagogical principles of this approach include moving theoretical instruction outside the classroom, using technological resources such as videos, readings, and interactive presentations, which allows students to access content at their own pace. Classroom time is dedicated to practical and collaborative activities, where students apply what they have learned and develop critical thinking and teamwork skills. This model encourages continuous interaction between teachers and students, with the teacher acting as a facilitator of learning, and aims to adapt teaching to the different styles and paces of students, promoting deeper and more meaningful learning.

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Theoretical Foundations

To analyse the impact and effectiveness of the flipped classroom model in higher education, it is essential to ground it in various learning theories that support its student-centred approach. These theories provide the necessary foundation to understand how the flipped classroom promotes deeper and more active learning, tailored to the individual needs and learning paces of each student.

•Constructivism, according to Carrasco (2020), is based on the idea that learning is an active process in which students construct their knowledge through interaction with their environment and

problem-solving. Within the framework of the flipped classroom, this theory supports the notion that students, by independently exploring content outside the classroom, develop a stronger understanding, which enables them to apply their knowledge more effectively during practical activities in class.

•Meaningful learning, according to Ausubel, asserts that students learn more effectively when new information is logically connected to their prior knowledge. In the context of the flipped classroom, Parra et al. (2022) highlight that this principle is reflected in the way students review theoretical content before class, allowing them to relate it to what they already know. This process facilitates a deeper and more lasting understanding during in-class activities.

•Active learning, based on Dewey's ideas, emphasises the importance of students' active participation in their learning process, allowing them to play a key role in constructing their own knowledge. In the flipped classroom model, according to Enríquez (2021), active learning takes place through practical, collaborative, and problem-solving activities in class, fostering greater interaction, reflection, and a dynamic, participatory application of the content

Key Elements of the Flipped Classroom

The fundamental aspects of the flipped classroom model are essential to ensuring its success in teaching. According to Escudero et al. (2020), these elements—which include the active participation of both teachers and students, the effective use of educational technologies, and the organisation of pre-class and in-class activities—work together to transform the way teaching and learning take place, fostering a more interactive and meaningful environment.

•In the flipped classroom model, the roles of the teacher and the student change significantly. The teacher becomes a facilitator and guide in the learning process, providing materials and preliminary guidelines, while the student takes on a more active and autonomous role, researching and assimilating the content independently before attending face-to-face classes.

•The use of educational technologies is another key aspect of the flipped classroom, as it enables students to access theoretical content through digital platforms, videos, readings, and interactive presentations. These tools not only provide a more flexible and accessible learning experience, but also support the personalisation of the educational process, allowing students to learn at their own pace.

•Pre-class and in-class activities are essential for the success of the flipped classroom. Pre-class activities, such as watching videos or reading materials, enable students to familiarise themselves with key concepts before the lesson. This gives them the opportunity to reflect on the content and formulate questions that will be discussed during the class.

The Importance of Active Participation and Meaningful Learning in the Flipped Classroom

According to Tobón (2022), active participation in the educational process refers to the direct engagement of students with their own learning, which involves a proactive, reflective, and collaborative attitude. In the context of the flipped classroom, this concept becomes particularly important, as the model aims to promote students' active participation, transforming them from passive receivers of information into active participants in their learning. By exploring the content independently outside of class, students have the opportunity to interact with digital materials, conduct research, and reflect on the topic before attending in-person lessons.

According to Vásquez (2024), meaningful learning in higher education is essential, as it enables students to link new information with what they already know, fostering a deeper and more lasting understanding of the subjects. Rather than memorising information in isolation, students manage to integrate what they have learned coherently and can apply it in real-life situations, which enhances the use of knowledge in practical and professional contexts.

Educational Technologies in the Flipped Classroom

According to Martínez et al. (2022), educational technologies are key to implementing the flipped classroom model, as they provide flexible and dynamic access to learning resources. Through online platforms, educational videos, collaborative applications, and gamification tools, students can interact with theoretical content before classes and actively engage in practical activities during in-person sessions.

•**Online Learning Platforms:** Platforms such as Moodle, Google Classroom, or Blackboard provide students with access to educational resources, such as readings, videos, and interactive presentations, in a flexible and autonomous manner. Through these tools, teachers can organise content, provide feedback, and track students' progress, which facilitates a more personalised learning experience tailored to each individual's needs.

•**Educational Videos:** Platforms such as YouTube, Vimeo, or materials created by the teachers themselves allow students to view visual explanations of theoretical concepts before lessons. Videos are an effective way to present complex information in a clear and engaging manner, and students can watch them as many times as they need, ensuring they understand the topics at their own pace before putting what they have learned into practice during in-person activities.

•**Online Collaboration Applications:** Tools such as Google Docs, Padlet, or Trulló are essential in the flipped classroom. They allow students to work together on projects, exchange ideas, and solve problems collaboratively, even outside of the classroom. These applications promote teamwork, idea organisation, and continuous interaction between students, enhancing active participation and cooperative learning.

•Benefits of the Flipped Classroom in Higher Education

The flipped classroom model offers several benefits to higher education, promoting the holistic development of students. According to Smith et al. (2023), these benefits include fostering essential skills such as critical thinking, teamwork, and autonomy, improving academic performance by allowing for deeper preparation and understanding of the content, and adapting to different learning styles by offering various ways to interact with educational material.

•**Development of key skills:** It encourages students to develop skills such as critical thinking, teamwork, and autonomy. By taking responsibility for learning the theoretical content independently before classes, students develop critical thinking skills by analysing and reflecting on the information. Furthermore, the collaborative activities in face-to-face classes promote teamwork and joint problem-solving, while the autonomous learning approach supports students' independence and their ability to manage their own educational process.

•**Improvement of academic performance:** Another important benefit of the flipped classroom is that it allows students to review the content at their own pace outside of class, which facilitates a better understanding of the topics before in-class activities. This helps them to arrive at face-to-face sessions better prepared to actively participate in discussions, debates, and practical tasks, leading to improved knowledge retention and better grades and academic performance.

•**Adaptability to different learning styles: It** allows students to interact with the content in different ways. Some may benefit more from visual content through videos, while others prefer to read or use interactive resources. This flexible approach offers several options for accessing educational material, enabling each student to learn according to their preferences and pace, resulting in a more inclusive and effective educational experience.

Challenges of the Flipped Classroom in Higher Education

Although the flipped classroom model offers numerous benefits in higher education, according to Solier et al. (2022), its implementation faces several significant challenges. These challenges must be overcome to ensure a successful and effective transition to the flipped classroom.

•**Teacher training**: Teachers need to develop new pedagogical and technological skills to create and implement effective strategies that encourage active participation and autonomous learning among students. This involves proper training in the use of digital tools and in the planning of activities that promote collaboration and critical thinking, which can be a challenge for those teachers accustomed to traditional teaching methods.

• **Access to technological resources:** This is another key challenge in the implementation of the flipped classroom. Not all students have equal access to electronic devices, the internet, or online learning platforms, which can create a digital divide and limit the participation of those who lack these resources. This challenge requires educational institutions to seek inclusive solutions that ensure access to technologies and resources for all students, regardless of their socio-economic situation.

•**Resistance to change:** Resistance from both teachers and students can also be an obstacle to the adoption of the flipped classroom model. Some teachers may prefer traditional teaching methods due to their familiarity and the sense of having more control over the classroom, while some students may feel insecure or uncomfortable with the autonomous and flexible approach of the flipped classroom.

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Innovations in the flipped classroom model

Innovations in the flipped classroom model have changed the way pedagogical practices are understood in higher education. According to Saravia et al. (2023), one of the main innovations is the use of emerging technologies, such as augmented reality (AR) and artificial intelligence (AI), which allow for further personalisation of the learning process. These tools provide immersive and adaptive experiences, where students can interact with content in a more visual and dynamic way.

Another important innovation is the integration of hybrid methodologies in the flipped classroom, which efficiently combines face-to-face and virtual activities. According to Litardo et al. (2024), this provides students with greater flexibility to access theoretical content through digital platforms, while face-to-face sessions focus on practical activities, discussions, and collaborative problem-solving.

Previous Case Studies

According to Pico et al. (2023) in their research Flipped Classroom in Teaching-Learning Processes in Engineering Degrees: A Systematic Review, the objective was to conduct a systematic review on the impact of the flipped classroom model on the teaching-learning process in engineering degrees. To achieve this, tools based on the principles of the PRISMA statement were used, which helped in the identification, selection, evaluation, and analysis of studies. The overall results showed that the flipped classroom has positive effects on the educational process, such as improved understanding of content, enhanced classroom atmosphere, as well as increased motivation and social interactions among students.

In their research Flipped Classroom in Higher Education: A Study through Student Narratives, García et al. (2019) focused on the use of the flipped classroom model to develop a music course in higher education. They used a narrative method to analyse 33 student narratives from those who participated in the course. In this approach, the theoretical part of the course was delivered through videos, and class time was dedicated to practical activities. The methodology was implemented during the 2016/2017 academic year at a public university in the Community of Madrid, Spain, with a group from the Early Childhood Education degree.

In their research Rethinking Technical Higher Education: Implementing the Flipped Classroom Model as a Possibility for New Learning Approaches, Quispe et al. (2020) highlight that the flipped classroom model offers new pedagogical opportunities in the technical-professional field, aligning with educational reforms in Peru that seek a more flexible, meaningful education that promotes more proactive, autonomous, and critical students. This approach emphasises the need to rethink traditional teaching models, particularly in technical-professional training, in order to overcome the disconnect between conventional teaching and the demands of modern society.

3.MATERIALS AND METHODS

In the implementation of the flipped classroom model in higher education, the study methodology involved a detailed review of the literature on the use of this pedagogical strategy and its impact on the teaching-learning process. This approach allowed for an examination of how the reorganisation of traditional teaching dynamics, moving theory outside the classroom and reserving class time for practical activities, affected motivation, active participation, and the acquisition of key skills in students.

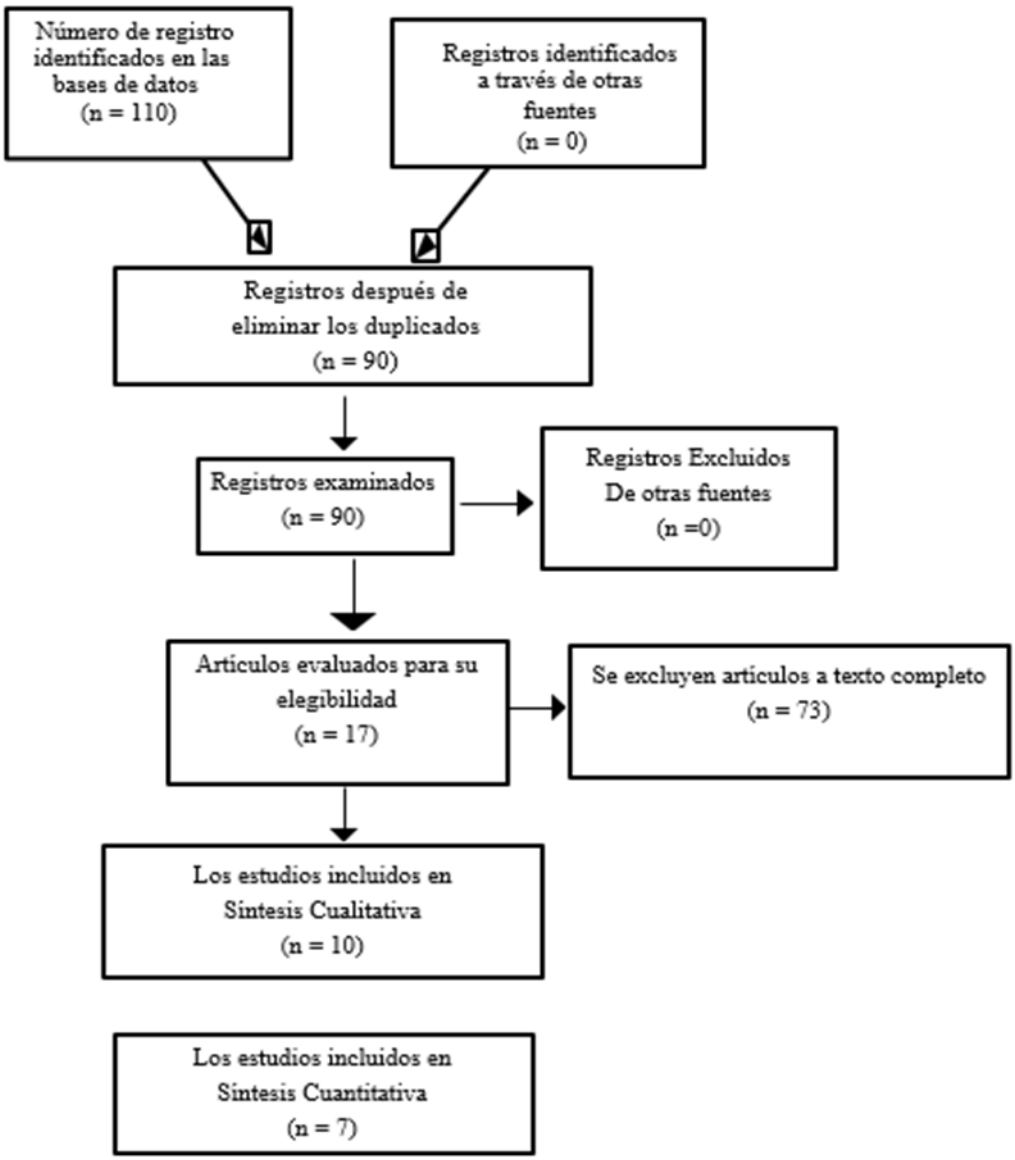
In the early stages of the research on the impact of the flipped classroom model in higher education, strict inclusion and exclusion criteria were applied to select the most relevant sources and studies. This detailed approach strengthened the reliability and validity of the results, ensuring a comprehensive analysis of the benefits and challenges associated with the implementation of this methodology. During the systematic review, 110 records were identified in the main academic databases, with no additional records found in other sources. After removing duplicates, 90 records were reviewed to provide a comprehensive overview of how the flipped classroom influences students' active participation, the acquisition of key skills, and the improvement of academic performance in higher education.

To conduct the literature review on the impact of the flipped classroom model in higher education, clear criteria were established to ensure the quality and relevance of the selected studies. Recent research, published in the last five years, was chosen to ensure the information was up-to-date and pertinent. Studies that examined how the flipped classroom affects active participation, the acquisition of key skills, and the improvement of academic performance were prioritised. Additionally, it was verified that the methodology used in the studies was clear and replicable, which allowed for a thorough understanding of the research processes and results relevant to implementing the flipped classroom in the university context. In total, 17 articles were evaluated for eligibility; of these, 10 were included in the qualitative synthesis and 7 in the quantitative synthesis.

To conduct the systematic review on the impact of the flipped classroom model in higher education, specific criteria were established to exclude certain studies. Seventy-three articles were discarded for not addressing how the flipped classroom affects students' active participation, the acquisition of key skills, or pedagogical strategies related to this model. Additionally, studies that did not use appropriate methods to measure the effectiveness of the flipped classroom, as well as those not published in peer-reviewed academic journals or not from recognised academic institutions, were removed.

The PRISMA method was used.

https://hollyhartman.shinyapps.io/PRISMAFlowDiagram/



4.RESULTS

The findings of this study highlight key aspects of the impact of the flipped classroom model in higher education, particularly regarding students' active participation, the use of educational technologies, and the development of critical skills. The analysis of previous studies demonstrated how this model promotes a better understanding of content, enhances academic performance, and fosters greater collaboration among students.

Table 1. Key Characteristics and Elements of the Flipped Classroom

Aspect	Description	Reference
Definition	A pedagogical strategy that moves theoretical instruction outside the classroom, using technological resources.	Ventosilla et al. (2021)
Student-centred approach	Student-centred, promoting autonomous and active learning.	Cardoso (2022)
Role of the teacher	Acts as a facilitator and guide of learning.	Escudero et al. (2020)
Technological resources	Use of videos, platforms, and interactive readings for pre-learning.	Alarcón et al. (2021)
Classroom activities	Collaborative practices, problem-solving, and debates.	Escudero et al. (202)

Note: The flipped classroom was characterised by a focus on independent learning, where students had access to content in advance through resources such as videos, readings, or interactive materials. In-person activities focused on applying knowledge in a practical way, promoting problem-solving, teamwork, and the development of critical skills.

Table 3. Benefits, challenges, and innovations in the flipped classroom

Aspect	Description	Reference
Benefit: Competencies	Development of critical thinking, teamwork, and autonomy.	Smith et al. (2023)
Benefit: Performance	Better preparation and understanding before in-person activities.	Smith et al. (2023)
Challenge: Teacher training	Requires pedagogical and technological skills to design effective strategies.	Solier et al. (2022)
Challenge: Digital divide	Unequal access to technological resources among students.	Solier et al. (2022)
Innovation: Technologies		Saravia et al. (2023)

Aspect	Description	Reference
Innovation: Hybrid	Use of augmented reality and artificial intelligence to personalise learning. Combination of in-person and virtual activities for greater flexibility.	Litardo et al. (2024)

Note: The flipped classroom provided multiple benefits, such as fostering student autonomy, a higher level of class participation, and the opportunity to personalise learning. However, it also posed some challenges, such as the need for continuous access to technology and the adaptation of both teachers and students to this model.

5.DISCUSSION

The flipped classroom model has proven to be an innovative pedagogical strategy that revolutionises the traditional approach to teaching. According to Ventosilla et al. (2021), this methodology allowed theoretical lessons to be moved outside the classroom, using technological tools such as videos and interactive readings. This created a more dynamic and collaborative classroom environment, where students put into practice what they had learned through debates and projects. The emphasis on active participation and student autonomy had a significant impact on their learning process.

From a theoretical perspective, Alarcón et al. (2021) pointed out that the flipped classroom is closely linked to constructivism, where students develop their knowledge through interaction and problem-solving. Furthermore, this model aligns with Ausubel's concept of meaningful learning, as it allows students to relate new information to their prior knowledge. This not only facilitated a better understanding of the content but also promoted learning tailored to the diverse individual styles and paces.

Cardoso (2022) highlighted that educational technology was crucial for the success of the flipped classroom. Tools such as online learning platforms, videos, and collaboration apps provided students with flexible access to resources. These technologies not only facilitated preparation before classes but also encouraged teamwork and the development of critical skills, creating a more interactive and participatory environment.

Tobón (2022) emphasised that active student participation was essential in this model. The independent study of content outside the classroom, combined with practical and collaborative activities in class, strengthened their learning in a dynamic way. This approach enabled students to become the protagonists of their own educational process, which favoured better retention of knowledge and the development of key skills such as critical thinking and teamwork.

Saravia et al. (2023) highlighted how innovative technologies, such as artificial intelligence and augmented reality, have enhanced the impact of the flipped classroom in higher education. These tools have allowed for personalised learning, adapting it to the individual needs of each student, representing a significant advancement in the implementation of this methodology. Despite challenges such as unequal access to technological resources and resistance to change, the benefits of

the flipped classroom have far outweighed its limitations, solidifying it as a key tool in contemporary teaching.

6.CONCLUSION

The flipped classroom model represents a significant shift in teaching practices, standing out as a strategy that fosters active, autonomous, and collaborative learning among students. This approach allows for better use of classroom time, focusing on practical activities that promote the development of critical thinking and problem-solving skills. Furthermore, the use of educational technologies in this model not only facilitates access to theoretical content but also offers a more flexible learning experience, tailored to the diverse styles and paces of students.

The implementation of the flipped classroom model in higher education has proven effective in improving academic performance, as students arrive better prepared for in-person classes. This student-centred approach fosters the development of essential competencies such as autonomy, teamwork, and critical thinking skills. However, significant challenges remain, such as the need to train educators and overcome technological barriers, which must be addressed for successful adoption. The flipped classroom plays a crucial role in increasing active participation among university students in various areas. By moving the acquisition of theoretical content outside the classroom, an environment is created where students take a more active role, interacting with their peers and lecturers to solve problems and apply knowledge practically. This approach not only enhances understanding of the topics but also develops key skills such as critical thinking and collaboration.

However, the adoption of this model in higher education institutions presents several challenges that affect both lecturers and students. Some of the main obstacles include the lack of training for lecturers in the use of technological tools, resistance to changing traditional teaching methodologies, and disparities in students' access to technology. Overcoming these challenges is crucial to ensuring that the flipped classroom model becomes an effective and accessible tool in the university context.

Finally, the flipped classroom is considered an inclusive pedagogical strategy that meets the demands of a digitalised society. Despite the resistance to change that some educational sectors may have, its ability to adapt to students' needs and leverage technological innovations makes it a key tool for transforming and enriching teaching and learning processes in higher education.

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