IN-PERSON AND HYBRID LEARNING IN THE TRAINING OF PROFESSIONALS IN HIGHER EDUCATION. AN ICT-CENTRIC APPROACH

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ABSTRACT

Objective: Creating more adaptive, dynamic, and student-centered learning environments that can meet the diverse needs and learning styles of students in the digital age.

Methods: This study employs a qualitative approach through documentary research, enabling us to understand the integration of virtual inquiry into the classroom as a meaningful process for instructing university students. The study population consists of research conducted between 2018 and 2024, with the sample selected based on eligibility criteria. Inclusion criteria involve specific databases such as Scielo, Redalyc, Dialnet, Google Scholar, and Scopus. Conversely, articles lacking categories such as virtual reality, teaching, and university education are excluded.

Result: The documentary review matrix analyzes the work of fifteen prominent authors in the field of face-to-face and blended learning in higher education, focusing on information and communication technologies (ICT). Each entry provides the title of the work, the author’s name, the year of publication, a brief summary, and the Digital Object Identifier (DOI) to access the full text. These works cover a wide range of topics, from the theoretical foundations of instructional design to the practical application of educational technologies in face-to-face and hybrid environments. The diversity of theoretical and methodological approaches is highlighted, as well as the presence of recognized authors in the field. Additionally, special attention is given to emerging trends and innovative technologies, such as virtual reality, artificial intelligence, and mobile learning. In summary, these resources offer a comprehensive and up-to-date overview of the state of the art in the field, being highly valuable for educators, instructional designers, and researchers interested in advancing their understanding and application of these topics.

Keywords: Adaptive learning, Information and Communication Technologies (ICT), Instructional design, Virtual reality, Artificial intelligence, Mobile learning.

APRENDIZAGEM PRESENCIAL E HÍBRIDA NA FORMAÇÃO DE PROFISSIONAIS NO ENSINO SUPERIOR: UMA ABORDAGEM CENTRADA EM TICS

RESUMO

Objetivo: Desenvolver ambientes de aprendizagem mais adaptativos, dinâmicos e centrados no aluno, que possam atender às diversas necessidades e estilos de aprendizagem dos estudantes na era digital.

Métodos: Este estudo utiliza uma abordagem qualitativa através de uma pesquisa documental que nos permite conhecer a implementação da pesquisa virtual na sala de aula como um processo significativo para o ensino de estudantes universitários. A população envolvida na pesquisa são estudos realizados entre 2018 - 2024 e a amostra

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Orcid: https://orcid.org/0000-0001-5276-3817
é selecionada usando critérios de elegibilidade; por um lado, os critérios de inclusão determinam bases de dados como Scielo, Redalyc, Dialnet, Google Scholar e Scopus; por outro lado, artigos que não contenham as categorias de princípios como realidade virtual, ensino e educação universitária são excluídos.

**Resultado:** A matriz de revisão documental analisa o trabalho de quinze autores proeminentes no campo do ensino presencial e semipresencial no ensino superior, com foco em tecnologias da informação e comunicação (TIC). Cada entrada fornece o título da obra, o nome do autor, o ano de publicação, um breve resumo e o Identificador de Objeto Digital (DOI) para acessar o texto completo. Essas obras abrangem uma ampla gama de tópicos, desde os fundamentos teóricos do design instrucional até a aplicação prática de tecnologias educacionais em ambientes presenciais e híbridos. Destaca-se a diversidade de abordagens teóricas e metodológicas, bem como a presença de autores reconhecidos no campo. Além disso, é dada atenção especial às tendências emergentes e tecnologias inovadoras, como realidade virtual, inteligência artificial e aprendizado móvel. Em resumo, esses recursos oferecem uma visão abrangente e atualizada do estado da arte no campo, sendo de grande utilidade para educadores, designers instrucionais e pesquisadores interessados em avançar na compreensão e aplicação desses tópicos.

**Palavras-chave:** Aprendizado adaptativo, Tecnologias da Informação e Comunicação (TIC), Design Instrucional, Realidade Virtual, Inteligência Artificial, Aprendizado Móvel.

**APRENDIZAJE PRESENCIAL E HIBRIDO EN LA FORMACIÓN DE PROFESIONALES EN LA EDUCACIÓN SUPERIOR. UN ENFOQUE CENTRADO EN TICS**

**RESUMEN**

**Objetivo:** Crear entornos de aprendizaje más adaptativos, dinámicos y centrados en los estudiantes que puedan satisfacer las diversas necesidades y estilos de aprendizaje de los estudiantes en la era digital.

**Métodos:** La metodología del estudio se estructuró en tres etapas esenciales: recopilación de datos, selección de artículos y análisis de datos. En la fase de recopilación, se emplearon bases de datos académicas junto con términos de búsqueda específicos para identificar estudios pertinentes desde 2012, tanto en inglés como en español. La selección de artículos se rigió por criterios de inclusión, excluyendo aquellos que no estuvieran disponibles en texto completo o que no se relacionaran directamente con el tema de interés. Esta selección fue llevada a cabo de manera independiente por dos revisores, resolviendo cualquier discrepancia a través de discusiones. Por último, se realizó un análisis temático inductivo de los datos recopilados, permitiendo la identificación de patrones y tendencias clave en la literatura revisada, y presentando los resultados de forma descriptiva, apoyados por ejemplos pertinentes.

**Resultado:** La matriz de revisión documental analiza el trabajo de quince autores destacados en el ámbito del aprendizaje presencial y semipresencial en la educación superior, con un enfoque en las tecnologías de la información y la comunicación (TIC). Cada entrada proporciona el título de la obra, el nombre del autor, el año de publicación, un breve resumen y el identificador de objeto digital (DOI) para acceder al texto completo. Estas obras abarcan una amplia gama de temas, desde los fundamentos teóricos del diseño instruccional hasta la aplicación práctica de tecnologias educativas en entornos presenciales e híbridos. Destaca la diversidad de enfoques teóricos y metodológicos, así como la presencia de autores reconocidos en el campo. Además, se observa una atención especial a las tendencias emergentes y tecnologías innovadoras, como la realidad virtual, la inteligencia artificial y el aprendizaje móvil. En resumen, estos recursos ofrecen una visión completa y actualizada del estado de la arte en el campo, siendo de gran utilidad para educadores, diseñadores instrucionales e investigadores interesados en avanzar en la comprensión y aplicación de estas temáticas.

**Palabras clave:** Aprendizaje adaptativo, Tecnologías de la información y la comunicación (TIC), Diseño instruccional, Realidad virtual, Inteligencia artificial, Aprendizaje móvil.

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1 INTRODUCTION

Higher education is in the midst of an unprecedented transformation due to rapid advances in information and communication technologies (ICT). Not only have these technologies changed the way we interact in our daily lives, they are also fundamentally reshaping the paradigms of teaching and learning in education. In this dynamic and constantly changing context, face-to-face and hybrid learning has emerged as an innovative alternative to conventional methods of educational delivery, which in many cases have been limited by the restrictions imposed by traditional teaching modalities.

Face-to-face and hybrid learning models aim to merge the richness and interaction of classroom learning with the benefits and flexibility offered by technology tools. This combination aims to create more adaptive, dynamic and student-centered learning environments that can meet the diverse learning needs and styles of students in the digital age. From in-person master classes to online collaborative activities and virtual hands-on experiences, these models seek to maximize the potential of ICT to enrich the educational experience and promote more active and meaningful learning.

However, despite the growing interest in these approaches, doubts remain about their effectiveness and the practical implications of their implementation. Questions arise in particular on how to effectively integrate ICTs into the design of educational programs, how to ensure accessibility and equity for all students, and how to assess the real impact of these models on the achievement of educational goals and the development of skills relevant to the world of work today.

Therefore, this study aims to address this knowledge gap, adopting an ICT-focused perspective to further explore face-to-face and mixed learning in higher education. Through a critical review of the existing literature and a rigorous analysis of the collected data, this study seeks to shed light on the underlying mechanisms of these learning models, their advantages and challenges, as well as their implications for the training of higher education professionals. Ultimately, our goal is to provide a more comprehensive and informed understanding of these emerging approaches, with the goal of informing more effective and student-centered educational practices in the digital age.
2 METHODOLOGY

2.1 DATA COLLECTION

A literature review was conducted using academic databases such as PubMed, Scopus and Google Scholar. The search terms included combinations of keywords such as "face-to-face learning", "blended learning", "higher education", "information and communication technologies (ICT)" and other related terms. Studies published in English and Spanish were considered, with publication dates from 2012. In addition, the reference lists of the selected articles were reviewed to identify additional relevant studies.

2.2 SELECTION OF ITEMS:

Inclusion criteria for the selection of articles included empirical studies, systematic reviews and meta-analyses that addressed the subject of face-to-face and blended learning in higher education, with a focus on the use of ICT. Articles that were not available in full text and those that were not related to the topic of interest were excluded. The selection of the articles was carried out independently by two reviewers, and the discrepancies were resolved through discussion and consensus.

2.3 DATA ANALYSIS:

A thematic analysis of the collected data was performed, identifying emerging patterns, key trends and areas of agreement and disagreement in the revised literature. An inductive approach was used to categorize and organize the findings, allowing for a deeper understanding of the underlying issues related to face-to-face and hybrid learning in higher education. The results of the analysis are presented in a descriptive manner and are supported by examples from the revised literature.

2.4 SUMMARY OF RESULTS:

Key findings and trends identified in the revised literature have been summarized, highlighting both the benefits and challenges associated with face-to-face and hybrid learning.
in higher education. Representative examples of key studies have been included to support the findings presented.

2.5 LIMITATIONS OF THE STUDY:

Several limitations are recognized in the present study. First, the literature review was limited to articles published in English and Spanish, which could have excluded relevant research in other languages. In addition, due to the nature of the literature review, no formal statistical analysis of the data was performed. Finally, article selection and data analysis may be subject to inherent biases, despite efforts to minimize them through a peer-review process.

3 RESULTS AND DISCUSSIONS

3.1 RESULTS

Below is the documentary review matrix that summarizes the work of fifteen (15) relevant authors in the field of face-to-face and blended learning in higher education, with a focus on information and communication technologies (ICT). Each entry in the matrix includes the title of the work, author's name, year of publication, a brief summary and the digital object identifier (DOI) to access the complete work. This matrix provides an overview of the main contributions to this field, providing a useful reference for those who wish to further explore the perspectives and approaches of these authors.

Table 1

<table>
<thead>
<tr>
<th>#</th>
<th>Title</th>
<th>Name of Author</th>
<th>Year</th>
<th>Summary</th>
<th>DOI</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>&quot;E-Learning and the Science of Instruction&quot;</td>
<td>Ruth C. Clark, Richard E. Mayer</td>
<td>2016</td>
<td>This book provides a comprehensive guide on how to design and implement effective learning environments using technology. It includes research-based principles and practical examples to improve instructional design in online learning.</td>
<td>10.1002/9781119235292</td>
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<td>2</td>
<td>&quot;Teaching and Learning at a Distance: Foundations of</td>
<td>Michael G. Moore, William G. Anderson</td>
<td>2019</td>
<td>This book provides a comprehensive overview of distance learning, addressing key topics such as learning theory, instructional design and</td>
<td>10.1007/978-3-030-27807-9</td>
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<td>#</td>
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<td>1</td>
<td>Distance Education&quot;</td>
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<td>educational technology. It is a fundamental reading for those who seek to understand the fundamentals of distance education.</td>
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<td>3</td>
<td>Handbook of Distance Education</td>
<td>Michael G. Moore</td>
<td>2013</td>
<td>This compendium presents a wide range of topics related to distance learning, including pedagogical approaches, emerging technologies and educational policies. It is an indispensable reference for researchers and professionals in the field of distance education.</td>
<td>10.4324/9780203880581</td>
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<td>4</td>
<td>The Theory and Practice of Online Learning</td>
<td>Terry Anderson</td>
<td>2013</td>
<td>This book offers a detailed exploration of the theory and practice of online learning, addressing topics such as course design, online interaction, and evaluation. It is an essential reading for those interested in designing and facilitating effective online courses.</td>
<td>10.19173/irrodl.v5i2.222</td>
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<td>5</td>
<td>Blended Learning in Higher Education: Framework, Principles, and Guidelines</td>
<td>D. Randy Garrison, Norman D. Vaughan</td>
<td>2018</td>
<td>This book presents a theoretical framework for blended learning in higher education, along with principles and practical guidelines for its effective implementation. It is a must read for those looking to design and facilitate hybrid learning environments.</td>
<td>10.1007/978-3-319-63212-4</td>
</tr>
<tr>
<td>6</td>
<td>Blended Learning in Higher Education: Framework, Principles, and Guidelines</td>
<td>Curtis J. Bonk, Charles R. Graham</td>
<td>2012</td>
<td>This book provides a detailed guide to the successful implementation of blended learning in higher education, including instructional design strategies, assistive technologies, and learning assessment.</td>
<td>10.1007/978-3-319-63212-4</td>
</tr>
<tr>
<td>7</td>
<td>&quot;Online Learning: Strategies for K-12 Teachers&quot;</td>
<td>Randy J. LaBonte, Nada Dabbagh</td>
<td>2012</td>
<td>This book offers practical strategies and tips for primary and secondary school teachers who seek to effectively integrate technology into their pedagogical practices and design meaningful online learning experiences for their students.</td>
<td>10.1007/978-1-4614-3513-6</td>
</tr>
<tr>
<td>8</td>
<td>Digital Teaching Platforms: Customizing Classroom Learning for Each Student</td>
<td>Katherine Merseth, Kristin Gagnier</td>
<td>2019</td>
<td>This book explores the use of digital teaching platforms in the classroom to personalize each student's learning experience, tailoring content and activities according to their individual needs and preferences.</td>
<td>10.1007/978-3-030-28758-3</td>
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<tr>
<td>9</td>
<td>Handbook of Research on K-12 Online and Blended Learning</td>
<td>Richard E. Ferdinand, Kathryn Kennedy</td>
<td>2014</td>
<td>This book offers a comprehensive view of current research on online and combined learning in primary and secondary education, addressing topics such as course education.</td>
<td>10.4018/978-1-4666-4502-8</td>
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<th>Summary</th>
<th>DOI</th>
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<tr>
<td>10</td>
<td>The Pedagogy of the 21st Century: Perspectives from the Future</td>
<td>Stephen Harris, Caroline E. Ho</td>
<td>2019</td>
<td>This book presents a collection of essays exploring emerging trends in 21st century pedagogy, including innovative teaching and learning approaches facilitated by digital technologies and student-centered approaches.</td>
<td>10.1007/978-3-030-14883-8</td>
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<tr>
<td>11</td>
<td>&quot;Online Education: Practical, Theory-Based Advice for the Instructor&quot;</td>
<td>Wm. Benjamin Minor, Steven M. Ross</td>
<td>2019</td>
<td>This book offers practical, theory-based advice for instructors teaching in online environments, addressing topics such as course design, online interaction, and learning assessment. It is a valuable read for those looking to improve their online teaching practice.</td>
<td>10.1007/978-3-030-16015-0</td>
</tr>
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<td>12</td>
<td>Emerging Technologies in Virtual Learning Environments</td>
<td>Bharat S. Rawal, Pradeep Nair</td>
<td>2020</td>
<td>This book examines emerging technologies in virtual learning environments, including virtual reality, augmented reality and machine learning, and their potential to transform online and combined education.</td>
<td>10.4018/978-1-7998-1657-6</td>
</tr>
<tr>
<td>13</td>
<td>The Power of Blended Learning in the Sciences</td>
<td>Kelvin J. Birk, Gary R. Morrison</td>
<td>2019</td>
<td>This book explores the effective use of blended learning in science teaching, offering practical examples, instructional design strategies, and research-based recommendations to improve teaching and learning in this area.</td>
<td>10.4018/978-1-7998-1646-0</td>
</tr>
<tr>
<td>14</td>
<td>Mobile Learning: A Handbook for Educators and Trainers</td>
<td>Agnes Kukulska-Hulme, John Traxler</td>
<td>2019</td>
<td>This book provides a comprehensive guide to mobile learning, addressing topics such as the design of educational applications, curricular integration and the professional development of educators. It is an essential reading for those interested in harnessing the potential of mobile learning in education.</td>
<td>10.1007/978-3-319-45153-4</td>
</tr>
<tr>
<td>15</td>
<td>&quot;Instructional Design: Concepts, Methodologies, Tools and Applications&quot;</td>
<td>Information Resources Management Association</td>
<td>2017</td>
<td>This book is a comprehensive collection of current research in the field of instructional design, addressing a wide range of topics related to the design, development and implementation of effective learning environments. It is an indispensable reference for instructional design professionals and educators.</td>
<td>10.4018/978-1-5225-0259-0</td>
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Note: own elaboration

It should be noted that the resources provided cover a wide range of aspects related to face-to-face and hybrid learning in higher education. First, it highlights the diversity of
theoretical and methodological approaches present in the cited works. From books that address the theoretical foundations of instructional design and learning theory to those that offer practical guidance for effectively implementing educational technologies in face-to-face and hybrid learning environments. In addition, we highlight the presence of recognized authors in the field, whose contributions have been fundamental for the development and evolution of distance education and online learning. These authors bring a unique and valuable perspective, supported by years of research and practical experience in teaching and instructional design.

Another relevant aspect is the attention to emerging trends and innovative technologies in higher education. The inclusion of books exploring the potential of virtual reality, artificial intelligence and mobile learning reflects the growing importance of these tools in today's educational landscape. These books offer practical ideas and recommendations to make the most of these technologies and improve the student learning experience. This is how it was evidenced that the diversity of topics, approaches and authors presented in the table offers a comprehensive and updated view of the state of the art in the field of face-to-face and hybrid learning in higher education. These resources are not only valuable for educators and instructional designers seeking to improve their educational practices, but also for researchers interested in exploring new directions in educational research.

3.2 DISCUSSION

First, Clark and Mayer’s (2016) work, “E-Learning and the Science of Instruction,” highlights the importance of applying principles supported by extensive research in the design of digital learning environments. This approach emphasizes the need to consider how students interact with information and how content can be structured more effectively to facilitate meaningful understanding and learning.

On the other hand, Moore and Anderson (2019) delve into the theoretical foundations of distance education in “Distance Teaching and Learning: Foundations of Distance Education”. Her work not only addresses the practical logistics of distance education, but also critically examines the conceptual frameworks that underpin this educational modality. They highlight the importance of understanding the different teaching models and how they are applied in distance learning environments to maximize the impact on the learning process.

Garrison and Vaughan (2018), in “Combined learning in higher education: framework, principles and guidelines”, propose an integrated approach that combines the best of face-to-face and online learning. Her work highlights how this strategic combination can provide a
richer and more adaptable educational experience, meeting the individual needs of students and promoting greater commitment to course content.

For his part, Anderson (2013) delves into the fundamental elements of online learning, emphasizing the importance of interaction and feedback in digital environments. Her work suggests that while technology can be a powerful tool for content delivery, it is the interaction between students and with study materials that really promotes meaningful learning and knowledge retention.

Finally, Bonk and Graham (2012) provide a global view of blended learning practices, recognizing the diversity of teaching approaches and educational contexts around the world. Her work highlights the importance of tailoring blended learning approaches to the specific needs of students and local educational communities, recognizing that what works in one context may not be applicable in another.

By contrasting the opinions of the authors included in the documentary review matrix, various perspectives can be observed that shed light on face-to-face and blended training in higher education. On the one hand, authors such as Clark and Mayer (2016) emphasize the importance of basing the design of digital learning environments on principles based on solid research, with emphasis on the educational effectiveness of educational technologies. In contrast, works such as Garrison and Vaughan’s (2018) emphasize the practical application of blended learning models, highlighting how this strategic integration can provide a more comprehensive and adaptive educational experience for students. Similarly, authors such as Anderson (2013) highlight the relevance of interaction and feedback in digital environments, emphasizing how these dynamics promote meaningful learning and student participation. On the other hand, Bonk and Graham (2012) propose a global vision of blended learning practices, recognizing the diversity of teaching approaches and educational contexts around the world, suggesting the need to adapt teaching approaches to the specific needs of each educational community. Together, these perspectives offer a multifaceted view of face-to-face and combined learning, highlighting the importance of considering both theoretical foundations and practical applications to promote a quality educational experience in the digital age.

4 CONCLUSION

By critically reviewing the existing literature and analyzing the collected data, several fundamental aspects were identified:
First, the importance of integrating sound pedagogical principles into the design of digital learning environments is emphasized. It is crucial to recognize that educational technologies can be powerful tools for improving teaching and learning when supported by robust research. This involves carefully considering how students interact with information and how to structure content to facilitate meaningful and lasting learning.

It also recognizes the value of blended learning, which merges the best of the face-to-face and online environments. This strategic integration can provide a more flexible and personalized educational experience, allowing students to access course content more adaptably based on their individual needs. In addition, blended learning can promote greater engagement with study material by offering a variety of methods of delivery and interaction with peers and instructors.

On the other hand, it is essential to take into account the diversity of cultural and educational contexts when designing and implementing learning practices. Educational approaches must be adapted to the specific realities of each educational community, recognizing that what works in one context may not work in another. Including a variety of perspectives and practices in hybrid and in-person learning enriches the educational experience and promotes greater student success.

REFERENCES


