

DIDACTIC MODELS IN DIGITAL EDUCATION: REFLECTIONS FOR AN INTERNATIONAL COMPARATIVE STUDY

MODELOS DIDÁTICOS EM EDUCAÇÃO DIGITAL: REFLEXÕES PARA UM ESTUDO COMPARATIVO INTERNACIONAL

MODELOS DIDÁCTICOS EN EDUCACIÓN DIGITAL: REFLEXIONES PARA UN ESTUDIO COMPARATIVO INTERNACIONAL

Ismael Vieira¹ [0000-0003-2054-5123]

Roberto Baelo² [0000-0003-1003-6739]

Paula Peres³ [0000-0003-4964-5929]

¹ISCAP/P.PORTO & Universidade de León, Portugal, icv@iscap.ipp.pt

²Universidade de León, Spain, rbaea@unileon.es

³ISCAP/P.PORTO, Portugal, pperes@iscap.ipp.pt

Abstract

This paper aims to reflect on the importance of digital didactics in digital educational processes in higher education (HE). It seeks to provide a general overview of the state of the discussion on digital didactics, specifically the concept of digital didactics, the relevance of specific didactic models for digital educational environments, and the need for teacher training in this field. Literature shows that there still is a gap between the wide range of educational technologies available and the didactic knowledge necessary to effectively use of ICT in teachers' professional practice. This paper also includes an overview of our doctoral project in Digital Didactics taking place at University of León (Spain), with two important objectives in mind: to ascertain and classify the most prevalent didactic models and methods used in digital education in the international literature, and to understand whether the existing training programs in three higher education institutions, in countries such as Portugal, Spain and Finland, are adequate and encourage the adoption of active models and methods in digital education. Based on a mixed cross-sectional type design the project will be conducted in two main phases: a systematic literature review about digital didactics, followed by data collection through a survey and interviews, statistical analysis and content analysis on teacher training programs in HE and the use of didactic models/methods in digital education at three HE institutions.

Keywords: digital education, digital didactics, didactic models, higher education.

Resumo

Este artigo tem como objetivo refletir sobre a importância da didática digital nos processos educativos digitais no Ensino Superior (ES). Procura fornecer uma visão geral do estado da discussão sobre a didática digital, especificamente o conceito de didática digital, a relevância de modelos didáticos específicos para ambientes educativos digitais e a necessidade de formação de professores nesta área. A literatura mostra que ainda existe uma lacuna entre a ampla gama de tecnologias educativas disponíveis e o conhecimento didático necessário para utilizar eficazmente as TIC na prática profissional dos professores. Este artigo também inclui uma visão geral do nosso projeto de doutoramento em Didática Digital a decorrer na Universidade de León (Espanha), com dois objetivos importantes em mente: identificar e classificar os modelos e métodos didáticos mais prevalentes utilizados na educação digital na literatura internacional e compreender se os programas de formação existentes em três instituições de ES, em países como Portugal, Espanha e Finlândia, são adequados e incentivam a adoção de modelos e métodos ativos na educação digital. Com base num desenho de tipo transversal misto, o projeto será realizado em

duas fases principais: uma revisão sistemática da literatura sobre didática digital, seguida da recolha de dados através de inquéritos e entrevistas, análise estatística e análise de conteúdo sobre programas de formação de professores no ES e o uso de modelos/métodos didáticos na educação digital em três instituições de ES.

Palavras-chave: educação digital, didática digital, modelos didáticos, ensino superior.

Resumen

Este artículo tiene como objetivo reflexionar sobre la importancia de la didáctica digital en los procesos educativos digitales en la Educación Superior (ES). Busca proporcionar una visión general del estado de la discusión sobre la didáctica digital, específicamente el concepto de didáctica digital, la relevancia de modelos didáticos específicos para entornos educativos digitales y la necesidad de formación docente en este campo. La literatura muestra que aún existe una brecha entre la amplia gama de tecnologías educativas disponibles y el conocimiento didáctico necesario para utilizar eficazmente las TIC en la práctica profesional de los docentes. Este artículo también incluye una visión general de nuestro proyecto doctoral en Didáctica Digital que se lleva a cabo en la Universidad de León (España), con dos objetivos importantes en mente: determinar y clasificar los modelos y métodos didácticos más prevalentes utilizados en la educación digital en la literatura internacional, y comprender si los programas de formación existentes en tres instituciones de ES, en países como Portugal, España y Finlandia, son adecuados y fomentan la adopción de modelos y métodos activos en la educación digital. Basado en un diseño de tipo transversal mixto, el proyecto se llevará a cabo en dos fases principales: una revisión sistemática de la literatura sobre didáctica digital, seguida de la recopilación de datos a través de encuestas y entrevistas, análisis estadístico y análisis de contenido sobre los programas de formación docente en ES y el uso de modelos/métodos didácticos en la educación digital en tres instituciones de ES.

Palabras-clave: educación digital, didáctica digital, modelos didácticos, educación superior.

INTRODUCTION

The development of digital education in recent years and the increased use of information and communication technologies (ICT) in education has generated enthusiasm at all levels of education and training. However, contrary to what one might think, the latest UNESCO report on global education (UNESCO, 2023) states that "There is little robust evidence on digital technology's added value in education" (p. 3) and that many teachers do not feel prepared and confident to teach using digital technologies (p. 166). There seems to be a gap between the wide range of educational technologies available and the didactic knowledge necessary to effectively use ICT in the professional practice of teachers.

As Bezoluk *et al.* (2021) points out, there is a process of "digitization" occurring in education, that is the use of traditional methods with the help of ICT tools, for example conducting a lecture in online format. In this sense the new digital age requires pedagogy to rethink traditional didactic foundations (p.2). The new didactics must combine new innovative digital technologies, the development of electronic resources that can skillfully combine learning goals, content, and results. But above all, must recognize students as connected learners, more than traditional views that differentiate students as passive or active learners (Tchoshanov, 2013). The new generation of students, also known as Generation Z, is characterized by the inability to focus on one thing for a long time, impatience, reluctance to engage in repetitive activities, but also for the ability to parallel processing of different information, that are reasons enough for introducing new projects, concepts, and didactic approaches (Bezoluk *et al.* (2021).

On the other side, teachers must adopt new pedagogical principles, including being skillful in digital didactics, because it's counterproductive and ineffective to keep "embedding" the traditional didactics into digital education processes. It is imperative that teachers acquire digital technological skills to work in digital education ecosystems. In this scenario, is crucial the acquisition of didactic technological competencies as an integral part of a teacher's professional competency since digital competencies in this field mainly refers to the ability of teachers to use digital tools and resources in their teaching.

This paper aims to reflect on the importance and uniqueness of digital didactics in digital education processes in higher education. Its purpose is to provide an overview of the current situation surrounding this topic, focusing on aspects that are currently under discussion, such as the concept of digital didactics itself, the relevance of specific didactic models for digital educational environments, and the need for updating skills in this field by teachers. Subsequently, we explain how this doctoral project will be conducted, highlighting the objectives and the methodology to be used.

1 IS THERE A NEED FOR NEW DIDACTICS IN DIGITAL EDUCATION?

Didactics known to date have mostly been conceived for and by a world that was unaware of the new virtual environments. On that scenario, the didactic models used in Digital Education often replicate the didactics used in conventional face-to-face classes. Theories of learning such as behaviorism, cognitivism, and constructivism were narratives designed for another reality, and today they are in the process of reinventing themselves or making way for new narratives (Ortega González *et al.*, 2020). This happens due to technological changes occurring constantly, and new approaches of teaching and learning will proliferate because technology has disrupted the traditional and formal educational processes of higher education. Despite a wide variety of approaches, models, and methodologies, derived from the so-called emerging pedagogies (Ortega González *et al.*, 2020), at the didactic level still exist models that replicate traditional didactics (instructive type).

Digital Education, dematerialized, mediated by ICTs and often without the presence of a teacher and other colleagues brings new challenges to the teaching and learning process. Besides the content knowledge and the technological dimensions there is a pedagogical issue to be enhanced, that is many teachers still use traditional teaching methods in digital education, which were created for the pre-digital generation (Kędzierska & Wnęk-Gozdek, 2015). It means that there is a gap between the new generations' ways of learning and the teachers' way of teaching. In this situation, new didactic models more adjusted to digital teaching are required.

Digital education requires a more complex organization than the traditional classroom. It requires a digital education ecosystem (OECD, 2023) where the digital competencies of the teachers will have a key role. Besides the digital tools and resources that could support effective teaching and learning in the classroom, there should be strong didactic competencies that will help to achieve important educational goals such as making education more inclusive, engaging and equitable, providing a holistic education, etc.

The most recent Global Education Monitoring Report from UNESCO (2023) highlighted that there is little robust evidence of digital technology's added value in education since technology evolves faster than it is possible to integrate and evaluate. The report emphasizes that although some educational technologies have the potential to improve certain types of learning in some contexts, the incorporation of technology into education is not focusing on learning outcomes but rather on digital contributions. The report gives the example of Peru, where during the Covid-19 pandemic, over 1 million computers were distributed, but their use was not integrated into pedagogy, resulting in no improvement in learning outcomes (UNESCO, 2023). It also points out that teachers often feel unprepared and lack confidence in teaching with technology. There seems to be a gap between the wide range of educational technologies available and the didactic use given by teachers.

In the last 20 years, technology has surged into the educational field, particularly in higher education, with the development and distribution of educational content, learning management systems, automatic translation applications, augmented and virtual reality, digital testing, and, more recently, artificial intelligence. But the main question is whether teachers are prepared to use all these tools in the context of an increasingly digital education. The use of technology, particularly in digital education, requests the adoption of specific didactics, giving teachers a different role than the traditional one. This seems to be the most relevant challenge, because since the Covid-19 pandemic there's been a boom in the adoption of digital means and virtual environments in education.

1.1 Digital didactics

Digital didactics has been a concept used to describe the didactics appropriate to digital media, also known as e-didactics or online didactics. Its definition has been subject to constant modifications and updates according to the

area of expertise of the authors defining it (teachers, methodologists, ICT professionals, educational psychologists, etc.). A study conducted by Bezoluk *et al.* (2021) revealed that there is no unified interpretation of the concept of digital didactics in international literature. There is a terminological aspect to emphasize when it comes to digital didactics, linked to the digitalization of education. Bezoluk *et al.* (2021) draw attention to the fact that the digitalization of education is not the same as "digitization," which refers to the use of traditional methods with the help of digital tools, such as online lectures.

According to Tchoshanov (2013), the main difference between classical didactics and digital didactics lies in the transition from teaching to learning engineering. The characteristics of digital education, namely flexible time and space, indirect social interaction, and abundant information resources (Kameneva, 2020; Mello & Barros, 2014), imply a change in the role of the teacher, who no longer simply imparts knowledge but rather becomes an engineer who analyses, designs, and constructs learning and assessment environments and experiences (Tchoshanov, 2013).

This learning engineering presupposes that the teacher-engineer intervenes to create outcome-based, technology-enhanced learning environments that enable students to set their own learning objectives, monitor and assess their own learning progress, develop interactive content and relevant learning experiences through the selection and design of tasks, problems, projects, and activities that incorporate digital tools and ICT resources to promote student learning and creativity, select and develop authentic assessments aligned with learning objectives and content, and use assessment data to improve teaching and promote student learning (Tchoshanov, 2013). This assumption presupposes that the students are considered connected/interactive learners, which is quite different from the traditional conception that distinguished students as passive vs. active. Assuming that students interact with digital content, teachers, and peers through digital means, the didactic conception now has to encompass unlimited open access knowledge. Consequently, the educator must reconfigure their pedagogical practice to become the creator of interactive learning experiences. But, as Bonilla Torres *et al.* (2023) mention, in addition to selecting the most appropriate pedagogical and didactic strategies, it is equally important that the proposals engage all stakeholders to avoid the potential disengagement of participants in the educational process.

The European perspective on the design and understanding of education, particularly concerning digital didactics, differs from the American model of instructional technology/design for higher education. Like Jahnke & Norberg (2013) says "Digital Didactics must critically question everything in the search for such appropriate processes, like the course concept, the isolation principle of teaching, the isolation of teaching and learning from society, the student homogeneity ideal, current forms of grading and feedback, separation of formal to non-formal learning, and designs of learning environments" (p.131).

Authors like Blinov *et al.* (2019) make it clear that digital didactics is not merely digitized didactics. They give the example of the use of digital manuals in schools as an instance of digitized didactics, which adds little beyond a supposed increase in student motivation, extrinsic and short-lived motivation. The authors argue that only "few people understand how to use digital technologies to create the universal and professional competencies necessary for the employee" (p.3). In contrast to the "digitized" didactics, which relies on the omnipotence of digital media, digital didactics uses these tools to solve concrete pedagogical tasks that are relevant precisely for the upbringing of the "digital generation" in the digital society (Blinov *et al.*, 2019).

In this sense, Jahnke & Norberg (2013) argue that digital didactics should be guided by difference in three senses. First, it should focus on student learning, as opposed to self-directed individual learning. Second, it should prioritize institutional effectiveness, enhancing the role of teachers by redefining it. Third, it should emphasize the value of education for society, through increased access and meaningful concepts of lifelong learning, which requires close cooperation with the public and private sectors. The author further acknowledges that Digital Didactics, teaching, and learning are intertwined and form a new educational entity that is difficult to imagine.

A recent study by Bonilla Torres *et al.* (2023) on pedagogical models in higher education mediated by ICT shows that students achieve better academic results with constructivist models (86%), followed by the TPACK model - Technology, Pedagogy, and Content Knowledge (7%) and TELL - Technology-Enhanced Language Learning (7%). The model with the best performance is precisely the constructivist, because it uses technology to situate learning and apply prior knowledge around problems, challenges, or cases through teacher instruction, collaboration, peer teaching, virtual questions, and other methods of interaction within a controlled knowledge application environment. However, the authors also emphasize that it is very important to train teachers in the use of technology to effectively manage the online environments where learning takes place.

The adoption of digital didactic models must take in account aspects like the didactic interactions, between the teacher, student and content, the digital didactic design (learning objectives, learning activities, assessment/feedback) and the didactical conditions, which include the strategic institutional development, curriculum development and an advanced training for teachers (Liu *et al.*, 2020). Only different digital didactic models can transform teaching, contributing to a form of deeper learning, not surface learning only, and can integrate opportunities for learning, where learners expand their thinking beyond consumptive behavior and beyond traditional reproduction of existing knowledge (Jahnke & Norberg, 2013).

To achieve this last component is crucial, since the acquisition of didactic technological competencies should be an integral part of a teacher's professional competency, independently of the subject that teacher teaches (Jahnke & Norberg, 2013; Liu *et al.*, 2020).

2. PH.D. PROJECT OVERVIEW

Within the described context, our doctoral research project - currently ongoing at the University of León, Spain - will seek answers regarding the state of digital didactics utilization in selected HE institutions in Portugal, Spain, and Finland. The issue of digital didactics is a vital topic for the future of digital education and its objectives as outlined, for example, by the European Commission (2020). Preparing citizens and professionals with digital skills is an ambitious project that presupposes alignment among all bodies and agencies active in education and training, governments, democratic societies, and the labour market (European Commission, 2020).

In this sense, the study aims to comparatively and selectively analyze aspects related to the concept of digital didactics, as opposed to digitized didactics, applicable to the phenomenon of digital education, as well as the teacher training programs followed by three HE institutions, and how this digital didactics is being implemented.

2.1 Objectives

The main objective of this research is to compare the variables involved in the choice and use of didactic models in digital education by teachers in three selected HE institutions from Portugal, Spain, and Finland, to be chosen in the near future.

This general objective is divided into three specific objectives.

1. The first objective will be to ascertain and classify the most prevalent didactic models and methods used in digital education in the international literature in a taxonomy based on the criteria traditional/instructive model and active model, identifying, and characterizing the main dimensions of this didactic.
2. Then we intend to understand whether the existing training programs in 3 HE institutions, in the countries under analysis, are adequate and encourage the adoption of active models and methods in digital education and how the skills acquired in teacher training are put into practice. This objective is fundamental to understand the commitment of the higher institutions with the improvement of education processes, particularly to digital education.
3. The third objective will be establishing a comparative difference in the use of didactic models in digital education according to variables linked to teachers (gender, age, professional experience, training, areas in which they teach) and institutions (type of didactic training made available to teachers, and methodological guidelines of the institution).

2.2. Methodology

This doctoral project unfolds in two distinct phases, each corresponding to the adoption of specific methodologies for each phase.

The first phase, where we currently stand, involves a systematic literature review, which will allow us to identify, evaluate, and interpret all relevant research related to the subject under study. By adopting this method, it will be possible to summarize the contributions of the most relevant authors, identify existing gaps, better guide the research, and create a framework/background for developing an original study. In this study, we will use the PRISMA 2020 guideline, not only because it will allow us to better identify, select, evaluate, and synthesize studies but also because it is considered highly relevant for mixed methods literature reviews and recommended for systematically

used systematic reviews (Paige *et al.*, 2021). The systematic literature review will focus on articles published in the last 5 years in journals indexed in the Web of Science, Scopus, Dialnet and Open Research Europe.

The second phase presupposes data collection to enable us to analyze institutional practices regarding teacher training programs in higher education concerning digital didactics and the application of these models and methods in their teaching practice.

To analyze the existing teacher training programs in HE institutions, we will initially utilize the method of document collection and analysis. This will allow us to identify the type of training programs being implemented by the institutions under study and their relevance for the implementation of an active didactic model in digital education.

To analyze the didactic practices used by teachers in the context of digital education, an electronic survey will be prepared and conducted in the three selected HE institutions, one from each country studied. Additionally, a series of key informant interviews on the main research findings and focal points will be proposed. Subsequently, the data collected through the survey and interviews will undergo statistical analysis and content analysis.

FINAL CONSIDERATIONS

In this paper, we've delved into the changing landscape of digital didactics within higher education. We've scrutinized the shift from traditional teaching methods to innovative approaches, crucial for bridging the gap between the abundance of educational technologies and their effective integration into teaching practices.

Our paper highlights the pressing need for educators to adapt and cultivate digital pedagogical principles. The rise of the digital age challenges conventional theories of learning, prompting a reassessment of foundational didactics. The emergence of new digital didactics must not only embrace cutting-edge technologies but also acknowledge the distinct traits of connected learners who excel in interactive and immersive learning environments.

It's vital for educators to develop digital technological competencies as an essential component of their professional growth. This equips them to construct outcome-driven, technology-driven learning spaces that cater to the diverse needs of students.

In conclusion, the transition to digital didactics marks a significant paradigm shift in education. It demands a critical reevaluation of existing didactic models and a concerted effort to devise and implement new teaching approaches aligned with the requirements of the digital education environments. As we navigate this transition, nurturing an educational environment that fosters continuous learning, innovation, and collaboration among all stakeholders is crucial.

We anticipate that studying the didactic models followed by teachers from three HE institutions in Portugal, Spain, and Finland may provide further insights into what has been done in this domain and the challenges that teachers have encountered when trying to implement didactic principles in virtual learning environments.

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